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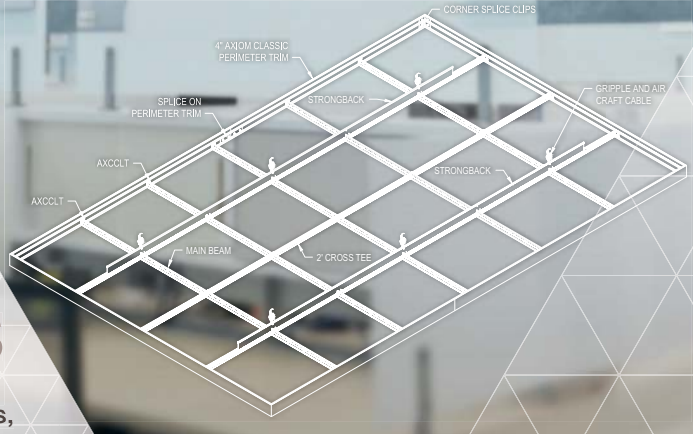

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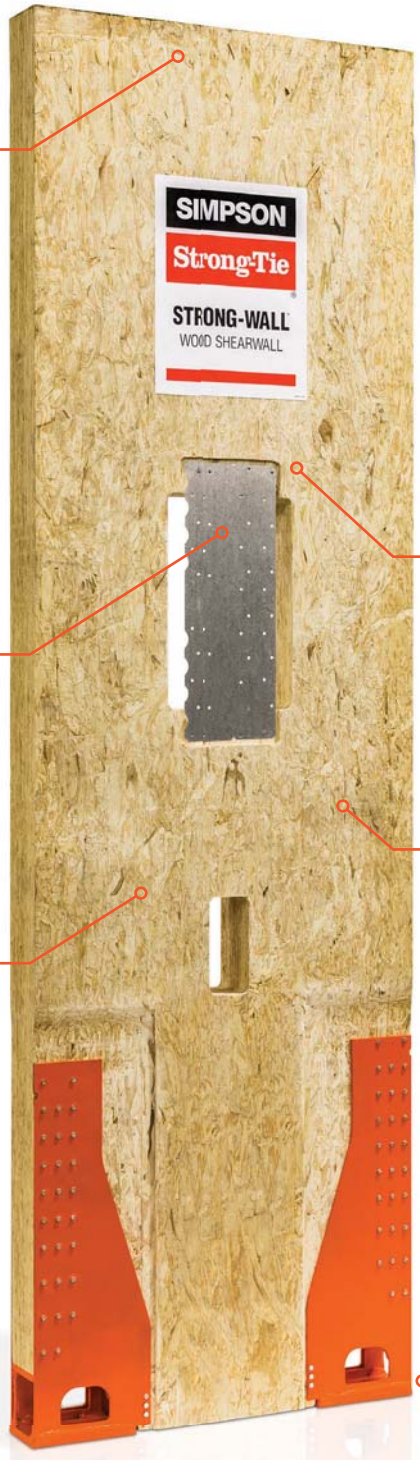

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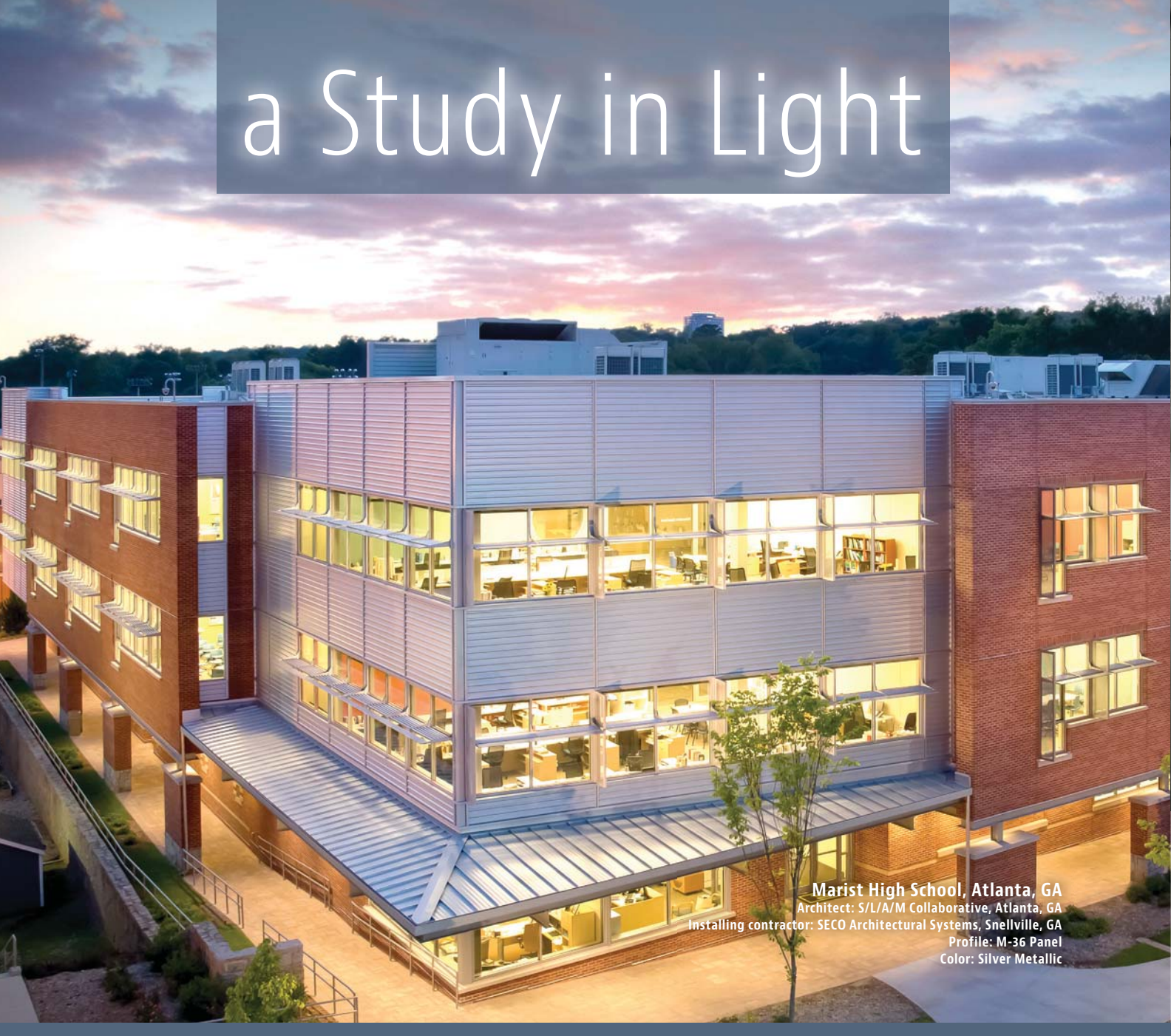
a Study in Light



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feature projects

PUBLIC PRESENTATION

A former printing plant and adjacent administration building are renovated and receive a 35,000-square-foot addition to house fine arts and film at the University of California Berkeley.

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PERUSE EDUCATIONAL FACILITIES FROM AROUND THE COUNTRY:

- Walter Anderson Museum of Art, Ocean Springs, Miss.
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- Gym, San Benito High School, Hollister, Calif.
- Mt. Pleasant Central School District, Thornwood, N.Y.
- Langdell Hall, Harvard Law School, Cambridge, Mass.
- Natatorium, Waukesha South High School, Waukesha, Wis.
- Cardozo Education Campus, Washington, D.C.

cover

COVER PHOTO: **IWAN BAAN**

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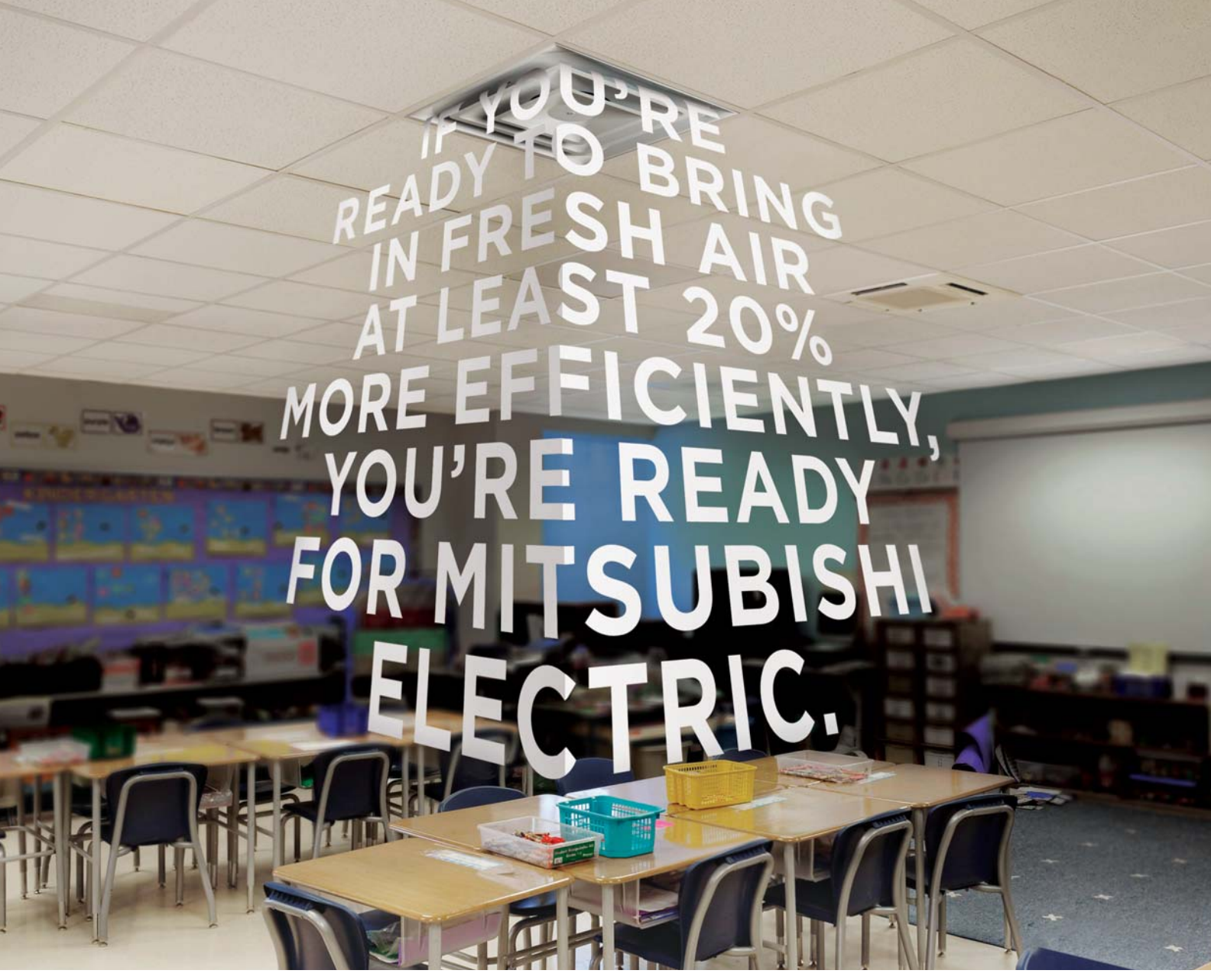

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IT'S NOT POLITICS AS USUAL

My husband, Bart, and I are about to celebrate our first wedding anniversary. I have learned this past year that, in many ways, the first year of marriage is an adjustment period. There have been more good times than bad, fortunately, and today we have a much better understanding of (and deeper love for) one another than we did on our wedding day.

Bart and I knew going into our marriage that we have a lot of differences, which sometimes have created challenges. We root for opposing local sports teams; we like different foods; we prefer different forms of entertainment; and he's a Republican while I'm a registered Independent who almost always votes Democrat.

This last point has been especially difficult in a contentious (I really mean nutso) election year. When Hillary Clinton stumped in our area in January, my mom and I went to hear her speak. My husband didn't speak to me for three days afterward. Bart is a product of his conservative western Iowa environment and he's never had to think differently before. Anyone who didn't agree with his point of view was shrugged off. I was raised in western Iowa, too. My father is conservative, but my mother is from Europe and we traveled extensively when I was growing up, not to mention I lived in Chicago for 14 years. I'm a product of my environment, too.

Although Bart doesn't agree with my political leanings, he realizes he can't just shrug off his wife. He believes I'm smart. And I believe he's smart. We both want what's best for our country and what benefits us personally living in this country. Therefore, we've slowly started having intelligent conversations about our differing views. And guess what happened? We realized our views weren't that different after all! Eureka!

In fact, thanks to Facebook, I found a quiz that underscored our similarities: ISideWith.com. We took the quiz together and found many of our answers were exactly the same on varying issues. The differences appeared when we answered questions relating to how the issues should be handled within (or without) the government. Ultimately, the quiz told us whom we should vote for based on our answers. For us, the real benefit of the quiz was seeing how alike we really are when it comes to the world around us.

Some days, I think we got married at the worst time—right before an election year—because our conversations can get heated. Other days, I think we got married at the best time. We've learned fairly quickly what comments will push the other's buttons. And we've come to respect (and sometimes even agree with) the other's perspective. I like to think this election is making us deeper, more thoughtful people. My husband is obviously thinking that, too. The other night, over dinner, I said, "Congress should shadow us for a month and learn how opposing viewpoints can work together successfully." Bart simply said, "Maybe we'd make them better people, too."

Christina Koch

CHRISTINA KOCH
Editor in Chief

P.S. I wrote this "Point of View" from my completed home office! (See July-August "Point of View", page 12, or retrofitmagazine.com/renovation-project-requires-patience.)

retrofit Wins 2016 Azbee Awards from ASBPE

retrofit is proud to announce it won a 2016 Gold National Award, Gold Regional Award and two Bronze Regional Awards (Southeast) from the American Society of Business Publication Editors.

retrofit won the Gold Regional Award in the "Regular Contributed Column" category for "Trend Alert", which is written by Robert Nieminen. The Gold Regional Award entries went on to be judged at the national level, and ***retrofit*** won a Gold National Award. View the "Trend Alert" entries at bit.ly/2aAu0Be.

retrofit won the two Regional Bronze Awards for design. View the "Cover Story" winner at bit.ly/2aZFYQK and the "Magazine Design" winner at bit.ly/2aJnm8F.

Congratulations to Nieminen, ***retrofit***'s Art Director Vilija Krajewski and the entire ***retrofit*** team!

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CONTRIBUTING WRITERS

Pamela Murray Johnson is vice president of New York-based Skanska USA where she has overseen the construction of several school projects for the District of Columbia Department of General Services, including several modernization projects. In "Business", page 24, Murray Johnson explains how D.C. is renovating schools to be more sustainable and, therefore, budget conscious.

KJ Fields, a Portland, Ore.-based ***retrofit*** contributor, expertly writes about the transformation of a former printing plant and adjacent administration building into the University of California Berkeley Art Museum and Pacific Film Archive in our "Cover Story", page 30. The impressive $112 million project comprises 83,000 square feet of renovation and new construction.

Nathan M. Gillette, AIA, LEED AP O+M, CEM, is director of Natura Architectural Consulting, Grand Rapids, Mich., and a ***retrofit*** editorial advisor. He works with clients to successfully implement and manage energy-efficiency and sustainability projects. As such, Gillette shares insight about the energy-reduction opportunities for today's data centers in "Energy", page 64.

Securing funding internally can be the biggest hurdle to advancing energy-efficiency projects. **Erin Hiatt**, senior manager of Sustainability & Compliance for the Retail Industry Leaders Association, Arlington, Va., explains in "Energy", page 70, how the Herzogenaurach, Germany-based adidas Group overcame this hurdle and has invested $5.5 million in energy projects in the past four years.

Portland, Ore.-based freelance design journalist, critic and architectural photographer **Brian Libby** writes about how a vacant school became the Iredale Mineral Cosmetics Ltd. headquarters in Great Barrington, Mass. Libby enjoyed learning about how the building and landscape blended historic preservation and sustainability without compromising the integrity of either. Read the story in "Transformation", page 76.

Kurt Haapala, AIA, LEED AP, a partner at Mahlum, which has offices in Portland, Ore., and Seattle, built the firm's higher education housing studio into a nationally recognized practice. His enthusiasm for student engagement inspired the renovation of San Diego State University's Zura Hall into a vibrant home for students seeking an authentic SoCal vibe. Read about it in "Multifamily", page 84.

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MODERN RESTROOMS ARE FOCUSED ON WATER CONSERVATION

By Robert Kravitz

Every five to seven years, building owners and managers like to retrofit a facility's restrooms. Today, more areas of the U.S. are focusing on water-conservation efforts because water and sewer charges are increasing around the country. One of the benefits building owners/managers have now is that there are so many water-conserving fixtures available, many of which were not available just a few years ago. In fact, traditional restroom fixtures are not so traditional anymore.

www.retrofitmagazine.com/restrooms-water-conservation

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NEWS

Green Seal Launches Architectural Insulation Standard

Washington, D.C.-based Green Seal has launched its Architectural Insulation Standard (GS-54) to make it easier for the market to identify green insulation products that work and protect human and environmental health. It sets challenging yet achievable requirements that reflect environmental leadership among products currently available or emerging in the U.S. ¶ GS-54 is the only up-to-date insulation standard developed specifically for the U.S. market. Its criteria cover significant impacts across the life-cycle stages of several types of insulation. It also provides a clear and specific guideline for product design. ¶ The major requirements in the standard include: ASTM performance specifications; health and environmental requirements for recovered content, global-warming potential, VOC emissions and restricted substances; packaging requirements; consumer information and labeling requirements for installation instructions, safety procedures, protective equipment, hazard warnings and product stewardship. ¶ The standard covers various products, including blankets, boards, blown-in, foams and reflective insulation. It provides criteria for materials, such as fiberglass, mineral wool, polyurethanes, polystyrenes, cellulose, fabrics and others that provide thermal resistance. ¶ A lack of information available to purchasers and consumers about the sustainability of insulation, growing market trends and the role insulation plays in green building were factors in the creation of the standard. ¶ "More than 40 organizations and professionals concerned about insulation participated in the development of this leadership standard," says Green Seal's President and CEO Arthur Weissman, Ph.D. "These included representatives from the environmental, science and health communities, industry trade groups, manufacturers, purchasers, government, NGOs and academia. This level of involvement suggests there is a real need for this standard's guidelines on what makes insulation products more sustainable." ¶ "Green Seal's insulation standard criteria represent the environmental leadership choices that are currently available to purchasers," adds Ann Blake, Ph.D., an environmental and public health consultant. "This new standard has successfully found the balance between where the industry is and where we would like it to be. These sustainability tools must be practical for mainstream purchasers to take action and to inspire the development of more environmentally preferable options." ¶ Green Seal's certification process based on its standards involves an in-depth review of product data and manufacturing procedures, including an onsite audit of manufacturing facilities. Periodic monitoring is required to maintain certification. ¶ To learn more about green insulation and the health and environmental impacts of insulation, visit www.greenseal.org/insulation. For those interested in a free download of the standard and to apply for certification, visit www.greenseal.org/gs54.

GLOBAL REVENUE FOR ENERGY-EFFICIENCY RETROFITS EXPECTED TO GROW

A new report from Boulder, Colo.-based Navigant Research analyzes the state of the global market for energy-efficiency retrofits in small and medium commercial buildings (SMCBs), including the key market drivers and barriers, as well as market forecasts for revenue segmented by region through 2025.

SMCBs, those ranging from less than 10,000 square feet up to 100,000 square feet, have not seen the same penetration of energy-efficiency technologies as larger facilities because of the lower expenditures on energy management, lack of customer education, perceived high risk of SMCB retrofit financing, and split incentives between the building owner and tenant. However, with the largest commercial buildings already engaged in energy-efficiency retrofits, the focus is expected to shift to SMCBs, which represent the majority of buildings worldwide.

"Energy-efficiency retrofits can improve building performance, reduce consumption and save operating costs," says Christina Jung, research associate with Navigant Research. "Tailored solutions and business models that take into consideration the fact that the SMCB market is diverse and large, consisting of buildings of all ages, sectors and management regimes, will be able to capture the great potential SMCB market holds."

Approximately two-thirds of global buildings' floor space is occupied by SMCBs and more than 90 percent of commercial buildings are small or medium, according to the report. Because most service and technology providers have already focused their marketing and sales on the larger buildings because of the ability to generate more revenue and a shorter return-on-investment period, SMCBs are the next step.

The report, "Energy Efficiency Retrofits for Small and Medium Commercial Buildings", states revenue in the global SMCB energy-efficiency retrofits market is expected to grow from $24.1 billion in 2016 to $38.6 billion in 2025. The study examines the key market drivers and barriers related to energy-efficiency retrofits in SMCBs. It provides definitions related to energy-efficiency retrofits for SMCBs and profiles key industry players. An Executive Summary of the report is available for free download on the Navigant Research website, bit.ly/2aKBo7H.


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ONE SCHOOL at a TIME

WRITTEN BY | PAMELA MURRAY JOHNSON

Washington, D.C., Demonstrates How to Meet Modern Construction and Sustainability Standards Despite Tight School Budgets

The condition and design of school buildings and grounds affect the quality of education and the vitality of the school and its community. To integrate modern educational requirements into existing, often aging schools, school officials must create school modernization plans that carefully weigh the comparative merits of replacing or renovating those schools and balance the preservation of historic character with modern safety and technology.

Successful overhauls incorporate sustainable features, which facilitate high performance from school buildings and reduce operating costs, and serve as the backbone of a school that offers a positive learning environment for students and teachers and can help revitalize entire neighborhoods. Here are some of the sustainable features being used in schools today:

- Variable refrigerant flow or geothermal systems, which lower electric and gas costs.

(continues on page 26)

PHOTOS: SKANSKA USA

HORACE MANN ELEMENTARY SCHOOL, LOCATED IN NORTHWEST WASHINGTON, D.C., IS A 20,000-SQUARE-FOOT FACILITY BUILT IN 1931. IT NOW HAS TWO ADDITIONS TOTALING 37,830 SQUARE FEET, NEARLY TRIPLING THE SCHOOL'S SIZE AND ALLEVIATING OVERCROWDING.

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Under the management of the District of Columbia Department of General Services (DGS), New York-based Skanska USA balanced these factors while completing two recent construction projects for the District of Columbia Public Schools. The best practices applied by DGS and Skanska demonstrate how to produce schools that meet modern construction and sustainability standards and expand educational opportunities despite tight budget constraints within an existing community with needs of its own. The following projects illustrate individualized approaches suited to challenges faced at two different D.C. schools:

HORACE MANN ELEMENTARY SCHOOL

The team designing Horace Mann Elementary School, located in northwest Washington, decided to augment the existing 20,000-square-foot facility built in 1931 with two new additions totaling 37,830 square feet, nearly tripling the school's size and alleviating overcrowding. Skanska was responsible for this multi-phased modernization and expansion of an existing Pre-K through 5 elementary school. The project consisted of first fully upgrading the existing facility during the summer months and then constructing two additional steel-framed buildings with an open atrium entrance, connecting the additions to the existing structure over the course of the next year. Students occupied the school throughout its renovation and the completed school opened in fall 2015.

The two additions to the original building form a "U" shape, which creates a courtyard between the buildings. In the atrium that connects old and new, there is an interior green wall with plants growing on a felt back and trickling water behind it. The extensive curtainwall and generous use of skylights throughout the school flood the space with light and increase the feeling of the school's connection to the outdoor environment.

For athletics and other outdoor activities, the renovated facility includes extensive new landscaping with a relocated basketball court along with a soccer field already in place. A theater was made possible when the creation of an expanded parking lot allowed Skanska to use a retaining wall as the base against which the seating wall was installed. The

ORIGINALLY CONSTRUCTED IN THE 1930s, **LAFAYETTE ELEMENTARY SCHOOL** WAS THE LARGEST ELEMENTARY SCHOOL IN THE DISTRICT AT 113,600 SQUARE FEET AND SERVED NEARLY 700 STUDENTS BEFORE ITS RENOVATION.

P3 Models for School Construction

For many decades, stopgap measures have kept schools running without fixing underlying problems or replacing structures that are beyond their useful life cycle. Budget shortages make it difficult to fund capital improvements, so many districts are looking to harness private-sector expertise and efficiency for school construction, hoping to deliver projects faster and cheaper than through the typical government procurement process.

Although not yet in widespread use in the U.S., the public-private partnership (P3) model has been successful in many other countries. During the past 10 years, a partnership between New York-based Skanska USA and the Bristol City Council in England has delivered 44 separate school projects. It has created places for 10,000 new students and improved the learning environment for more than 13,500 children, as well as for 300 children with additional learning needs. The projects have revitalized existing buildings and constructed new schools to deliver room for new students in the neighborhoods that need it most.

Projects have used innovative solutions to best fit each school's needs. For example, a police station and office block were converted for school use and additional classrooms were placed on a school's roof to save playing fields.

The partnership has been so successful that it was recently extended for another five years to work on more projects.

By transferring risk for financing, design, building, operations and maintenance to a private partner in a P3, schools are able to access upfront funding to deliver projects more quickly and are able to budget accurately for the long term.

These factors make P3 an attractive solution to school districts trying to reconcile tight budgets with vast needs.

area connects to a playground and an outdoor learning area, which was designed to be natural and organic at the request of the community.

The school's rooftop includes potted food-bearing plants grown vertically. Students can work with staff from local organic restaurants and teachers licensed in cooking to learn how to grow their food and then cook meals in a kitchen adjacent to the roof.

The school also utilizes a stormwater management system and uses 100 percent LED lights for energy efficiency. The LEED Gold certification for the project ensures long-term utility cost savings.

LAFAYETTE ELEMENTARY SCHOOL

Skanska and DGS' newest renovation at Lafayette Elementary School is scheduled for completion in time for school in fall 2016. Originally constructed in the 1930s, Lafayette Elementary School was the largest elementary school in the district at 113,600 square feet and served nearly 700 students before its renovation. Community involvement encouraged designers to renovate the historically significant main building and preserve the Georgian brick façade common to the area. A 1970s addition was razed and replaced with one matching the style of the original building, expanding the facility to 120,000 square feet to serve 805 students. A temporary campus was built onsite to accommodate students while the renovation and addition were completed.

Rather than simply sprucing up the existing spaces, DGS; Skanska; and Hartman-Cox Architects, Washington, completely redesigned its layout, putting the cafeteria below grade with skylights to brighten the space and a green roof overhead. Bringing it to the center of the school, they were able to make the flow of students through the cafeteria less disruptive and also save a significant amount in construction costs.

This school's mission also includes an emphasis on integrating the arts into all subject areas. A number of key elements allow students a full arts-integrated learning experience. The design doubled the size of the art/music/physical education

ACTIVELY SOLICITING INVOLVEMENT FROM NEIGHBORS ENSURES THAT SCHOOL PROJECTS RESPOND TO COMMUNITY NEEDS AND VALUES.

facilities and located them closer to the center of the school. The gymnasium was completely renovated.

One of the aspects of the renovation that most interested the community was solving ongoing drainage problems on the school's ball fields, which are heavily used for community sports and recreation. The construction of a cistern and bioretention ponds forms the foundation for an entirely reconfigured drainage plan that will benefit the whole neighborhood in managing stormwater to prevent recurrent flooding.

LED bulbs are used throughout the school, and the outdoor lighting was customized to balance the security of the school with the neighborhood's interest in reducing light pollution. As it is for all of Skanska's projects, LEED certification was planned from the earliest stages, with Gold being the target for Lafayette.

By incorporating sustainable features and retrofitting existing buildings whenever possible in these schools, the design-build teams were not only able to save significantly on construction costs–essential in today's funding climate–but were also forward-looking to significantly reduce energy and water consumption over the whole life of the buildings, providing long-term value to the school district.

Skanska is dedicated to creating long-lasting value for local communities–leaving behind positive legacies that go beyond concrete and steel. Actively soliciting involvement from neighbors ensures that school projects respond to community needs and values. Integrating sustainable-design features make the schools cost-effective over the long term. Based on the idea that quality schools foster strong communities, Skanska works in each project to follow its motto to build for a better society.

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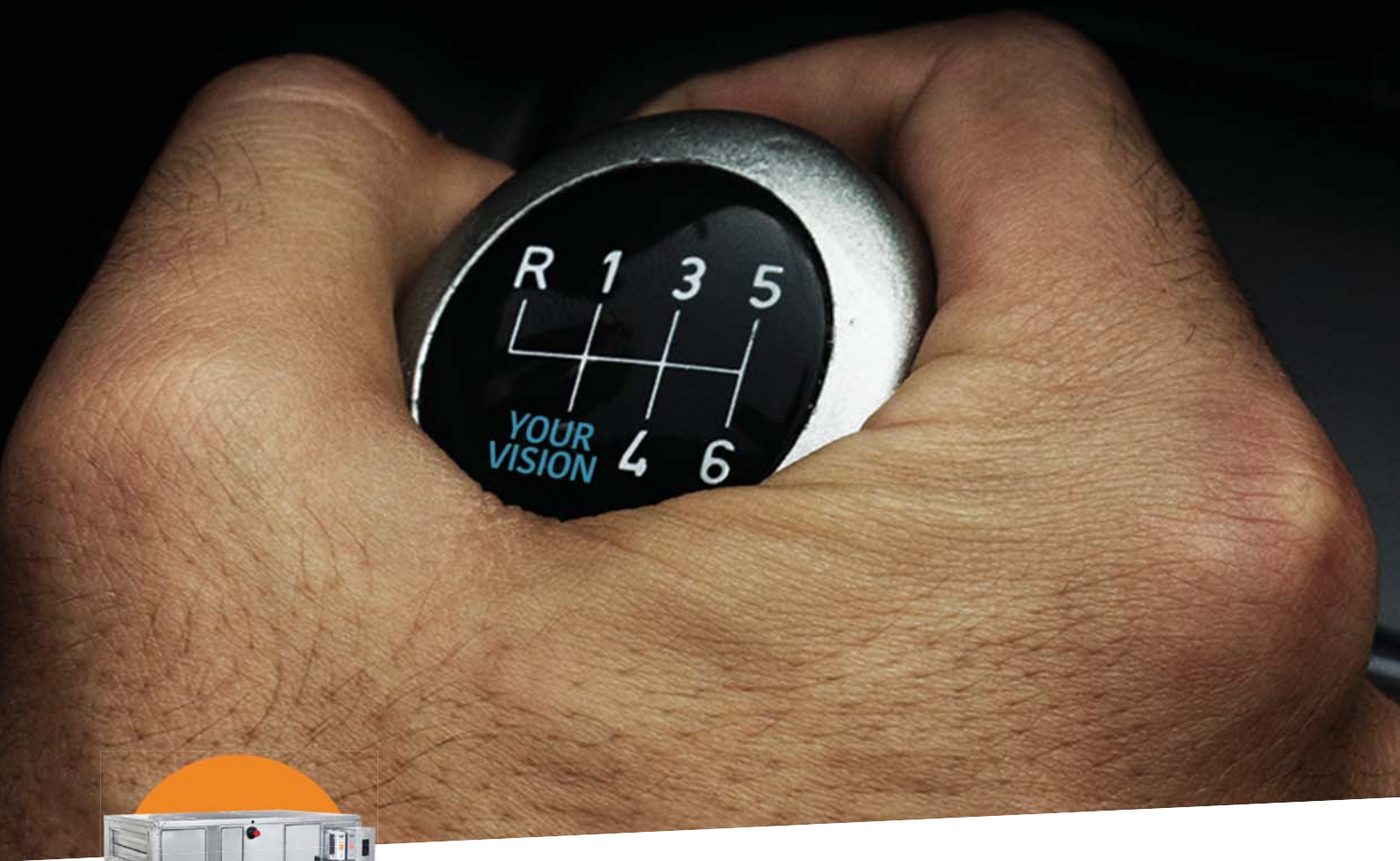

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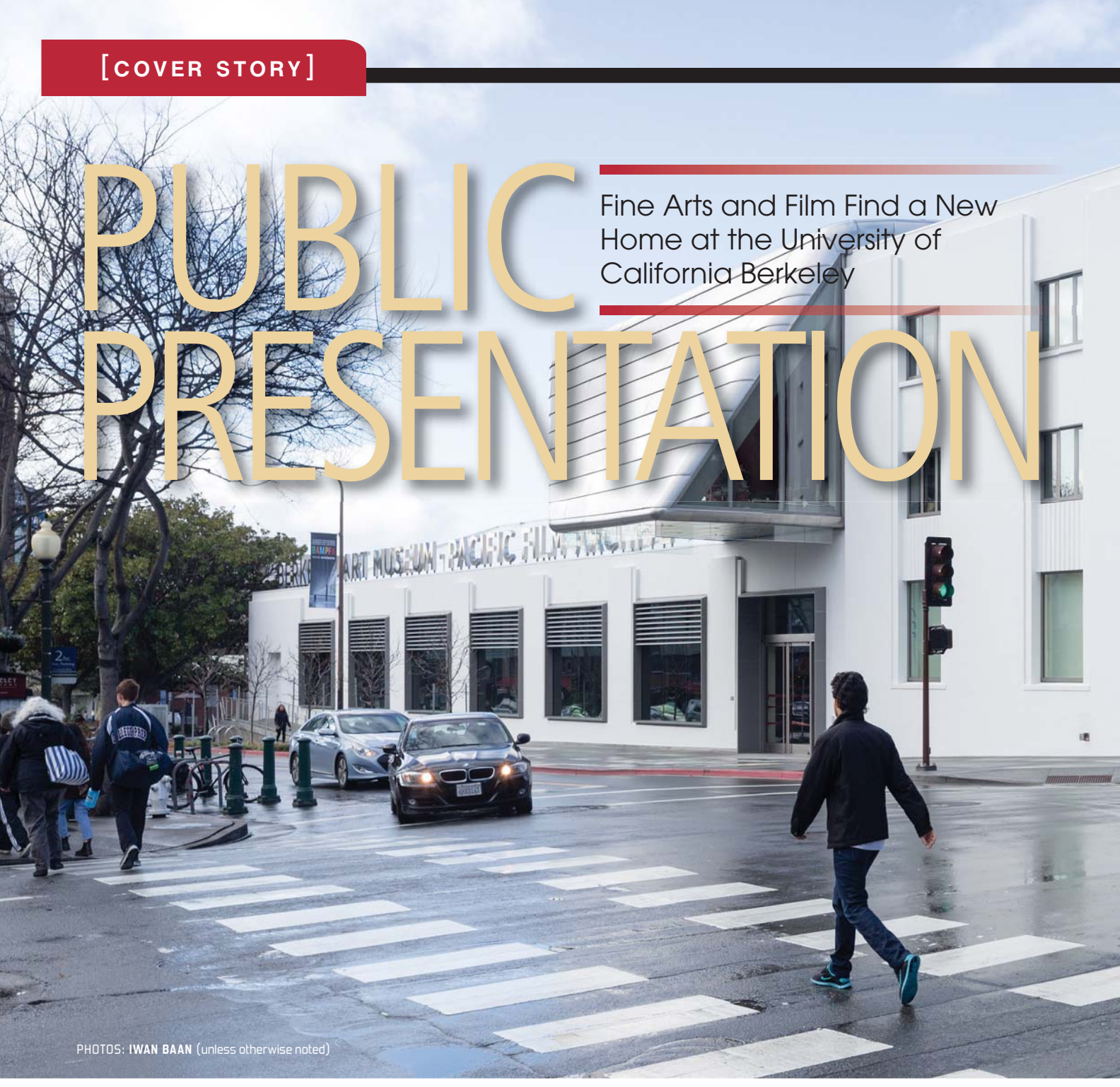
PUBLIC PRESENTATION

Fine Arts and Film Find a New Home at the University of California Berkeley



PHOTOS: **IWAN BAAN** (unless otherwise noted)

[WRITTEN BY | **KJ FIELDS**]

As the caretaker of 19,000 works of art dating from 3,000 BCE and more than 17,500 films and videos, the University of California Berkeley Art Museum and Pacific Film Archive (BAMPFA) honors its mission to inspire the imagination. BAMPFA's collections exhibit history and originality, and its new location vibrantly expresses both of these qualities in architectural form.

Seismic concerns necessitated a move out of the celebrated Mario Ciampi-designed building to the edge of campus in downtown Berkeley. The original concept for BAMPFA's new site was to demolish a printing plant and adjacent administration building—both erected

Although the Art Deco printing plant was not a registered historic landmark, the space held significance as the site where the original Charter of the United Nations had been printed. The community wanted to save the structure and the adjacent administration building as they lent history and human scale to the neighborhood.

PHOTO: **EHDD**

in 1938—and create a 125,000-square-foot replacement. Fortunately, the plan was abandoned because of the economic downturn. Although the Art Deco printing press building was not a registered historic landmark, the space held significance as the site where the original Charter of the United Nations had been printed. "The community wanted to save the buildings as they lent history, historic fabric and human scale to the neighborhood," recalls Duncan Ballash, president and principal of San Francisco-based architecture firm EHDD. "The university embraced the idea and launched a national design competition to reuse the press building and administration buildings in the design."

PHOTO: **EHDD**

> THE **THEATER BUILDING**'S NEW METAL CONSTRUCTION NESTLES AGAINST THE EXISTING BUILDINGS AND PROVIDES A CONTRAST AND EXTENSION OF THE USES, BRINGING THE THREE BUILDINGS TOGETHER.
> *— Duncan Ballash, president and principal, EHDD*

New York's Diller Scofidio + Renfro (DS+R) won the completion and EHDD served as the executive architect on the $112 million project, comprising 83,000 square feet of renovation and new construction.

Selective Exposure

The 14,000-square-foot administration building was kept intact as offices for BAMPFA's director and staff. The 34,000-square-foot press building became art exhibition and display space along with museum amenities. Internal circulation connects the administration and press buildings but the structures are thermally separated by the administration building's existing concrete walls, new insulated walls and doors in the interconnecting stairwells. This strategy allows each space to have its own HVAC system, affording the administration building operable windows and energy efficiency while protecting the art and conservation spaces from temperature swings and humidity.

Ballash says the team identified features of the press building that held historic value and worked well for reuse. Team members determined to save the press building's south-façade and structural steel bents that created a sawtooth roof with a north-facing clerestory. The roof structure, however, was in poor shape.

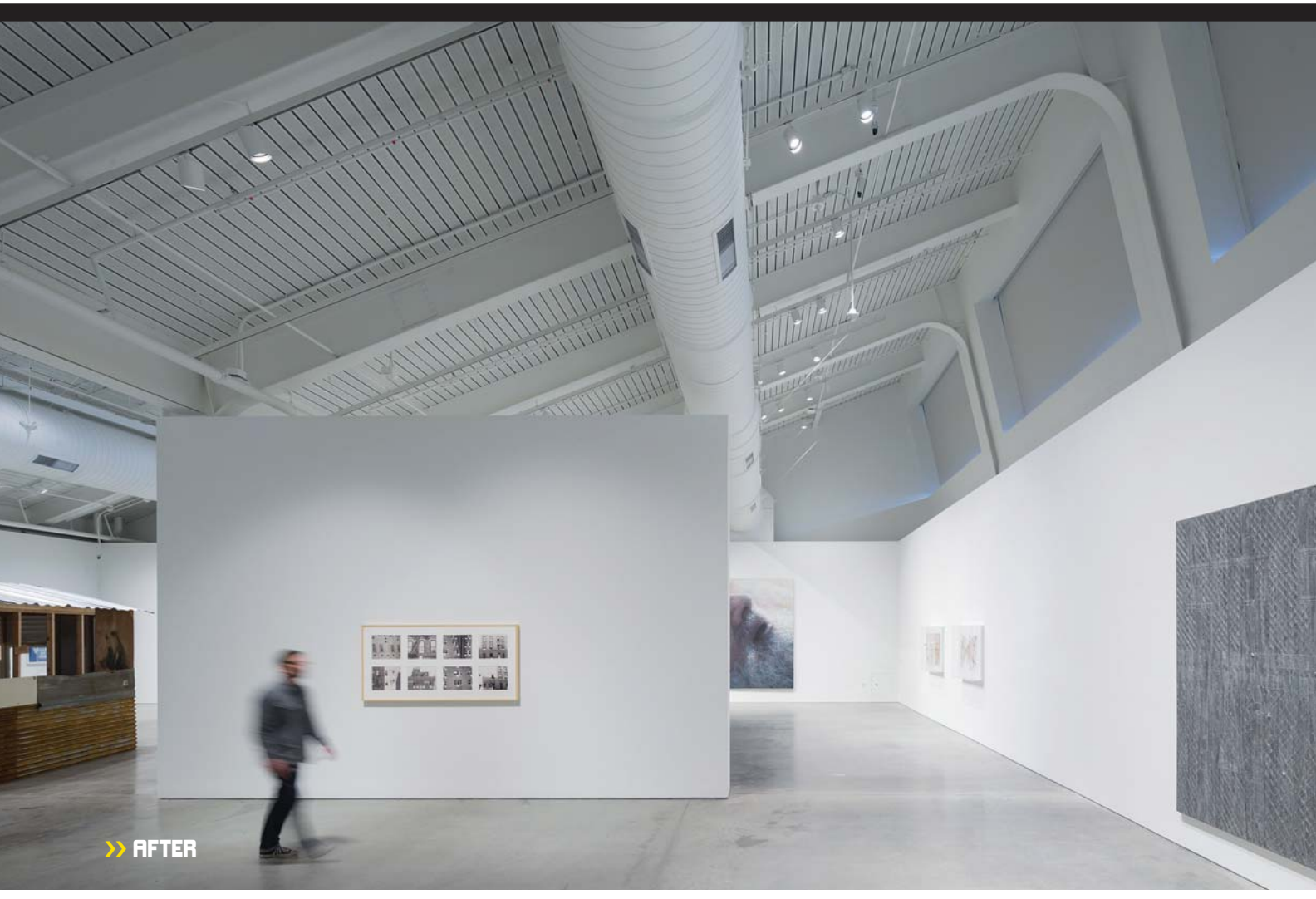
"This building sits a mile and a half from the Hayward fault, and we needed to make it seismically sound," says Nick Morisco, senior associate at EHDD. "We decided to remove the roof and take out the structural steel bents piece-by-piece, then reinstall them." The bents were jackhammered out, cut in pieces and stored offsite. Crews removed lead paint, hammered out dents and then craned the bents back in place to support a new roof.

The press and administration buildings share a foundation but are separate structures with independent systems to resist seismic loads and will each move very differently during an earthquake. Select shear-wall remediation was sufficient to brace the administration building. To create a structurally sound system for the press building, in addition to the new roof, the team installed a new west wall, select shear walls and supplemental steel braces at the clerestory openings.


PHOTO: **KATE STOCKTON**

ABOVE: At the north end of the site, the steel volume terminates with an exterior LED video screen that brings the building façade to life.

LEFT: The stainless-steel shell wraps over the top of the administration building's structure. Team members saved the press building's south-façade and structural steel bents, which create a sawtooth roof with a north-facing clerestory.



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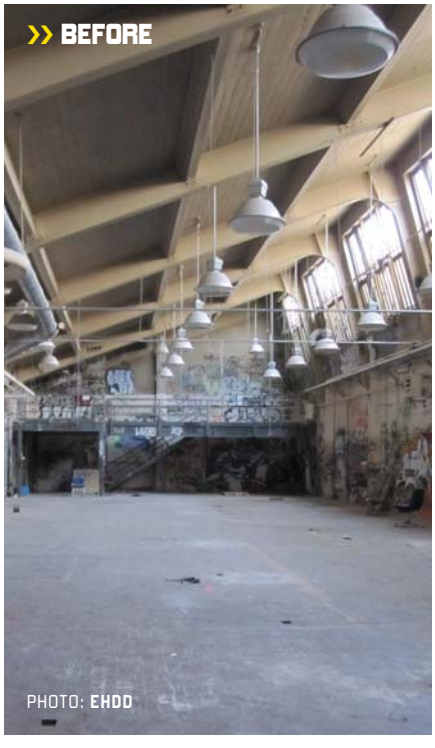


>> BEFORE

PHOTO: EHDD

Because some art is light sensitive, the clerestory windows are equipped with three settings: filtered natural light from the glazing, a shade that can be pulled down to allow for 5 percent natural light penetration and a blackout shade.

Light and Shadow

On the historic south façade along Center Street, DS+R's design removed original glass block windows and expanded the openings with clear insulated glazing to allow natural light to flow into the gift shop, lobby, an assembly performance space and indirectly into the galleries. The large front windows also offer the community views to a 60- by 25-foot interior wall, where international artists will display commissioned murals.

The north-facing clerestory allowed the operators of the original printing press to use natural light and Ballash says it served as the inspiration for converting the former press area into a naturally lit art gallery. "Because some art is light sensitive, we equipped the clerestory windows with three settings: one with filtered natural light from the glazing itself, the second is a shade that can be pulled down to allow for 5 percent natural light penetration and the third is a blackout shade."

Removing the roof and steel bents also facilitated an underground operation that was part of the project. The design created new art galleries tucked beneath the press building and a small portion of the administration building. Reaching below the water table at 27-feet below adjacent grade, the excavation for the galleries occurred within the printing plant's footprint. "We shored the south façade in place while the galleries were constructed underneath, and then we built the press building back in place on top of the new galleries," Morisco

explains. "The administration building was also suspended on impressive shoring during the underground construction."

Addressing issues with the water table was another matter. "We basically created a very robust bathtub to house the below-level galleries," Ballash describes. The "bathtub" began as a gravel layer with piping to convey any water away to be pumped offsite. Pre-applied sheet membrane waterproofing extends horizontally across the site and transitions up the walls. A 4-inch-thick concrete protection slab lays atop of the membrane. The final layer is a mat slab comprised of rebar and concrete ranging from 30-inches to 48-inches thick.

Metal Profile

DS+R's design for the addition placed the 232-seat Barbro Osher Theater inside a stainless-steel shell that wraps over the top of the administration's structure. At the north end of the site, the steel volume terminates with an exterior LED video screen that brings the building façade to life. "The exterior screen is on the backside of the theater's interior screen, reflecting what's happening inside," Ballash notes. "This serves as a marquee for the museum and takes its mission outside to further activate Addison Street, which anchors downtown Berkeley's performing arts district."

The metal spine originates from the south, housing a café space that cantilevers over Center Street and showcases the building's entrance. In addition to its eye-catching form, the draping stainless-steel assembly serves practical applications as an air and water barrier, as well as cladding that sheds water from the building. The metal assembly starts at the interior as a layer of sheet metal with studs on top. The crew placed insulation between the studs before adding another layer of sheet metal. A waterproof membrane covers these layers, which is finished with the stainless-steel cladding in a shingle-style installation.

The team brought Maplewood, Minn.-based MG McGrath Inc. contractors onto the project in the early stages as part of a design-assist process to construct the computer-generated metal form. Composed of 1,382 stainless-steel panels, the

» Retrofit Team

EXECUTIVE ARCHITECT, ARCHITECT OF RECORD // EHDD Architecture, San Francisco, www.ehdd.com

DESIGN ARCHITECT // Diller Scofidio + Renfro, New York, www.dsrny.com

STRUCTURAL ENGINEER // Forell/Elsesser Engineers, San Francisco, www.forell.com

M/E/P ENGINEER // Stantec, Sherman Oaks, Calif., www.stantec.com

FAÇADE AND WATERPROOFING CONSULTANT // Simpson Gumpertz & Heger, San Francisco and Boston, www.sgh.com

SHORING ENGINEER // Degenkolb, San Francisco, degenkolb.com

CONSTRUCTION MANAGER // Plant Construction Co., San Francisco, www.plantconstruction.com

STRUCTURAL STEEL ERECTOR // Glazier Steel, Hayward, Calif., www.glaziersteel.com

STRUCTURAL CONCRETE // Webcor Builders, Alameda, Calif., www.webcor.com

STAINLESS STEEL INSTALLER // MG McGrath Inc., Maplewood, Minn., mgmcgrath.com

Materials

CUSTOM STAINLESS STEEL // MG McGrath Inc., mgmcgrath.com

CUSTOM STEEL MULLION GLAZING SYSTEM // Architectural Glass and Aluminum, aga-ca.com

ROOFING // Sika, usa.sika.com/en/roofing/roofing.html

WINDOWS (ADMINISTRATION BUILDING) // Wausau Window and Wall Systems, www.wausauwindow.com

GLAZING // RankerAMG, rankeramg.com

GLASS // Northwestern Industries, www.nwiglass.com

SKYLIGHTS (HORIZONTAL) // Garibaldi Glass, www.garibaldiglass.com

CLERESTORY // Advanced Glazings, www.advancedglazings.com

ENTRANCES // Dawson Doors, www.dawsondoors.com

COILING DOOR // Barton Overhead Door Inc., bartondoor.com

PAINTS AND STAINS // Sherwin-Williams, www.sherwin-williams.com

SOLID SURFACING // Corian, bit.ly/1U8wba4

RESILIENT FLOORING // Dex-O-Tex (epoxy resinous), dex-o-tex.com

SPECIAL INTERIOR FINISHES UNIQUE TO THIS PROJECT // Knauf Danoline (perforated GWB), knaufdanoline.com

GALLERY LIGHTING // Litelab, www.litelab.com

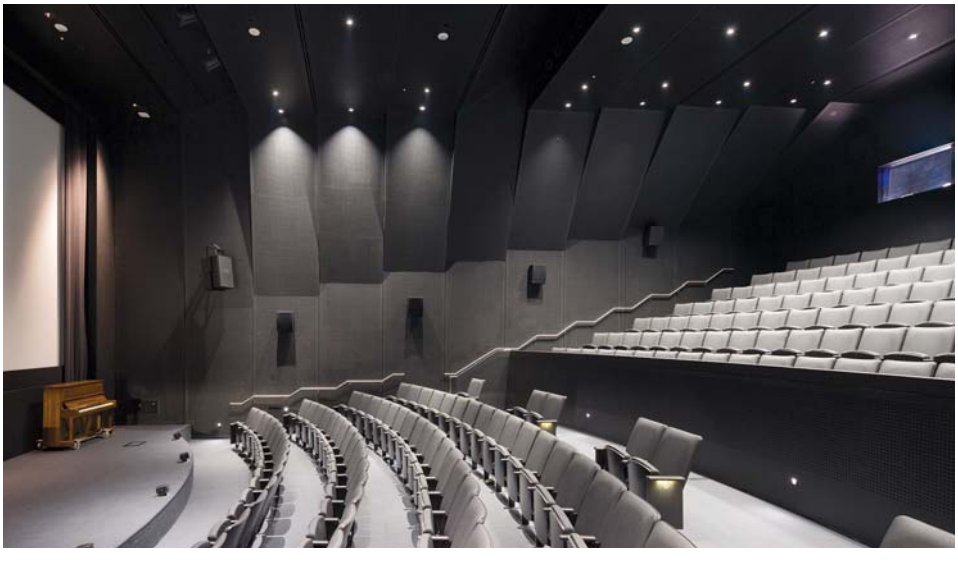
THE PRESS AND ADMINISTRATION BUILDINGS SHARE A FOUNDATION BUT ARE **SEPARATE STRUCTURES** WITH INDEPENDENT SYSTEMS TO RESIST SEISMIC LOADS AND WILL EACH MOVE VERY DIFFERENTLY DURING AN EARTHQUAKE.

complex, curved geometry mandated that each panel be unique. The panels were prefabricated and numbered, then precisely fit together onsite.

"The theater building's new metal construction nestles against the existing buildings and provides a contrast and extension of the uses, bringing the three buildings together," Ballash says. "Inside, the metal form becomes the internal circulation and the connecting spine of the project that pulls the theater, administration and galleries together as one project."

BAMPFA strengthens the theme of integration with film viewing screens throughout the museum. In addition to the Barbro Osher Theater, a smaller theater holds 33 people for intimate screenings. The galleries are flexible, as well, serving as spaces for traditional displays, art research and performing arts.

Re-envisioned vintage buildings combined with a unique contemporary design and the ability to catch glimpses of what's happening inside stimulate the interest of passersby and help BAMPFA further its mission to engage the larger community.



ABOVE: The metal spine originates from the south, housing a café space that cantilevers over Center Street and showcases the building's entrance.

LEFT: The 232-seat Barbro Osher Theater is inside the stainless-steel shell.

WALTER ANDERSON MUSEUM OF ART | Ocean Springs, Miss.

» Materials

The Walter Anderson Museum of Art, or WAMA, is dedicated to the celebration of the works of three brothers: Walter Inglis Anderson, whose depictions of the plants, animals and people of the Gulf Coast have placed him among the forefront of American painters of the 20th century; Peter Anderson, master potter and founder of Shearwater Pottery; and James McConnell Anderson, noted painter and ceramist.

Unfortunately, the existing lighting installed in the '90s, which consisted of incandescent spots and floods and linear fluorescent tubes, didn't showcase the artwork in the way it deserved. As lamps reached their end of life and were replaced, the museum was left with an inconsistent look because of different color temperatures and quality of lighting. "The nuances of the artwork were being lost," says Rosemary Roosa, the museum's executive director. "Therefore, we wanted to install high-quality lighting and a controls system to showcase and preserve the artwork, which includes fragile watercolors, as well as save money and energy."

The new light needed to showcase the beauty of valuable masterpieces while refraining from damaging them.

Mississippi Power, the museum's energy provider, recommended SYLVANIA Lighting Solutions (SLS), an OSRAM Americas company, to evaluate and execute the upgrade. For WAMA, SLS provided a suite of services with a single point of contact, including an audit and survey of the existing lighting system; project management; and design, installation and commissioning of the new energy-efficient lighting and controls solution. Full interior photometric designs with 3-D light rendering for WAMA were developed out of the SLS Design Center, Middletown, N.Y. The one-source approach helped save time, money and energy.

SLS's design experts determined LED and reduced-wattage fluorescent lighting provided the right combination of energy savings, long-life ratings and light quality for the museum's specific needs. "Our museum has high ceilings and a cathedral feel that represents Walter Anderson's spiritual connection with nature," Roosa explains. "This did present issues though when we needed to replace lights. We appreciate the long life of the new lighting will address this problem. In addition, the new LED lamps do not give off the heat our previous lighting did and are free of UV and IR radiation, which also helps preserve the artwork in several of our galleries."

SLS also installed a wireless lighting controls system that allows the museum to save even more energy by automatically shutting off lights when no one is in a room and set specific lighting scenes for events throughout the day.

As a result, WAMA projects an annual saving of 48,333 kWh, translating into $6,798 in energy savings and avoidance of 65,996 pounds

of CO_2 emissions from electricity plants. In addition, because of the long life of the lighting systems, the museum also expects to save approximately $1,349 in maintenance costs per year.

The project consists of the following lamps:

- 207 SYLVANIA ULTRA PRO PAR30 and PAR20 LED Lamps
- 24 SYLVANIA ULTRA MR16 LED Lamps
- Six SYLVANIA ULTRA G25 LED Lamps
- 304 SYLVANIA OCTRON 800 XP XL
- ECOLOGIC 3 T8 Fluorescent Lamps and QUICKTRONIC PROStart Programmed Rapid Start Dimming and Non-Dimming Ballasts
- 198 Juno PAR30 LED Track Heads

LIGHTING MANUFACTURER AND PROJECT MANAGER: SYLVANIA Lighting Solutions (SLS), an OSRAM Americas company, bit.ly/2aN1XLf

» The Retrofit

A visit to WAMA, which opened in 1991, is an enchanting and unique experience. The watercolors, drawings, oils, block prints, ceramics and carvings by the Anderson brothers are represented in the museum's permanent collection.

"Walter Inglis Anderson was an early environmentalist, and we always want to promote harmony between his art and the surrounding coastal environment," says Roosa.

PHOTOS: SYLVANIA LIGHTING SOLUTIONS, AN OSRAM AMERICAS COMPANY

PHOTOS: GUARDIAN INDUSTRIES

FORD PIQUETTE AVENUE PLANT | Detroit

Retrofit Team

WINDOW TEAM: Volunteers led by Art Pope, a former Ford Motor Co. engineer, www.fordpiquetteavenueplant.org

Materials

Guardian Industries Corp. recently completed a long-term donation of glass to help the Ford Piquette Avenue Plant restore its windows.

The last shipment of glass from Guardian's Carleton, Mich., float glass plant will help workers finish 355 windows in the 3-story National Historic Landmark, all of which needed critical repair and restoration. The relationship between Guardian and the Ford Piquette Avenue Plant began in 2011 after a Guardian employee attended an event at the site and saw an opportunity to help.

The Window Team is divided into a Sash Team, Frame Team and Carpentry Team. The teams are following the Washington, D.C.-based National Park Service Secretary of the Interior's Standards for the Treatment of Historic Properties.

"We're 85 percent finished. We're able to do about 30 windows per season," explains Art Pope, a former engineer with Ford Motor Co., who manages the Window Team. "It takes six weeks of Mondays from the time we take the sash out of frame and start the process to fully restoring the sash and the frame and installing the glass."

The Sash Team scrapes and removes the paint, putty and glass; applies a two-part epoxy on porous areas where there are cracks; and sands, primes and applies two coats of paint.

The Frame Team works mostly outside on a lift to scrape the frame and apply that same two-part epoxy. After the epoxy dries, they, too, sand, prime and apply two coats of paint.

If the wood has deteriorated too much on the 100-plus-year-old frames, the Carpentry Team duplicates any parts needed. They also make transom windows and have built doors and sliding windows at the visitor service desk. Another significant contribution by the Carpentry Team was to repair the fire escape on the east side of the building. In the original building design, people would have exited out the window to the fire escape. Current fire code required the renovated building to replace the window with doors. Therefore, the Carpentry Team designed doors that look like windows, complete with Guardian Glass.

The three teams are composed of 22 people. About 15 to 18 volunteers work every Monday—April 1 through the week of Thanksgiving. The majority of workers are Ford retirees, schoolteachers and General Motors retirees.

"We work 8:30 a.m. to 2:30 p.m. with a break at 10 a.m. for coffee and doughnuts and to solve the world's problems," Pope explains. "We also have an annual breakfast the first Monday of December, when we award the MVP of the year. There is a lot of good camaraderie.

"Guardian has given us plenty of glass," he continues. "Guardian also invited us to Carleton to see how glass is made. We were very impressed with that."

"To me, what is remarkable about the Window Team is that they built their own factory in the plant on the second floor," says Nancy Darga, executive director of the Ford Piquette Avenue Plant. "They developed a window manual. They experiment with wood fungicide and report back the results to Sherwin-Williams. Our success in making this National Historic Landmark weathertight is a result of the dedication of these men and women, who were recognized by the MotorCities National Heritage Area with the 2015 Award of Excellence in the preservation category."

GLASS MANUFACTURER: Guardian Industries, www.guardian.com

The Retrofit

The Ford Piquette Avenue Plant is the first building built and owned by Ford Motor Co. Eight different automobile models were produced between 1904 and 1910, culminating with the world-changing Model T. The first 12,000 Model T's were built at the Piquette plant.

The semi-abandoned building was purchased in 2000 by the Model T Automotive Heritage Complex, a non-profit corporation dedicated to the preservation of the Piquette Plant. Now a National Historic Landmark, the plant has become a major tourist attraction, welcoming thousands of visitors annually.

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HAWKINS FIELD, VANDERBILT UNIVERSITY | Nashville, Tenn.

» Materials

The home field of the Vanderbilt University men's baseball team now features an advanced LED system designed to enhance the viewing experiences for spectators while reducing energy use by as much as 75 percent.

The new LED system features Ephesus Stadium Pro lights and a DMX control system, which enables dynamic fan experience effects and increases operational flexibility. The lights at Hawkins Field have instant-on capability, eliminating the warm-up period associated with more traditional metal-halide lighting products.

The Ephesus LED lighting system's fixtures shine uniformly on the playing surface, creating a better stage for players and fans in the stadium and those watching on high-definition television. The versatility of an LED system also allows for operational flexibility and the creation of programmable light shows for fan entertainment.

LED LIGHTING MANUFACTURER:
Eaton's Ephesus Lighting,
www.ephesuslighting.com

» The Retrofit

For more than a decade, Vanderbilt University has had one of the nation's most successful baseball programs. The team entered the 2016 season ranked No. 7 by Baseball America and inside the top 10 in all of college baseball's most respected pre-season polls. Head Coach Tim Corbin has compiled a 567-271 record in his 14-year tenure, including consecutive appearances in the College World Series, finishing as runner-up in 2015 after being crowned national champions in 2014.

The Commodores opened their 2016 season under the LED system on Feb. 19 against the University of San Diego. "Our new LED lights make Hawkins Field an even better place to play and watch a game," says Kevin Colon, associate athletic director, Vanderbilt University.

PHOTO: JOHN RUSSELL, VANDERBILT UNIVERSITY ATHLETICS

Spectacular restoration overcomes tight schedule and window replication challenges.

Sitting high on a hill, Cardozo Education Campus has overlooked our nation's capital since 1916. But thanks to an ambitious renovation, which resulted in LEED Silver recognition and featured more than 1,000 historic replication windows from Graham, it's still sitting pretty. The building's inclusion on the National Register of Historic Places and the need for National Park Service (NPS) approvals made the window portion particularly challenging. Despite a tight timeline, Graham came through.

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GYM, SAN BENITO HIGH SCHOOL | Hollister, Calif.

» Retrofit Team

ARCHITECT: Aedis Architects, San Jose, Calif., www.aedisarchitects.com

» Materials

When it came time to replace the gym's 40- by 40-foot skylight, Henrik W. Malinowski, AIA, senior project manager for Aedis Architects, specified one that could give off the right amount of light for every event: IntelaSun Controlled Daylighting. The dynamic shading system adjusts based on the angle of the sun and user-controlled settings. IntelaSun balances light levels and eliminates solar heat gain and glare throughout the day. The system can be programmed to be fully automated or it can be operated manually from a wall-mounted control. When completely open, the light transmission in the gym is 66 percent while closing the blades reduces the light transmission to 3 percent.

"We were specifically drawn to its ability to darken rooms via built-in 'intelligent blades'," Malinowski says. "San Benito will use this feature a lot during video projections and other events where room darkening is desired."

IntelaSun's series of rotating internal louvers, called SolaBlades, are completely shielded from the weather and outside elements, sandwiched between two panels, minimizing maintenance and maximizing lifespan.

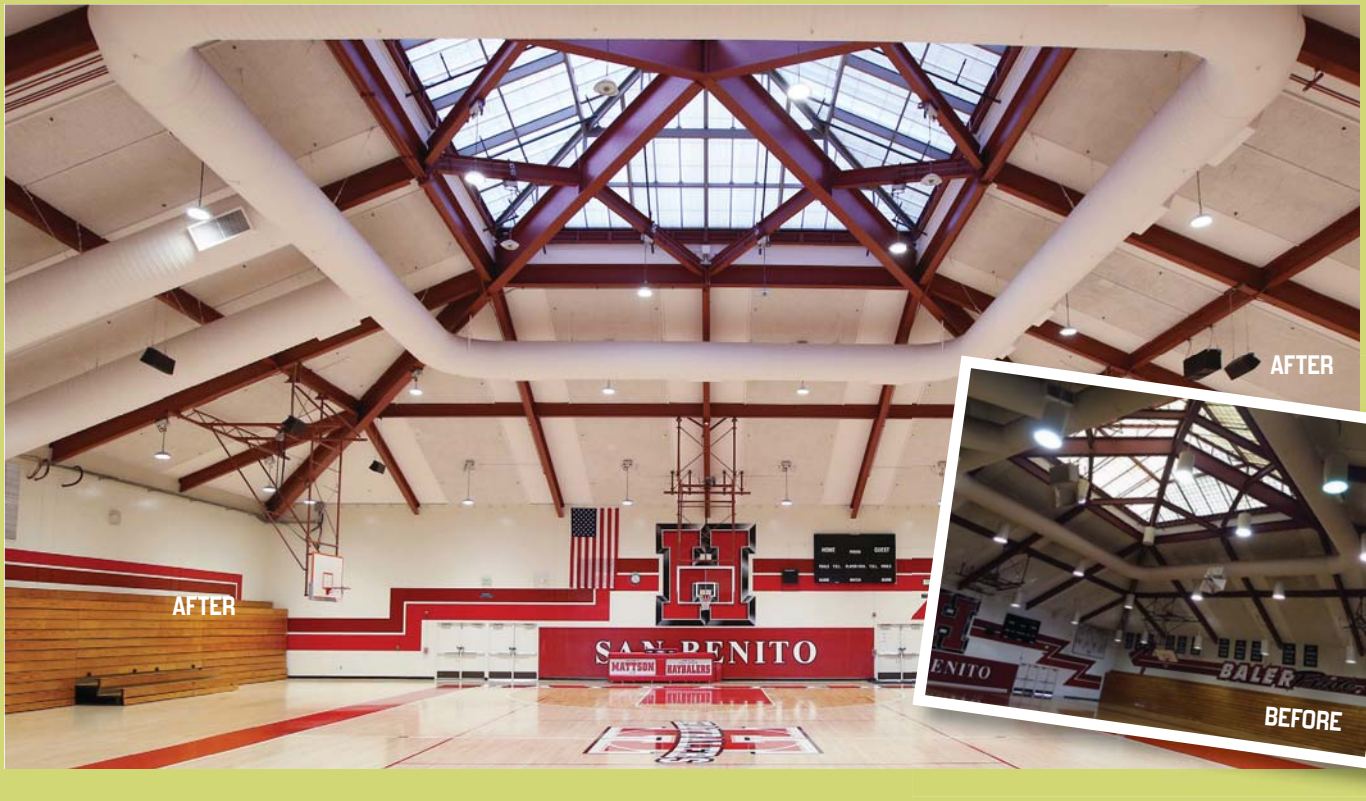
Beyond the daylighting benefits, installation of the IntelaSun skylights at San Benito High School helped the high-school renovation project stay on budget.

INTELASUN SKYLIGHT MANUFACTURER: CPI Daylighting, www.cpidaylighting.com

» The Retrofit

The gym serves a number of different functions, from school sporting events to daily lunch periods and all school assemblies. Therefore, it requires a number of varying light levels.

PHOTOS: CPI DAYLIGHTING



PHOTOS: LIGHT EFFICIENT DESIGN

MT. PLEASANT CENTRAL SCHOOL DISTRICT | Thornwood, N.Y.

» Materials

School district officials had tolerated significant problems with shadows and darkness during nighttime sporting events held in their schools' gymnasiums. Opposing teams complained about the unusually dark conditions. Coaches and physical-education teachers noticed disadvantages for the home teams. Night games were full of confusion because of the players' inability to track balls and plays.

Ed Kear, the district's facilities director, decided to explore some alternative lighting for the gyms. Kear replaced 50 400-watt lamps with LED-8030 150-watt replacements within the high-school gym and two elementary school gyms. "After considering material and labor costs, I decided to install the retrofit lamps," Kear says.

LED RETROFIT LAMPS MANUFACTURER: Light Efficient Design, www.led-llc.com

» The Retrofit

The energy-saving retrofit lighting upgrade within the high-school gym alone saved the school district more than $8,000 per year. Coaches, teachers and other administrators agree the consistent nighttime gymnasium lighting has been a phenomenal transformation. School staff has noticed better total illumination and overall color when comparing the lights before and after. And the school district no longer receives complaints regarding its gym lighting.

Mt. Pleasant Central School District is so pleased with the easy change that administrators plan to upgrade the middle school and parking lot with Light Efficient Design's lamps. "The installation was straightforward," Kear notes. "We are very happy with the installation and performance of the Light Efficient Design LED-8030 lamps."

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JOSH BOLTINHOUSE, AIA, LEED AP | LAMBERT ARCHITECTURE + CONSTRUCTION SERVICES

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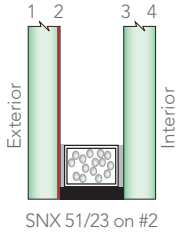

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LANGDELL HALL, HARVARD LAW SCHOOL | Cambridge, Mass.

» Retrofit Team

ARCHITECT: Baker I Wohl Architects, Boston, www.baker-wohl.com

GENERAL CONTRACTOR: Consigli Construction Co. Inc., Milford, Mass., www.consigli.com

ROOFING CONTRACTOR: Titan Roofing, Springfield, Mass., www.titanroofing.com

ENVELOPE CONSULTANT: Simpson Gumpertz & Heger, Boston, www.sgh.com

» Materials

The building required extensive repairs to the roof and limestone parapets to address water damage and leakage that had occurred over the years because of cracked mortar and inadequate drainage. The roof restoration included replacement of multiple types of roofing systems, including built-up, metal standing seam and PVC membrane, as well as significant parapet flashing. A total of 24,750 pounds of copper and 0.8 acres of PVC rubber were installed over the expansive roof. Copper, which was selected for its aesthetics, durability, ease of maintenance and longevity, also helps preserve Langdell Hall's original appearance and retain the integrity of the building's historical character.

Prior to installation of the finished roof, a mock-up installation of the copper roof was executed and reviewed by the design team. The mock-up included all details that would occur in the project. All sheet-metal workers were required to complete an installation test. Simpson Gumpertz & Heger approved each worker prior to starting on the project.

Standing-seam and flat-seam copper panels were installed to replace existing copper panels and maintain historical integrity of the original design. New copper panels were 22-gauge thickness in lengths varying from 19 feet 5 inches to 9 feet 10 inches, 20 ounces per square foot. Standing-seam height was 1 1/2 inch with 20 3/4-inch panel width (standing seam to standing seam) with exposed mill finish. Approximately 1,400 linear feet of zinc-coated copper, also known as "Freedom Gray" parapet coping cap, was installed at the perimeter.

Before the copper panels could be installed, extensive masonry repairs were completed on the head houses.

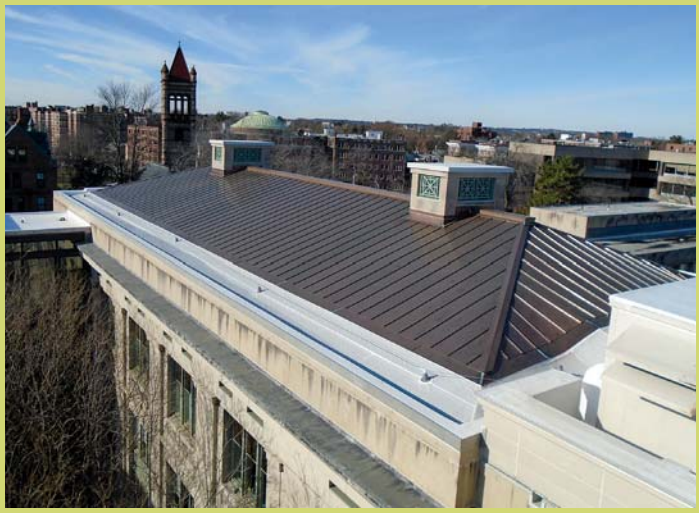
COPPER MANUFACTURER: Hussey Copper, www.husseycopper.com

» The Retrofit

Named for Harvard's first Dean of the Law School, Christopher Columbus Langdell, the facility was initially built in 1907. Northern and western wings were completed in 1929. Langdell Hall is home to the largest academic law library in the world, containing more than 2.3 million volumes and 300,000 rare books.

Located in the heart of Harvard Law School's campus and adjacent to Cambridge's historic district, the roofing project was completed in four phases, complying with the city of Cambridge's historic codes. Harvard Law's library remained open during the roofing project.

The roof replacement, which revitalized this iconic neoclassical building, received a 2016 North American Copper in Architecture Award bestowed by the New York-based Copper Development Association Inc.



PHOTOS: **MATHEW KUZMIK**

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PHOTOS: OPTEC LED LIGHTING

NATATORIUM, WAUKESHA SOUTH HIGH SCHOOL | Waukesha, Wis.

By Jeff Gatzow

» Retrofit Team

LIGHTING SUPPLIER: Hein Electric Supply Co., West Allis, Wis., www.hein.com

» Materials

The natatorium originally was designed with a metal-halide indirect lighting system to reflect light from the ceiling to minimize glare on the water's surface. Over the years, the ceiling and walls darkened because of deteriorating light levels and fixtures burning out, creating a cave-like atmosphere. Replacing the burned-out fixtures was so challenging they were typically left until there were enough to warrant bringing out the lift.

Tom Cherone, master electrician, Waukesha School District, knew the lighting system needed improvement. Through Hein Electric Supply, Cherone learned about retrofitting the existing lighting system with LED high-bay luminaires to improve illumination quality, safety and security while reducing energy costs and consumption.

In a one-for-one replacement, 42 1000W metal-halide fixtures were replaced with 240W LED high-bay luminaires and eight 36W fluorescent tubes were retrofitted with 80W LED high-bay luminaires.

"The new lights are terrific," Cherone says. "They strike instantly, provide more lumens than our old lights, will last for years and are cost effective. When all the fixtures are on, we're saving an astounding 70 percent in energy over the previous lights."

Because they emit less heat than the metal-halide fixtures, the school will be able to run the air conditioning less in the summer months, further reducing the energy bill.

Additional power savings are achieved from turning off the fixtures when not in use. The previous lights were left on continuously because they took so long to warm up to full brightness.

"At swim meets, I used to apologize to the visiting teams because it was so dark," explains Blaine Carlson, CEO/head coach for the Waukesha Express Swim Team. "With these new lights, I think we can even attract additional meets to this facility."

LIGHTING MANUFACTURER: Optec LED Lighting, www.optecledlighting.com

» The Retrofit

South High School is Waukesha's oldest high school, opening in 1957. Today, the 1,460 students use a swimming pool complex that was rebuilt in 2005, replacing a smaller and much older pool, spectator and locker-room facility. The 27,000-square-foot natatorium is larger than in most schools, accommodating nearly 2,000 spectators.

Cherone is so pleased with the reduction in maintenance, energy savings and consumption, and the dramatic improvement in light quality that he's planning to replace all the metal-halide lights in the district's schools' pools with LED high-bay luminaires.

In addition to upgrading the natatorium lighting, the district is implementing an exterior lighting program for the schools' parking lots, saving the district more money and, most importantly, improving security through better light levels.

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Circle No. 30

CARDOZO EDUCATION CAMPUS | Washington, D.C.

» Retrofit Team

ARCHITECT: Hartman-Cox Architects, Washington, www.hartmancox.com

WINDOW INSTALLER: Heavy Commercial Windows, York, Pa., (717) 792-3374

» Materials

The renovation project involved the complete modernization of 355,400 square feet of existing historic infrastructure and a 42,000-square-foot gymnasium addition.

Adding to the renovation's strikingly fresh appearance are 1,100 windows—a mix of Series S2200 double hung, Series S6800 fixed, and Series S6500 casement and fixed windows.

The building's inclusion on the National Register of Historic Places and the need for Washington-based National Park Service approvals made the window portion particularly challenging.

The design team relied heavily on Graham Architectural Products, the window manufacturer, because it specializes in historic windows, AW-rated historic replication windows. Randy Boardman, window design consultant, designed a workable solution and the manufacturing team was able to overcome a tight timeline, which for design and construction was 18 months.

"It was a very historic job with a tight schedule …, so everybody worked together to pull it out," says Keith Walter, president of Heavy Commercial Windows.

WINDOW MANUFACTURER: Graham Architectural Products, www.grahamwindows.com

» The Retrofit

The District of Columbia's longest continuously operating public high school is a landmark in a city full of them. It sits on a two-square-block parcel high on a hill with breathtaking views of our nation's capital and its monuments.

Built a century ago and designed by William B. Ittner, referred to by one author as "the most influential man in school architecture in the United States", time had taken a toll on the building. The District of Columbia Public Schools had not been able to maintain the building, all of which makes its recent renovation one of the more remarkable comebacks in a city that has seen its share.

The school has undergone a dramatic renovation, reopening its doors as a LEED Silver school. The completed project was so extraordinary, the District of Columbia Historic Preservation Office/ Office of Planning gave it the Historic Preservation Review Board Chair's Award, citing "its exceptional design work in restoration, rehabilitation and new construction affecting historic District property".

PHOTOS: GRAHAM ARCHITECTURAL PRODUCTS

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Circle No. 31

GOLDFISH SWIMMING SCHOOL | Wyckoff, N.J.

Retrofit Team

GENERAL CONTRACTOR: Mosher Dolan, Royal Oak, Mich., www.mosherdolan.com
CONSULTING ENGINEER: Mechanical Electrical Engineering Consultants (MEEC) PC, Plymouth, Mich., www.meeci.com
MECHANICAL CONTRACTOR: Comfort Control Systems, Haskell, N.J., www.ccsysinc.com
ENERGY-RECOVERY CONSULTANT: ThermalNetics, Auburn Hills, Mich., thermalnetics.com
ARCHITECT: Krieger Klatt Architects, Royal Oak, kriegerklatt.com

Materials

Because 90 percent of Goldfish Swimming School franchisees locate their businesses in existing buildings, envelope build-outs and humidity control are essential to success. The tendency for outward moisture migration during winter and inward during summer creates construction challenges for any space not originally built for an indoor pool's humidity, vapor pressures and temperature. Little can be done once an indoor pool space is built and underperforms in humidity or temperature control.

Traditional construction methodology recommends building out a structure's exterior wall with insulation and façades; however, Mosher Dolan builds steel-stud walls inward for Goldfish Swimming School natatorium construction. The interior wall, which is built inward 10 to 12 inches, allows for an air buffer zone, insulation and a vapor barrier, the latter of which seamlessly envelopes the walls, ceiling and floor. "The more a building is constructed outward, the more issues arise with structural-steel integrity, masonry loads and air-infiltration opportunities," explains Steve Marszalek, Mosher Dolan construction advisor. "Mechanical dehumidification equipment is essential to humidity control in spaces like indoor pools, but the building's construction materials and techniques are equally important."

For the schools' build-outs, MEEC specifies a 10- or 12-ton NE-Series dehumidifier. The unit heats, cools and dehumidifies the swimming space to 92 F and 55 percent relative humidity while using heat recovery to efficiently provide free 90 F pool water heating. "The space and water temperatures, which are about 10 degrees higher than more conventional indoor pool rooms, make the building envelope and dehumidification extremely critical for success," says William Vernier III, P.E., LEED AP, MEEC senior engineer.

ThermalNetics typically sizes the dehumidifier based on the 25- by 75-foot pool's pounds of moisture per hour removal requirement to maintain 55 RH. Dehumidifier sizing also depends on the ASHRAE Standard 62.1 requirement of four to six volumetric air changes per hour. "Many equipment suppliers tend to calculate cfm as per wet deck area, which is typically 2- to 4-feet wide around the pool surface perimeter," Vernier notes. "Our calculations follow the ASHRAE code, which requires 0.48-cfm per square foot for deck and pool area."

The dehumidifier's coils are dipped in a corrosion-resistant coating, and the refrigeration circuit uses pressure transducers for optimum compressor operation. Mosher Dolan recommends franchisees take advantage of the dehumidifier's occupied and unoccupied modes for additional savings.

As a back-up, MEEC also specifies an in-duct heater on the outdoor air intake when outdoor ambient air temperatures fall below 35 F. A 260-MBH gas-fired condensing boiler mixes air and makeup air to a discharge temperature of 100 F. Without the auxiliary heat, which is supplied through an auxiliary back-up hot-water coil, winter discharge temperatures and the large amount of required outdoor air can drop discharge temperature as low as 55 F. A second 400-MBH boiler is used for fast pool water heating required after pool maintenance dump-and-fills. Conventional high-efficiency HVAC rooftop systems condition the separate offices, reception, changing room and other dry areas.

To maintain environmental control, each location uses WebSentry technology, a proprietary web-based, automated remote-monitoring program that allows authorized personnel to access the unit's Command-Center onboard microprocessor via a computer or smartphone. Using real-time data along with historical recording and alarm features, Goldfish Swimming School's technical staff can monitor dehumidifiers for optimum operational conditions, efficiency and ensure long-term energy savings and indoor air comfort.

INDOOR POOL DEHUMIDIFIER, HVAC EQUIPMENT, AUXILIARY BACK-UP HOT WATER COIL AND WEBSENTRY MANUFACTURER: Seresco USA Inc., serescodehumidifiers.com
IN-DUCT HEATER MANUFACTURER: Markel Products Co., www.markel-products.com
BOILERS MANUFACTURER: Lochinvar, www.lochinvar.com

The Retrofit

The newest swim school location is in a 10,400-square-foot storefront and features a 4-foot constant-depth gunite pool. Like all Goldfish build-outs, the former retail space is outfitted with an inner wall, insulation, vapor barriers and other methods to prevent humidity and pool chemical air exfiltration into the neighboring Mexican restaurant and Marshall's anchor store.

PHOTOS: SERESCO USA INC.

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[1]Smart phone or tablet must be connected to the internet.

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Circle No. 32

DETROIT INSTITUTE OF MUSIC EDUCATION

Retrofit Team

CONSULTING ENGINEER: Peter Basso Associates Inc., Troy, Mich., www.peterbassoassociates.com
MECHANICAL CONTRACTOR: Complete Mechanical Contracting Inc., Westland, Mich., (734) 729-5599
GENERAL CONTRACTOR: Sachse Construction, Detroit, www.sachseconstruction.com

ARCHITECT: Neumann/Smith Architecture, Detroit, www.neumannsmith.com
SHEET-METAL CONTRACTOR: Ventcon, Allen Park, Mich., ventcon.com
HVAC CONTROLS INSTALLER: Michigan Environmental Controls Inc., New Hudson, Mich., mecbuildingcontrols.com

PHOTOS: RECTORSEAL CORP.

Materials

The light-load-bearing capacity of a 19th century timber roof dictated an innovative HVAC retrofit specification for a historic downtown building renovation. After considering a myriad of conventional HVAC methods, George Hopkins, principal of Peter Basso Associates, chose comparably lighter-weight variable refrigerant flow (VRF) technology and unique rooftop equipment mounts with footings for strategic weight distribution. Both technologies also minimized roof penetrations from ductwork, curbs and more conventional labor-intensive fabricated I-beam supports, which ultimately saved tens of thousands of dollars.

To offset the roof's weight-bearing limitations, the Peter Basso Associates team specified Big Foot Systems tubular, corrosion-resistant, hot-dipped galvanized modular steel equipment mounts. They support seven groupings of 20 CITY MULTI Series VRF condensers, ranging up to 325,000 Btu. The VRF condensers provide refrigerant to 39 fan coils that supply the majority of air conditioning and partial heating through open architectural ceiling, rectangular metal ductwork.

The equipment mounting system's 12- by 12-inch-square anti-vibration nylon footing pads were strategically positioned over roof joists to preserve the roof's structural integrity while supporting the VRF units' distributed weight. The pads' anti-vibration attributes are critical in minimizing noise transmission to the rehearsal and performance spaces, as well as the third-floor recording studio. "The anti-vibration feet allowed us to eliminate the expense of conventional spring isolators and other equipment," Hopkins says.

Custom-designed for the project by the manufacturer's in-house team, the equipment mounts saved the venture 30 percent in installation labor and materials versus traditional mounting methods, according to Robert Smith, project manager, Complete Mechanical Contracting.

Furthermore, the adjustable legs provided easy equipment leveling without the use of shims to accommodate the building's roof slope of approximately 1 inch per foot. When the building is reroofed someday, roofing surfaces can be replaced underneath one leg at a time while the other three legs allow the units and piping to remain connected and functional.

The Peter Basso Associates design also uses a 7,500-cfm air-to-air energy-recovery ventilator (ERV) to supply outdoor air to each floor's fan coil. The ERV return air is supplied by ceiling plenums, bathrooms and janitor-closet exhaust air. Peter Basso Associates located it on the third floor because of the roof's weight limitations.

BIG FOOT SYSTEMS' MOUNTING MANUFACTURER: RectorSeal Corp., www.rectorseal.com
CITY MULTI VRF CONDENSERS AND FAN COILS MANUFACTURER: Mitsubishi Electric Cooling & Heating, www.mitsubishipro.com
ENERGY-RECOVERY VENTILATOR MANUFACTURER: RenewAire, www.renewaire.com
NIAGARA CONTROLS MANUFACTURER: Tridium, www.tridium.com
CONTROL AND SENSING EQUIPMENT MANUFACTURER: Johnson Controls, www.johnsoncontrols.com

The Retrofit

The 6-story, former Bamlet Building, owned and managed by Detroit's Bedrock Real Estate Services, was designed of brick and timber in the Neoclassical style by famed architecture firm Spier & Rohns in 1897—long before specifications of cooling towers, chillers and other heavy rooftop HVAC systems were conceived.

Bedrock, which oversaw the 36,000-square-foot mixed-use space's renovation, has invested more than $1.8 billion since 2011 in acquiring, renovating and developing more than 80 downtown Detroit properties. The strategy of retaining and preserving historic building features, such as with this building, complements the urban-style dining, shopping, technology, arts, business and residential environment Detroit-based Quicken Loans Founder and Chairman Dan Gilbert has envisioned and supported.

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PHOTO: UPONOR

WICK TOWER | Youngstown, Ohio

Retrofit Team

ARCHITECT: City Architecture, Cleveland, www.cityarch.com
MECHANICAL CONTRACTOR: Clayton Heating and Air Conditioning, Youngstown, www.clayton-heating.com
MANUFACTURER'S REPRESENTATIVE: Preferred Sales, Hermitage, Pa., preferredsales.com

Materials

In April 2014 John Yurcik with Preferred Sales received a phone call from Tim Clayton, owner of Clayton Heating and Air Conditioning, which was hired to install a hydronic heating and cooling distribution system for the Wick Tower. "I had worked with Tim Clayton on several radiant applications," Yurcik recalls. "He had one question for me: 'Can I run a four-pipe fan coil system through the existing structure using PEX?'"

The two met, studied the architectural plans, mechanical designs and pondered the limitations that working within an existing structure (more than 100 years old) provides. There were several points to consider: extremely snug workspace above the ceiling, plenum-rated piping was a must (required by the building owner), insulation concerns, and tight timelines and budgets.

It's becoming more common for developers to use plenum-rated piping in plenum spaces because this is the only space available in remodeling and even in some new construction applications, according to Yurcik. And local codes sometimes dictate a plenum-rated product must be used. In addition, the building's southern face is a wall of glass, and the radiant heating and cooling system takes a huge load off the forced air system.

Pre-insulated Wirsbo hePEX piping with varying sizes from 1/2 to 2 inches was specified for this installation. Although Clayton Heating and Air Conditioning has much experience installing PEX, 23 installers were trained for the pre-insulated Wirsbo hePEX installation to help them feel comfortable with the process.

Yurcik demonstrated the product, showed installation techniques, how to make a proper F1960 expansion connection, how to hang the pipe properly in a plenum space, and discussed ratings and how to repair kinks if they should occur. The process, which included classroom and onsite training, quickly helped the installers get up to speed and, after a brief exam, they were ready to move on to the installation stage.

The installation was straightforward with the pipe looping above the joist within rooms and then linked to the distribution manifold at each floor. The distribution lines run across hallways to the main hydronic water supply risers that run from the basement mechanical room to the top floor of the building.

By using a hydronic heating and cooling system, HVAC contractors save on labor (fewer installers needed) for a significantly shorter and quicker installation with less use of connections than a copper system. "Hydronic heating and cooling is a hot topic these days," Yurcik adds. "It really doesn't seem to make sense for installers to continue down the copper path anymore."

For this particular installation, it would have been impossible to install copper in the cramped work space. Even if it had been possible, adding insulation would have made the job incredibly time and labor intensive, Yurcik notes.

Clayton told Yurcik that it would have been cost-prohibitive to use any other product than the pre-insulated Wirsbo hePEX. "There are a lot of limitations in revamping high-rise buildings and this product is, in my opinion, the only way installers can provide the efficiencies and cost and labor savings the current market conditions require," Yurcik says.

Materials used:

- 1,100 feet of 1 1/2-inch pre-insulated Wirsbo hePEX pipe
- 8,100 feet of 1 1/4- to 1 1/2-inch pre-insulated Wirsbo hePEX pipe
- ProPEX Fittings

HYDRONIC HEATING AND COOLING SYSTEM MANUFACTURER: Uponor, www.uponor-usa.com

The Retrofit

The historic 66,000-square-foot Wick Tower has seen peaks and valleys since its completion in 1910—even being the tallest building in town for several decades. But hard financial times affected the stately building and it slowly fell into disrepair. When the building sold to local developer Dominic Marchionda in 2012, work began to restore the dignified structure to its original splendor while adding modern amenities and features to speak to the tastes of today's renters.

City Architecture designed 32 upscale and modern individual apartments and included a convenient deli on the first floor. With a nod to its rich past, the developer wanted to keep the integrity of the building and take advantage of the existing tall ceilings and its solid steel construction.

ZION EPISCOPAL CHURCH | Oconomowoc, Wis.

Retrofit Team

MECHANICAL CONTRACTOR: Schulte Heating LLC, Oconomowoc, schulteheating.com

Materials

With failing boilers and an inefficient heating system, the historic church needed help.

"Our heating system consisted of four nearly 12-year-old 199-MBH boilers," says Linda Georgeson, senior warden with Zion Episcopal Church. "Two of the four boilers were no longer functioning, and we were convinced the other two would fail because one was leaking. We were quite distressed to have such failures on this large purchase of units that were considered state-of-the-art when we bought them."

Church representatives invested a lot of time researching and evaluating commercial boilers and reviewing the proposals they received. "In an open meeting of the church, we charted cross comparisons of all the different units, the associated costs and warranties, and who would handle installation," Georgeson recalls.

Rich Schulte Jr., vice president of Schulte Heating, oversaw the boiler upgrade project.

"Upon our analysis, in addition to having unreliable boilers, the church also had quite a bit more capacity than it needed with the four previous boilers," Schulte says. "And the church knew it had to act quickly because they wouldn't be able to heat the building with only one functioning boiler."

Schulte Heating replaced the four failing boilers with two Evergreen boilers—299 MBH and 399 MBH. They were installed as a Multiple Boiler System, using the Modbus Communication feature. In this configuration, a master boiler controls the modulation and sequencing of boilers on the network to achieve the desired system supply temperature.

"With the automatic sequencing feature, the boilers communicate directly with one another, so they sequence themselves and rotate as needed," Schulte says. "Both operate at the lowest rate to optimize efficiencies."

The new 95 percent AFUE Evergreen offers simple controls, flexible functionality for multiple applications and a durable design, as well as is easy to install, use and maintain. The units are adaptable for most heating needs, including light commercial or large residential applications, and for single- or multi-boiler installations. Evergreen offers quiet operation, floor standing or wall mount options, and environmental sustainability.

"Evergreen is the only boiler I proposed to Zion because I really like the technology of the fire-tube heat exchanger in those boilers," Schulte notes. "In addition, they are easy to set up through the set-up wizard option provided on initial start-up and also easily maintained. Another important feature is the units don't require a separate, external control panel or boiler panel, and that was ideal because the church did not currently have a separate interface to view the status of the systems. It's now very easy to see the system status and service the units, if needed."

The installation took less than a week, and Georgeson is already seeing efficiencies with the new units, which have been installed for less than a year. "We've noticed a significant savings on our energy bills when comparing this year's monthly bills to last year," Georgeson says. "This was not surprising as we expected to experience energy savings based on the high efficiency of these boilers. We imagine we will save hundreds of dollars in the long term."

The units are configured to handle the five separate church thermostats/zones. Each thermostat is programmed for usage depending on the day and whether the area is occupied.

EVERGREEN BOILERS MANUFACTURER: Weil-McLain, www.weil-mclain.com

The Retrofit

In 1846, the Rt. Reverend Jackson Kemper, the first missionary Episcopal Bishop, established the Zion Episcopal community in Oconomowoc. The present day stone church situated on Fowler Lake was built in 1889.

PHOTOS: WEIL-MCLAIN

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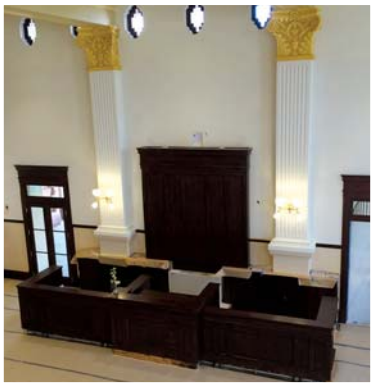
BEXAR COUNTY COURTHOUSE | San Antonio



PHOTOS: LG

Retrofit Team

HVAC EQUIPMENT AND SOLUTIONS PROVIDER: Texas Air Systems, San Antonio, www.texasairsystems.com

Materials

Renovating the large, ornate courtroom was a major challenge. It had to be air conditioned but without the bulky ductwork and drop ceiling required to hide the existing conventional system. The steeply sloped decorative roof of the building prohibited the installation of any mechanical equipment on the roof, and there was no room for equipment on the ground. The new HVAC system had to be inconspicuous and extremely quiet to avoid interfering with courtroom proceedings.

Additionally, a central chiller plant supplied chilled water to the previously installed, conventional HVAC system and to several other buildings in the area, so changing the chilled-water source was not an option. Instead, the team got creative and designed a solution that allowed the new system to operate with the existing water loop.

Texas Air Systems utilized variable refrigerant flow (VRF) technology to create a solution to maintain the integrity of the historic building while ensuring air conditioning for those who work in the building. Texas Air Systems solved the challenge with 84 tons of water-cooled source units and 47 indoor units that matched the aesthetic of the courthouse. The compact VRF systems were installed to work around the unique ceiling structure and meet the project's design and architectural challenges. Additionally, preconstruction testing with a custom-built model unit proved this design would provide the quiet operation needed in the courtroom.

To combat the technological challenges the project presented, the design engineer, controls contractor, mechanical contractor and Texas Air Systems worked together to redesign the water loop to supply water to the water-source units and allow the existing system to continue to function as originally designed. A BACnet gateway integrated the controls into an existing wide-area automation network so Bexar County officials could monitor the system from a remote location that controls multiple buildings in the area.

VRF MANUFACTURER: LG, www.lghvac.com

The Retrofit

In 1896, the citizens of Bexar County built a magnificent courthouse. Now listed on the National Register of Historic Places, this imposing structure boasts a stunning sandstone, granite and terra-cotta exterior. One of the largest historic courthouses in the state, Bexar County Courthouse features a courtroom with 25-foot-tall coffered ceilings graced by gilded moldings and millwork and decorative windows placed high on the walls, which illuminate the courtroom and its balcony. Over the years, the ravages of time, expedient repairs and multiple additions, including a conventional air-conditioning system, degraded the appearance of the courthouse and its featured courtroom. Although the conventional air-conditioning system brought welcome relief to the people who worked there, the extensive ductwork and drop ceiling required by this system blocked the windows and balcony and hid the ornate ceiling.

> The goal of this renovation was to **restore** the structure to its original 1896 appearance without sacrificing modern comfort.

Fortunately, the state of Texas recognized the value of the Bexar County Courthouse. The Texas Historic Courthouse Preservation Program provided matching funds for a $9 million renovation project, which was completed in 2015. The goal of this renovation was to restore the structure to its original 1896 appearance without sacrificing modern comfort.

The Texas Historical Commission was so impressed by the renovation project that during the ribbon-cutting ceremony, it presented the Distinguished Service Award to the Bexar County Historical Commission. Because of the success of this installation, other projects across the region and beyond are looking to VRF technology as a clear solution to their toughest air-conditioning needs.

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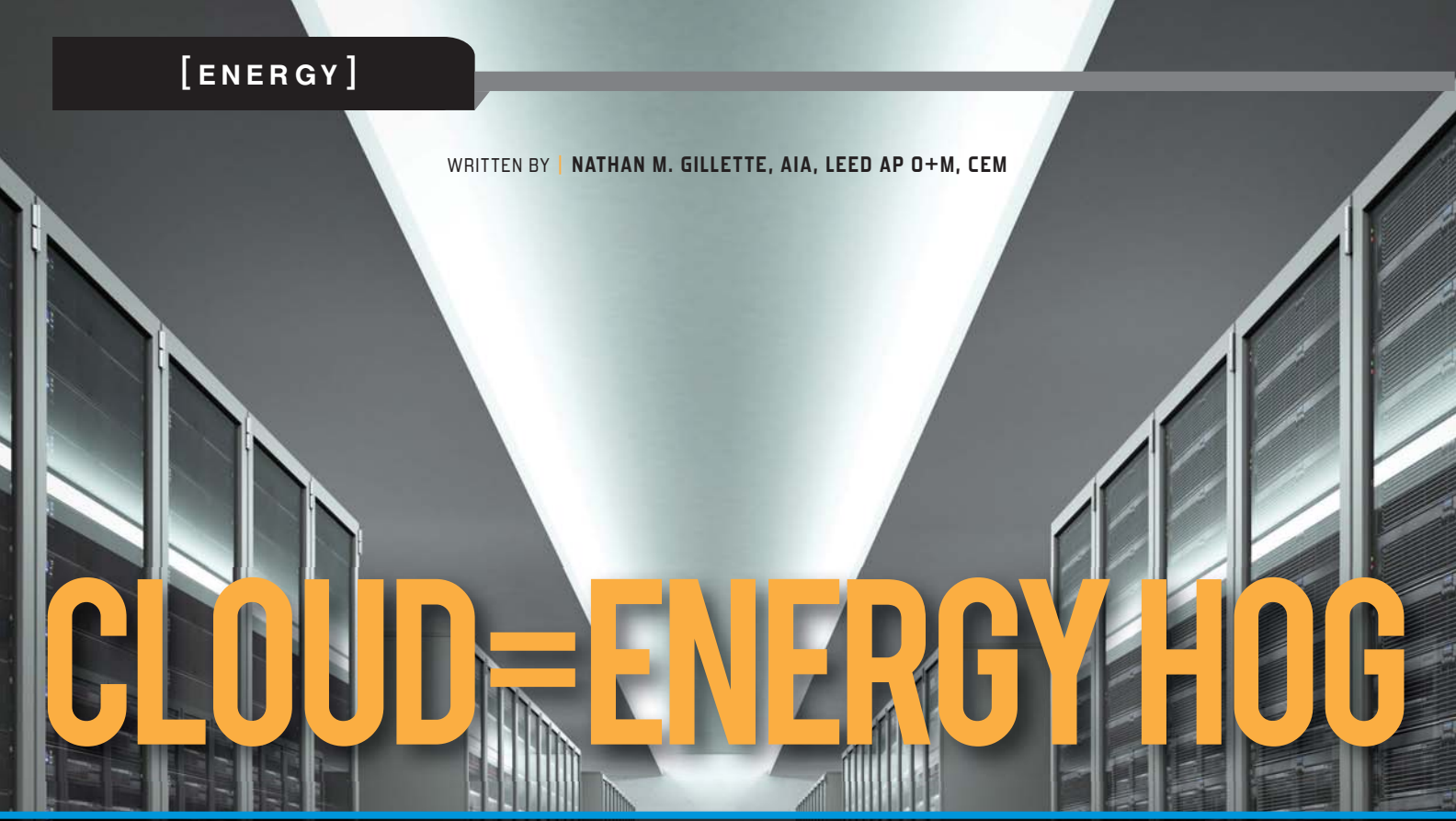
WRITTEN BY | NATHAN M. GILLETTE, AIA, LEED AP O+M, CEM



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Data-center energy consumption is quite staggering. It has been estimated

(continues on page 66)

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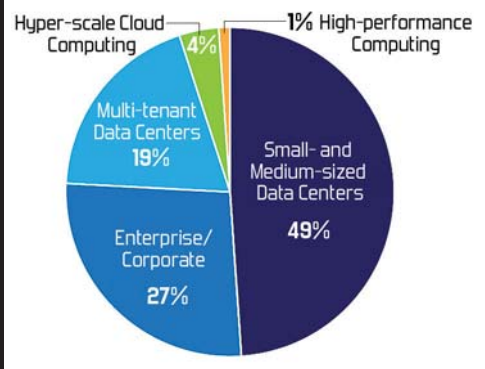
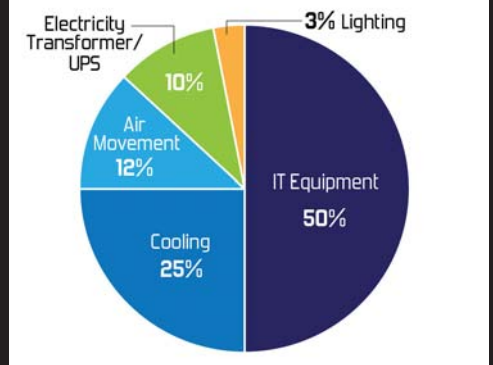


DATA CENTER ENERGY CONSUMPTION



CHARTS: NATURAL RESOURCES DEFENSE COUNCIL'S "DATA CENTER EFFICIENCY ASSESSMENT", AUGUST 2014

that 2 to 3 percent of all electricity generated in the U.S. is used to power data centers. While the amount of energy consumed is large, it affords the opportunity to implement energy-efficiency measures to decrease impacts to the environment and reduce the bottom line for the companies that operate these data centers. Electricity is a commodity, and the general trend is that the cost of electricity is rising; therefore, many companies are taking a close look at their data center operations and implementing changes to reduce operating costs.

Data Center Effectiveness

The data center industry uses the measurement PUE, or power usage effectiveness, to measure efficiency. A PUE of 2.0 means for every watt of IT power, an additional watt is consumed to cool and distribute power to the IT equipment. A PUE closer to 1.0 means nearly all of the energy is used for computing. Many of the major data centers have been working to decrease their PUE to levels around 1.2, but the largest data centers only account for roughly 5 percent of the total energy consumption of data centers in existence. The vast majority of data centers are small- and medium-sized and are generally much less efficient.

Clearly this leaves a lot of room for retrofitting opportunities in smaller data centers, but where to begin? It helps if we first have an understanding of how the pie is divided when it comes to energy consumption in a data center. The bottom graph to the left shows 50 percent of the power that is consumed in a data center is by the IT equipment itself. The next biggest user of energy is cooling in the data center at 25 percent. Air movement is next at 12 percent. The uninterrupted power supply (10 percent) and lighting (3 percent) use the least energy in a data center.

Energy-reduction Strategies

Because the largest energy user in a data center is the IT equipment itself, it makes sense to start exploring energy-efficiency opportunities there. IT professionals are looking at strategies that range from simply turning off unused equipment to installing more energy-efficient servers.

One would assume that all servers in a data center are working at maximum capacity, but almost the exact opposite is true. Server efficiency generally ranges between 12 and 18 percent. By increasing server efficiency, a reduction in the number of servers required is possible. By some accounts as many as 30 percent of computer servers are categorized as "comatose". By definition a comatose server is a server that has not delivered information or computing

DATA CENTERS ARE COMPLEX **USERS OF ENERGY**, OFTEN WITH MICRO ENVIRONMENTS THAT CAN BE EXTREMELY CHALLENGING TO ANALYZE AND ASSESS.

services in six months or more. There are many reasons these servers are underutilized, including changing needs of a company and simply forgetting the server exists and/or is operational. Yet, many of these servers are still operating 24 hours a day, seven days a week, consuming energy. Identifying these comatose servers and taking them offline is proving to be an effective strategy for energy efficiency.

Keeping It Cool

One of the biggest enemies of computer systems is heat. Too much heat can severely impact the lifespan of computer equipment. Keeping the equipment at a cooler temperature is a key goal of IT professionals. However, keeping the equipment cool comes at a cost with large, sophisticated, energy-consuming HVAC equipment.

In general, cooler air is taken in on the front side of a server and hot air is expelled from a fan on the rear of a server. Anyone who has ever put their hand behind a computer knows just how much heat is removed from a single computer; now multiply that by 100 or even 1,000 and it's easy to understand that cooling is important.

One cooling strategy being implemented in many existing data centers is thermal segregation—basically creating "hot aisles" and "cold aisles". A hot aisle is an area between two racks of servers where the fans are expelling hot air toward each other. Consequently, a cold aisle is an area where the fronts of two servers are facing each other, not expelling heat at each other. Cooling can then be concentrated in the cold aisles without the waste heat from servers intermixing. Some data centers are even going as far as to separate the hot and cold aisles with a plastic curtain, similar to what you might see at the entrance of a walk-in cooler or freezer, to further help thermally segregate the server areas.

Because the servers need to operate within a defined temperature range, most excess heat has typically been ventilated from the data center. However, this is a tremendous waste of energy, particularly in instances where the heat can be reclaimed and reused. A strategy of reclaiming the excess heat is particularly suited for private or corporate data centers that are located inside of office buildings in colder climates. Waste heat that is generated in a data center can be reclaimed through a heat-exchange process and used to heat occupied areas of the building.

Paying the Costs

Generally, the cost/benefit analysis of implementing energy-efficiency measures guides decisions about which strategies to pursue first—often those with the shortest payback period. However, one aspect that needs to be considered is available incentives from utility companies.

Most every utility company offers monetary incentives to customers to reduce energy in their buildings. The reason utility companies offer incentives is simple: It is more cost-effective to pay a customer to reduce energy than invest in expensive upgrades in

BY SOME ACCOUNTS AS MANY AS 30 PERCENT OF COMPUTER SERVERS ARE CATEGORIZED AS "**COMATOSE**". BY DEFINITION A COMATOSE SERVER IS A SERVER THAT HAS NOT DELIVERED INFORMATION OR COMPUTING SERVICES IN SIX MONTHS OR MORE.

existing infrastructure. Upgrades of this nature do not usually fall into most prescriptive categories in utility incentive programs but rather into a custom category. The process typically involves the utility company or a trusted consultant providing guidance and analysis of potential energy savings and determining an appropriate incentive amount. In some areas, the incentives can reach 30 percent of the cost of implementing the energy-efficiency equipment or strategy, thus drastically reducing payback periods. One resource to check for available incentives in your area is the Database of State Incentives for Renewables & Efficiency, or DSIRE, www.dsireusa.org.

Implementation

Data centers are complex users of energy, often with micro environments that can be extremely challenging to analyze and assess. New technology develops so rapidly it has a tendency to be out of date as soon as it is installed. Hiring design and consulting professionals that understand these nuances is key to a successful retrofit project and cost savings for data center owners.

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DATABASE OF STATE INCENTIVES FOR RENEWABLES & EFFICIENCY, DSIRE: www.dsireusa.org

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THE greenENERGY FUND

WRITTEN BY | **ERIN HIATT**

THE **adidas GROUP** SCORES BIG BY INTERNALLY FINANCING ITS ENERGY INVESTMENTS

PHOTO: **RETAIL INDUSTRY LEADERS ASSOCIATION**

The Herzogenaurach, Germany-based adidas Group has financed several energy-efficiency projects to date through its greenENERGY Fund, including wireless intelligent LEDs in a large distribution center.

It's no secret that for corporate energy managers, securing funding internally can often be the biggest hurdle to advancing energy-efficiency projects. In addition, the larger and more complex a company is, the bigger that barrier can be as the C-Suite decision-makers and budget-setters become less accessible and the competition for capital becomes greater. This is especially true for retail corporate energy managers, where product development investments are more core to the business than operations. However, thanks to the merits of energy efficiency, there are ways to overcome these barriers.

The Herzogenaurach, Germany-based adidas Group is home to some of the world's most recognizable athletic brands. It operates in more than 160 countries, employs more than 55,000 people and produces more than 778 million product units every year. Annual sales consistently reside in the billions. And during the last four years, the group has invested $5.5 million in energy projects. So how did a multi-billion-dollar, multi-brand global company integrate energy-efficiency and renewable-energy projects into its day-to-day operations without breaking the bank?

adidas Group followed one of its own guiding principles and got creative. In 2012, the adidas Group, which represents adidas, Reebok and TaylorMade, established an internal venture capital fund, known as the greenENERGY Fund, to provide financing specifically for energy-efficiency and renewable-energy projects. In addition to this financial commitment, it dedicates the time and expertise needed to monitor and verify energy and cost savings, shares the results across the company and ensures the long-term success of the program.

(continues on page 72)

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The Process

In designing the greenENERGY Fund, the adidas Group had the following four key goals in mind:

- First, the investments would have to enhance the overall value of the business. It's not only about the financial rate of return, but about brand reputation and the impact these changes would have on operational efficiency, consumer experience and the environment.
- Second, the fund would need to accelerate carbon reductions relative to adidas' vision of becoming a zero-emission company.
- Third, any energy and financial savings should be measurable and verifiable.
- Lastly, the greenENERGY Fund should be a vehicle to track and share best practices across company facilities globally. With stores all over the map, the adidas Group wanted to be able to share and implement energy-efficiency strategies in multiple facilities and measure the results companywide.

Between June 2012 - November 2015:

- Approved funding for 49 projects
- Invested $5.5M USD
- Forecasted 33% IRR on project portfolio
- 10-year NPV is $2.5M USD

greenENERGY Fund Portfolio Environmental Impacts 2012 projected through 12/2025		
Lifetime electricity reduced*	118,365,960	kWh
Lifetime gas reduced**	(1,294,754)	Therms
Net carbon reduction	37,184	MT C02-e
This is like removing 1,001 cars from the road in 2015.		

** Length of project lives range between one to 13 years.*
*** Because of fuel cell installation, net gas consumption has increased.*

The Results

Since establishing the internal venture capital fund, the adidas Group has invested $5.5 million in 49 different projects to date, and the forecasted internal rate of return (IRR) across the project portfolio currently is 33 percent.

With project lives ranging between one to 13 years, the greenENERGY Fund projects the environmental impacts of the complete portfolio through the year 2025 to yield a lifetime electricity reduction of 118,365,960 kWh, a lifetime gas reduction of 1,294,754 therms and a net carbon reduction of 37,184 MT CO_2 equivalent. That is like removing 1,001 cars from the road in 2015.

The fund is structured such that strategic long-term energy projects are bundled

ALIGNING ENERGY-EFFICIENCY **GOALS** WITH BUSINESS GOALS IS CRUCIAL TO ADVANCING PROJECTS.

together with those that have quick returns. The subsequent portfolio has a target IRR of 20 percent, which allows projects below that threshold to be paired with projects that exceed that threshold. This not only increases the likelihood of success for all investments, but it allows the adidas Group to take advantage of opportunities that might otherwise be too risky to invest in on its own.

Following initial implementation of an energy-efficiency project, the fund's corporate energy team audits facilities, providing feedback and sharing best practices that can accelerate investments. The success of projects is evaluated by their expected cost savings and their carbon impact. Essentially, managers want to know how many metric tons of CO_2 are reduced per dollar invested. Ultimately, after verifying energy and cost savings, the fund's representatives share the results across the company.

By centralizing energy management, the adidas Group delivers greater savings, improved transparency and quick project turnaround technical support services for facilities.

In short, the greenENERGY Fund enables the company to overcome the aforementioned common internal financing hurdles, such as internal competition for capital, short payback horizons and a lack of time or budget on the part of facility managers.

Projects financed to date through the greenENERGY Fund include everything from an exterior LED lighting retrofit in a distribution center, to more efficient HVAC units in large showrooms, to wireless intelligent LEDs in a large distribution center. The upgrades take place in leased and owned spaces, including retail stores, data and distribution centers, and corporate offices.

Doug Noonan, vice president of corporate real estate for adidas Group, says, "The greenENERGY Fund has nicely accelerated the pace of investments in energy efficiency in our owned operations. It has also helped to normalize this idea that energy-efficiency investments can be great business investments."

Developing Your Own Model

The adidas Group's success with its internal capital fund marks one creative solution to a problem many companies face. Although the group tailored the fund to suit its specific business needs, this type of internal financing mechanism for energy-

> THE **greenENERGY** FUND HAS NICELY ACCELERATED THE PACE OF INVESTMENTS IN ENERGY EFFICIENCY IN OUR OWNED OPERATIONS. IT HAS ALSO HELPED TO NORMALIZE THIS IDEA THAT ENERGY-EFFICIENCY INVESTMENTS CAN BE GREAT BUSINESS INVESTMENTS. *—Doug Noonan, vice president of corporate real estate, adidas Group*

efficiency and renewable-energy projects is replicable outside of the adidas Group.

The Arlington, Va.-based Retail Industry Leaders Association's (RILA's) Retail Energy Management Program recently featured the adidas Group's approach to funding in one of its implementation models developed through a partnership with the U.S. Department of Energy, Washington, D.C.

The model, which highlights innovative, proven energy solutions from market leaders in the retail sector, serves as a resource for other companies looking to implement similar funding mechanisms to grow their energy programs. (View the model at bit.ly/2bgsIII.) In addition to offering additional background on the adidas Group's unique approach to energy financing, how its fund is structured and how the group measures success, RILA's Implementation Model presents key takeaways for others looking to establish an energy fund within their own companies.

According to the model, companies considering creating a dedicated energy fund should follow a few keys to ensure its success internally. First, take advantage of the financial analysis tools and metrics already in use across the company and express energy and cost savings in terms that others across the business will understand. That way, finance executives and others can more easily measure value as it relates across business operations. As Noonan alludes, aligning energy-efficiency goals with business goals is crucial to advancing projects.

Similarly, it's important to advertise successful projects across the company—to not only receive additional buy-in for projects internally, but to showcase the value of the investments to other potential sites for implementation. Allowing stores to retain a portion of the savings is the best way to enforce that message, particularly by showing a clear line to increased profitability by reducing operational expense.

Lastly, be prepared to complete rigorous monitoring and verification protocol. Transparency regarding project performance is key and the long-term success of those projects and the fund as a whole depends on being able to accurately measure savings and IRR.

LEARN MORE

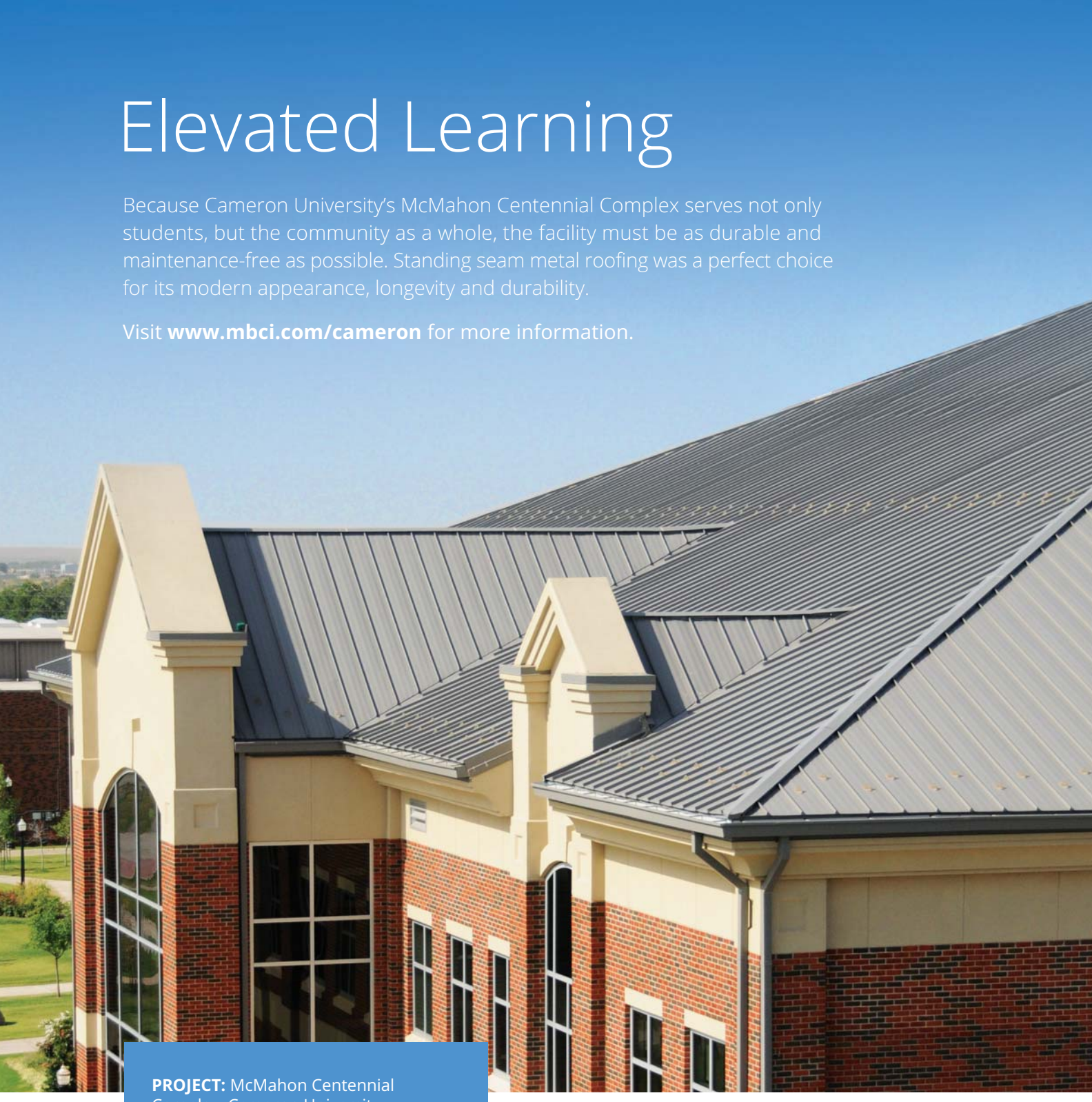
The Arlington, Va.-based Retail Industry Leaders Association (RILA) is the trade association of the world's largest and most innovative retail companies. RILA members include more than 200 retailers, product manufacturers and service suppliers, which together account for more than $1.5 trillion in annual sales, millions of American jobs and more than 100,000 stores, manufacturing facilities and distribution centers domestically and abroad. Visit RILA's website at www.rila.org.

To learn more about Herzogenaurach, Germany-based adidas Group's unique approach to energy financing, how its fund is structured and how the group measures success, view RILA's Implementation Model at bit.ly/2bgsIII. The model also presents key takeaways for others looking to establish an energy fund within their own companies.

Elevated Learning

Because Cameron University's McMahon Centennial Complex serves not only students, but the community as a whole, the facility must be as durable and maintenance-free as possible. Standing seam metal roofing was a perfect choice for its modern appearance, longevity and durability.

Visit **www.mbci.com/cameron** for more information.



PROJECT: McMahon Centennial Complex, Cameron University

LOCATION: Lawton, Oklahoma

ARCHITECT: Frankfurt-Short-Bruza Associates

CONTRACTOR: Brox Industries

PANEL PROFILE: LokSeam® (Slate Gray / Galvalume®)

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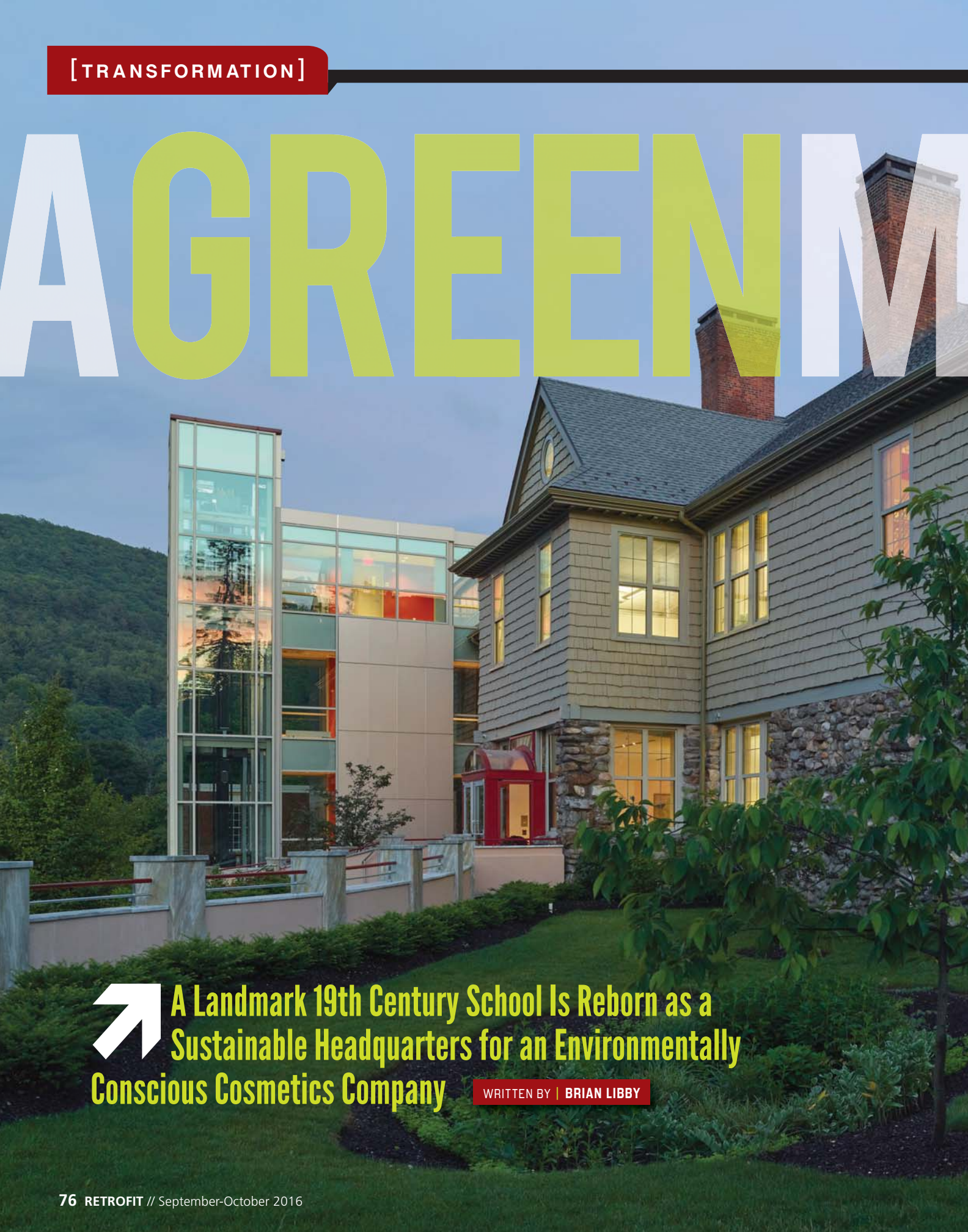


A Landmark 19th Century School Is Reborn as a Sustainable Headquarters for an Environmentally Conscious Cosmetics Company

WRITTEN BY | **BRIAN LIBBY**

AKEOVER

For more than 120 years, the William Cullen Bryant School has stood as a landmark of Great Barrington and the Berkshires region of western Massachusetts with its distinctive arts and crafts design and central location just off Main Street. When cosmetics magnate and preservationist Jane Iredale was seeking larger quarters for her locally based company—Iredale Mineral Cosmetics Ltd.—a few years ago, she zeroed in on the school as an unorthodox yet inventive solution.

New York-based Croxton Collaborative Architects (CCA) PC, known in green-building circles for designing landmark headquarters, including the Natural Resources Defense Council and the National Audubon Society, both in New York, was brought on board for the transformational project. "Bryant was beautifully put together—very sturdy in terms of the building technology of the time," says CCA President Randolph Croxton. "There was this sense of pulling from nature, not doing very elaborate decorative treatment but being extremely straightforward, expressing the local materials being used: the wood shingles, the boulders forming its base and the local sourcing of all the materials. And it's a very important touchstone for many of the people in Great Barrington. During the project, we'd constantly hear people saying, 'This is where I went to third grade.'"

Following the construction of a new regional elementary school 5 miles outside the town in 2004, the Bryant school sat vacant for more than a decade despite being an official Massachusetts Cultural Resource. Its fate and that of the nearby Searles Middle School (also dating to the 1890s) were uncertain at best. Now, Bryant is not only enjoying new life as the Iredale Mineral Cosmetics headquarters, but also helping to revitalize the town beyond its center.

PHOTOS: **TIM HURSLEY**

Retrofit Team >>

OWNER // Iredale Mineral Cosmetics Ltd., Great Barrington, Mass., janeiredale.com

ARCHITECT & INTERIOR DESIGN // Croxton Collaborative Architects PC, New York, croxtoncollaborative.com

STRUCTURAL ENGINEER // Robert Silman Associates PC, New York, www.silman.com

MEP/FP ENGINEER // Dagher Engineering, New York, www.dagherengineering.com

CIVIL ENGINEER // Forsight Land Services, Pittsfield, Mass., www.foresightland.com

FF&E AND COLORIST // Carl Black, Hudson, N.Y., (518) 929-3481

LANDSCAPE ARCHITECT // Okerstrom Lang Ltd., Great Barrington, okerstromlang.com

GENERAL CONTRACTOR // Allegrone Construction Co. Inc., Lenox, Mass., www.allegrone.com

MECHANICAL/HVAC CONTRACTOR // F.E. Moran, Northbrook, Ill., www.femoran.com

ELECTRICAL CONTRACTOR // Comalli Group, Pittsfield, comalli.com

LANDSCAPER // Windy Hill Farm, Great Barrington, www.windyhillfarminc.com

WOOD FLOORING CONTRACTOR // Shooks General Floor Sanding, Stockbridge, Mass., (413) 232-7982

TILE AND CARPET CONTRACTOR // Mercier Carpet, West Springfield, Mass., merciercarpet.com

FIRE-PROTECTION CONTRACTOR // Hampshire Fire Protection LLC, Westfield, Mass., www.hampshirefirellc.com

"Great Barrington has a vibrant Main Street that's still thriving with local businesses. But when you get just off Main Street, you start to notice the empty buildings," explains Suzie Fowle, a wildlife biologist and longtime member of the Great Barrington Planning Board. "The Bryant school is part of a larger school complex of buildings, and it still feels quiet in that part of town, even though it's right by a public river walk. Seeing a building like this get revived and done beautifully and sensitively, it's wonderful, and it's also a beginning."

One with Nature

Iredale says the building and its restoration made an ideal statement for her company. "Our makeup brand always has been considered a natural brand. We use primarily minerals," she explains. "So we were interested in having something that was consistent with that image—something built out of natural materials, like the boulders around the building, the shingles, the wood floors. They all fit with the image of our brand, which is something natural but is well designed and works well. And we wanted a place that was unique, so when we brought people here from all over the world they would get what we were about as soon as they walk in the door."

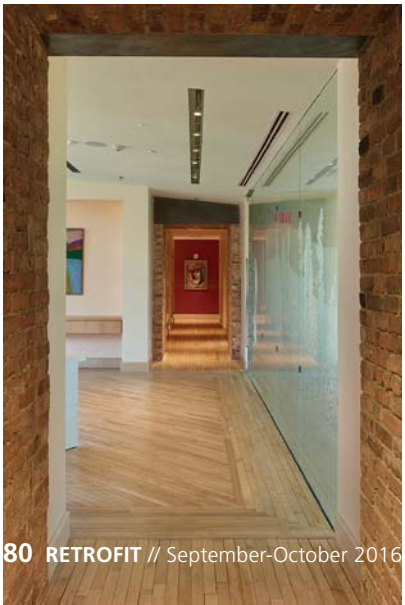
The design couldn't just be a faithful historic restoration. Because the building is located less than 400 feet from the Housatonic River and part of the Housatonic River Watershed, a natural system that moves through several nearby towns, the site had to have optimal stormwater-runoff capabilities to ensure the building's resilience. CCA's design, therefore, includes a comprehensive rain-garden system integrated with a new stormwater detention tank. But the outside of the building is also a canvas for growing flowers and native plants, an Iredale Mineral Cosmetics tradition dating back to the days of including lavender from Jane Iredale's home garden in every package shipped to customers.

"The original project site was almost entirely asphalt, with no vegetation, and with enormous amounts of erosion and silt and particulates flowing directly into the river," Croxton explains. So the designer created what he calls "a necklace of rain gardens that are gravity fed as their pools fill up and overflow in sequence toward the river." Overall, the landscaping had two purposes. "On the one hand, it was a fundamental issue of sustainability and managing stormwater particulates and flooding, which are major issues adjacent to the river," he explains. "But they also turned out to be grace notes in Jane's expression of her gardens. It was a great combination."

The extensive water-management plan was only a part of the sustainability drive that sets

Croxton Collaborative Architects was able to significantly increase the amount of usable interior square footage from 12,000 to 21,000 square feet without expanding the building's historic perimeter walls. The team carved habitable space out of the basement and the attic, which now is the most architecturally dramatic space. Massive skylights and a wall of new glass fill the attic with light.

The design retained and beautified the original maple flooring on the first and second floors. Jane Iredale also wanted the building to be full of natural light, which studies show makes employees more productive and aids in staff retention.



ambitious goals for a LEED Gold rating (but also goes beyond its requirements). The project diverted more than 90 percent of waste from landfills, for example. Thanks to added insulation and high-quality windows, the building uses 46 percent less energy than if it had been built by standard construction methods and materials and achieves a 27 percent cost reduction. The design retained and beautified some of the natural materials inside and out, such as original maple flooring on the first and second floors. And the client wanted the building to be full of natural light, which studies show makes employees more productive and aids in staff retention.

"It didn't seem conceivable to do a building that wasn't sustainable in some fashion," Iredale says. "It's much harder to do it with an existing building instead of from the ground up. Fortunately for us, the building was built very solidly. The people building it knew they were building it for their children. They put their hearts and souls into it. The whole thing fit into our philosophy."

21st Century Technology

The headquarters also makes ingenious use of a variable refrigerant mechanical system and heat exchanger, which uses condensers on the outside of the building to distribute air inside via fan units as needed, but in a much more efficient way than traditional HVAC ducts.

(continues on page 82)

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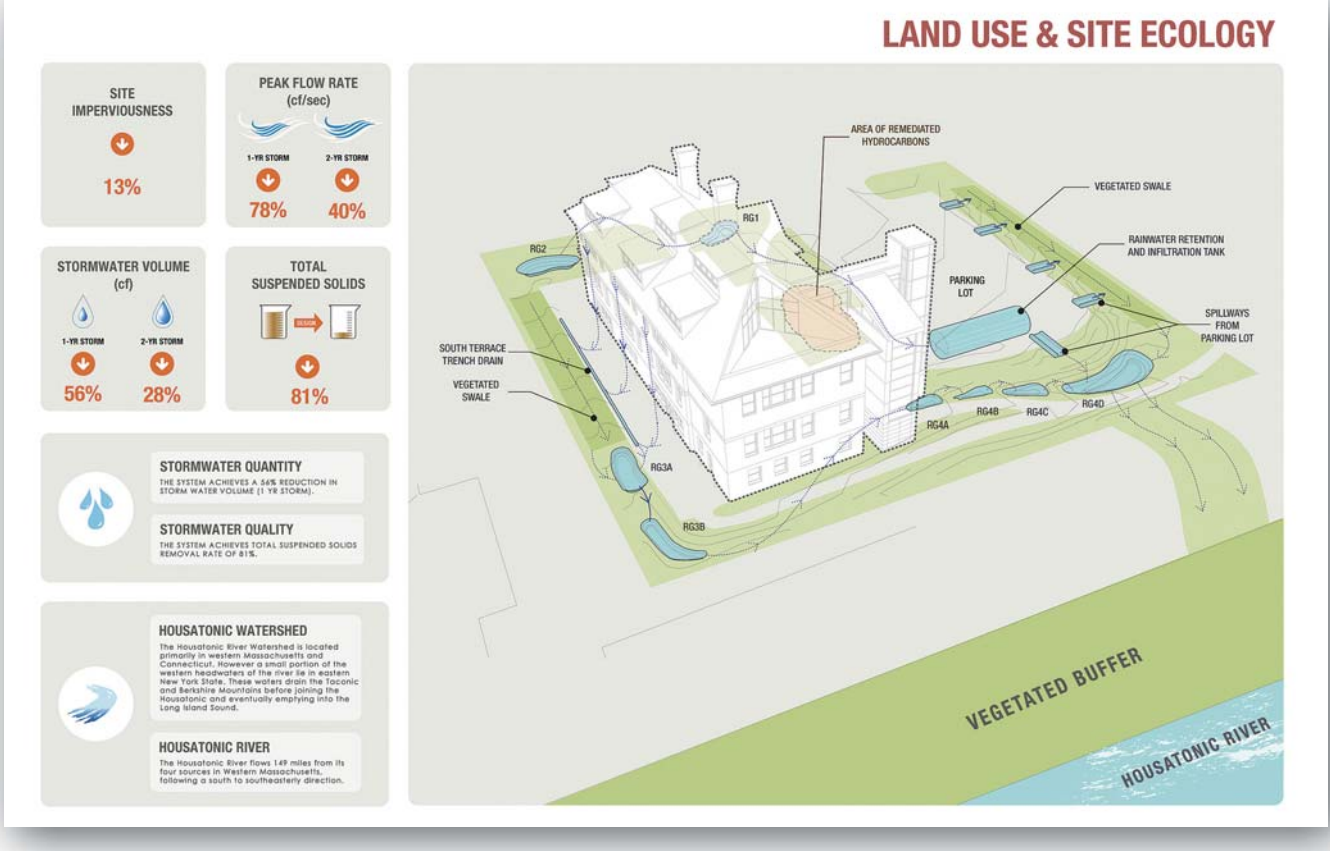
THE ORIGINAL PROJECT SITE WAS ALMOST ENTIRELY ASPHALT WITH ENORMOUS AMOUNTS OF EROSION AND PARTICULATES FLOWING DIRECTLY INTO THE NEARBY HOUSATONIC RIVER. THEREFORE, CCA'S DESIGN INCLUDES A COMPREHENSIVE RAIN-GARDEN SYSTEM INTEGRATED WITH A NEW STORMWATER DETENTION TANK. THE OUTSIDE OF THE BUILDING IS ALSO A CANVAS FOR GROWING FLOWERS AND NATIVE PLANTS.

"There's no need to move large ducts and volumes of air through the space," Croxton explains. "Therefore, we were able to retain the original geometries of the ceilings and the spaces without intrusion."

The 19th century building also needed modern conveniences, including an elevator. But rather than trying to wedge the elevator or stairs into the old building, CCA created a new freestanding steel and glass circulation tower, comprising an elevator and staircases; the tower is connected to the original building via a bridge. "With the glass elevator on the outside, the building looks like a mix of real authenticity with a modern flair," Iredale says.

Croxton argues there is no one correct approach for how to style an addition and that context is everything. He says: "We do a lot of renovation and restoration work. Sometimes it is much better to take the new element and make it visible by the way it's detailed and assembled, but to use a complementary material that doesn't call attention to itself, so that it still is clearly of its own time, but it doesn't



become a strong contrast. In this case, the original building itself is so unique, with these enormous boulders for this whole first floor and then shifting to the large wood shingles and composition coming up to this very large eyebrow overhang, that there was no way—and we felt it would be completely inappropriate—to mimic that. We felt it was best to be as sort of spare and clean and, if anything, reflecting in the use of the glass, mirroring the natural setting and the building itself and really standing away from the building."

The architects were also able to significantly increase the amount of usable interior square footage from 12,000 to 21,000 square feet without expanding its historic perimeter walls by carving habitable space out of the basement (digging out perimeter walls to allow windows) and the attic. "It's really the most architecturally dramatic space," Croxton says of the attic, where massive skylights and a wall of new glass fill the area with light.

New Bonds

Since moving in earlier this year, Iredale employees have been quite happy with the new space. "Overwhelmingly, when outsiders and visitors come to the building, they're just gobsmacked," Jane Iredale says. "There are so many touches, from the lavender-etched glass walls to the way they were able to maintain the full height of the windows even with the infrastructure in the ceiling, and the way we were able to maintain the original floors. I don't think there's anybody in this experience that doesn't love coming to work. Departments that weren't interacting with each other are chatting and having fun. It's a lovely bonding experience."

What's more, the company's founder and namesake, a London native, believes historic building renovations, such as this one, have a value that can't be fully assessed in terms of dollars or even LEED credits. "It just resonates with everything in my being, from the smell to the way the floors creak to the leaded windows," Iredale says. "It puts things into perspective for you. The building has been standing for more than 100 hundred years. In Bryant, you know this was populated with kids. We left the marks to remind us there is history here and people grew up here. I love that feeling about a building, that I'm just a small part of a big picture. It keeps you humble."

Materials >>

METAL CLADDING // Alucobond, www.alucobondusa.com

ALUMINUM STOREFRONT AND CURTAIN-WALL // Kawneer, www.kawneer.com

ELEVATOR // Otis Gen2, www.otis.com

LIGHTING, DIMMING SYSTEM, LIGHTING CONTROLS // Lutron, www.lutron.com

WINDOW GLASS // PPG Solarban 70XL Glass, www.ppgideascapes.com

STRUCTURAL GLASS // ISG, www.structuralglass.com

DEMOUNTABLE PARTITIONS // Dirtt, www.dirtt.net

ETCHED GLASS // Skyline Design, www.skydesign.com

COUNTERTOPS // Solid Surface Silestone by Cosentino, www.silestoneusa.com

PAINTS AND STAINS // Liberty Paint Corp., libertyonthehudson.com

FLOOR AND WALL TILE // Lea Ceramiche, www.ceramichelea.it, and Ann Sacks, www.annsacks.com

MARBLE // Blue Cloud Marble, bluecloudmarble.com

WOOD FLOOR FINISH // Bona, us.bona.com

BRICK PAVER // Hanover, www.hanoverpavers.com

RETAINING WALL // Versa-Lok, www.versa-lok.com

Zoo to Zing

WRITTEN BY | **KURT HAAPALA, AIA, LEED AP**

The intersection of smart design, environmental stewardship and cultural evolution underpins the complete transformation of Zura Hall into a vibrant home for students seeking an authentic SoCal vibe. The San Diego State University (SDSU) project sets a new bar for student housing within the shell of a 1960s-era residence hall while showcasing the burgeoning sustainable surf movement.

SDSU is a public research university that is part of the 23-school California State University (CSU) system. It is the largest and oldest higher-education institution in San Diego County. Serving 34,000 students, SDSU houses more than 4,700 students in 12 residential facilities—most built before 1970. To keep up

ZURA HALL WAS ONE OF THE OLDEST RESIDENCE HALLS ON CAMPUS AND CONSIDERED ONE OF THE LEAST DESIRABLE LIVING OPTIONS.

PHOTOS: **LAWRENCE ANDERSON** (unless otherwise noted)

SDSU's Renovated Zura Hall Sets a New Benchmark for Residence Halls on Campus

Retrofit Team

ARCHITECTS // HMC Architects, Los Angeles, hmcarchitects.com, and Mahlum, Portland, Ore., www.mahlum.com

GENERAL CONTRACTOR // Balfour Beatty Construction, San Diego, www.balfourbeattyus.com

INTERIOR DESIGN // Mahlum

MEP ENGINEER // Randall Lamb Associates, San Diego, www.randalllamb.com

STRUCTURAL ENGINEER // Saiful/Bouquet Structural Engineers, Pasadena, Calif., www.saifulbouquet.com

CIVIL ENGINEER // Nasland Engineering, San Diego, www.nasland.com

LANDSCAPE ARCHITECT // Land Lab, Neil Hadley, San Diego, land-lab.com

MECHANICAL DESIGN-BUILD SUBCONTRACTOR // Atlas Mechanical Inc., San Diego, atlasmechanical.com

PLUMBING DESIGN-BUILD SUBCONTRACTOR // Sherwood Mechanical, San Diego, www.sherwoodmechanical.com

ELECTRICAL DESIGN-BUILD SUBCONTRACTOR // Dynalectric, San Diego, www.dyna-sd.com

WINDOW SUBCONTRACTOR // Centex Glazing, La Mesa, Calif., centexglazing.com

Bam! THE ENCLOSED SPACES WERE TRANSFORMED INTO SOCIAL AND STUDY AREAS—FROM OPEN STUDY NOOKS AND PRIVATE STUDY ROOMS TO TV LOUNGES—TO FOSTER CONNECTIONS AMONG THE THREE RESIDENTIAL WINGS.

with demand and competition for in-state and out-of-state students, in 2012, SDSU assessed its housing inventory to strategize and prioritize long-range investment to transform the student living experience on campus.

Zura Hall, affectionately known by students as "the Zura Zoo", was one of the oldest residence halls on campus. Lacking the types of features expected by 21st century students and functioning with outdated building systems, Zura was one of the least desirable living options on campus. The campus' facilities assessment, which included issues related to accessibility, electrical capacity, HVAC systems, fire and life safety, seismic performance, vertical transportation, and site and interior finishes, scored Zura lowest in most of the assessment categories.

DESIGN-BUILD

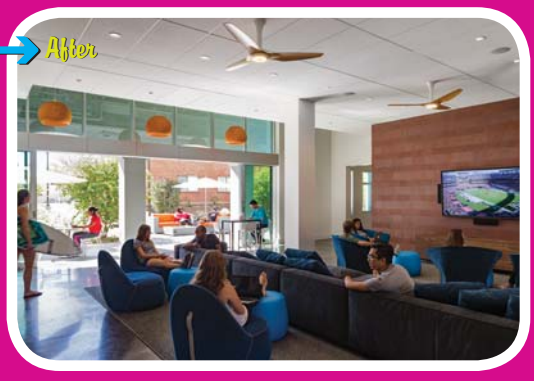
To maintain the capital investment of the original facility, SDSU elected to extensively renovate the building to create a safer, more energy-efficient and attractive living environment. To undertake the project, SDSU selected a collaborative design-build team composed of architectural partners HMC Architects, Los Angeles, and Mahlum, Portland, Ore., along with Balfour Beatty Construction, San Diego.

During initial building investigations, the design team found numerous opportunities to bridge community and enhance the overall student experience. Taking the elevator to the sixth floor, the sunset views and vast unused roof were stunning, offering the possibility to deliver something truly unique for SDSU.

Early campus outreach and student listening sessions revealed five core design goals to guide design and construction:

1. Improve OPERATIONAL EFFICIENCY through a focus on building systems, user convenience and operational flow patterns.
2. ENHANCE COMMUNITY through connection of spaces to bring students together.
3. Support ACADEMIC INTEGRATION through faculty-in-residence programming and multi-use, academic spaces.
4. Promote EQUITY and DIVERSITY by improving accessibility and all student

Zura Hall



spaces, as well as by enhancing privacy in toilet and shower facilities.

5. Celebrate the SAN DIEGO LIFESTYLE by providing unique outdoor environments to extend the SoCal student experience and support an emerging sustainable surfing industry through art, education and academic partnerships.

MEETING ASPIRATIONS

One of the first operational elements tackled was an unusual one: trash and recycling. The existing process used an old trash chute to deliver waste to the basement, where staff carted it upstairs via a freight elevator to unattractive dumpsters, parked in full view of students. The new flow directed trash to an enclosed room at ground level for easy, discreet removal. By immediately addressing such a functional but important concern, the design-build team focused on a primary obstacle to the building's core organization that allowed other space-saving solutions.

Another immediate area of concern was the chronic problems brought about by generations of surfers who used communal bathrooms to clean gear and stored boards and wetsuits in small crowded rooms or on outdoor decks. Conversations with facilities staff and students about the issue led to the development of a surf wash, repair and storage facility outside the main entry to mitigate ongoing plumbing damage, foster community and showcase the San Diego surf culture.

To nurture a cohesive, connected community, a single, secure entry on the ground floor was set adjacent to a shared lounge, kitchen and rec area that opens onto a resort-like outdoor space. On the upper floors, central open-air breezeways were enclosed to provide students access to all building floors. The enclosed spaces were transformed into social and study areas—

Materials

RESILIENT FLOORING // Patcraft, www.patcraft.com

ACOUSTICAL LINEAR WOOD CEILING // USG, www.usg.com

VINYL CASEMENT WINDOWS // VPI, www.vpiwindows.com

CERAMIC AND GLASS MOSAICS // Daltile, www.daltile.com

CARPET TILE // Interface, www.interface.com

FIXTURES // Sloan, www.sloan.com; Zurn, www.zurn.com; Moen, www.moen.com; Mansfield, www.mansfieldplumbing.com; Kohler, www.us.kohler.com; and Elkay, www.elkay.com

PAINT // Sherwin-Williams, www.sherwin-williams.com

LIGHTING // Architectural Lighting Works, www.alwuk.com, and Cooper Lighting, www.cooperindustries.com

SLATE // Vermont Structural Slate Co., www.vermontstructuralslate.com

SURFBOARDS // Wegener Surfboards, www.wegenersurf.com; Firewire Surfboards, www.firewiresurfboards.com; Hemp Surfboards, www.hempsurfboards.com; REECO Surfboards, www.reecosurfboards.com; and Hess Boards, hesssurfboards.com

ARTIST MURAL // Andy Davis, andydavisdesigns.com

SURFBOARD LOCKERS // Mahlum in partnership with Heartwork, www.heartwork.com

LOUNGE FURNITURE // Ligne Roset, www.ligne-roset.com

BROOM CHAIRS AND STOOLS // Emeco, www.emeco.net

STUDY ROOMS // Turnstone, myturnstone.com

LOUNGE FURNITURE // Bernhardt, www.bernhardt.com

INTERIOR AND EXTERIOR TABLES // Ohio Design, ohiodesign.com

OUTDOOR MIA LIN TABLES // Knoll, www.knoll.com

OUTDOOR FIRE PITS AND HEAT LAMPS // Restoration Hardware, www.restorationhardware.com

STUDENT ROOMS // Foliot, www.foliot.com

OFFICE FURNITURE // Teknion, www.teknion.com

OUTDOOR LOUNGE FURNITURE // Kannoa, www.kannoa.com

OUTDOOR FURNITURE // Loll, lolldesigns.com

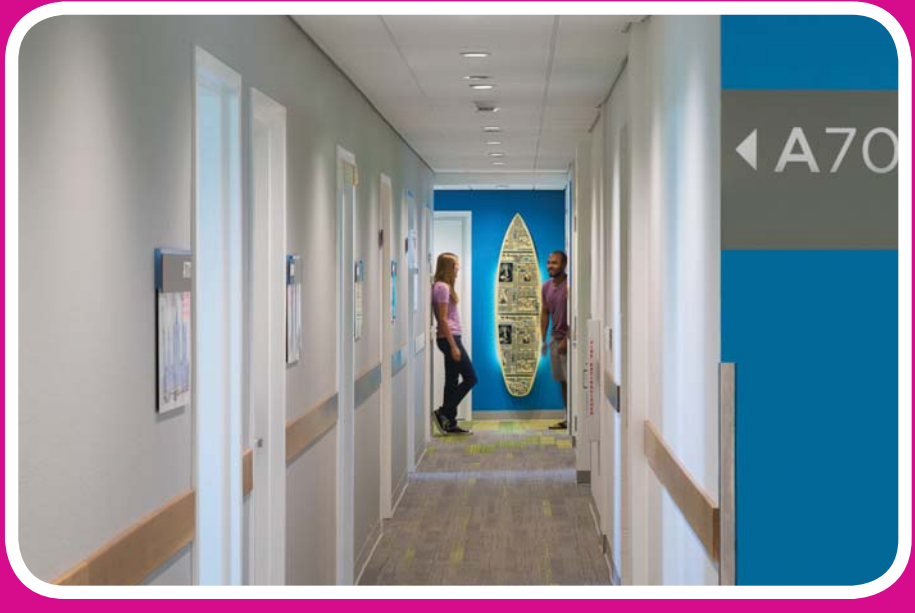
CONCRETE POOL AND PING PONG TABLES // James DeWulf, www.jamesdewulf.com

RECLAIMED WOOD BENCHES // John Beck Steel, johnbecksteel.com

from open study nooks and private study rooms to TV lounges—to foster connections among the three residential wings. Topping off the renovation, a roof deck was installed that gives students a place to enjoy SoCal weather and panoramic views of downtown and Mission Bay.

SDSU has a long tradition of academic support within the residential environment and the renovation offered the opportunity to enhance connectivity to academics. The program includes two apartments for the faculty-in-residence program and added high-tech student tutoring and education spaces, as well as faculty and teaching assistant offices. Themes on residential floors support more than 24 planned residential communities, including Honors, Emerging Leaders, Health & Healing, ROTC, Pre-Law and Nursing.

The renovation supports equity and inclusion by removing barriers; increasing ADA; and supporting the needs of students with mobility, vision or hearing differences. Design solutions include elevators now stopping at every floor, accessible bedrooms with extra space for wheelchair parking and recharging located throughout each floor, and fully accessible shower and toilet facilities. Moreover, enhanced privacy in student bathrooms and shower facilities supports universal student access—irrespective of gender identity—with dignity.



Surf's Up! AN ARRAY OF 46 SHORT BOARDS ADORN EACH RESIDENTIAL COMMUNITY AND SHOWCASES THE ARTISTRY AND TECHNICAL SKILL OF LOCAL SHAPERS WHO ARE HELPING TO CHANGE THE SURFING INDUSTRY BY UTILIZING MORE SUSTAINABLE MANUFACTURING TECHNIQUES.

SURF CULTURE

San Diego's rich surf culture is celebrated throughout the building. A large mural by surf legend and artist Andy Davis hangs at the front entry paired with wood longboards by Danny Hess of San Francisco-based Hess Boards that recall historic boards used by Hawaiian royalty. An array of 46 short boards adorn each residential community and showcases the artistry and technical skill of local shapers who are helping to change the surfing industry by utilizing more sustainable manufacturing techniques.

Through research of the great surf culture of San Diego, the design-build team realized the high toxicity levels of traditional, mass-produced surfboards. Dozens of traditionally made surfboards would have created a dangerous fire hazard and negatively affected the indoor air quality. Each board's significant carbon footprint (more than 600 pounds of CO_2 for a typical 6-foot board, according to the nonprofit group Sustainable Surf, Manhattan Beach, Calif.) was more than the team or university wanted to commission—and would send the wrong message about SDSU's commitment to sustainability and environmental stewardship.

The team partnered with SDSU's Center for Surf Research and STOKE Certified, a sustainability certification program for surf and ski tourism operators, to learn about emerging methods to produce environmentally friendly surfboards. Working with wood, hemp, entropy resin and upcycled Styrofoam, leading sustainable surfboard shapers, including Hess; John Wegener of Encinitas, Calif.-based Wegener Surboards; Mark Price of San Clemente, Calif.-based Firewire Surfboards; Chad Kaimanu Jackson of Santa Cruz, Calif.-based Hemp Surfboards; and Marc Sanchez of San Diego-based REECO Surfboards, created the boards for Zura Hall. Building signage mounted with each board shares information about its shaper, design process and inspiration, as well as material/toxicity content.

"It makes sense on so many levels that SDSU incorporate local surfing culture, art, creativity and sustainability into this redesign," says Dr. Jess Ponting,

(continues on page 92)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> THE **ZURA SPIRIT** HAS BEEN REBORN; INCOMING STUDENTS EMBRACE THEIR NEW ENVIRONMENT WITH GREATER LEVELS OF ENGAGEMENT, SATISFACTION AND ACADEMIC PERFORMANCE. *—Eric J. Hansen, MBA, Ph.D., LEED Green Associate, director of Housing Administration, San Diego State University*

PHOTO: HMC ARCHITECTS/MAHLUM

Meet me on the rooftop! A ROOF DECK WAS INSTALLED THAT GIVES STUDENTS A PLACE TO ENJOY SoCal WEATHER AND PANORAMIC VIEWS OF DOWNTOWN AND MISSION BAY.

director of the Center for Surf Research and co-founder of STOKE Certified. "This project will hopefully broaden exposure to eco-friendly surfboards and further spur the industry to become more sustainable."

ZURA SPIRIT

The renovation of Zura Hall is the first collaborative design-build project completed by the CSU system. HMC Architects with Mahlum and Balfour Beatty Construction worked together with the campus to complete the renovation in just two and a half years. The accelerated schedule was made possible by the nature of the design-build process that requires the whole team—owner, architect and contractor—to work together to meet programmatic, budgetary and design goals.

"SDSU's goals for their students were at the forefront of everyone's minds as decisions were made," recalls Kristina Singiser, AIA, LEED AP, senior project manager at HMC Architects. "Our process streamlined design and construction and blurred the traditional team lines."

Renovated Zura Hall welcomed its first residents for the Fall 2015 term. Since opening, it has set a new standard for SDSU's housing trajectory and has raised the bar for student living environments within San Diego and the CSU system.

Eric J. Hansen, MBA, Ph.D., LEED Green Associate, director of Housing Administration at SDSU, notes: "The renovation of Zura Hall was nothing short of transformational. Not only were the systems and finishes replaced after 45 years of hard residential use, but many operational and community challenges were rectified. Just as important, the Zura spirit has been reborn; incoming students embrace their new environment with greater levels of engagement, satisfaction and academic performance. Zura is now the benchmark with which all other SDSU renovations and new construction are measured."

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THE SPEED OF CHANGE

WRITTEN BY | ROBERT NIEMINEN

LED TECHNOLOGY IS CHANGING FASTER THAN THE BUILDING INDUSTRY CAN KEEP UP. HERE'S WHAT FACILITY EXECUTIVES SHOULD KNOW BEFORE UPGRADING.

To suggest LED lighting has taken the building industry by storm is somewhat of an understatement. The market and technology are advancing at incredible rates—so much so it's difficult for building executives to keep pace.

For starters, the scale of the LED lighting market is expected to jump from $25.7 billion in 2015 to $30.5 billion in 2016 with a penetration rate projected to climb from 31 percent in 2015 to 36 percent this year, according to the 2016 Global LED Lighting Market Trends Report by LEDinside, a market intelligence firm covering the global LED industry, including data, intelligence, LED adoption, prices, and buyer and seller information. "Internationally, LED markets

(continues on page 96)

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> If you have a five-year project, it is true (an LED) you bought is probably going to be **replaced by a newer model**. That's why we like going with big, established companies, so you can have consistency across products. What you don't want to do is try different manufacturers and then all of a sudden the color qualities don't match up or the controls don't all match up.

*— **Chip Israel**, FIALD, MIES, LEED AP, LC, CEO and founder, Lighting Design Alliance*

are evolving at warp speed in terms of price and product quality," explains Christine Egan, CEO of Washington, D.C.-based nonprofit energy-efficiency advocate, CLASP. "In Europe, some quality-brand LED lamps on the market today are at price points that were only expected to be in shops in 2025."

In fact, LED technology's lightning-quick growth caught many in the industry by surprise, according to Steve Kath, CLMC, president of the International Association of Lighting Management Companies (NALMCO), Ankeny, Iowa, in a recent message to the organization's members.

"There have been great strides in performance while the costs have slowly come down, making it a widely accepted option for many," Kath writes. "It has also opened the door for many new businesses."

Increased competition has introduced additional challenges, however. "It's always going to be frustrating because, right now, lighting [technology] is probably changing faster than cell phones," suggests Chip Israel, FIALD, MIES, LEED AP, LC, and CEO and founder of the Long Beach, Calif.-based Lighting Design Alliance. As a result, many building owners who retrofit their facilities over time are discovering the technology they purchased only a short time ago is already obsolete, opening the door to compatibility issues with upgrades or renovations not far down the road.

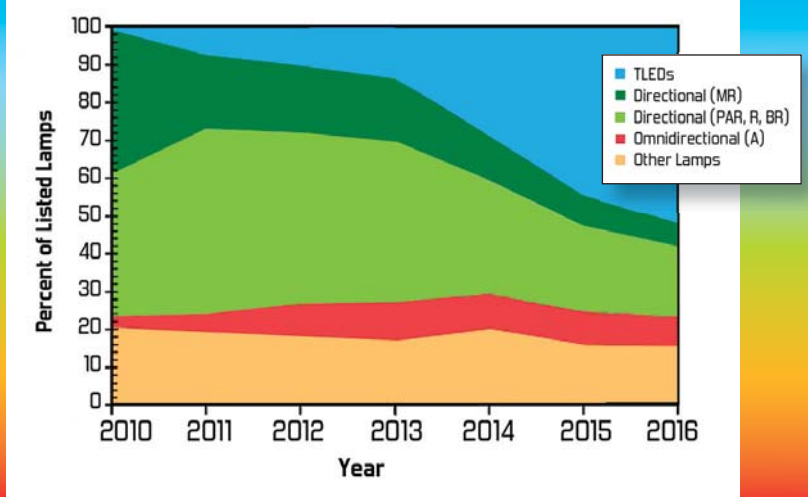
Therefore, facility executives would be wise to take several factors into consideration to ensure their investment in LED lighting upgrades is a sound one.

Watch Out for Pitfalls

With the costs coming down as the quality and life cycles of fixtures are going up, LEDs are an attractive option for retrofitting existing buildings with more efficient lighting. Given that products like linear LED lamps (TLEDs) typically draw about 60 percent of the power that linear fluorescents do, according to the U.S. Department of Energy, Washington, D.C., TLEDs are a great way to achieve energy savings. However, considering energy efficiency alone is a mistake.

(continues on page 98)

AT A GLANCE **LAMPS LISTED BY LED LIGHTING FACTS**



SOURCE: **LED LIGHTING FACTS, U.S. DEPARTMENT OF ENERGY**

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Multiple Mounting Options

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As an ENERGY STAR® qualified AV product, the switcher includes Extron exclusive power saving modes designed to reduce energy usage and operating costs.

Retrofitting with LEDs "is a learning process".

"One of the downfalls I think a lot of companies make is they just want to do LED because they think LED doesn't use any energy and it lasts forever," explains Randy Breske, CLMC, CSLC, CLEP, project manager at Eco Engineering Inc., Cincinnati. "They jump on that bandwagon with both feet and think it's going to be the be-all and end-all. They don't look at the entire big picture of what the impact of their retrofit on their facility will be—not only on their energy costs but maintenance costs, longevity of the system, the product [compatibility], things of that nature."

Israel agrees and says in his experience, many clients are focused exclusively on reducing wattage and often don't take other important lighting factors into consideration—a scenario that already played itself out when the industry switched from incandescent lamps to compact fluorescents.

"They saved a lot of energy, but the problem is the compact fluorescent didn't have any candle power or it couldn't punch the light down to the floor," Israel notes. "All of a sudden the spaces appeared gloomy or they weren't as bright as they used to be, so there were some trade-offs."

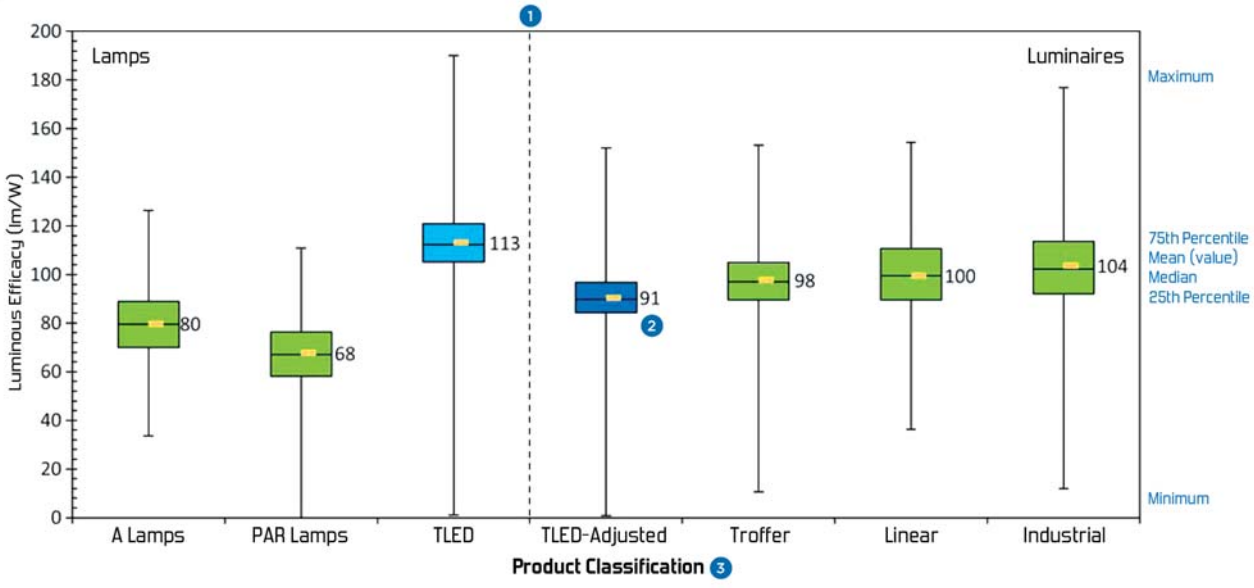
Weighing the Options

Before considering LED products for a building retrofit, it's important to remember: "Every product works very well in some applications; no product is going to work in every application, and I think that's very important," Israel says. Further, LEDs may not be the right solution for every environment, says Breske—especially those prone to extreme temperatures.

As such, Breske suggests facility executives develop a lighting upgrade strategy based on the big-picture need of the facility

(continues on page 100)

TLEDs Current Efficacy vs. Other Product Types



1 This chart compares the efficacy of TLEDs to other product categories. Lamp categories are shown on the left and luminaire categories are shown on the right. The typical efficacy of TLEDs substantially exceeds the efficacy of A lamps and PAR lamps.

2 To appropriately compare the efficacy of TLEDs to that of other LED luminaires, a multiplier of 0.8 was applied, representing the efficiency of a typical troffer luminaire in which a TLED might be operated. When this is done, TLEDs tend to have lower efficacies than the dedicated LED luminaires against which they might compete.

3 Products listed by LED Lighting Facts are classified by the submitting manufacturer. There is some ambiguity between categories, and the variation within any given category may be substantial.

SOURCE: **LED LIGHTING FACTS, U.S. DEPARTMENT OF ENERGY**

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Fennick McGredie Architecture Photo: Courtesy William Horne

Boston Logan Airport

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and take into consideration the tasks that are being performed and the number of hours the facility will be in operation daily, for example. He says clients need to ask a number of questions, including (but not limited to): What do you want the lighting system to do? What activities will be taking place in the space? Where are they being performed? How much light is necessary to perform those functions effectively?

Once the answers have been determined, the process of selecting the most appropriate lighting product is easier but not without some careful consideration. Breske says there's a wide range of LED retrofit options for commercial buildings that can often be paired with controls for optimal performance.

UL Type A TLEDs, for example, have become a popular option because they work with existing inline ballasts. TLEDs are the easiest to install and don't require any structural modifications (simply change the bulb). However, not every TLED is compatible with existing ballasts, which can cause them to fail. Also, Type A tubes are limited in their dimming and control capabilities. Efficiency is also sacrificed to some extent because of the loss of power from the existing ballast.

UL Type B TLEDs, on the other hand, bypass the ballast entirely and eliminate some compatibility issues because they are hardwired directly into electrical boxes. The benefit of Type B products is there's no loss of power by removing the ballast, but control and dimming are limited, as well.

Among the most flexible and cost-effective options are LED retrofit kits, which use the existing fixture without sacrificing controls. "There are some wonderful retrofit troffer kits out there that incorporate some configuration of an array of LED chips and a driver," Breske says, noting many of them incorporate dimming, as well. "Most of these retrofit kits will use the existing fixture body of the fluorescent fixture. Many of them not only save energy and give you the controllability and flexibility, they also enhance the appearance. Most of them are of a volumetric nature, so they're architecturally very pleasing."

Of course, ballasts and fixtures can be completely replaced with new ones, but the costs are significantly higher. As such, Breske says retrofit kits have a distinct advantage because they cost much less to install. While kits appraise less than new fixtures, Breske says the decision is ultimately based on what the customer wants and finds practical.

According to Israel, it comes down to making informed decisions: "It's really about understanding the technology." He says it's important to test all components beforehand to ensure the lighting modules,

Facility executives will likely need to **replace existing fixtures** or **lighting components** in the near future that have been rendered obsolete or aren't available in the same wattage or color outputs.

drivers, and dimmers are all compatible and have proper controls to avoid flickering, which some LEDs have been known to do. "It's not to scare people away, it's just, do your homework and make sure you have the correct system," he explains.

Future Proofing

Speaking of compatibility, there's a harsh reality to face: facility executives will likely need to replace existing fixtures or lighting components in the near future that have been rendered obsolete or aren't available in the same wattage or color outputs. And with the speed of change in LED technology, "future proofing" an existing facility to accommodate these advancements will be increasingly challenging. But there are a few things building owners and facility managers should—and shouldn't—do.

"If you have a five-year project, it is true [an LED] you bought is probably going to be replaced by a newer model," Israel says. "That's why we like going with big, established companies, so you can have consistency across products. What you don't want to do is try different manufacturers and then all of a sudden the color qualities don't match up or the controls don't all match up."

Breske describes the LED market today as "the Wild West" because there are so many manufacturers in the market without much standardization across products. He says that will change in time, however, as the number of players in the market

Among the most flexible and cost-effective options are **LED retrofit kits**, which use the existing fixture without sacrificing controls.

"weed themselves out" and regulations come into play.

"Right now, there's not a lot of standardization. There are some requirements, but it's just not heavily regulated," he explains. "As those regulations and standards become adopted, it will make components more compatible with each other."

In the meantime, Israel says facility owners and managers would be wise to ensure any fixtures purchased are well documented. Look for barcodes on each fixture and know what type of LED boards are being used, the controls that are put in, as well as the types of drivers the fixtures are running on. When those fixtures or components come up for replacement, there will be more options available, he says.

For example, if a replacement LED is brighter in spite of using the same wattage as the existing fixture because technology has already advanced, Israel says the manufacturer can match the lumen outputs at a lower wattage, which will actually save more energy. (This is contingent upon good documentation, he emphasizes.)

Alternatively, Israel suggests facility executives invest in modular fixtures with quick connectors and light engines and drivers that are easily removable so upgrades and replacements are easy to do and avoid waste.

"There are some fixtures right now that if the fixture dies, you throw away the entire fixture," he says. "That's the housing, the heat sink—all the parts that are still good, you have to get rid of, so we really prefer the modular type of solution."

Ultimately, Israel says retrofitting with LEDs "is a learning process", and documentation and modularity are the best bets today to ensure a bright tomorrow.

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ANNOUNCING NEW 2017 CONFERENCE TRACKS

TRACK 1: THRIVING IN A DISRUPTED LIGHTING MARKET

Setting the stage for the next wave of market evolution

Explore the wide range of uses of LEDs in lighting products and emerging applications while gaining an understanding of the future development of the solid-state lighting market. Hear from the experts about the challenges to market growth and possible solutions to overcoming those challenges.

TRACK 2: TECHNOLOGY INNOVATION TO SUPPORT MARKET GROWTH

Key technologies that will change the face of lighting

Gain insight into the technical issues associated with the development and implementation of LED lighting. The scope includes not only the LED components but also the technologies that go into making a lighting product, including drivers, optics, and materials. The issues addressed in this track include performance, lifetime, reliability, luminaire design, comparison of technical approaches, and many others.

TRACK 3: WILL ALL LIGHTING BECOME CONNECTED?

The role of lighting in the Internet of Things

Learn the latest on how connected or smart lighting fits into the world of IOT (Internet of Things). Discussions will cover the entire spectrum of the market, including data analytics, network security, the true value of connected lighting, convergence of lighting into the IOT, communications protocols, smart cities, new business approaches and many more.

THE LED SHOW: CO-LOCATED WITH STRATEGIES IN LIGHT

Lighting Experience - the Designer Perspective

The LED Show track focuses on innovative lighting design and lighting applications with topics including color quality, Title 24, design es and new fixture technology. Panel discussions will touch on the effects of lighting and how it affects our human biological rhythms/physiology. Other featured topics include enabled technology, IoT, breakthrough technologies, new distribution models, Smart Cities, and much more.

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For more information, visit www.strategiesinlight.com and www.theledshow.com

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www.noritz.com // Circle No. 60

NYLON ALTERNATIVE TO PLASTIC SHEETING

ZipWall ZipFast reusable barrier panels are an airtight, opaque and environmentally friendly alternative to plastic sheeting. The 12-foot panels, which are made of nylon fabric, quickly zip together to form a barrier as wide as needed. Available in standard and flame-retardant versions, the panels are ready to use out of the box without cutting or measuring. In addition to effective dust containment, ZipFast panels present a professional appearance and provide privacy on both sides of the barrier.

zipwall.com // Circle No. 61

POLYESTER-COVERED PANELS ABSORB SOUND

Snowsound's patented sound-absorption technology optimizes room acoustics in new shapes and applications: Blade, Corner, Snowfront, Oversize Desk, Oversize, Sipario and Cubby. Available in a variety of colors, the panels are covered with durable, high-quality polyester firmly bonded to the inner core to form a thin, lightweight single unit. Snowsound panels meet UL flame spread and smoke development standards, are GREENGUARD Gold certified and are 100 percent recyclable.

www.snowsoundusa.com // Circle No. 62

ILLUMINATE DISPLAYS WITH MODERN FIXTURE

Nora Lighting has introduced the Jason LED track head, a fixture for display lighting in retail and commercial applications. With modern, minimalist styling, Jason includes an integral driver in its flat-back design and is offered in 30K and 35K with 18W, 26W and 33W. It has two beam spreads, spot and flood. Three lumen outputs are available in the same housing for lighting flexibility with a consistent appearance. Featuring die-cast aluminum construction, Jason is available in black and white finishes with cylindrical or rectangular-shaped housing.

www.noralighting.com // Circle No. 63

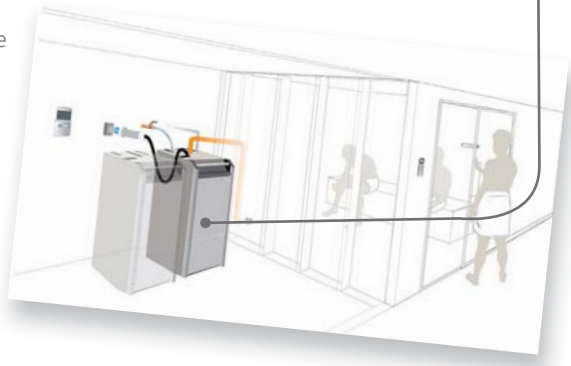
CEILING PANELS ARE CARVED FROM BAMBOO

Smith & Fong Co. has debuted Plyboo Ceilings, a line of 40 different carved and textured ceiling panels. The systems employ the company's carved bamboo panel products—Reveal, Sound, Linear and Linear Sound Collections—all of which are fabricated to fit all standard ceiling grids and can be installed in large panels up to 4 by 10 feet for custom applications. Plyboo Ceilings are made from 100 percent FSC-certified, rapidly renewable bamboo; the panels pass stringent VOC emissions standards. They are fabricated in 3/4- and 1/2-inch thicknesses and are Class B or C fire rated.

www.plyboo.com // Circle No. 64

ENSURE POWER TO STEAM ROOMS

ThermaSol has engineered SuperDuty, a series of commercial generators creating a fully digital, solid state system that ensures steam rooms are never out of order. SuperDuty, which incorporates a non-pressurized design, features energy-saving SmartSteam technology, which only uses the exact amount of power needed to maintain the selected room temperature. Rather than using all the available kilowatts (repeatedly turning on and off), SmartSteam meters the power. The generator also boasts stainless-steel construction, simple installation, programmable maintenance, high and low temperature settings, and seven-day programmability.



www.thermasol.com // Circle No. 65

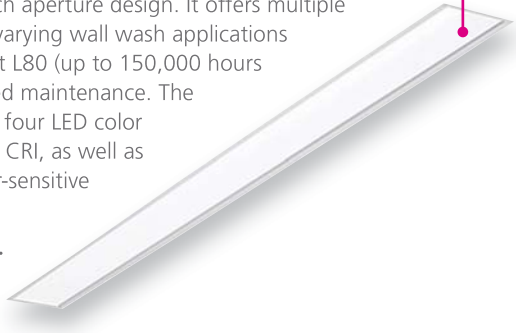
LVT IS DESIGNED BY INTERNATIONAL ARTISTS

Tarkett has unveiled Collections Infinies, a digitally printed luxury vinyl tile (LVT), featuring designs by internationally renowned artists. Collections Infinies enables architects and designers to actively participate in the product design process. Collections Infinies currently includes the following designs: "Trans-Materia" from Suzanne Tick, "Glow" from Krista Ninivaggi of K&Co, "Riot" from 2x4 and "Crystal" from D.B. Kim. A fifth design will be introduced from Stefan Sagmeister in the fall.

www.collectionsinfinies.tarkettna.com // Circle No. 66

LED OFFERS VARYING WALL WASH APPLICATIONS

Hubbell Lighting's Columbia Lighting has launched its CWW, a contemporary wall wash LED luminaire designed for retail and commercial applications. The performance of the CWW meets uniformity of 5:1 on vertical surfaces from ceiling to floor. The CWW boasts a slender profile and narrow, 3-inch aperture design. It offers multiple optical distributions for varying wall wash applications and 60,000-hour LEDs at L80 (up to 150,000 hours projected life) for reduced maintenance. The product is available with four LED color choices and standard 80 CRI, as well as optional 90 CRI for color-sensitive applications.



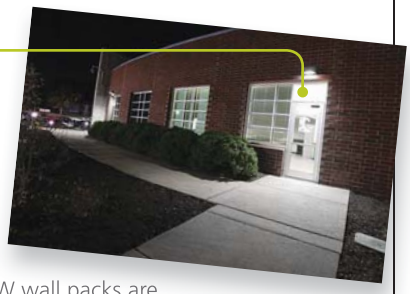
www.columbialighting.com/products/cww // Circle No. 67

DUCT SEALANT OFFERS ENHANCED PERFORMANCE

Carlisle HVAC Products has made available Foil-Grip 1404-181BFXTM rolled sealant. The UL 181B-FX listed, pressure-sensitive, rolled mastic sealant provides the same performance as the previous 181B-FX product but with improved ease of use with a 2-mil foil facer. The water- and UV-resistant product exceeds building-code requirements while providing enhanced performance, environmental safety and easier application. In addition, improved tack provides enhanced grip and adhesion.

www.carlislehvac.com // Circle No. 68

REPLACE METAL HALIDE FIXTURES WITH LED WALL PACKS



SuperBrightLEDs has released its Full-Cutoff LED WallPacks, which use cool white LEDs to emit a 60- by 90-degree oval beam of downward-focused, glare-free illumination. The 70W wall packs are equivalent replacements for 320W metal-halide fixtures and are designed to last twice as long. A light-detecting photo-control option is available to lengthen LED life span even further. The weatherproof LED wall packs are designed for security lighting, warehouse lighting, gas station lighting, building entryways, and other industrial and commercial applications.

www.superbrightleds.com // Circle No. 69

FAUCETS BALANCE WATER SAVINGS WITH USER COMFORT

Chicago Faucets' 3600 Series is the latest addition to the Chicago Faucets Metermix line of metering faucets. All 3600 Series faucets feature user-adjustable temperature control. The faucets' MVP metering cartridge provides precise water flow, automatic shut-off and adjustable runtime to save water with every use. A choice of flow rates from 0.35 to 1.5 GPM allows specifiers and building owners to strike the right balance between water savings and user comfort. Threaded mounting studs and free-spinning, stainless-steel hose connections make installation easy. In addition, the 3600 Series meets ADA requirements.

www.chicagofaucets.com // Circle No. 70

FAN COILS ARE REDUCED IN SIZE

Carrier has improved its Performance Series fan coils for easier installation and a nearly 20 percent smaller footprint. The enhanced fan coils offer factory-installed electric heat options, as well as increased flexibility for single-stage-demand dehumidification. The units are available in two options: a 2-ton 15 seasonal energy-efficiency rating with a 14-inch-wide cabinet and a 5-ton 15 SEER rating with a 21-inch-wide cabinet. The fan coils achieve a wider airflow range and include a lower continuous fan option, resulting in lower electric bills and lower sound levels.

www.carrier.com // Circle No. 72

SLEEK PROFILE ALLOWS FOR MORE GLASS EXPOSURE

JELD-WEN EpicVue contemporary clad-wood windows and patio doors feature clean lines, square interior detailing and a sleek profile to leave more of the glass exposed. The windows' aluminum-extruded sash provides rigid strength and stability, which helps support the pane and allows expansive openings. In addition, 90-degree direct set windows can be installed in the corner of a structure to create a panoramic view of the surroundings. EpicVue patio doors are available in a variety of configurations, including swinging and sliding. The windows and doors are available in nine wood species and five stains, as well as custom color matching. Hardware is available in 10 finishes.

jeld-wen.com // Circle No. 75

AV SYSTEMS ENSURE COMPATIBILITY WITH CURRENT AND FUTURE SOURCES

Extron Electronics has introduced a new generation of Pole-Vault Digital Classroom AV Systems, powered by an upgraded ENERGY STAR-compliant switcher/amplifier with enhanced capabilities. The new systems provide 4K video switching to ensure compatibility with current and future sources and displays. They also feature local HDMI inputs for sources that do not need direct user access, including Extron ShareLink, Apple TV and Google Chromecast, as well as CATV tuners and streaming decoders. In many cases, these devices can also be secured within the system enclosure. The audio file playback capability allows pre-recorded emergency and informational announcements to be stored in the switcher memory.

www.extronclassroom.com // Circle No. 76

PEX POLYMER FITTINGS MEET LARGE-DIAMETER APPLICATIONS

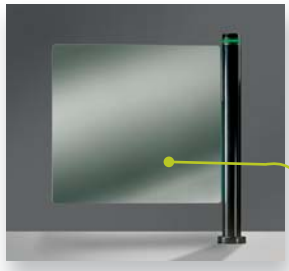
Zurn Industries LLC has made available its 1 1/4- to 2-inch Zurn PEX Qick Sert CR Corrosion Resistant Polymer Fittings to meet large-diameter applications. Customers now have a broad size-range—1/2 to 2 inches—from which to choose. The insert and crimp fitting system is constructed of a polymer material designed to prevent corrosion and resist chemicals and chlorine in aggressive water environments. It meets ASTM F877 performance requirements and reduces labor and installation time for PEX tubing. The crimp systems are immediately full strength upon installation and deliver more flow than required by fixtures. They provide a permanent, leak-free connection.

www.zurn.com // Circle No. 77

DESKS AND STORAGE UNITS CAN BE CONFIGURED FOR INDIVIDUAL NEEDS

HON's Concinnity desk line offers a coordinated suite of laminate desk and storage components that lets designers create a custom look without the need for custom products. The line offers an extensive assortment of storage products—bookcases, organizing tools and file cabinets, wardrobes, towers and credenzas. Modular design enables configurations to fit individual needs with parts to create continuous horizontal planes or multi-level, overlapping, layered surfaces. A variety of base and leg styles can add privacy or keep the look open and airy. Adjustable or fixed-height standing-height solutions support today's healthy work styles.

hon.com/concinnity // Circle No. 78



ACCESS GATE USES LITTLE ENERGY

Boon Edam has launched the Winglock Swing, an intuitive, single-wing access gate. The gate is designed to coordinate with the Speedlane Lifeline series (as an additional specialized lane) or be used as a standalone installation. A combination of green, orange and red colors displaying static, pulsing and flashing signals guide traffic through. Just 9W of energy is used in standby mode and 20W while in motion. A substantial floor plate design alleviates the need for an additional supporting side post, which notably simplifies installation into the flooring. The gate comes standard in brushed stainless steel, but specifiers can choose from a wide range of finishes or colors, as well as custom options.

www.boonedam.us/winglock-swing // Circle No. 79

INDUSTRIAL SKYLIGHTS MEET CODE REQUIREMENTS

SKYCO Skylights are a capped system with a polycarbonate dome and proprietary wave design to ensure performance and durability. Capped industrial skylight systems eliminate the common cracking that occurs in the domes of capless systems. The company's industrial skylights have an evaluation report ESR#3837 from ICC Evaluation Service, which provides evidence that the curb-mounted, self-flashing and Vortex louvered curb skylights meet code requirements.

skycoskylights.com // Circle No. 80

REPLACE FLOOR-MOUNTED TOILETS WITH WALL-HUNG TOILETS

Geberit's next generation Monolith system for wall-hung toilets adds new color selections—umber and sand—to its existing design palette, and new iridescent safety glass finishes join white and black options. Monolith's revamped installation technique makes installation easier, as well. The system is designed to replace a floor-mounted toilet with a wall-hung toilet. It was developed to connect to existing drainage and water-supply connections. Monolith uses a water-saving dual-flush mechanism that is built into the top of the housing. The system's large and small levers offer two water-saving flush choices: 1.6 GPF for solid waste and 0.8 GPF for liquid waste.

geberit.us // Circle No. 81

LED DRIVER PROVIDES CONSTANT POWER FOR 120 MINUTES

The ILB-CP07-2H emergency LED driver from IOTA Engineering combines constant power performance with an extended 120-minute runtime, creating a solution for two-hour FEMA tornado-safe-room requirements. The driver provides 7 watts of constant power to Class 2 10-60VDC LED fixtures and is UL Classified for field and factory installation. Additional product features include universal 120-277VAC input, a maintenance-free long-life recyclable nickel cadmium battery, rated for damp-location use, and enclosed and gasketed fixtures. The driver is covered by a five-year warranty.

www.iotaengineering.com // Circle No. 82

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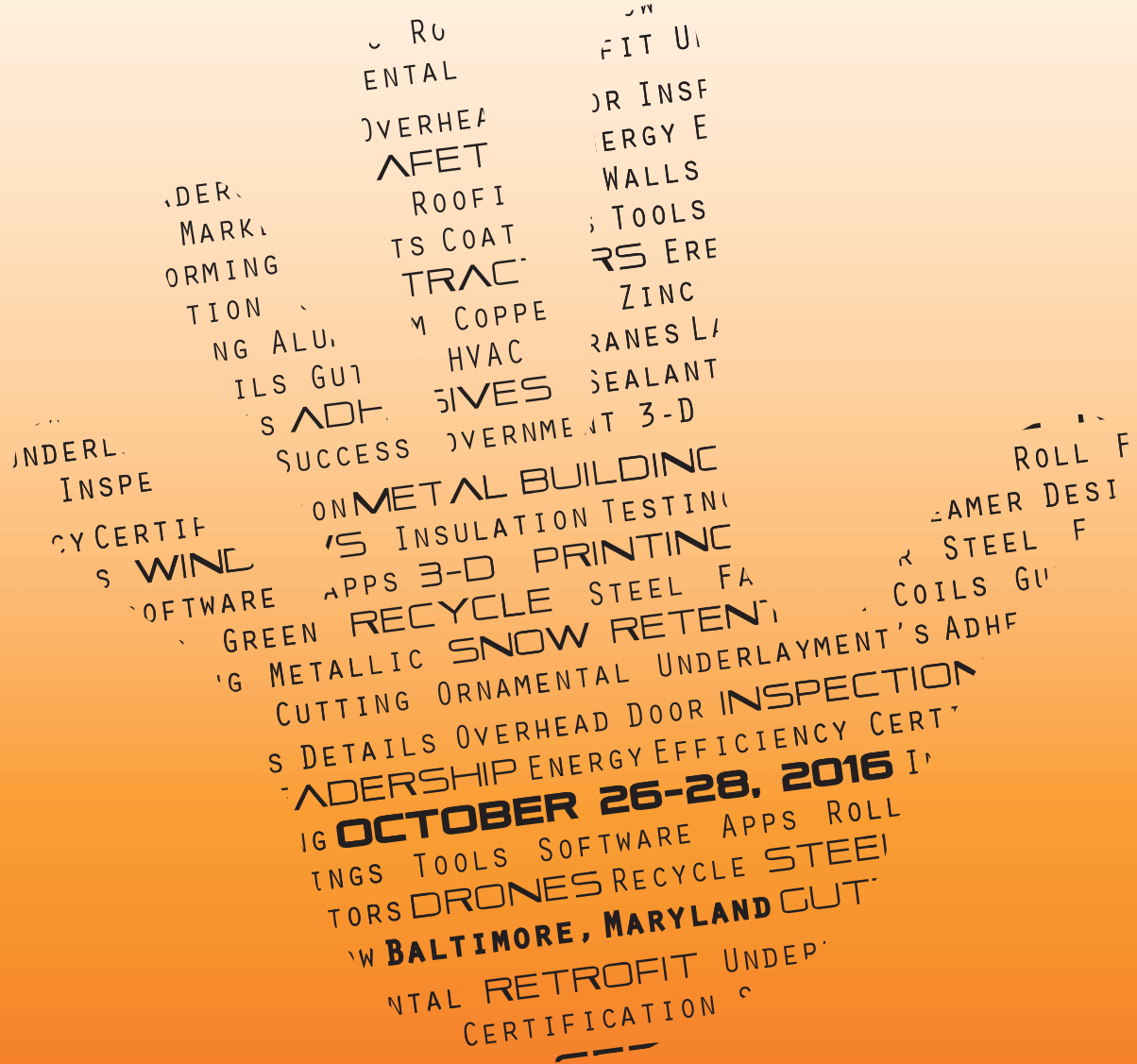

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A 100-YEAR-OLD PARK IS REMADE WITH BEAUTY, ECOLOGY AND FUNCTION IN MIND

PHOTOS: JONNU SINGLETON/SWA

SWA's redesign of San Jacinto Plaza, a historic gathering place in the downtown business district of El Paso, Texas, provides a state-of-the-art urban open space while protecting and celebrating the history and culture of the site. The project was the result of an intensive community process involving input from a wide range of constituents. Active programming, environmental and economic sustainability, and great design have become the de facto criteria for catalyzing renewed interest and investment in the types of urban open spaces exemplified by the updated plaza.

"The centuries-old Arcadian park of axial paths, lawns, benches, and trees is under extreme pressure to adapt to a rapidly changing context of urban densification, cultural diversity and community programming," explains Gerdo Aquino, CEO of SWA, which has offices in California, Texas, China and United Arab Emirates. Aquino led the redesign and was assisted by Ying-Yu Hung. "El Paso, Texas, is one such place whose 100-year-old, storied park has taken center stage in the evolving narrative of the city."

Programming for the park was a main priority, as was the community's desire to retain some of its historic identity. In response, SWA integrated the existing formal axial paths with informal paths and bridges that take park users to various destinations, including gaming areas for ping-pong, chess, washoes (a local favorite similar to horseshoes but with water), a children's splash pad and a café with colorful seating arrangements. At the park's center, the designers restored Los Lagortos, a beloved sculpture by Luis Jimenez that pays tribute to the live alligators that inhabited the plaza more than 45 years ago. Created with San Antonio-based Lake Flato Architects, a metal structure protects the sculpture from the sun and provides a shaded area for activities.


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