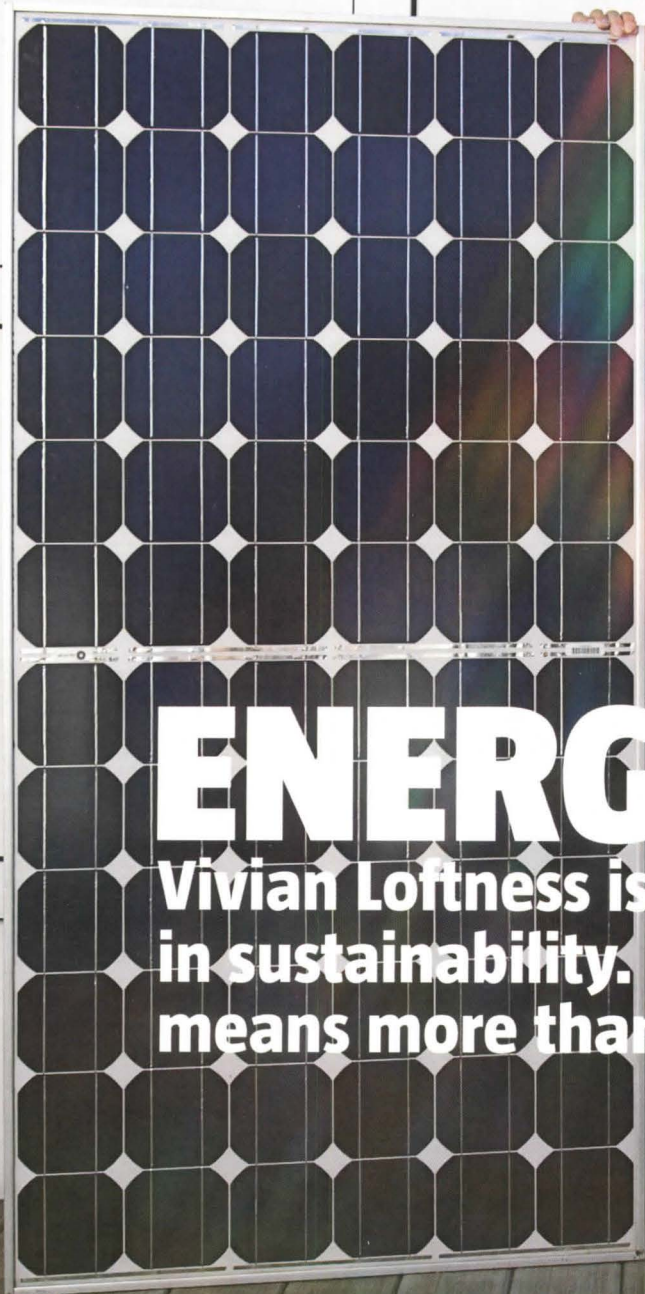


Greening Your Office 51 A God Among Model-makers 71  
Big Box Rebirth 84 Hei From Helsinki 63 Vinyl on Trial 88

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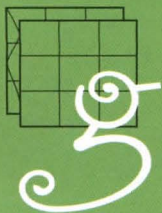
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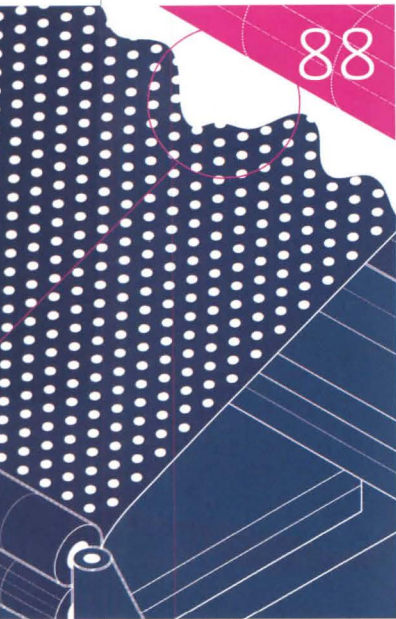
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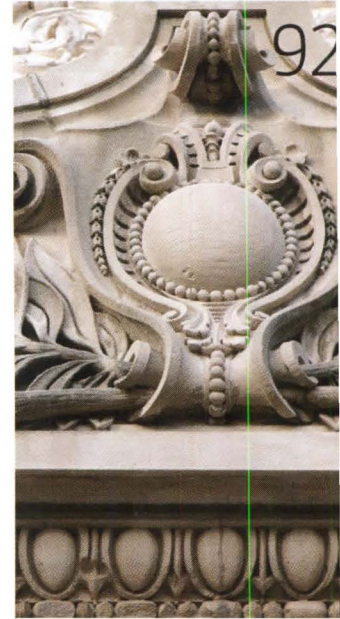
# CONTENT



JAMESON SIMPSON



JULIA CHRISTENSEN



MICHAEL ROBINSON

## FEATURES

76 **Promise vs. Performance** EDWARD KEEGAN  
LEED certification is supposed to free a building from being a drain on our energy resources. But how well do those ratings reflect actual performance?

84 **Big Box Reuse** JULIA CHRISTENSEN  
As stores like Wal-Mart and Kmart leave one large structure for a larger one, communities around the country are finding creative uses for the buildings left behind.

88 **Raw Materials: Vinyl** BRADFORD MCKEE  
PVC is a common yet controversial plastic used in construction. See how it's made and what happens at the end of its life.

92 **Suffragette City** VERNON MAYS  
The restoration of City Hall in University City, Mo., not only aimed to reclaim the building's Beaux Arts past but also to establish its energy-efficient future.

100 **Tales From the Downturn** NED CRAMER  
According to Dan Probst of Jones Lang LaSalle, the recession will not hurt green construction. In fact, the new economic climate makes it a necessity.

102 **Life in a Fishbowl** KATIE GERFEN  
Two new LEED-rated dormitories at the Illinois Institute of Technology will monitor energy used by every person in real time—using electronic fish.

"THEY HAD NO IDEA THEIR M&V REPORT WAS TELLING THEM THEIR BUILDING WAS A DOG. THERE WAS NO CONTEXT."

Mark Frankel, technical director, New Buildings Institute, from "Promise vs. Performance," page 76.



**ON THE COVER**  
Carnegie Mellon University professor Vivian Loftness. Portrait by William Anthony.

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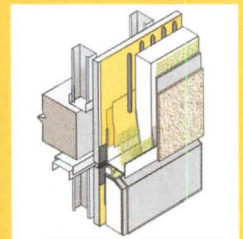
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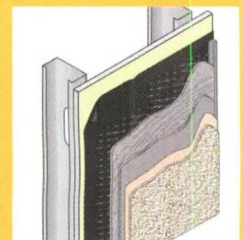
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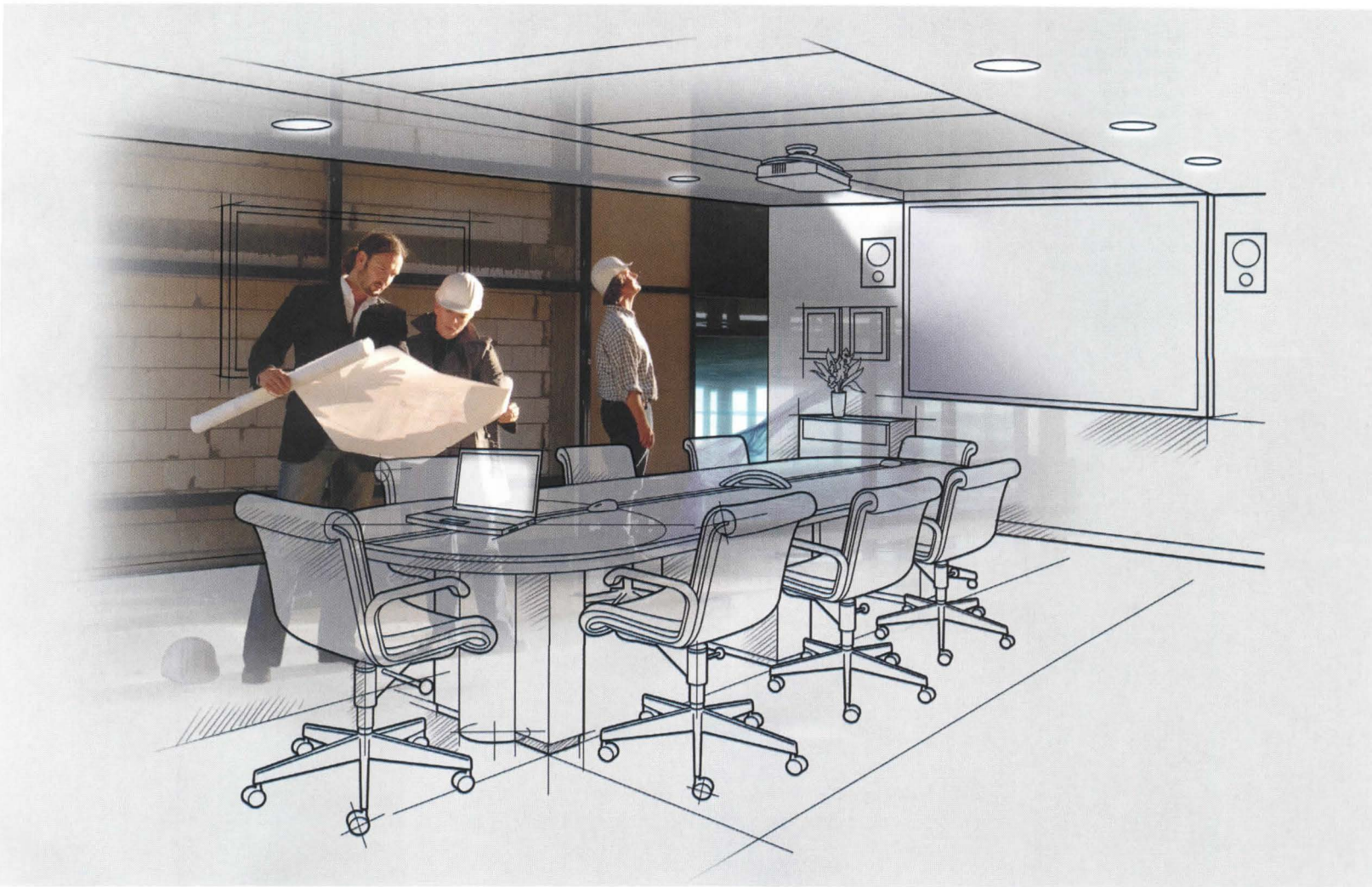


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# CONTENT

**RIGHT** Visitors check out the exhibitions in Laituri, a new center in Helsinki devoted to urban planning.

**FAR RIGHT** At One Haworth Center, the architects and A/V specialists made sure the equipment fit seamlessly within the spaces.



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## FRONT

- 16 **Dialogue**
- 18 **Contributors**
- 20 **Report**  
U.S. architecture firm starts work in Libya; HOK Sport now plays singles; 9/11 memorial design unveiled; and more ...
- 36 **Calendar**  
A month or two in the life of the profession.
- 38 **Products**  
Systems. *Andrew Slocomb West*
- 44 **Numbers**  
The rapid expansion of public transportation. *Kate Herman*
- 46 **Local Market**  
Allentown, Pa., forges a new future after manufacturing. *Margot Carmichael Lester*
- 48 **Screen Grab**  
Schooldesigner.com teaches good architecture for classrooms. *Elizabeth Evitts Dickinson*

## DEPARTMENTS

- 51 **Best Practices** How Green Is My Office?  
A director of sustainable design gives her advice on how to reduce your office's environmental footprint. *Fred A. Bernstein*

- 53 **A/V** Celebrating A/V 2008  
The *Pro AV* Spotlight Awards highlight the best integration of A/V into design. *Andrew Slocomb West and the Pro AV editorial staff*
- 63 **Letter** Letter From Helsinki  
Public opinion plays a very important role in the Finnish capital's architectural planning. *Amanda Kolson Hurley*
- 71 **Specialist** Model Citizen  
Inside the office of one of the industry's premier model-makers. *John Gendall*

## BACK

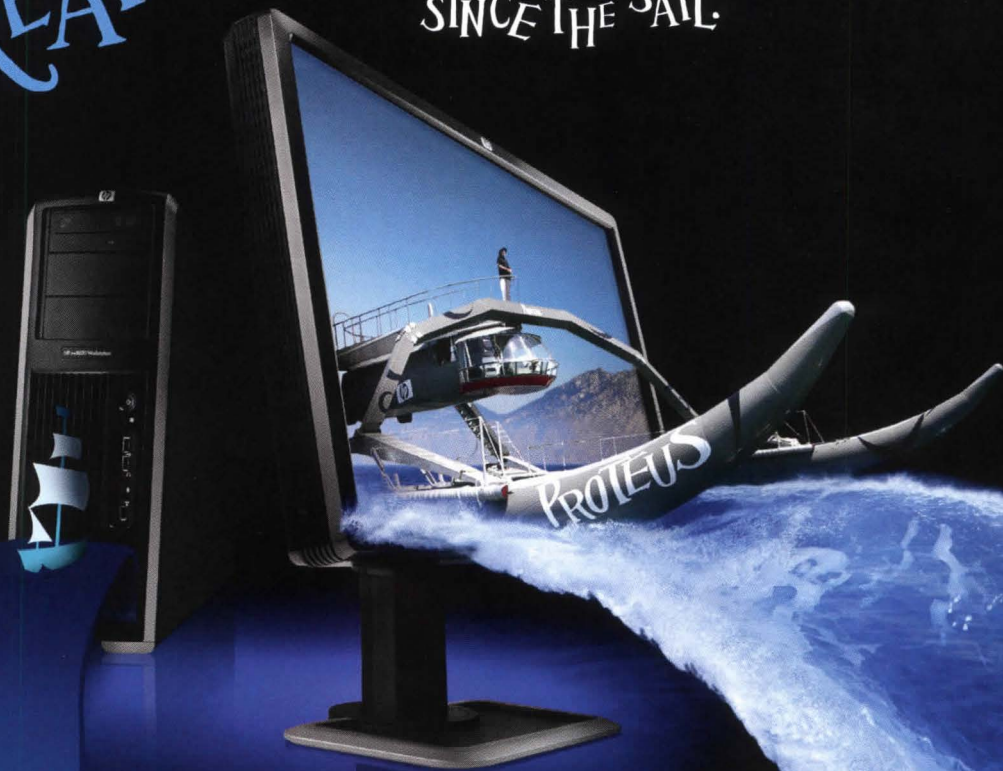
- 107 **Culture**  
A new look at development in China, optical confusion, and more ... *Hannah McCann*
- 120 **Q&A** Kent Peterson  
A discussion about how architects and engineers need to work together to improve energy usage and interior comfort. *Interview by Edward Keegan*

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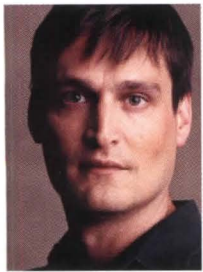
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## Dialogue

# YOU'RE GREEN? THEN SHOW US THE DATA



TIMOTHY GREENFIELD-SANDERS

**Ned Cramer**  
Editor in Chief

**HERE'S A MARKETING TIP:** Stop sending press releases touting LEED-rated buildings. I'm not alone in saying this. During a panel discussion at the recent Society for Marketing Professional Services conference in Denver, my fellow speakers—editors from *Engineering News Record*, *Building Design & Construction*, and *Architectural Record*—all agreed that garnering a LEED rating simply isn't newsworthy anymore. Our point—if I may speak for the group—wasn't that a LEED rating has lost its inherent value, but that it's become relatively commonplace. That's a good thing. It's a sign that more architects are designing green and more of their clients are paying for the privilege.

But when it comes to advertising your sustainable bona fides—and here I speak for myself—these days there are better ways to get a busy editor's attention. LEED is an aspirational tool, a kind of sustainability forecast. It only holds true until move-in day. From that moment forward, for a building's entire operational life, a LEED rating has little value except for marketing. To gain an actionable, four-dimensional understanding of the value of sustainable design strategies, architects, building owners, and facility managers have to invest in long-term performance evaluations.

How much energy and water does a building consume? How much waste does it produce? What is its carbon footprint? These are the kinds of questions contemporary architects must be prepared to answer in order to make the sustainability movement truly sustainable, as ARCHITECT editor at large Edward Keegan asserts in this month's cover story, "Promise vs. Performance" (page 76). If we can't back up our green rhetoric with hard numbers, we'll lose credibility with (and commitment from) tenants, investors, and other client groups. This audience is nearly captive. They are increasingly intrigued by the potential health benefits of green architecture and cost savings over the life of a building. But if the profession is going to tout such advantages, it had better deliver. The burden of proof lies with architects.

It's easy to grow overwhelmed by conflicting claims about sustainability. Witness the ongoing debate over PVC, which contributing editor Bradford McKee addresses in "Raw Materials: Vinyl" (page 88). Is it a toxic offender, or a recyclable wonder product? Similarly, big box stores, with their acres of asphalt, are hardly environmental models, but abandoned Wal-Marts and Kmart's can take on second, productive lives, as artist Julia Christensen shows in "Big Box Reuse" (page 84)—so does that make them, in a sense, green? In many such cases, there is no straight-line answer. But the science of building performance doesn't have to be complicated. The solution is to establish simple measurement systems and routines—to provide clear data that back up the promise of the design. There are plenty of existing, low-cost evaluation tools, from monthly electricity bills and employee attendance records to toilet valves that track water consumption and lighting controls that monitor energy use.

Occam's razor—*lex parsimoniae*—holds that all things being equal, the simplest solution is the best. Several of the experts we interviewed for "Promise vs. Performance" made the exact same assertion, that buildings of the 1920s are as green as or greener than the latest LEED-rated glass tower. I've been pushing this idea for years. When I was curator at the Chicago Architecture Foundation, I used Burnham & Root's landmark Rookery Building of 1888 as an object lesson to explain daylighting and passive ventilation to lay audiences. If architects were able to design well-ventilated, well-lit skyscrapers decades before the advent of air conditioning and fluorescent lighting, there's no reason we can't design equally simple, sustainable buildings today. We just need to prove that they work.

## Not So (Pre)Fab

Loved your editorial ["Prefab Is Fab, but Only Half the Battle," September]. Here in the trenches, it seems we constantly battle the perception that prefab is the Answer To Everything with regard to housing. It's definitely not, and to promote it as such can be very misleading. It seems that voicing this opinion brands one as cranky and old school, and who wants to be old school?

**Dan Maginn**  
El Dorado Inc.  
[dmaginn@eldoradoarchitects.com](mailto:dmaginn@eldoradoarchitects.com)

Your editorial in the September issue could not have been more dead-on regarding the overriding importance of planning versus prefabrication. Our projects also use prefab units. They're called bricks, or sheets of drywall, or plywood! These materials are at a size that allows everyone to have a meaningful role in the creation of a richly envisioned architectural expression. How do people fall in love with buildings where they were provided no meaningful opportunity to express their full humanity? I understand the value of mass customization, but I'm just a little worried we don't look a bit more deeply into the social and artistic implications of all this.

**Philip A. Esocoff**  
Esocoff & Associates Architects  
[pesocoff@esocoff.com](mailto:pesocoff@esocoff.com)

## Say What You Mean

Regarding your rant about "Pricey Gas Is Good for Architecture" (August 2008), here are two opportunities for you to put your money where your mouth is: (1) pay my family's \$630 annual gas tax bill; and (2) move to Western Europe. I suspect you won't consider either one of these, because higher taxes are great, just as long as someone else pays them, right? And in reality, you don't like the thought of paying \$10 for a gallon of gas any better than the rest of us. If you insist on telling the rest of us how to live, then at least have the guts to say what you mean: Vote Obama!

**Kent Sanford**  
Intergroup Architects  
[ksanford@intergrouparchitects.com](mailto:ksanford@intergrouparchitects.com)

## R + D = 2?

What does it say that a jury of three men would determine 21 R+D winners, of whom exactly two are women?

**M. Lane Chapman**  
Cooper Carry  
[lanechapman@coopercarry.com](mailto:lanechapman@coopercarry.com)

## Corrections

The portrait for September's "Tales From the Downturn" was taken by Stefan Hester, not Tracy Powell. Also, the table of contents in the August issue misspelled the name of R+D Award winner Chomarat. We regret the errors.



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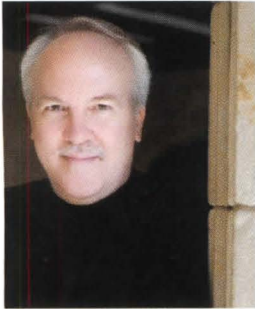
**FOR THE PAST TWO DECADES**, Vernon Mays has combined the careers of writer and curator with a focus on architectural design. From 2000 until earlier this year, he was curator of architecture and design at the Virginia Center for Architecture in Richmond. Recent exhibitions he organized include this summer's "Italian Dressing: Palladio and American Classicism," at the Virginia Center, and "Blueprint for America: A Gift to the Nation," which he guest-curated this spring for the AIA's national headquarters in Washington.

Mays is the founding editor of *Inform* magazine, published by the Virginia Society AIA. He was architecture critic for the *Hartford Courant* newspaper in Connecticut and a senior editor at *Progressive Architecture*, and has contributed to publications including *Wired*, *Preservation*, *Interior Design*, and *Landscape Architecture*. He has an M.Arch. from Virginia Tech and a B.A. from the University of North Carolina, Chapel Hill.

For his feature article "Suffragette City" (page 92), Mays visited University City, Mo., a small municipality bordering St. Louis. While studying the LEED renovation of the city hall, he became intrigued by the history of the

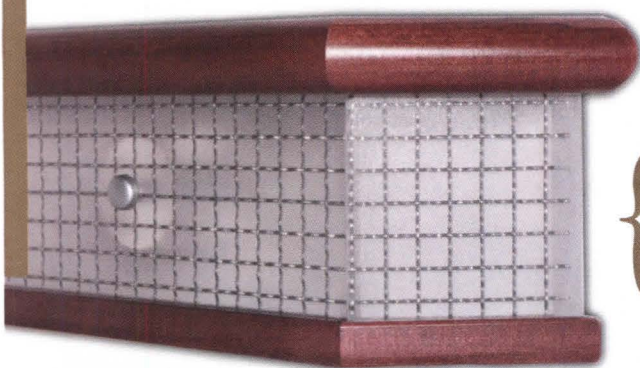
building and of University City itself, which was founded by radical publisher Edward Gardner Lewis. In 1903, a year before the St. Louis World's Fair, Lewis began construction on a five-story Beaux Arts base for his company, which published *Woman's Magazine* and *Woman's Farm Journal*. By 1912, he had founded the now-defunct People's University and the American Woman's League, and soon after established a City Beautiful-inspired colony for the latter group in Atascadero, Calif. His former headquarters became University City's city hall in 1930.

One of the odder features of the building is a huge searchlight that can be hoisted through the roof; Lewis used it to draw crowds to his building during the World's Fair, and the city still uses it on special occasions. Not surprisingly, the city hall is a beloved local landmark. "One of the clerks in the building told me her daughter had been married there," says Mays. "They're very proud of it."



**Vernon Mays**  
"Suffragette City," p. 92

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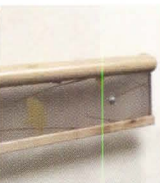
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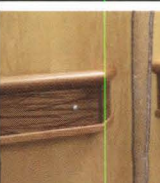
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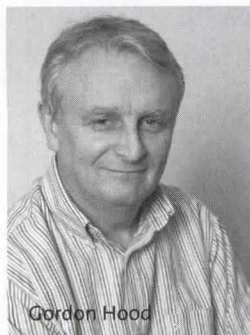
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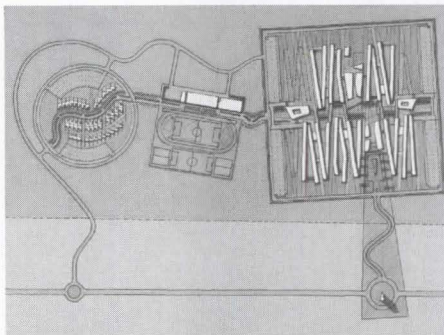
Interview

# Libya Open to American Architects

RMJM Hillier's Global Education Studio director discusses the first project in the country by a U.S. practice since full diplomatic relations were restored.



Gordon Hood



Gordon Hood heads RMJM Hillier's Global Education Studio. The practice, which has done work for the University of Cambridge, Cornell University, and other places of higher education, is now designing a branch campus for Libya's 7th of October University. The master plan (above right) takes inspiration from the desert rose, an indigenous silica crystal.

**EARLIER THIS YEAR**, RMJM Hillier became the first U.S. architecture firm to receive a commission in Libya since the United States normalized relations with the North African nation in 2006. Working in a country that has had a highly contentious relationship with the United States for decades and is led by a man—Moammar Gaddafi—most would describe as a dictator might give some firms pause, but this is nothing new for RMJM, which designed the Olympic Green Convention Center for the Beijing Olympics and the Okhta Center tower in St. Petersburg, Russia, for state-owned energy company Gazprom. “We do a lot of due diligence on the people we work for,” RMJM CEO Peter Morrison told ARCHITECT last spring (“The House of Morrison,” May 2008). “If we believed there was something morally deficient, we wouldn’t work for these clients.”

The project in Libya, a branch campus in Bani Walid for the 7th of October University that will serve more than 3,000 students, is being designed by the Global Education Studio, based in RMJM Hillier's Princeton, N.J., office. Construction on the 123-acre campus is expected to begin in 2009 and finish in 2010. Firm principal and studio director Gordon Hood spoke with ARCHITECT about design inspirations, dealing with the desert environment, and the development potential of a country with enormous amounts of open land and an equally large checkbook to pay for new construction. **BRAULIO AGNESE**

## How did the firm end up getting into Libya?

The Libyan government has a procurement arm called ODAC [Organisation for the Development of Administrative Centres], and they contacted us to see if we were interested in doing education work. We met them at our office in London and showed them our capabilities.

**Inspiration for the campus comes from the desert rose, a silica crystal. How did this happen?**

The campus is in the desert. We visited the site and did a lot of background research. We wanted something indigenous and discussed a number of ideas, of which the desert rose was one. That appealed to them.

## Are you working with a local firm?

No. We are doing the designs from here but are visiting Tripoli to meet the client, and we have some meetings in London and some by videoconference.

## Do you plan on opening an office in Tripoli?

Hard to say at the moment. That would be down the line. We wouldn't be doing that for two projects, but we might review that in the future.

## What are your impressions of the country?

Huge potential, if you think how all of the other sides of the Mediterranean are some of the most expensive real estate in the world. The country has huge oil reserves. Basically, they have money in the bank. They've decided, I think, to go on a modernization program of nearly every one of their social services—education, health, residential—but they're also moving forward with a huge tourist program, looking at developing 400 kilometers of coastline. There are not that many tourists there at the moment. They have some of the best Roman ruins in the world.

## Does Libya have a vernacular style you are drawing from, or is what you're doing entirely new?

Libya has a very rich history. Many civilizations have left their mark in terms of architecture. But to some degree, they have all colonized Libya. We looked for indigenous forms, particularly forms that could deal with the severe desert climate. We found a very interesting settlement called Ghadames [a UNESCO world heritage site]. It deals with climate in terms of buildings being clustered close together, with narrow courtyards and connecting spaces. They're very interested in the campus buildings being contemporary. There's no pastiche. So, in a sense, the origins of the culture are used as inspiration, but not in terms of re-creating a historic style. It's used as a starting point.

## Are you trying to make the campus as green as possible?

They are very interested in it being sustainable. We are looking at introducing as many areas of natural ventilation as we can, having areas of circulation which are open walkways rather than air-conditioned spaces—but some of the more technical spaces are air-conditioned. We're trying to make it low-energy. We're trying to use materials which can be delivered locally. We have to figure out the technologies which are most appropriate to be delivered by the Libyan construction industry.

## Have you met Gaddafi?

I have not. He meets Condoleezza Rice.

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Historic Structure

## Farnsworth House Flooded

Beloved modernist icon suffered no structural damage but will likely be closed for the rest of the year.

LUDWIG MIES VAN DER ROHE'S Farnsworth House was designed with Plano, Ill.'s, Fox River in mind—the floor slab is suspended 5 feet above ground level to allow occasional floodwaters to pass beneath—but since its completion in 1951, it has nonetheless suffered Mother Nature's indigni-

ties a half dozen times, most recently last month. Record rainfall on Sept. 13 and 14 raised the river more than 14 feet above its normal level, filling the house with 15 inches of water.

"We were very fortunate," says James Peters, president of Landmarks Illinois, which manages the site, owned by the National Trust for Historic Preservation. Unlike in 1996, when the swollen river smashed the glass windows, last month's flooding caused no structural damage. But enough harm was done that the house will probably be closed for the rest of 2008. The timing couldn't have been worse, says Peters: Autumn is prime tourist season for the house museum, and no visitors for several months means up to \$70,000 in lost revenue.

Over the years, says Peters, Landmarks Illinois has received many proposals on how to protect the modernist icon, including a high wall around the house and hydraulic pistons to lift the structure higher. "So far," he notes, "none of them are practical." The September flooding "will cause us to revisit those ideas," he adds. "We've talked about creating a website to showcase all the proposals. We don't want people to think we haven't been thinking about this." B.A.

Follow repair progress on the Farnsworth House at [landmarksillinois.blogspot.com](http://landmarksillinois.blogspot.com), written by site manager Whitney French.



The Farnsworth House on Sept. 14. Because Landmarks Illinois had advanced notice of potential flooding, staff were able to take preventive measures to save furniture.

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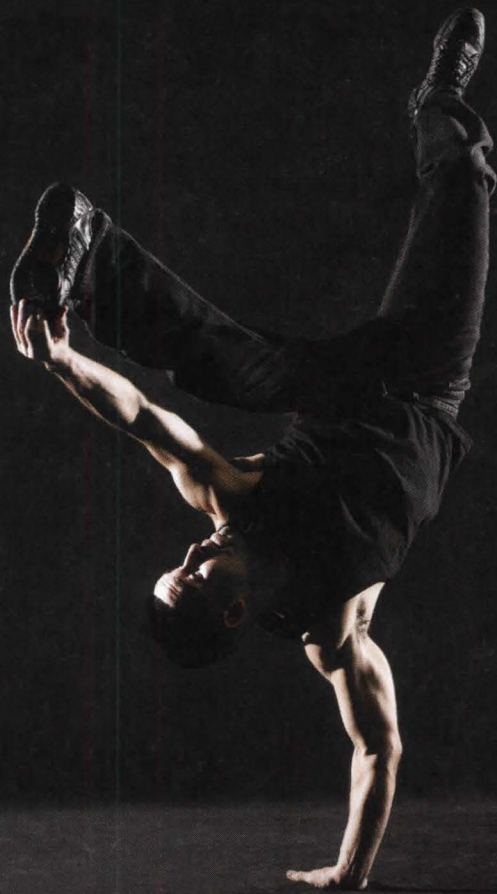
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List

## Best U.S. Architecture Firms to Work For, 2008

1. Scott & Goble Architects, Tulsa, Okla.
2. EDSA, Fort Lauderdale, Fla.
3. Anderson Brulé Architects, San Jose, Calif.
4. Taylor, Newport Beach, Calif.
5. Group One Partners, Boston
6. Parkhill, Smith & Cooper, Lubbock, Texas
7. DES Architects + Engineers, Redwood City, Calif.
8. JMZ Architects and Planners, Glen Falls, N.Y.
9. Little, Charlotte, N.C.
10. Sasaki Associates, Watertown, Mass.

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## REPORT

Culture

# Chandigarh Honors Corbu

Indian city seeks world heritage status and will open a research center about its creator.

**SEVEN YEARS AFTER** being approached by UNESCO, local governmental entities in Chandigarh, located in the Himalayan foothills of northern India, have applied for the city's designation as a world heritage site.

Designed by Le Corbusier during the 1950s and early 1960s, the city of wide boulevards, leafy landscapes, and boldly geometric concrete structures is the 20th century architect's most completely built urban vision. Its iconic Parliament, Secretariat, and Palace of Justice are staples of architectural history survey courses. Most of Corbusier's buildings sit within the city's 27-square-mile historic core.

While designation could bring more attention—not to mention tourism and its income—to Chandigarh, not everyone has been receptive. Aditya Prakash was a

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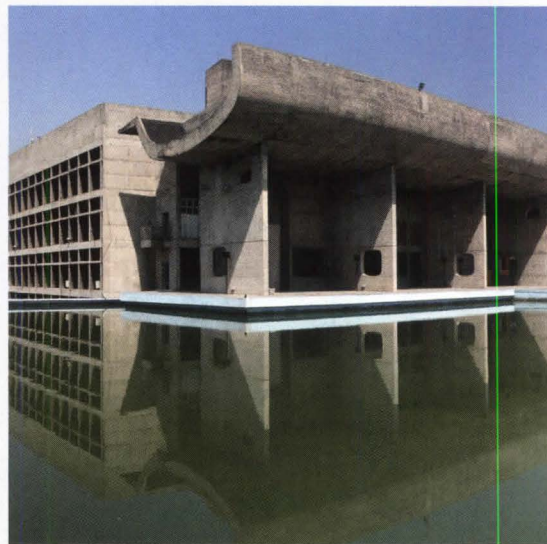
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The Parliament in Chandigarh, India, also known as the Palace of Assembly, is among Le Corbusier's best-known buildings in the city.

longtime chief architect of the city and a member of the original team that worked with Corbusier. Prakash died in August, but earlier this summer, according to the Indian business newspaper *Mint*, he complained that preservation might preclude the city's growth and change over time. "We should not kill it," he said, "but it should be allowed to die."

Concurrently, plans have been announced for a new museum and research center that will serve as an interpretative center for Corbusier's designs. It will be the second such center in India devoted to the architect—the other is in Ahmedabad—and the sixth in the world. The center will be located in a Corbusier-designed structure that was his office during the development and construction of the city. Reportedly, many objects, including furniture, shelves, and cupboards, have remained untouched since the architect last left Chandigarh more than four decades ago.

The new center may open as early as this month, with its companion website to be available soon. The UNESCO world heritage designation is expected in early 2009. EDWARD KEEGAN



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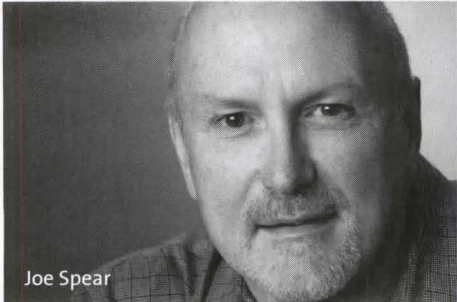
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## REPORT

Business

# HOK Sport Is a Free Agent

Practice responsible for more than 825 sports and event facilities becomes fully autonomous.



Joe Spear

**IN AUGUST**, the board of HOK Group and the managers of HOK Sport Venue Event, which has been a part of HOK for a quarter century and a wholly owned subsidiary since 2000, agreed to a transfer of ownership, allowing HOK Sport to become an independent firm. Although finan-

cial information was not disclosed, HOK vice chairman Clark Davis says it was basically a rearrangement of employee ownership. About 300 shareholders have stock in HOK Group, and members of HOK Sport were able to exchange their HOK Group stock for sports practice stock.

The buyout comes as a natural progression of the practices, say those involved in the transaction. As an independent subsidiary of HOK, HOK Sport has effectively been run as its own business, meaning the move will have no effect on day-to-day operations or client relationships.

"On our minds was how we grow and incentivize our staff, how we keep key players involved," says Joe Spear, senior principal at HOK Sport. "We didn't control the stock program

that HOK had, and helping us keep our star performers for a long time was a big part [of the decision]." In discussing HOK Sport's relationship with HOK over his 25 years there, Spear says HOK grew the practice by allowing it to do all sports projects the firm received, an opportunity he saw nowhere else.

HOK Sport will keep its name at least through the end of 2008, when the buyout is expected to be complete. A new corporate name and brand are being developed. An article in *The Kansas City Star* says the transaction includes a noncompete agreement that will last for a few years. The firm's headquarters will remain in Kansas City, Mo., and it will maintain offices in Nashville and Knoxville, Tenn.; London; and Brisbane, Australia. **ANDREW SLOCOMB WEST**

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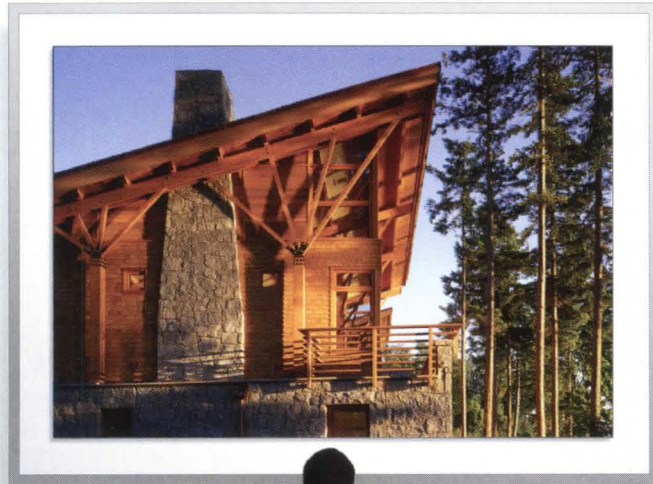
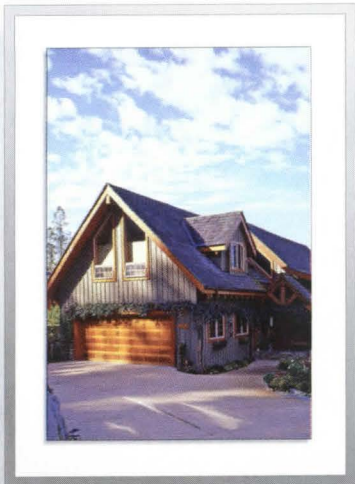
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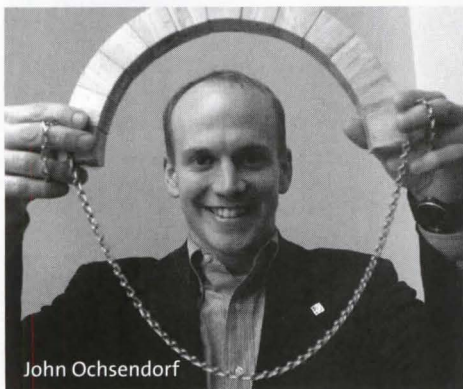


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## REPORT

Recognition

# MIT's Ochsendorf, 2008 MacArthur Fellow



John Ochsendorf

**JOHN OCHSENDORF IS ON A ROLL.** In 2007, the associate professor of building technology at MIT's School of Architecture won a coveted Rome Prize fellowship. And last month, he learned he was the recipient of a 2008 "genius grant" from the MacArthur Foundation Fellows Program. The award, \$100,000 a year for five years, with no

strings attached, has been given annually since 1981 to U.S. citizens who show "exceptional merit and promise for continued and enhanced cre-

they've been nominated. "My first thought was, it's not possible," said Ochsendorf—a structural engineer and architectural historian whose

**"Interdisciplinary work like mine doesn't often get a lot of attention. This is a tremendous vote of confidence."**

—John Ochsendorf, associate professor, MIT School of Architecture

ative work." (Previous winners from the world of architecture are critic Ada Louise Huxtable in 1981, designers Elizabeth Diller and Ricardo Scofidio in 1999, and educator Samuel Mockbee in 2000.) Unlike the Rome Prize, however, for which Ochsendorf applied, the MacArthur grant was a surprise: Winners do not even know that

pursuits include preserving structures and interpreting ancient technologies for contemporary use—on Sept. 23, the day the grants were announced. "Interdisciplinary work like mine doesn't often get a lot of attention. This is a tremendous vote of confidence. It says, 'Hey, what you're doing is pretty interesting.'" B.A.

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## REPORT

In Memoriam

# Stephen Kliment, Architect and Journalist, Dies at 78

**ARCHITECT, EDITOR, AND JOURNALIST** Stephen Kliment died on Sept. 10. He was 78 years old. Best known as the editor in chief of *Architectural Record* from 1990 through 1996, Kliment enjoyed a widely varied career. A Czech native raised in Great Britain, he came to the United States to study architecture at MIT and Princeton. Following graduate school, he worked briefly for Skidmore, Owings & Merrill before a stint as editor of *Architecture and Engineering News*. He then practiced for a dozen years as a partner with Caudill Rowlett Scott. Prior to his editorship at *Record*, Kliment was the acquisitions editor of architecture books at John Wiley & Sons, a role he reprised during the last decade of his life, when he established the publisher's Building Type Basics series. E.K.

Ground Zero



The National September 11 Memorial & Museum has unveiled the design for the Memorial Museum Pavilion, by Norwegian firm Snøhetta. It is the only aboveground part of what will be a 220,000-square-foot museum and tribute to 9/11 victims. The glass-and-steel structure will be sited among a grove of oak trees at the back of the eight-acre site, where the architects see the building as the visual center of the memorial, inside and out. To engage the reflecting pools in the footprints of the Twin Towers, the south façade will tilt down toward the pools. The atrium, which will house two columns from Minoru Yamasaki's buildings, will pull light into the museum below and offer a view up to the Manhattan skyline. A.S.W.

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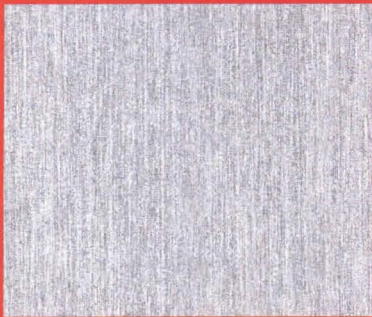
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## REPORT

Social Responsibility

# Pro Bono Work Gains Traction Among Architects

Survey by Public Architecture, new AIA guidelines point to increased efforts to help local communities, nonprofits, and others.

IN 2005, THE SAN FRANCISCO nonprofit Public Architecture created The 1%, a program that recruits architecture firms to pledge 1 percent of their billable hours to pro bono work. To date, more than 400 firms have signed up. "When we formed Public Architecture [in 2002] and started looking into ways of doing pro bono work, we found little help within the community, including the AIA," says executive director John Cary. "That's one reason we launched The 1%." However, he adds, "the AIA represents its individual members. We approach pro bono as something that involves the entire firm."

Anthony Costello, Irving Distinguished Professor Emeritus of Architecture at Ball State University and the guidelines' primary author. For the initiative, part of the AIA's sesquicentennial celebration in 2007, "hundreds of architects engaged in providing thousands of hours of pro bono planning and design services," notes Costello.

Cary points out that design is only one aspect of pro bono work: "The list of projects firms are involved in really speaks to the ways an architect's skills can be used, whether it's sitting on community boards, providing education, or providing architectural services." And firms of every

"We are seeing architects emerging as civic leaders in their communities and changing the commonly held image of the architect as an elitist servant of the corporate or wealthy client."

—Anthony Costello, primary author, AIA guidelines on pro bono services

The 1% released the results of its second annual survey of participating firms in August, revealing the time spent on pro bono, as well as the types of projects and the motivations for, and limitations of, doing such work. More than two-thirds of responding firms reported committing 2 percent or more of their time to pro bono work—the best news from the survey, says Cary. "It really shows the generosity of firms."

Reflecting this growing engagement with pro bono work, the American Institute of Architects released a draft of pro bono guidelines this summer, inviting members to comment before the AIA board of directors votes on them at year's end. Whereas groups like the American Bar Association and the American Medical Association have long maintained such guidelines, the AIA did not address the subject until it amended its code of ethics in 2007.

"The institute's commitment to these guidelines owes a great deal to the success of the AIA 150 Blueprint for America initiative," says

size are joining in, "from sole practitioners to large, global companies," says Cary.

HOK is one such global firm. Kenneth Drucker, senior principal and the director of design for the New York office, says, "Our offices typically have at least one pro bono project per year. We work in the communities where we have offices, and we like to work with institutions where we have a commitment from one of our employees."

The next step for the program, says Cary, is "to align our firm recruitments with places that have requested assistance." To that end, The 1% solicits nonprofits to register when they encounter challenges that could be solved through professional architectural services.

"The growing commitment to pro bono is evident in the phenomenal growth of [The 1%]," says Costello. "We are seeing architects emerging as civic leaders in their communities and changing the commonly held image of the architect as an elitist servant of the corporate or wealthy client." JOHN GENDALL





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## REPORT

### Clips

The AIA will be releasing **six new contract documents** on Oct. 17: a BIM exhibit, two integrated project delivery agreements, two design/build agreements, and a scope of services document. The documents will be available on the AIA website and in paper form.

The **University of Washington** has changed the name of its architecture school to the **College of Built Environments**. The dean and faculty felt that "College of Architecture and Urban Planning" did not reflect the responsibilities of a 21st century design school. The school claims it is the first in the U.S. to use the term "built environment" in its name, although it is popular with schools in other countries.

The General Services Administration and the Building Owners and Managers Association have withdrawn their challenges to the International Code Council about **new requirements for skyscrapers** in the wake of the Sept. 11 attacks. At its September meeting to finalize the 2009 building code, the ICC upheld requirements that **office buildings taller than 420 feet must have an additional stairwell** and more-robust fireproofing. It also added to a requirement for **glow-in-the-dark paint in stairwells of buildings over 75 feet** by mandating it for existing buildings, not just

for new construction. In a compromise with the GSA, the ICC will waive the requirement for an extra stairwell if a building has an elevator that can evacuate people in an emergency. Still outstanding is a controversial proposal to require sprinklers in all new-home construction.

In other ICC news, the group has released **new construction guidelines for hurricane and high-wind areas**. The Standard for Residential Construction in High Wind Regions (ICC-600) features wind-resistant construction details and design guidelines. The standard will be available to communities for adoption in their codes and will be a referenced standard in the 2009 International Residential Code.

**Charles Thornton**, co-founder of engineering and design firm Thornton Tomasetti, has been awarded the **2008 Henry C. Turner Prize**, given by the National Building Museum. Thornton is receiving the award for his founding of the **Architecture, Construction, and Engineering Mentor Program of America**, which has affiliate organizations in 31 states and involves 45,000 students nationwide. The Turner Prize comes with a \$25,000 cash award.

**A. Epstein and Sons International** has changed its name to **Epstein** in order to reflect its current ownership structure and corporate branding.

The firm was founded 87 years ago in Chicago and was bought out by employees in December 2005.

**HKS** has completed its acquisition of London-based RyderHKS International, purchasing the last third of the stock from Ryder, an architecture firm based in Newcastle, England. The London office of HKS will now be called **HKS Architects Ltd.**

The **Harvard Graduate School of Design** has launched a new **concentration in sustainable design** as part of its Master of Design Studies program. The curriculum will be coordinated by associate professor of architectural technology **Christopher Reinhart**.

**Robert A.M. Stern Architects** has been tapped to design **two residential colleges at Yale University**. The colleges will expand the average undergraduate population of 5,250 to about 6,000 and are expected to open in 2013. Yale's 12 existing colleges were designed by James Gamble Rogers and Eero Saarinen.

The **Ethisphere Institute** has published "**2020 Global Sustainability Centers**," a list of 20 large and mid-size cities with the best plans for a sustainable future. **New York City** and **Portland, Ore.**, are the only U.S. cities on the list. Read the institute's analysis at [ethisphere.com/2020-global-sustainability-centers](http://ethisphere.com/2020-global-sustainability-centers).

### Urban Spaces

# End of the Road?

**AS PART OF THEIR** Highways to Boulevards initiative, the Congress for the New Urbanism and the Center for Neighborhood Technology have released "Freeways Without Futures," a list of the top 10 places across the nation that offer the best opportunities for urban revitalization through the replacement of deteriorating highways with walkable boulevards and denser development. Learn more about the roads on the list, the cities where urban-space reclamation has been successful, and current campaigns to remove freeways at [cnu.org/highways](http://cnu.org/highways). B.A.

1. **Alaskan Way Viaduct**, Seattle
2. **Sheridan Expressway**, Bronx, N.Y.
3. **The Skyway and Route 5**, Buffalo, N.Y.
4. **Route 34**, New Haven, Conn.
5. **Claiborne Expressway**, New Orleans
6. **Interstate 81**, Syracuse, N.Y.
7. **Interstate 64**, Louisville, Ky.
8. **Route 29**, Trenton, N.J.
9. **Gardiner Expressway**, Toronto, Ontario
10. **11th Street Bridges and the Southeast Freeway**, Washington, D.C.



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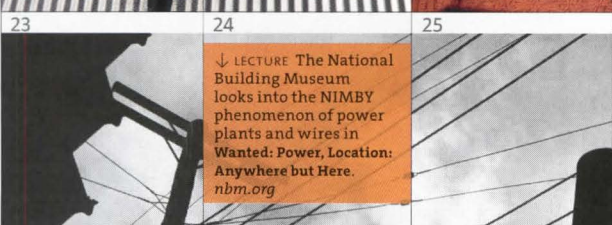

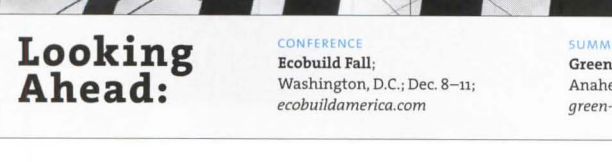


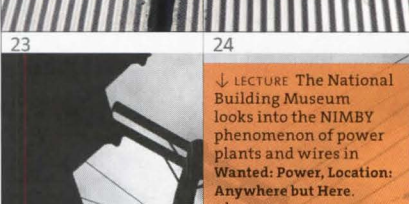
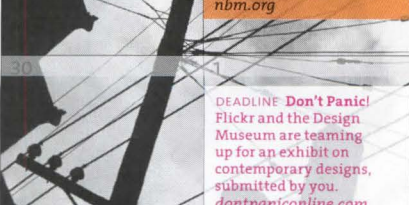


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Edited by Andrew Slocomb West

# CALENDAR

OCTOBER, NOVEMBER, DECEMBER

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
26 	27 	28 	29 	30 	31 	1 
				<p>LECTURE Attend <b>Solar Thermal</b> in New Haven, Conn., to learn what solar water heaters are all about. <a href="http://aiact.org">aiact.org</a></p>		<p>DEADLINE The <b>Milka Bliznakov Prize</b> is looking for research on women in architecture in this two-stage competition. <a href="http://tinyurl.com/bliznakov">tinyurl.com/bliznakov</a></p>
				<p>TRADE SHOW Don't worry if you missed Chicago, <b>NeoCon East</b> will show off the contract world again, this time in Baltimore. <a href="http://neconeast.com">neconeast.com</a></p>		
				<p>CONFERENCE <b>Justice Architecture</b> gathers in San Francisco to explore sustainability, design, delivery, and practice in the design of justice facilities. <a href="http://aia.org/caj_default">aia.org/caj_default</a></p>		
				<p>CONFERENCE Petra University in Jordan hosts the 2008 conference of <b>The Center for the Study of Architecture in the Arab Region</b>, which will look at the conservation of heritage sites. <a href="http://csaar-center.org">csaar-center.org</a></p>		<p>SEMINAR With all the talk about oil independence, the University of Pennsylvania is <b>Re-Imagining Cities</b> for the post-oil era. <a href="http://upenn.edu/pennur/afteroil">upenn.edu/pennur/afteroil</a></p>
9 	10 	11 	12 	13 	14 	15 
<p>DEADLINE Jump into Lake Michigan with the Metal Construction Association's <b>Maritime Museum and Historical Center</b> competition, sited off the coast of Chicago. <a href="http://metalconstruction.org">metalconstruction.org</a></p>				<p>SEMINAR <b>The Nature of Sacred Space</b> examines design trends in faith communities. <a href="http://aia.org/ev_ifraa_o8_vsa">aia.org/ev_ifraa_o8_vsa</a></p>		
16 	17 	18 	19 	20 	21 	22 
				<p>DEADLINE Every student wants to design a prison, right? <b>Prisoned 2009</b> is their chance. <a href="http://sociodesignfoundation.org">sociodesignfoundation.org</a></p>		
				<p>TRADE SHOW <b>Greenbuild</b> descends upon Boston this year. <a href="http://greenbuildexpo.org">greenbuildexpo.org</a></p>		
23 	24 	25 	26 	27 	28 	29 
<p>LECTURE The National Building Museum looks into the NIMBY phenomenon of power plants and wires in <b>Wanted: Power, Location: Anywhere but Here</b>. <a href="http://nbm.org">nbm.org</a></p>				<p>WEBINAR Log on to explore <b>The Peter and Paula Fasseas Cancer Clinic</b>, an AIA Healthcare Design Award winner, with its designers. <a href="http://aia.org/ev_aah_webinar_v3">aia.org/ev_aah_webinar_v3</a></p>		
<p>DEADLINE <b>Don't Panic!</b> Flickr and the Design Museum are teaming up for an exhibit on contemporary designs, submitted by you. <a href="http://dontpaniconline.com/designcities">dontpaniconline.com/designcities</a></p>						

## Looking Ahead:

CONFERENCE  
**Ecobuild Fall**;  
Washington, D.C.; Dec. 8–11;  
[ecobuildamerica.com](http://ecobuildamerica.com)

SUMMIT  
**Green California Schools**;  
Anaheim, Calif.; Dec. 8–10;  
[green-technology.org](http://green-technology.org)

CONFERENCE  
**Designing the Parks, Part II**;  
Sausalito, Calif.; Dec. 9–11;  
[designingtheparks.com](http://designingtheparks.com)

CONFERENCE  
**AIAS Forum**;  
Denver; Dec. 29–Jan. 1;  
[aias.org/forum](http://aias.org/forum)

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Text Andrew Slocomb West

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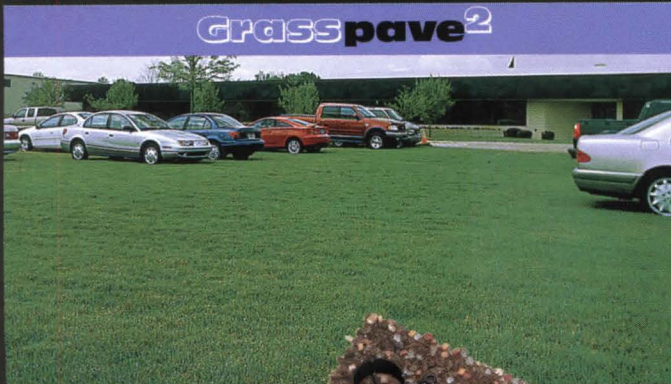
\* To obtain a copy of TAMKO's limited warranty, visit us online at [tamko.com](http://tamko.com) or call us at 1-800-641-4691.

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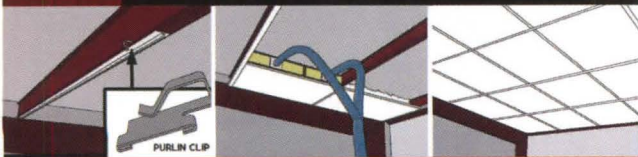


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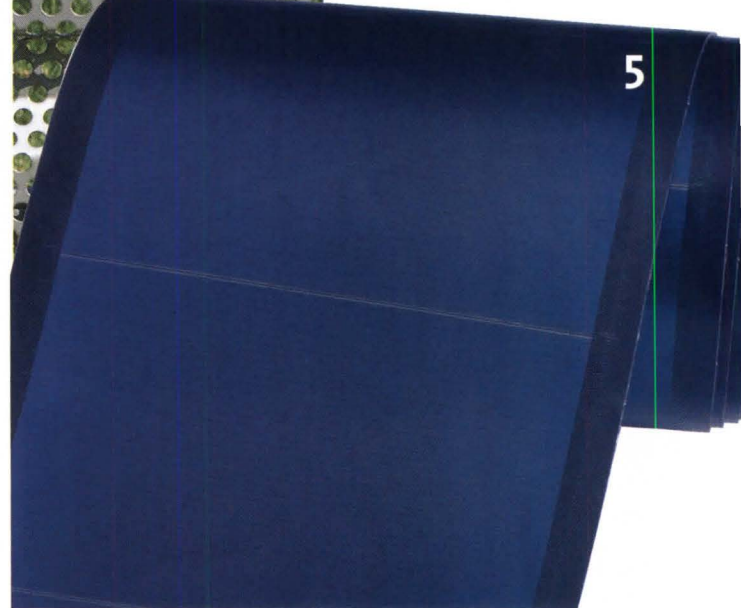
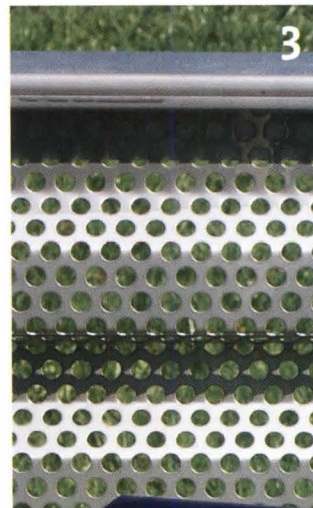


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Text Kate Herman

# NUMBERS

# 32%

The nationwide increase in public transportation ridership since 1995. Between 2002 and 2005, ridership on small urban and rural systems jumped nearly 20%.

## All Aboard

IN 2007, AMERICANS took 10.3 billion trips on public transportation—the highest ridership number in 50 years, according to the American Public Transportation Association. The group notes that every \$10 million invested in a local transit system generates \$30 million in business sales. And new systems can succeed fairly quickly. When Minneapolis' Hiawatha light rail opened in 2004, the projected daily ridership was 19,000; it now exceeds 28,000, says deputy metro transit general manager Mark Fuhrmann. The response from developers has also been good, he adds: 7,700 multifamily units have arisen since the project's approval in 2001. Twin Cities leaders are now constructing a \$914.8 million light-rail system linking Minneapolis and St. Paul. Hiawatha's popularity quieted naysayers, too, Fuhrmann notes: "The debate turned to, 'When can I get [this] in my corner of the region?'"

# FOUR MILLION

Gallons of gas saved every day in the United States through the use of public transit options.

# \$4.7 BILLION

The anticipated cost of Denver's **FasTracks** system (expected completion: 2017). The voter-approved project will create six new commuter- and light-rail corridors, extend three corridors, and build 18 miles of express bus service.

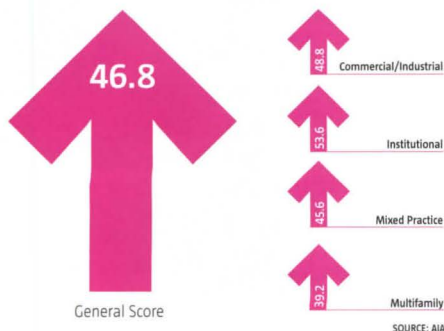
# 77

The number of **light-rail cars** Salt Lake City has ordered from Siemens Transportation Systems, making it the Sacramento, Calif.-based company's **largest order ever**. The city has a \$277 million contract with Siemens.

# 42,170

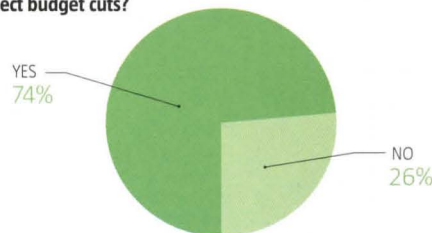
Anticipated **average daily ridership** in 2030 for the Minneapolis-St. Paul Central Corridor light rail, slated to open in 2014.

Architecture Billings Index, July 2008

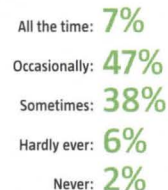


Survey of Architects: Building Green in a Down Economy

Would you fight to hold onto a green/sustainable design feature or specification in the face of project budget cuts?



If you answered yes, then are you typically successful in doing so?



SOURCE: TAKEN FROM ARCHITECT/HSR SURVEY OF 5,000 ARCHITECTS; RESPONSES: 294



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Text Margot Carmichael Lester

# LOCAL MARKET

## ALLENTOWN, PA.

### Population/Employment

July 2007 population: 107,117 (est.); 2000–2006 job growth: 8.2 percent.

### Office Market

Downtown commercial vacancy is less than 1 percent.

### Residential Market

Median home sale price in July 2008: \$148,000.

### Market Strengths

- Proximity to Philadelphia and New York
- Good housing affordability
- Aggressive efforts by city to help rehab brownfields

### Market Concerns

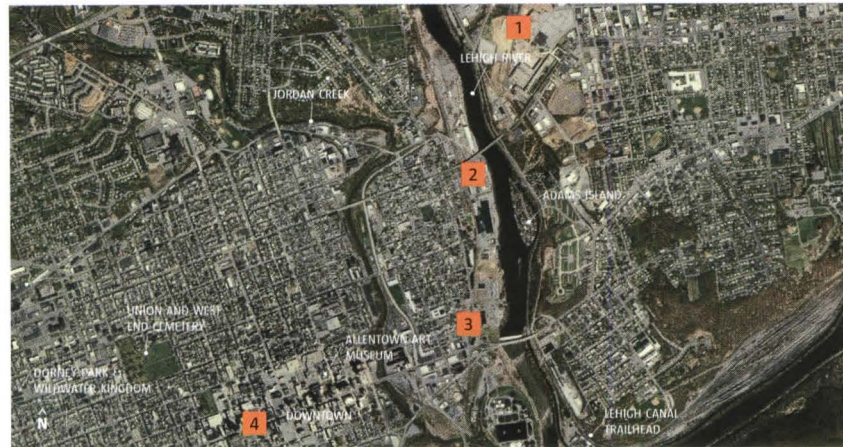
- Business base is mostly “old economy” manufacturing
- Cost of redeveloping industrial properties
- Urban sprawl

### Forecast

“I think [the current revitalization] will spur other projects of different scales,” says Burt Hill’s Edgar Smith. “Homeowners will see potential to raise a family. And I’d like to see more companies find their way [here]. They know their workers can afford housing stock, and that could spur more investment.”

**THE ALLENTOWN, PA., OF BILLY JOEL’S 1982 HIT SONG** was a played out, economically depressed city with a get-it-done citizenry struggling to keep the place alive. “The current picture contains more positives,” says architect Paul Felder, who moved to the Queen City from New York in 1974 and opened Architectural Studio. “[We’re] a community in transition from largely defunct manufacturing to a range of other things, like suburban development, commuting, trucking, and entertainment.”

Visionary planners and developers are transforming the city, which was *once* a steel and silk manufacturing hub. Building on the popularity of the Dorney Park & Wildwater Kingdom amusement park just outside of town, Allentown’s formerly industrial waterfront is becoming a cultural, sports, and entertainment mecca.



### 1 COCA-COLA PARK

**Architect:** HOK Sport, Kansas City, Mo.; **Completion:** 2008; **Cost:** \$48.4 million; **Size:** 10,000 seats • Home to the Lehigh Valley IronPigs, the stadium’s exterior is a nod to 19th century industrial aesthetics.

### 2 THE WATERFRONT

**Architect:** Burt Hill, Pittsburgh; **Completion:** 2017; **Cost:** \$175 million; **Size:** 26 acres • Sits on the Lehigh Structural Steel brownfield; combines housing, restaurants, and an amphitheater along a half mile of the Lehigh River.

### 3 AMERICA ON WHEELS MUSEUM

**Architect:** MGA Partners, Architects, Philadelphia; **Completion:** 2008; **Cost:** \$12.4 million; **Size:** 49,000 s.f. • The only museum devoted to all means of over-the-road transportation.

### 4 ALLENTOWN BREW WORKS

**Architect:** Bonsall Shafferman, Bethlehem, Pa.; **Completion:** 2007; **Cost:** \$4.4 million; **Size:** 37,700 s.f. • The Harold’s Furniture Building (1900) has become a restaurant/microbrewery and office space.

“The waterfront is one of the few really developable areas that’s a blank slate,” says Edgar J. Smith II, an associate architect in the Pittsburgh office of Burt Hill, which designed the project that started it all: a 26-acre residential and commercial development called—what else—The Waterfront. Museums, galleries, parks, and a baseball stadium have already sprung up around the ongoing project. “They’re keeping the cultural district close to homes and accessible to visitors,” says Smith.

“Allentown represents an important example of what is good and bad about our country,” Felder says. “It’s got a wonderful architectural heritage and an increasing willingness to preserve it. And a strong environmental interest that’s exemplified by lots of adaptive reuse, a desire for improved mass transit, and leadership from local industries.”

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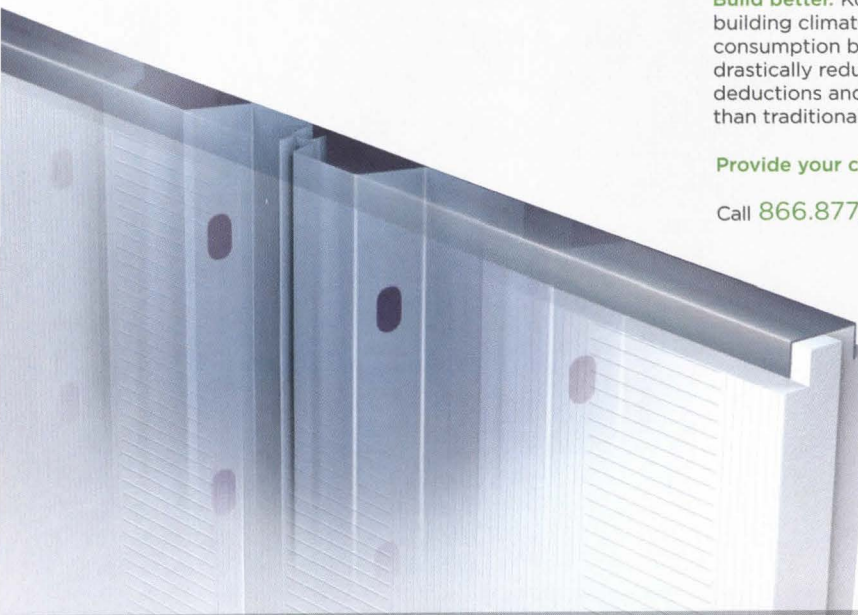
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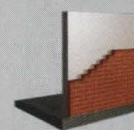
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Text Elizabeth Evitts Dickinson Photo Mike Morgan

# SCREEN GRAB

SCHOOLDESIGNER.COM



Offering K–12 educators and others a lesson in good architecture.

**JOEL SIMS HAS SPENT A LIFETIME** thinking about what goes into making a successful school. The son of a military man, Sims attended 10 different schools before ninth grade, and for the past 23 years he has designed K–12 projects for several architecture firms. Throughout his career, Sims, since 2003 the principal of his own, Lancaster, Pa.–based firm, Sims Architects, had noticed a gap in the marketplace: There was no comprehensive resource for educators, parents, and other interested parties to connect with architects or to see best practices for inspiration. So he launched Schooldesigner.com in 2006 to “elevate school design throughout the world,” Sims says.

A for-profit venture, Schooldesigner.com aims to demystify the design process and make architectural services and products accessible to those outside the profession. The site is organized into three categories: new products, building features, and a directory of firms specializing in K–12 design. Visitors can search the directory by name or by region and access a snapshot of the work that listed firms offer. Any architect can post a profile for about \$400, but the

site reserves the right to edit for content. “We’re not trying to be the police of good design, but we have rejected some projects and products because of questionable quality,” Sims says. The project coverage highlights specific features of a school’s design rather than focusing on the entire program. Sims believes this approach—“an online idea book,” he calls it—makes it easier for interested parties to find solutions to their own needs.

The site also offers a newsletter with articles on topics that don’t usually get much attention, like innovative accessibility solutions. And last year, Sims launched a design competition—dubbed the Collabotition—in which teachers, students, and administrators join design professionals in judging entrants in several categories, including aesthetics and green design.

Recent site updates include a new look and a section on LEED school designs. With 100,000 hits per month and a growing roster of firms and projects, Sims is already working on his next move: Collegedesigner.com, which will be dedicated to higher education.

## LINKS

<p><a href="http://livingnewdeal.berkeley.edu">livingnewdeal.berkeley.edu</a></p> <p>The Civilian Conservation Corps, the Public Works Administration, and other New Deal programs profoundly affected the nation’s landscape. This site is part of an effort to map, understand, and celebrate the California buildings and structures that remain.</p>	<p><a href="http://designobserver.com/archives/entry.html?id=38803">designobserver.com/archives/entry.html?id=38803</a></p> <p>A reflection on Yves Saint Laurent that draws parallels with architecture. “One trope of Modernism in design is an interest in structure,” Thomas de Monchaux notes. “Tectonics in architecture becomes, perhaps, tailoring in clothes.”</p>	<p><a href="http://stairporn.org">stairporn.org</a></p> <p>Do the words <i>volute</i>, <i>baluster</i>, <i>newel</i>, and <i>winder</i> give you a thrill? Do you spend lots of time sweating the details of how people will walk between floors? This blog is for you, then. No how-tos or schematics here—just pretty pictures of stairs.</p>	<p><a href="http://geocities.com/jussaymoe/dc_symbolism">geocities.com/jussaymoe/dc_symbolism</a></p> <p>Since 2001, a surveyor has been posting dissertation research about geometry and symbolism in the map of Washington, D.C. The author states up front that the point of view is “architectural and historical, rather than emotional and superstitious.”</p>
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Within 30 years the world's population will double, with most of the growth occurring in cities. Replacing soil and vegetation with man-made surfaces on this scale can lead to a problem called the Urban Heat Island Effect—vast, stationary “hot spots” that retain heat even after the sun sets, requiring increased energy consumption to cool homes and businesses.

To find sustainable solutions to this and other problems, the people of CEMEX have partnered with the U.S. EPA National Center of Excellence at Arizona State University to establish the Sustainable Materials and Renewable Technologies (SMART) program. As part of the program, CEMEX is developing new pavement technologies to reduce the Urban Heat Island Effect and improve storm water management, such as proprietary pervious concrete for use in parking lots throughout Arizona to research and document the benefits of these materials. Significantly cooler pavement and minimized storm water runoff are just two of the benefits of pervious concrete. The data generated by these tests will be used by state and local agencies around the country to formulate policies and specifications for “greener” pavements.

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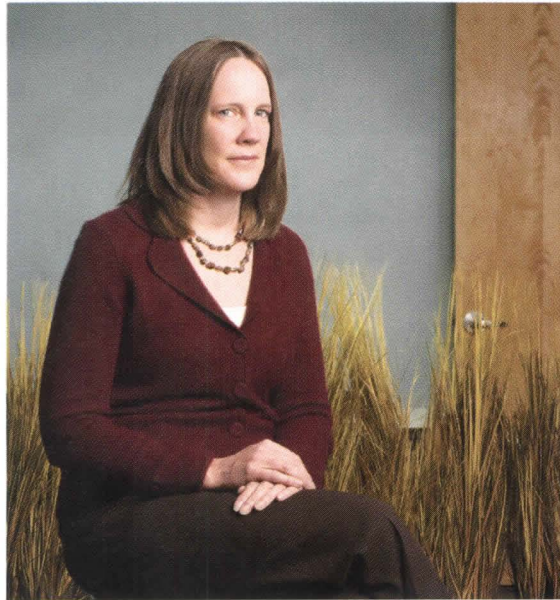


National Center of Excellence  
SMART Innovations for Urban Climate + Energy  
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SAVING THE ENVIRONMENT BEGINS AT WORK.

Text Fred A. Bernstein Photo David Mejias

## HOW GREEN IS MY OFFICE?



**Small steps, big difference:** Kristi Ennis, director of sustainable design for Boulder Associates, scrutinizes everything from lightbulbs to garbage pails in her effort to limit the firm's impact on the environment.

**BOULDER ASSOCIATES**, a 90-person architecture and interior design firm, specializes in creating healthcare and senior living facilities. When the firm's Colorado neighbor, Boulder Community Hospital, decided to build a new campus, Boulder Associates was brought in to help design it—and to make the building green. By the time the project was completed (it received LEED Silver certification in 2003), project architect Kristi Ennis knew she wanted to make green design her specialty. She spent a semester at the Ecosa Institute, in Prescott, Ariz., learning about sustainability, a subject that had received short shrift in her earlier training.

In 2004, when she returned from Ecosa, the firm named her director of sustainable design—a new position—with responsibility for “greening” all of the firm's projects. One of her first accomplishments was making sure the firm's main office in Boulder, completed in 2005, and its satellite in Sacramento, Calif., completed earlier this year, are as green as they can be. (Both were certified LEED Gold.) Here are some of her tips on reducing your office's environmental footprint.

### Reduce water use.

The firm has used both waterless urinals (in its Boulder office) and ¼-gallon-per-flush urinals (in Sacramento). Its toilets are dual-flush models. Bathroom sinks have faucets that turn off when you take your hands away. The firm also put water filters in its kitchens, so employees don't feel the need to drink bottled water. “You wouldn't believe how many bottles we save,” says Ennis.

### Stop wasting wattage.

The days when architects needed to light their drawing boards are over. “I think we have one traditional drafting table left in the office,” Ennis says. The firm has been able to get by with 13-watt fluorescent bulbs in swing-arm desk lamps. And all of the office appliances, including computers from Dell, plotters from Océ, and “business hubs” (copier/scanners) from Konica, have Energy Star ratings.

### Cut down on travel, both intercity ...

Boulder Associates has invested in “some pretty sophisticated” videoconferencing equipment, Ennis says, “so we don't have to travel for every meeting.” And when drawings are needed in a remote location, the firm (using online file transfer protocols) has them printed near that site, rather than ship them from Boulder or Sacramento.

### ... and intracity.

In Boulder, there's a firm bicycle, available to employees who need to make pickups or deliveries, or just to run to

the library or the dentist, Ennis says. In addition, the firm gives all its employees monthly bus passes.

### Steer clear of toxic materials.

The firm has a model-building shop with a separate ventilation system but uses nontoxic materials whenever possible. For informal study models, “most people do them at their own desks, with leftover cardboard and Elmer's white glue.”

### Recycle whenever possible.

Under each desk, where there would normally be a garbage pail, there is a recycling bin—“so you have to think twice not to recycle.” (The actual garbage pail is a “sidecar” barely big enough for a couple of coffee cups, says Ennis.)

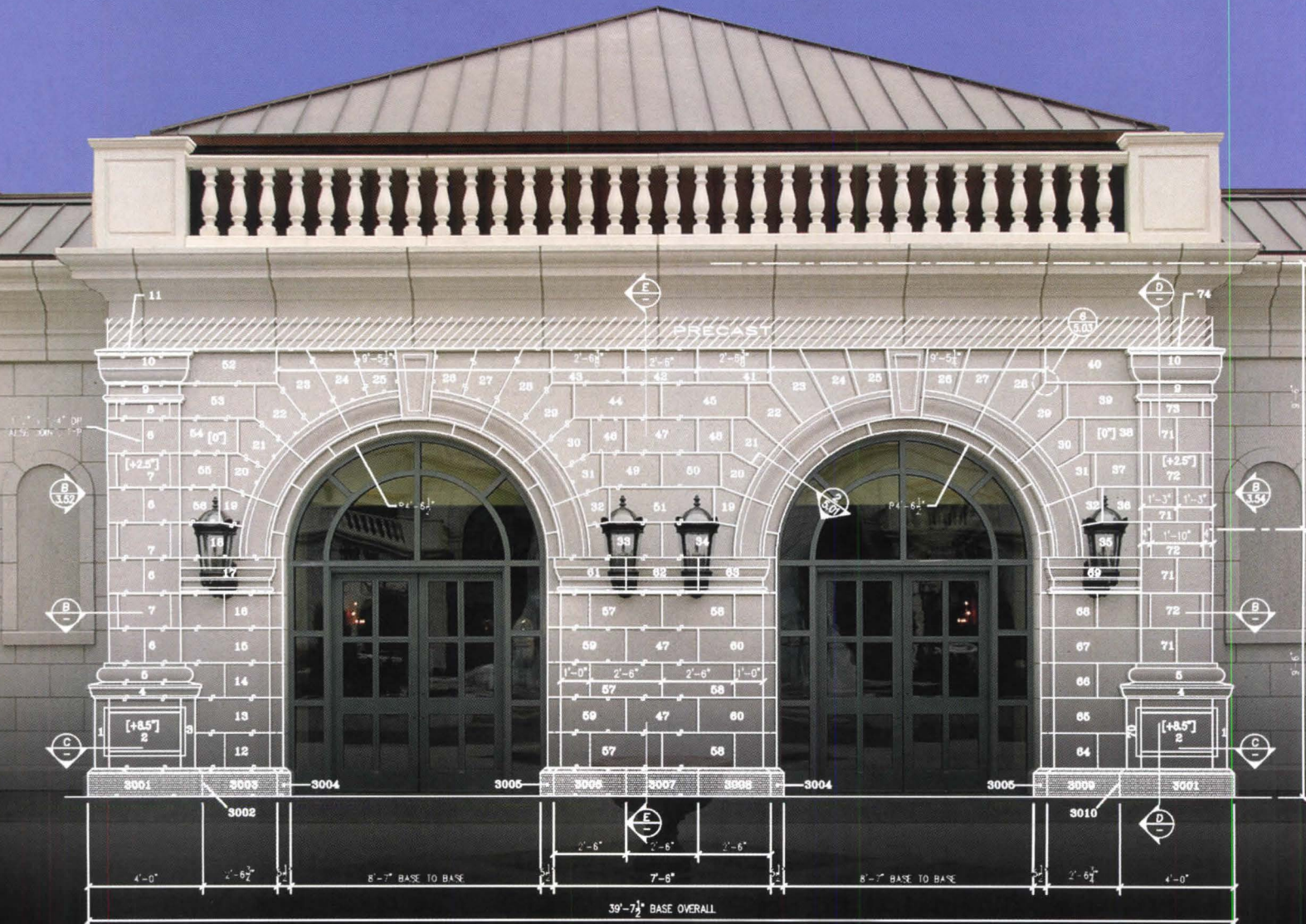
And more than paper and plastic gets recycled. The firm gets lots of product samples and either returns them to the manufacturers or finds another way to use them. Recently, Ennis says, “My son's day care took 12 carpet tiles for the kids to sit on during reading time.”

### Use your office to advertise what you can do for clients.

In designing its own offices, the firm's goal was to feature green materials prominently. Those used include wheatboard, which is made from rapidly renewable materials; formaldehyde-free MDF; and cotton insulation, made from surplus denim. Clients, says Ennis, are more likely to accept green products once they've seen and even touched them.

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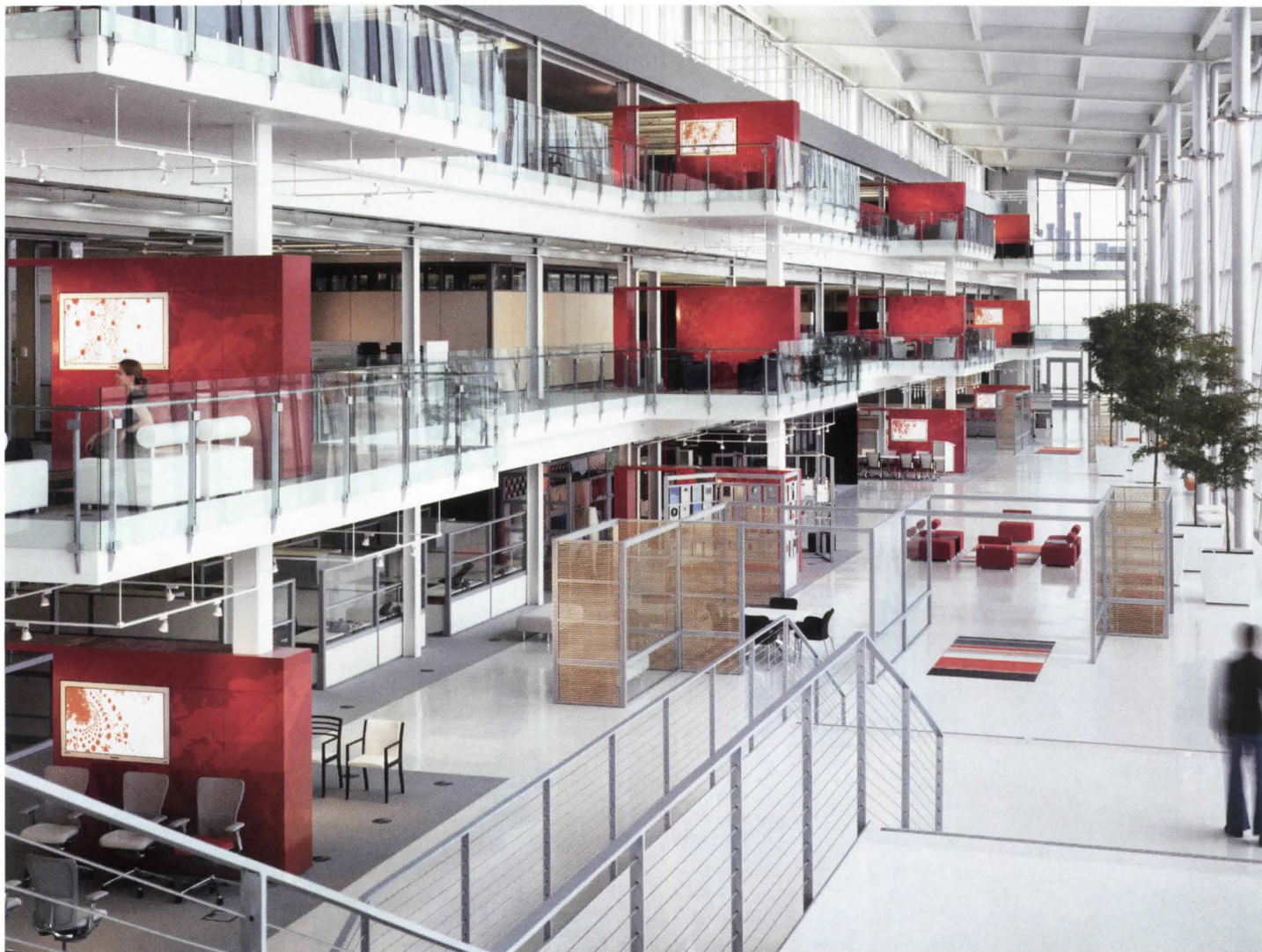
GENUINE STONE



A REVIEW OF THE FIRST ANNUAL *PRO AV* SPOTLIGHT AWARDS.

Text Andrew Slocomb West with the *PRO AV* Editorial Staff

# CELEBRATING A/V 2008



## One Haworth Center, Holland, Mich.

When your client is Haworth, the furniture and workspace experts, you can bet that they will keep an eye on A/V integration. Perkins+Will and Eva Maddox leaned on their integrators to make sure that any equipment blends seamlessly into the spaces. The atrium (shown) is dotted with "organic workspaces" that allow for impromptu meetings with complete access to Haworth's central content server.

**IN THIS DIGITAL AGE**, A/V consultants and integrators are becoming a vital resource for designers. Architects don't look to them anymore as subcontractors; increasingly, they are becoming integral members of the design team, working with the architects to use technology in new and unique ways. *ARCHITECT*'s sister publication *PRO AV* created the first annual *PRO AV* Spotlight Awards to promote this kind of work. Churches, hospitals, corporate headquarters, and sports bars are all using audio and video integration in new and exciting ways—and proving how helpful these consultants can be in designing complex buildings.

These 11 projects run the gamut of programs, from a large, utilitarian church to a small and ingenious airport lounge. The First Baptist Church of Glenarden in Upper Marlboro, Md., is part of the new trend of mega-

sized houses of worship that use broadcast solutions and high-tech innovations to engage the flock. The 205,000-square-foot building has a concert-grade sound system and a pair of 22-foot screens that give everyone a front-row view. The consultant, RLC Designs, was able to free up the program with more than 300 A/V connection panels throughout the space, creating new options for both architect and client.

Then there is the OneWorld Lounge at Los Angeles International Airport, which aims to occupy travelers between flights. From digital art to zoned music from Prescriptive Music, Gensler looked to its A/V consultants to make the space as comfortable as possible. They also threw in nine, digitally assigned showers—something that might help you recharge before that flight to Tokyo.



#### STATS Sports Restaurant , Atlanta

STATS in Atlanta had 150 technicians working through the night to get it ready for opening day (115 wires had to be pulled, terminated, and connected). AVI-SPL, the integrators from Tampa, Fla., were brought in well after the electrician, a problem when clean power has to drive 72 displays plus a boatload of other components. They used power conditioners on each screen, saving the electrician from having to rewire the entire building, though at a cost. Showing sports, though, is easy compared with making a broadcaster or even background music audible. Using a 15-zone audio system that senses the ambient noise in each area, the integrators created a system that adjusts the volume in each zone accordingly—now, that's smart technology.

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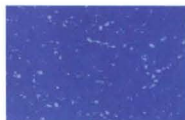
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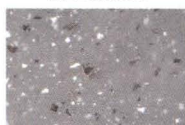
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## PRO AV SPOTLIGHT AWARDS

### BEST CORPORATE A/V PROJECT

One Haworth Center, Holland, Mich.

Integrator: AVI-SPL, Tampa, Fla.

Architect: Perkins+Will | Eva Maddox Branded Environments, Chicago

### BEST HEALTHCARE A/V PROJECT

Thomas Jefferson University Dorrance

Hamilton Building, Philadelphia

Integrator: AVSG, Broomall, Pa.

Architect: Burt Hill, Philadelphia

### BEST HOSPITALITY/RESTAURANT A/V PROJECT

STATS Sports Restaurant, Atlanta

Integrator: AVI-SPL, Tampa, Fla.

Architect: ASD, Atlanta

### BEST RETAIL A/V PROJECT

High Desert Harley-Davidson, Meridian, Idaho

Integrator: AAtronics, Boise, Idaho

### BEST ENTERTAINMENT/ARTS PROJECT

The Newseum, Washington, D.C.

Integrator: Communications Engineering, Newington, Va.

Consultant: SH Acoustics, Milford, Conn.

Architect: Polshek Partnership Architects, New York

### BEST GOVERNMENT A/V PROJECT (STATE & LOCAL)

Illinois House and Senate Chambers, Springfield, Ill.

Integrator: Bennett Electronics, Pontiac, Ill.

Consultant: Lipp A/V Design, Buffalo Grove, Ill.

Architect: Vinci Hamp Architects, Chicago

### BEST EDUCATION A/V PROJECT

Santa Clara University Learning Commons, Santa Clara, Calif.

Integrator: Riverview Systems Group, San Jose, Calif.

Consultant: The Sextant Group, Pittsburgh

Architect: Pfeiffer Partners Architects, Los Angeles

### BEST HOUSE OF WORSHIP A/V PROJECT

First Baptist Church of Glenarden, Upper Marlboro, Md.

Integrator: Communications Engineering, Newington, Va.

Consultant: RLC Designs, Glen Burnie, Md.

Architect: HH Architects, Dallas

### BEST GOVERNMENT A/V PROJECT (FEDERAL)

U.S. Marine Corps Forces (U.S.M.C.) Pacific

Headquarters Command Operations Center, Honolulu

Integrator: Audio Video Systems, Chantilly, Va.

### PRO AV SPOTLIGHT JUDGES' AWARD

OneWorld Lounge, Los Angeles

Integrator: Pro Sound CA, North Hollywood, Calif.

Consultant: Veneklasen Associates, Santa Monica, Calif.

Architect: Gensler

### PRO AV SPOTLIGHT JUDGES' AWARD

Adopt A Room, the University of Minnesota Fairview Hospital, Minneapolis

Integrator: Graybow Communications Group, Golden Valley, Minn.

Architect: Perkins+Will

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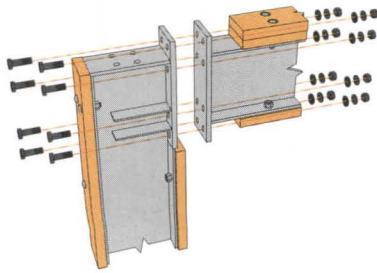
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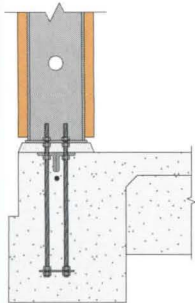


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A/V



**U.S.M.C. Forces Pacific Headquarters Command Operations Center, Honolulu**  
Mission critical may be an understatement for the Marines at these 35 desks. Audio Video Systems (AVS) designed and built the desks to outfit the pre-World War II space to meet post-9/11 needs. Technicians can pull data from a variety of sources and feed it to the 32-foot screen, allowing the Marines to follow leads as a team and update information on the fly. Using six projectors and a processor that blends the edges, AVS overcame the short 50-foot distance between screen and projector without sacrificing quality or having to modify the building.



**Illinois House and Senate Chambers, Springfield, Ill.**  
Illinois was turning the clock back on its capitol by restoring everything to its 1870s design—complicated enough without throwing in a modern sound and video system. Vinci Hamp Architects tapped Jeffrey Lipp to consult on the A/V system, which they sought to hide in the restored chambers. They succeeded in making the space look like 1870 (save the large LCD screens) while meeting the 2008 needs of the legislature. One of Lipp's tricks: When a senator hits the "Speak" button on his panel, the system focuses a camera on him and turns on his microphone, all automatically. Watch out, C-SPAN.



**Adopt A Room, Minneapolis**  
When Perkins+Will started work on the Adopt A Room prototype for pediatric hospitals, the architects brought the A/V team in from the start. Working with Graybow Communications Group, they created a room entirely controlled by three touchscreens, which can show the child's chart and info—allowing a nurse to check in without entering the room. The mounted television screens can show a rooftop camera, a gaming system, cable, and DVDs, all in the hope that small diversions can make the hospital visit a little easier. Lighting was another key factor in the design, giving the patient a full spectrum of colors at the touch of a screen.

TOP TO BOTTOM: COURTESY ACOLYTE PHOTO; COURTESY ERIC HAUSMAN/VINCI HAMP ARCHITECTS; COURTESY GRAYBOW HD





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## UNDERSTANDING LIGHTING DESIGN: HOW OPTICAL SYSTEMS INCREASE LUMINAIRE EFFICIENCY

By James Brigagliano



SPECIFYING THE PROPER LUMINAIRE WILL REDUCE LIGHT POLLUTION AND GLARE, INCREASE ENERGY AND PERFORMANCE EFFICIENCY, AND ADD BEAUTY, FUNCTION, SAFETY, AND INTEREST TO ANY INTERIOR OR EXTERIOR SPACE.



### ARCHITECT MAGAZINE CONTINUING EDUCATION

This course requires supplemental *online reading* in addition to the following article. For details on accessing the supplemental reading and to learn how to take the test, please see page 61.

Architectural lighting is a combination of art and science that creates a visually appealing, usable, and well lighted space. Lighting designers, architects, and engineers can create exceptional interior and exterior spaces through strategic placement of light. Calculated placement of appropriate luminaires can improve the aesthetics and functionality of a space. Well designed lighting plans can contribute to green building practices by incorporating energy-efficient and application-appropriate designs that help reduce electricity consumption and light pollution, while improving aesthetics and function. Lighting design focuses on three aspects of illumination — aesthetics, function, and efficiency.

A good lighting designer will have a handle on the science of lighting as well as the ability to enhance interior and exterior spaces through design specifications. Whether you're designing an interior or exterior lighting plan for a commercial, residential, academic, retail, or institutional project, you will have to be familiar with the basics of light, how optical systems shape and bend light, which sources are best suited for specific applications, and how they affect the aesthetics of your design. The assumption that lots of light is safer, more secure, and more welcoming is not necessarily true; high-performance optical systems and smart designs create the right amount of light without wasting energy and reduce glare.

Lighting specialists have lots of things to consider, including, but not limited to source type, environment, overall building design, performance, and aesthetics. It is safe to say that smart designs will use the lowest wattage of lamp possible to achieve the desired effect and will have timing or sensor systems to turn off lights when they are not in use, or when they are not needed.

### THE BASICS OF LIGHT

Before we address how lighting systems work to our advantage, we must first understand how light works. Light travels in straight lines called rays. When light rays meet an obstacle, a wall or window, for example, the light can be absorbed, reflected or refracted. Light rays are absorbed when the intensity of the light is reduced as a result of the object or surface that is in its way. Light is reflected when a surface redirects light rays.

### LEARNING OBJECTIVES

The learner will:

- Describe the basics of how light works.
- Identify how optical systems shape and bend light for design.
- Identify light sources for specific applications.
- Explore the aesthetic considerations for lighting design and applications.

Good lighting design can enhance work productivity, increase safety, be visually appealing, and complimentary to a building's design, inside and out.

The angle at which light strikes a reflecting surface is the same angle at which it will be reflected. When light is refracted, light rays are bent as the result of passing through a medium, such as glass or plastic. All transparent objects have a unique and constant affect on light rays, called the index of refraction, which determines how the light rays will be bent after passing through a surface.

Temperature (CCT) is a metric unit used to describe the color appearance of a light source; it measures the "warmth" and "coolness" of a lamp's appearance. Lower CCT values indicate warmer lamps (reds, oranges, and yellows); higher CCT values indicate cooler lamp's (blues and whites). The ability of a light source to render color of an object compared to the ability of natural light is called Color Rendering

Term	Basic explanation	Measurement
Luminous Flux	Amount of light emitted in all directions	Lumens (lm)
Luminous Intensity	Intensity of light in a specific direction	Candelas (cd)
Illuminance	Quantity of light on a specific unit area of a surface	Lux or footcandles
Luminance	Amount of light reaching the eye after it reflects off a surface	Candelas/m <sup>2</sup>

The change in direction of light is the basis for all optical technology. By understanding how light acts in different mediums, such as air, glass or plastic, we are able to develop optical devices that magnify, focus, reduce, or direct light to where it will be most usable. When designing a lighting plan you must also understand how light is quantified.

Luminous flux is the total amount of light emitted in all directions from a light source. Luminous intensity, on the other hand, measures the intensity of light emitted in a specific direction. Illuminance is the quantity of light on a specific surface area and luminance is the amount of light that reaches the eye after being reflected from a surface. These terms are important for lighting designers to be familiar with because optical system manufacturers often use these terms, quantities, and measurements to show how a luminaire will project light.

Designers must also consider color when creating a lighting plan. Light sources have different color temperatures and different abilities to portray the color of surrounding objects. Correlated Color

Index (CRI). Depending on the aesthetic affect you are trying to achieve, knowing how well a light source can accurately render color can drastically change your specifications.

## HOW OPTICAL SYSTEMS SHAPE AND BEND LIGHT

There is one purpose of an optical system: to direct light to where it is most needed. Direction of light, glare control, source efficiency, and overall aesthetic feel (appearance) should all be considered when specifying a luminaire for your lighting design. The final appearance of the fixture itself is largely determined by the type of optics used to direct the light.

Recall that reflection is re-direction of light. Primary reflectors are located behind the light source and are used to direct light away from the internal housing of the luminaire. Primary reflectors are categorized by the manufacturing process by which they are made. The type of reflector will

affect performance and cost. Lighting designers are being held more responsible for the cost of their specifications, which is why it is important for you to understand how each reflector type can affect application, appearance and cost.

Spun reflectors are made by spinning the reflective material (usually aluminum) at high speeds around a tool, called a chuck, which will make the desired shape of the reflector. This creates a smooth reflective surface that produces a controlled and concentrated beam. Typical luminaire applications for spun reflectors are downlights, high bays, and sports lighting. Spun reflectors are typically the least expensive reflector to manufacture.

Hydro-formed reflectors are made by pushing an unformed reflective material into a pre-formed bladder that is the desired shape of the reflector. This process is extremely precise, creating a smooth reflective surface that maximizes light output. Downlights, roadway, and parking area luminaires are typical fixtures using hydro-formed reflectors. The cost to manufacture hydro-formed reflectors escalates along with the reflectors increased precision.

Segmented reflectors are made by arranging highly polished surfaces to achieve a specific light distribution pattern. Segmented reflectors are typically more efficient than formed optics and are commonly used for pedestrian and site lighting. Segmented reflectors are the most complex of reflector types to manufacture and thus the most expensive.

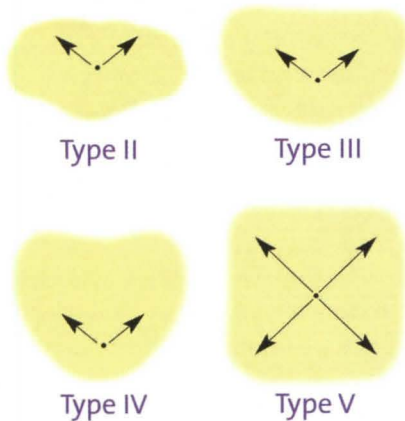
Look at the images comparing the light distribution of a lamp without an optical system and the lamp with an optical system. Notice that light from the bare lamp reaches the desired space, but that the majority of light is lost above the horizontal of the lamp. The same lamp with an optical system directs light only to the desired space, and no light is lost above the horizontal.

Term	Explanation	Measurement
Correlated Color Temperature (CCT)	Metric unit describing the color appearance (warmth or coolness) of a light source	Degrees Kelvin
Color Rendering Index (CRI)	Measures ability of a light source to render colors of an object compared to natural light	1 - 100 scale, 100 is best. CRI ≥ 70 is acceptable.

# UNDERSTANDING LIGHTING DESIGN: HOW OPTICAL SYSTEMS INCREASE LUMINAIRE EFFICIENCY

## OPTICAL SYSTEMS AND LIGHT DISTRIBUTION

The Illuminating Engineering Society (IES) has categorized four basic patterns of light distribution, Types II through V, for roadway and area lighting. In general, selection and use should be determined by the lighting plan requirements and subsequent luminaire and location placement relative to the lighted area. Types III and V are best used when placed towards the center of the area, and types II and IV are used most often placed/mounted at the side of the road, path, intersection or area (Chapter 10 Roadway and area lighting, IES handbook).



**TYPE II** distribution is ideal for illuminating long, narrow pathways, where the luminaire is placed near the path, approximately 1.75 mounting heights in width.

**TYPE III** distribution is best for roadways because it has a wider field of forward light. The mount should be approximately 2.75 mounting heights in width. This is one of the most requested distribution patterns and can also be used for general area and parking lot lighting.

**TYPE IV** distribution is typically used for wall-mounted applications. Luminaires should be placed near the side of the area with more than 2.75 mounting heights in width between them.

**TYPE V** distribution has a symmetrical, round pattern and is best used for lighting large areas. A luminaire with this distribution is best placed in the center of the area.

## LIGHT SOURCES FOR DIFFERENT APPLICATIONS



Now that you understand how light works and how optical systems are made to shape light, we can explore how light sources are suited for different applications.

Point sources emit light in all directions; there are no shades or reflectors to restrict the direction of the light. Incandescent bulbs are the most common lamps on the market and can be used in many applications. They are not the most efficient lamps available - only 10% of the energy produced is converted to light, the rest is heat. Compact fluorescent lamps were design to replace incandescent lamps, and like incandescent lamps, they can be used in many applications. They require less power and have longer life expectancies; they are more expensive, but the upfront cost is offset by the energy savings throughout the lifetime of the lamp.

Halogen lamps are being more widely used. They produce 50% more light than a standard incandescent lamp, while using the same amount of power. Halogen lamps produce the brightest, purest light available and are often used in displays, retail spaces and kitchens. High Pressure Sodium and Metal Halide lamps are considered to be High Intensity Discharge (HID) lamps, and are as efficient as fluorescent sources. Metal Halide lamps are commonly used for athletic stadiums, car dealerships, college campuses and areas where enhanced security is desired. High Pressure Sodium lamps have a long life expectancy but lack some of the color rendering qualities of Metal Halide. These lamps are commonly used for outdoor applications such as street lighting, warehouses, transportation facilities and locations where re-lamping may be difficult and expensive.

Linear sources project light in a straight line, either vertically or horizontally on a plane. Linear sources are most widely used in interior applications.

## EFFICIENCY

Where lighting efficiency is a concern, efficiency can be defined two ways: in terms of energy consumed (lumens per watt) and in terms of its application (putting the light where it is needed). The idea is to use an appropriate optical system for the application in order to avoid excessive energy consumption. Even efficient light sources can consume extra energy if they distribute light to areas where it is not needed. The International Dark Sky Association (IDA) estimates that 30 percent of outdoor lighting is directed skyward, costing consumers, businesses, and building owners \$1.5 billion per year, in the United States alone. To appropriately light a space or feature, you need to know the capability of the lamp itself, and the ability of the luminaire to direct light to where it is needed, rather than where it is not. The most efficient luminaires direct light to where it is needed which may enable a lower wattage lamp to be used.

Efficient lighting plans consider performance and aesthetics; light should not be unnecessarily directed toward the sky, nor should it be directed to a space where it may encroach on a resident's window or interior environment.



**Top photo: the luminaire emits light in all directions. While the light is bright, it is not effectively lighting the parking spaces and is causing skyward light pollution and glare. Bottom photo: the total amount of light emitted has been reduced with a reflective shade, but the effectiveness of the lighting on the parking spaces has improved.**



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**TEST QUESTIONS**

1. True/False: The index of refraction for light is the same in all materials.
2. \_\_\_\_\_ is the quantity of light on a specific unit area of a surface.
  - a. Luminance
  - b. Illuminance
  - c. Luminous intensity
  - d. Luminous flux
3. There are two measurements used to quantify and describe a light's color, they are:
  - a. Color Rendering Index (CRI) and Specific Color Temperature (SCT)
  - b. Correlated Color Temperature (CCT) and Specific Color Temperature (SCT)
  - c. Color Rendering Index (CRI) and Correlated Color Temperature (CCT)
4. True/False: The final appearance of a lighting fixture is largely determined by the type of optics used to direct the light.
5. Of the following, which is typically the most complex type of reflector?
  - a. Segmented reflectors
  - b. hydro-formed reflectors
  - c. primary reflectors
  - d. spun reflectors
6. Which of the following light distribution types is best suited for placement at the center of the area to be lit?
  - a. Types II and III
  - b. Types III and IV
  - c. Types II and IV
  - d. Types III and V
7. A properly specified luminaire will do which of the following?
  - a. Decrease luminous flux and increase luminous intensity
  - b. Decrease light pollution and decrease energy consumption
  - c. Increase luminance and increase luminance flux
  - d. A and B only
  - e. B and C only
8. Uniformity of light reduces visual strain by evenly distributing light so that our eyes do not have to adjust to \_\_\_\_\_.
  - a. changes in intensity and reflective angles
  - b. direct glare and indirect glare
  - c. changes in color and temperature
  - d. all of the above
9. The International Dark Sky Association (IDA) guidelines for cutoff levels are:
  - a. a full cutoff luminaire provides 0% of light at 90 degrees above nadir
  - b. a semi cutoff luminaire provides no more than 5% of light at 90 degrees above nadir
  - c. a cutoff luminaire provides no more than 2.5% of light at 90 degrees above nadir.
  - d. all of the above are correct
10. \_\_\_\_\_ show you where light will be directed but not the intensity at which it will be dispersed.
  - a. Photometric charts
  - b. ISO Candela plots
  - c. Luminance footprints
  - d. Product photos



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	4.	T	F						
	5.	a	b	c	d				
	6.	a	b	c	d				
	7.	a	b	c	d	e			
	8.	a	b	c	d				
	9.	a	b	c	d				
	10.	a	b	c	d				



**MAIL-IN TEST:** Photocopy this page. Clearly circle the letter of the correct answers. Mail this test with the completed form and check for \$10, payable to ArchitectCES, to:

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Text Amanda Kolson Hurley

# LETTER FROM HELSINKI



**Laituri**, or “platform” in Finnish, is an exhibition center that opened in June in a former bus station in central Helsinki. The center is the latest outreach effort by Helsinki’s 270-person-strong city planning department. Designed by NRT Architects and offering multimedia exhibits on local planning and development, Laituri received about 4,000 visitors in its first two months of operation.

**EVERYONE KNOWS** that Finns like saunas and heavy metal. But brochures?

“Finns *really* like brochures,” a local warned me, and sure enough, wherever I went in Finland’s capital, Helsinki, this August, I was steered toward a display rack stuffed with them. Not taking at least a couple at each stop seemed rude. After four days, I had acquired enough printed matter—and not just brochures, but postcards, maps, and honest-to-God books—to stock my own newsstand. Thoughtfully, the folks at the city planning department gave me a custom-printed shopping bag to stash everything in. It was handy, until it broke under the weight.

One reason for all the paper: Finland has a lot of trees, and printing is a time-honored national industry. But there’s another, less tangible explanation that has to do more with the Finnish social contract. As far as the government and its satellites are concerned, The Public is the all-important, perennial client, who must be informed

of every new planning goal and design concept, sounded out, and (in some cases) mollified well before ground is broken.

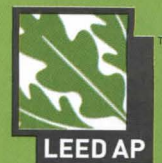
Finland’s Land Use and Building Act, which took effect in 2000, ensures public participation in planning efforts in broad terms. The city of Helsinki has gone beyond what this law mandates, however, by employing three full-time “interaction planners” in the city planning department—which makes all its development plans available online. The department sends out letters to residents, updating them on planning strategies; hosts events for public discussion; and allows a sufficient time period for the lodging and debating of complaints.

This is perhaps the least residents could expect, in a city that owns upwards of 70 percent of the land within its limits, and maintains a planning department of 270 people, among them 90 architects—for a population of only 570,000. To put that in perspective, New York City employs 280 planners for five boroughs and 8 million



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**Redefining the apartment building typology** is an explicit goal of the city of Helsinki, since apartments account for 85 percent of all housing units there. And local architects are happy to oblige. ALA, a young firm of about 20 people, won a competition for a major new housing development with its proposal for elliptical blocks of uneven height enclosing large green spaces. Construction is expected to begin next year.

people, while Washington, D.C., a city whose population and area are comparable to the Finnish capital's, has a planning office of 80.

Even in government-happy northern Europe, Helsinki stands out for the degree of control it exerts over growth inside its confines. First, there's the city's grip on its land; this dates back to a land grant by King Gustav I of Sweden in the 16th century and was strengthened by further land purchases during the Depression. Then there is the political system. The city planning board is appointed by the city council, which is composed of members from nine—yes, nine—political parties. Finnish politics depend on coalition building. Safe from the kind of seesaws between Republican and Democrat that can turn government priorities upside down, Helsinki's city planning board plows ahead year after year, committed to creating transit-oriented, mixed-income neighborhoods and more or less unruffled by what happens in elections.

Finally, there's money, which Helsinki has a lot of. Owning so much land has bolstered the city's finances: Revenues from ground rent, handled by the city's real estate department, came to 166 million euros (\$245 million) last year. Crucially, the city also owns a major utility, Helsinki Energy, which sells power back to the national grid. Helsinki Energy netted the city a surplus of \$322 million in 2007 alone.

Now, the clout of Helsinki's city planning department has even assumed physical form. This past June, the department opened its own exhibition center in a former bus station downtown. Called Laituri, or "platform" in Finnish, the center is about as different from the typical dreary municipal museum as one could imagine. A bright, high-ceilinged space designed by local firm NRT Architects, it features 15-foot fabric-panel maps showing the city in 2007 and 1943, as well as a short, well-made film that interviews locals about their favorite places in Helsinki; computers loaded with multimedia presentations (in Finnish, Swedish, and English) on the city's new districts; and an information desk. (There is also, naturally, a brimming publications rack.)

When I visited, Laituri was hosting a smart exhibition on apartment building typologies, part of a city-sponsored project to improve multifamily housing. Heikki Mäntymäki, clearly delighted with the new space as he showed me around, emphasized that Laituri is not a museum. "It looks to the future," he said, and will be "part of the evaluation process" for new proposals via discussion evenings and feedback surveys. Mäntymäki heads a five-person communications unit within the planning department. (This dedicated communications team is in addition to the "interaction planners.")

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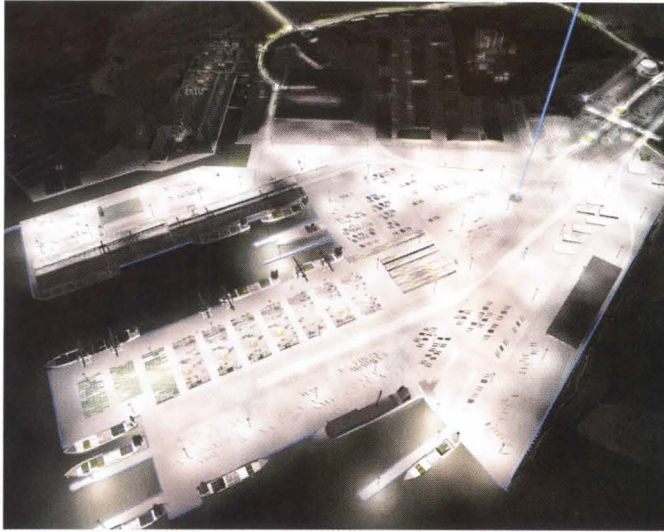
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**No detail too small:** The lighting at Helsinki's new port area was decided by a design competition. APRT, a Finnish architecture firm, won with its scheme of neon-blue poles topped by bold Xs. APRT also master-planned the billion-euro port, which opens in November.



If it seems a tad much—the “Laituri” T-shirts, pencils, and posters dreamed up by a hip Finnish graphic design shop, for instance—in fairness, Helsinki's citizens *do* have a lot of development news to keep up with at the moment. The city right now is embarking on what it touts in press releases as “the biggest construction boom in the city's history,” a multibillion-euro effort to grow mixed residential/commercial districts in areas wrested from industry. The city's population is expected to grow about 10 percent by 2030, and accordingly, Helsinki has set an ambitious target of building 5,000 new residences per year over the next decade.

The first step toward this was, really, a leap: The city decided to shift all its commercial port operations to a site just east of the city (land that it had annexed). As of this November, the city-owned Port of Helsinki will operate out of this new harbor at Vuosaari, leaving its two former locations—a North Harbor and West Harbor that flank the peninsular city center—open for future redevelopment.

Driving around the square-mile site, project director Antti Mäkinen pointed out different structures—a gatehouse, cargo warehouses, and a striking coffee roastery clad in Cor-Ten panels—and noted the work of Helsinki architecture firm APRT, which master-planned the sprawling site, although it lost a competition to design the gatehouse tower. APRT did win another, separate competition for lighting at the port with a scheme of striking blue light poles, each topped by a large X studded with fixtures—the kind of light pole that, in America, would be lucky to find a home in the parking lot of a modern art gallery, but in Finland illuminates stacks of shipping containers.

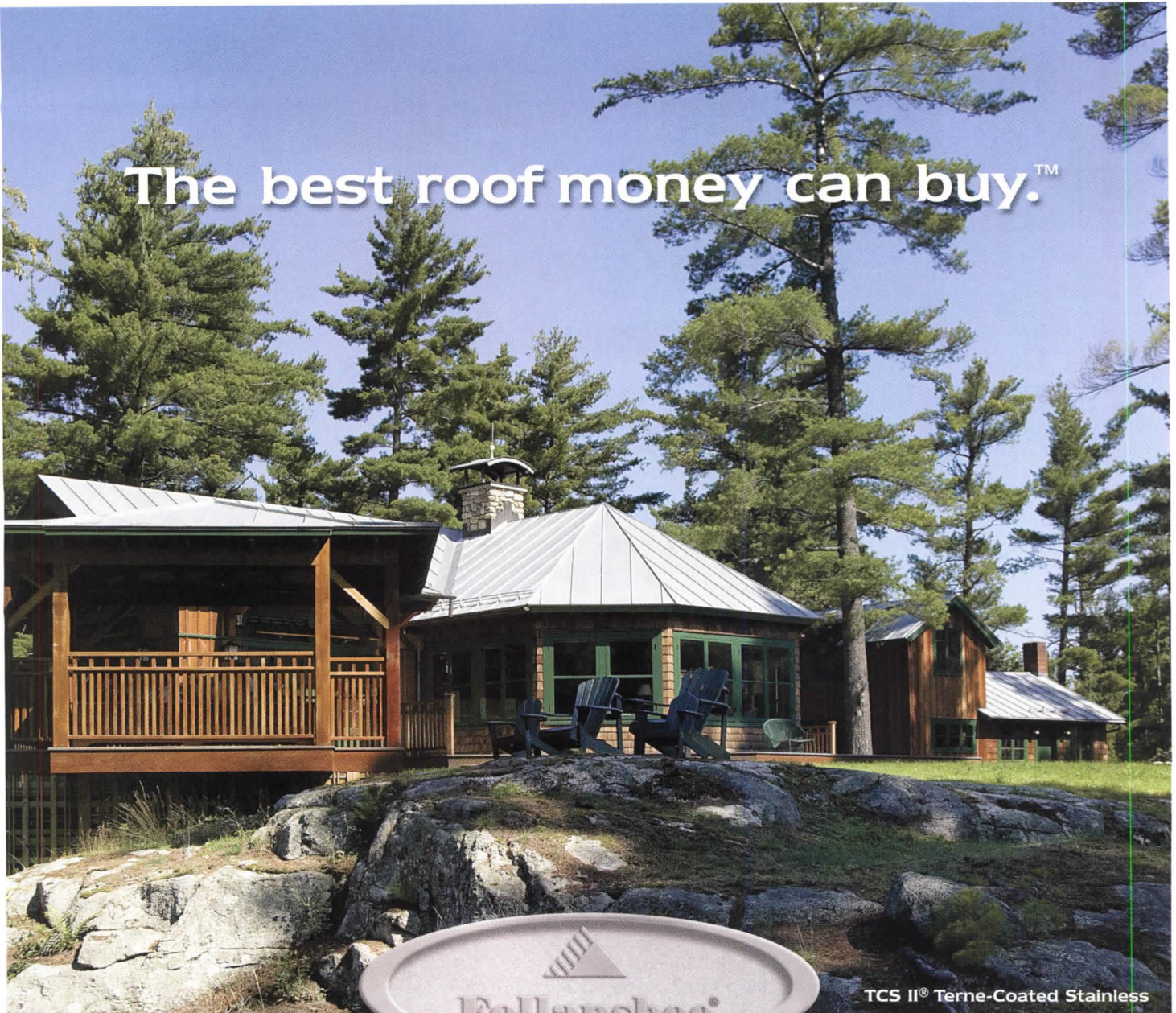
And why not? Elsewhere around Helsinki, I saw electricity pylons and water towers that please the eye—a prerequisite, you'd think, for structures that residents have to look at day after day. Besides, in a flat country that's cloaked in darkness much of the year, attractive man-made forms must be a welcome, even necessary, diversion.

The first architectural competition in Finland was held in 1876, for Helsinki's Bank of Finland building; Alvar Aalto's Paimio Sanatorium—possibly the most influential work of Finnish architecture—sprang from a competition entry in 1929. The practice of architecture in Finland today has largely been shaped by this tradition, which the muscular city government sustains by holding competitions for virtually all projects under its domain. Most all of these, and other competitions besides, are consulted on by SAFA, the Finnish Association of Architects. In 2007, according to SAFA, 25 competitions were held in Finland—20 of them invited, five open.

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This year, the numbers have jumped to 22 invited and 13 open. Not bad for a country with a population smaller than Missouri's.

What this means is that young architects have a decent shot at the biggest and most exciting projects and can launch their careers on the basis of an important win. The emerging Helsinki firm ALA is a case in point. ALA was founded in 2004, not long after its four partners graduated from architecture school. (Finland does not have

Last year, according to SAFA [the Finnish Association of Architects], 25 architectural competitions were held in Finland—20 of them invited, five open. This year, the numbers have jumped to 22 invited and 13 open. Not bad for a country with a population smaller than Missouri's.

a registration requirement for architects.) The following year, the partners won an open competition to design the Kilden Performing Arts Center in Kristiansand, Norway, beating out about 100 other entrants. The center, its foyer inserted beneath a monumental, canted wall of oak, is under construction and expected to open in 2010. Consultants on the \$200 million project include Arup.

ALA partner Janne Teräsvirta says that open competitions are "practically the only way to get going" for young Finnish architects, since it usually requires good luck or good connections to snag a commission (and besides, direct commissions are rarely offered for major projects). "It was very inspiring getting to compete equally with the best in the country while young, and also very good for [our] confidence to get success early on," he writes in an e-mail—composed on the way back to Helsinki from Tokyo, where ALA had just participated in a competition. Teräsvirta says the Kilden project and other wins have allowed the firm to shift its focus from open competitions to invited ones, which are compensated and, obviously, restrict the field of entrants. He also points out that SAFA defines and protects competition rules to ensure that they are conducted fairly.

Another Finnish architect, Pentti Kareoja of ARK-House Architects, told me that competitions lead to the best designs—they allow architects to take more risks. (We were in his office looking at a portfolio of recent projects, including a library for the University of Helsinki and a teacher training school, both won in invited competitions.) Asked about the difference between designing for competitions and on commission, Teräsvirta plays it down, but concedes that, "Deep down, [competition projects] might have a special place for us, having to do with the feeling of winning, which we all enjoy."

Risk-taking is surely in evidence in ALA's design for a major housing development in Helsinki (see page 65), which will replace a giant coal heap on a peninsula two scant miles from the city center, a site previously owned by Helsinki Energy. ALA proposes building three large, elliptical apartment buildings with parks at their centers. The buildings will be stepped in height, ranging from two stories at the midpoint of each ellipse to 10 or more at either end. And every "step" will be given over to a semiprivate terrace, with water views, for the residents of adjacent units.

Expected to begin construction in 2009, this Hanasaari residential area will be quite a departure for a country as steeped in functionalism as Finland. And yet, an ALA press release from earlier this year declares, "It is already safe to say that this striking design will be implemented as proposed." With a public mandate at their backs—rather than a politician's agenda or a developer's profit motive—even architects can sometimes smile on the planning process. ☺

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Text John Gendall Portrait Matt Greenslade

## MODEL CITIZEN



**Richard Tenguerian** (shown above, in his studio) treats architectural model-making as an art form, mixing his own paints and customizing a unique color palette for each client.

**RICHARD TENGUERIAN'S** portfolio reads like *A History of Architecture Since 1975*. The New York-based model-maker has long collaborated with some of architecture's most iconic figures, including Aldo Rossi, Bernard Tschumi, Philip Johnson, Emilio Ambasz, and Robert A.M. Stern, and with firms such as HOK, FXFowle, Kohn Pedersen Fox, and Skidmore, Owings & Merrill.

Intent on becoming an architect, the young Tenguerian quickly discovered his talent for fabricating models, picking up a job during high school making models for an architectural office. He has been doing it ever since, starting his own firm, Cubic Dimension, in 1989.

"When someone shows me a drawing, I see the finished product," he says. "I get the vision."

His basement office near New York's Astor Place maintains a healthy buzz. For his interview with *ARCHITECT*, he suggested meeting on a Saturday morning so that the office would be without distraction. But

even then—one of the last sunny days of summer—10 people could be found feverishly working. Walking through the studio, Tenguerian seamlessly shifts from the conversation to commenting on the work happening around him ("Make sure you cut that piece there," and, "Don't forget to replace this section") without losing focus.

Everything he does is custom-made. From the paint—which he mixes for each project, never sharing shades between clients—to the wooden cases that house the finished models, he fabricates each part of every project individually.

He keeps between 12 and 16 people on staff, each with a particular specialty. "Every model is unique, so I bring on people who can work with specific sets of challenges—paint color, carpentry, technology, or interpreting architectural drawings."

"I'm the conductor now," he says. "I'm no longer in the orchestra." But his deference belies the personal

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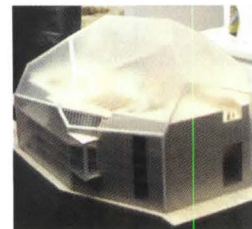
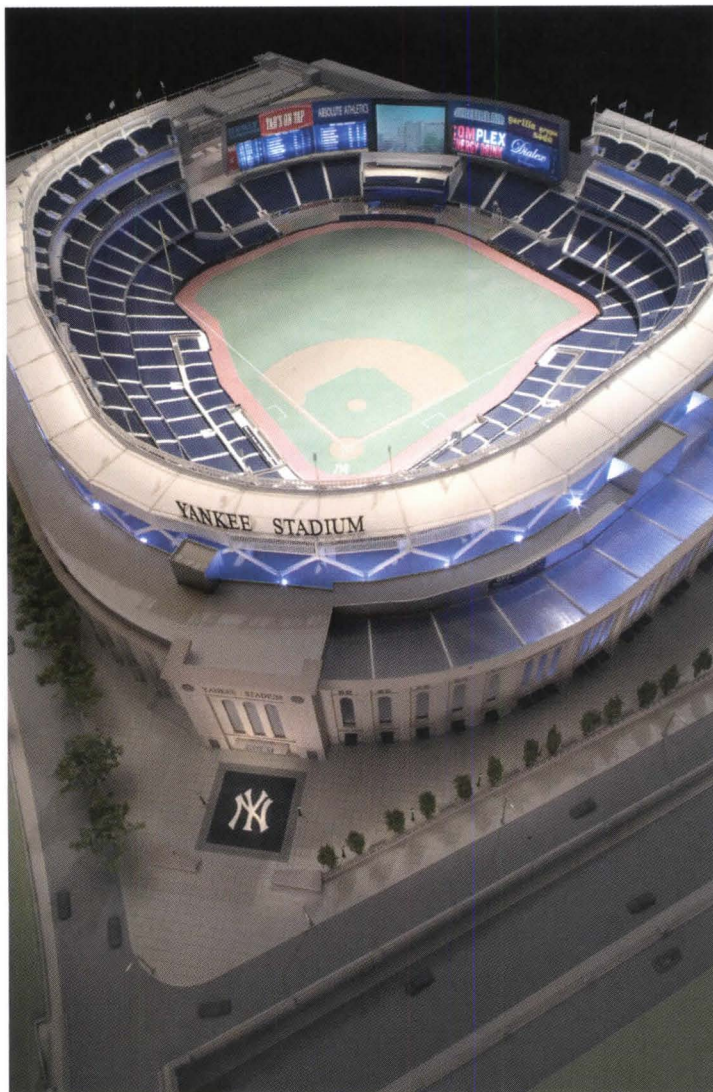
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## Specialist

investment he puts into each project, and he repeatedly notes what has quickly become obvious: "I put my heart into these projects." He treats each model not only as an important architectural document, but also as a work of art. Letters from clients speak of him as a "poet," a "master-builder," and an "artist." Rafael Moneo once shipped a model of Avery Fisher Hall (made by another model-maker) to New York, and when it became damaged in



Tenguerian created a new version of a Rafael Moneo model of Avery Fisher Hall (above) for free after it was damaged in shipping. For long-term clients like HOK, he builds a variety of models, including this marketing model for the new Yankee Stadium, designed by HOK Sport (left).

the process, the architect called Tenguerian to fix it. Tenguerian agreed and built a new model, later refusing payment. Flipping through a portfolio of souvenirs, he pulls out a personal check from Moneo, which he never cashed. "That project wasn't about money. It was about architecture and service."

Kenneth Drucker, senior principal and director of design at HOK, has worked with Tenguerian since 1985. "He's always been a model-maker of first choice," explains Drucker. "He's helped us win competitions, since his models are very persuasive tools in winning projects. His work is art."

The discipline of model-making, like architecture, has been completely redefined over the past few years by emerging technologies and digital practices. Models now link with interactive computer screens, light on command, and involve the challenging forms of contemporary architecture. Methods of fabrication have changed too, most notably with laser-cutting and 3-D printing. An artisan though he may be, Tenguerian is quick to incorporate emerging technologies into his craft, expanding the



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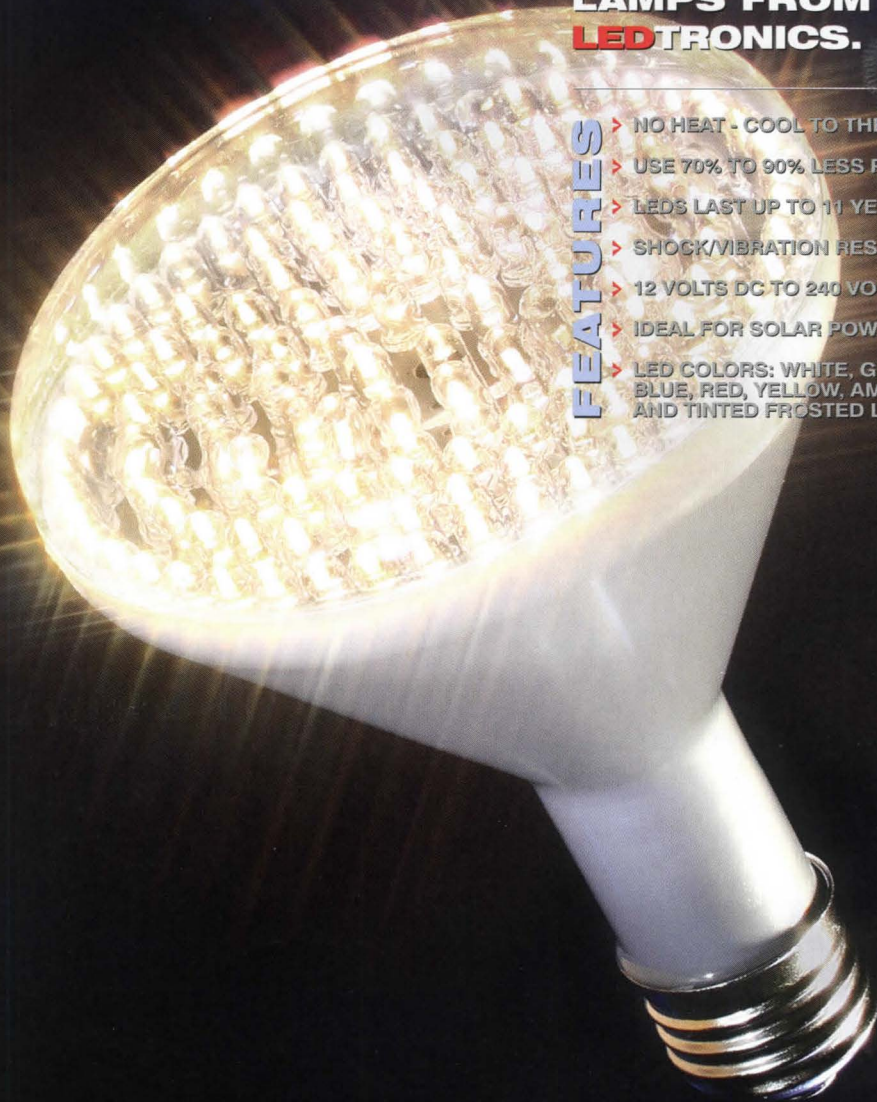


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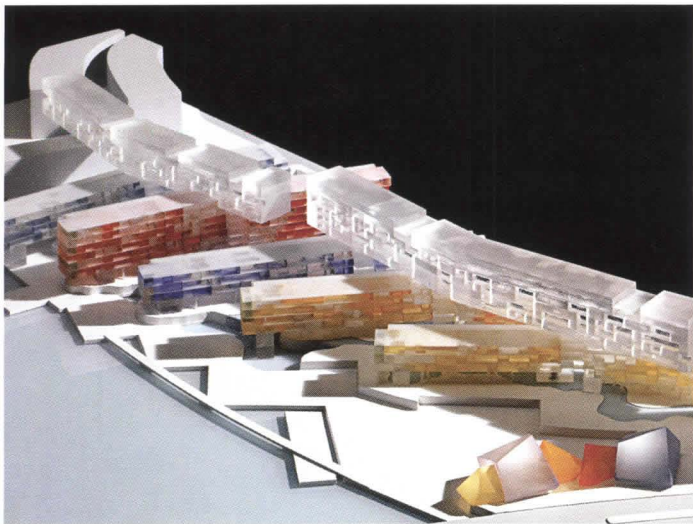
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Different materials are used for different models, including the translucent material used for this model of the Shams residential complex in Dubai, designed by FXFowle.

possibilities of his work. "You can't fudge a physical model," Tenguerian explains. "With software, you can change it as you go, but with a model, everything shows."

Tenguerian was trained as an architect, at Pratt Institute, and he approaches his work as an architect. "There are three components to the design process: the architect, the client, and the physical model," Tenguerian explains. "If you take one element away, things collapse." This is a point backed up by a stack of photos showing architects and clients with his models, pointing, craning necks, and discussing.

"Architects trust me. They know I have architectural training," he says. "Sometimes, when they're explaining a project to me, I can point out problems with the design." He does take on an occasional architectural project, most recently a church in Armenia.

Frank Lupo, a senior associate at FXFowle, says, "Richard understands projects. He does invaluable work in interpreting the project. You may have already formulated details, but he can help you conceptualize."

If Tenguerian's portfolio reads like a history book, his studio is one part museum, one part architectural salon. The walls are covered with photographs of him with the likes of Philip Johnson, and posing with his models in Kazakhstan, Dubai, and Singapore (he often delivers them personally).

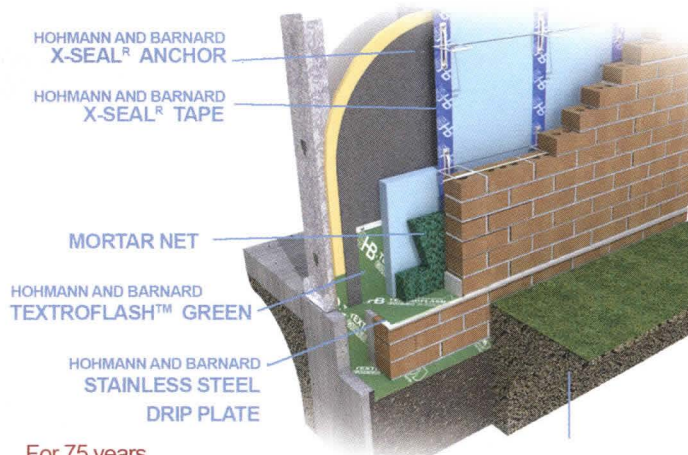
"If you want to get a sense of who's doing what in the architectural world, go to Richard's studio," advises Lupo. "You'll probably bump into someone you know, and you can see what Stern, HOK, and KPF are doing in one visit."

## Sustainable Masonry The Total System Approach

by Christopher Bupp  
Masonry and Architectural  
Services, Hohmann and Barnard



Masonry has long been considered one of the most sustainable and durable building materials in the construction industry. Today's cavity walls require the proper use of numerous masonry accessories to reinforce and tie together multiple wythes of masonry, plus control and expansion joints to handle movement. Flashings, air/vapor barriers, mortar collection devices, weeps & vents are designed to effectively manage moisture within the wall assembly.



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# PROMISE

## BENCHMARKS IN SUSTAINABILITY

- **1992** • EPA launches Energy Star program, aimed at reducing energy consumption and greenhouse gas emissions
- **1998** • U.S. Green Building Council launches LEED Pilot Program (later renamed LEED-NC Version 1.0)
- **2000** • Green Globes for Existing Buildings launched in Canada; the Green Building Initiative (GBI) acquires the rights to distribute Green Globes in the United States four years later
- **2002** • First edition of *Cradle to Cradle: Remaking the Way We Make Things*, by William McDonough and Michael Braungart
- **2005** • LEED-NC Version 2.2 effective • GBI is first green building organization to be accredited as a standards developer by American National Standards Institute
- **2006** • Architecture 2030 Challenge issued • *An Inconvenient Truth* released
- **2007** • ASHRAE Standard 90.1 2007 released • *An Inconvenient Truth* wins Academy Award; Al Gore wins Nobel Peace Prize • Energy Independence and Security Act signed; requires all new and renovated federal buildings to reduce fossil fuel use by 55 percent (from 2003 levels) by 2010 and to be carbon neutral by 2030
- **2009** • LEED for New Construction and Major Renovation 2009 effective
- **2010** • Architecture 2030 goal: All new buildings and major renovations have reduced fossil fuel consumption by 50 percent
- **2018** • Al Gore's goal: 100 percent of electricity is produced from renewable energy and carbon-free sources
- **2030** • Architecture 2030 goal: All new buildings are carbon neutral



A large, bold, black question mark graphic that dominates the left side of the page. The question mark is composed of a thick, solid black shape, with a circular dot at the bottom right.

Text Edward Keegan Portraits William Anthony

## A DEEPER SHADE OF GREEN

WE ALL KNOW THAT BUILDINGS ACCOUNT FOR 40 PERCENT OF THE ENERGY CONSUMED IN THIS COUNTRY. BUT LEED BUILDINGS—SURELY *THEY* CAN'T BE ENERGY HOGS? THE TRUTH IS, THE EFFECT OF RATING SYSTEMS LIKE LEED ON ACTUAL PERFORMANCE HAS NOT BEEN SCIENTIFICALLY DETERMINED ... YET.

# PERFORMANCE

**WE MAY LOOK BACK AT 2008** as the year when America finally woke up to the reality of energy. Gasoline prices topped \$4 per gallon in many locales around the nation, and something fundamental seemed to change. Americans drove less per month starting in November 2007—resulting in the greatest drop in miles driven since the Federal Highway

Administration started keeping records in 1942 and the highest volume of public transit use in 50 years (see page 44). Suddenly, energy conservation isn't just the rallying cry of nonprofit organizations or the subject of an indie film hit featuring a former vice president—it's part of everybody's changing daily habits.

Some architects have seen it coming for a decade or more. William McDonough cast himself as the profession's John the Baptist figure early in the 1990s. In 1993, the U.S. Green Building Council (USGBC) opened its doors as a small organization with significant input from architects. Now, it's not unusual for design firms to have more LEED-accredited professionals than licensed architects.

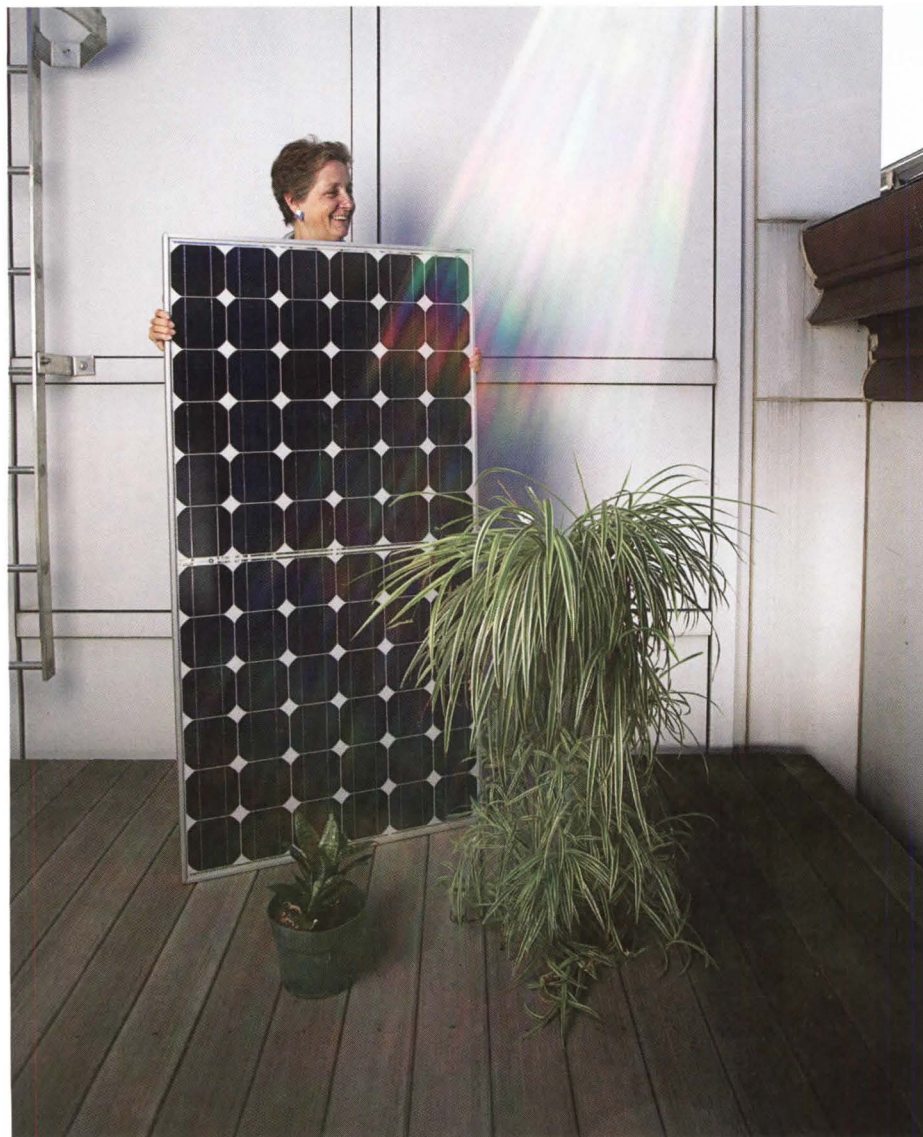
The profession's part of the problem is directly tied to a startling set of numbers reported by the Environmental Protection Agency (EPA). It's typical to find those involved in the building industry repeating them as a mantra: Buildings consume 12 percent of our water, account for 40 percent of our total yearly energy usage, and produce 48 percent of our total greenhouse gas (GHG) emissions.

Announced two years ago, the Architecture 2030 Challenge is rapidly gaining acceptance by building professionals. It stipulates reducing new building and renovation's GHG-emitting energy consumption 50 percent by 2010 and achieving carbon-neutral new buildings by 2030. Is this laudable goal even remotely possible? Have the steps we've taken during the past decade and a half given us the start that's required?

Therein lies our own inconvenient truth. From a marketing and political perspective, the green movement has won major battles. But the time has come for the profession to deliver the goods, and the science of sustainable building is still in its infancy.

#### LEED'S FIRST REPORT CARD

Despite its growing ubiquity, the USGBC's LEED program still touches on only a small percentage of buildings in the United States. As of September 2008, there were 1,705 LEED certified buildings, with 13,741 registered in the LEED certification process. (USGBC estimates that LEED represents 5 percent to 6 percent of all new commercial construction.) In March 2008, the nine-year-old labeling system got its first report card. Titled "Energy Performance of LEED for New Construction Buildings," the report was commissioned by the USGBC and conducted by the New Buildings Institute (NBI). Its results raise questions about the profession's awareness of the building sci-



## LEADING THE ACADEMY

### Vivian Loftness

University Professor, Carnegie Mellon University, Pittsburgh

Age: 56

Education: B.S. and M.Arch., Massachusetts Institute of Technology

Vivian Loftness joined the Carnegie Mellon faculty in 1981. "One of the main goals of my work is proving that quality buildings have positive outcomes in terms of energy, sustainability, health, productivity," she says. Loftness headed the School of Architecture from 1994 to 2004 but stepped down to devote more time to teaching and research. (She does find time to be on the USGBC's board of directors and lecture on sustainability around the world.) "I'm amazed at the impact of LEED in promoting team design ... very early in the design process," she says, noting the contrast to the traditional model of architectural creation, which holds that the best ideas come out of the brain of an individual (at midnight or later).

Loftness sees today's college-age generation as a driver of necessary change within the academy. "They're demanding courses that cut across disciplines," she says, even though universities are still organized on disciplinary lines. But one simple solution could change the playing field. "If Congress told NIH [the National Institutes of Health] and NSF [the National Science Foundation] to put 1 percent of their budgets next year to ... built environment issues, you would see building science pop up all over the country," she says. "It would be across disciplines, and you could totally transform the mind-set."

ence issues that will be central to solving our side of the global warming equation.

"The study started from a discussion about how we make the rating system better if we don't know what's wrong with it now," says the USGBC's vice president for technical development, Brendan Owens. Mark Frankel, the NBI's technical director and a co-author of the report, notes that **one of the most shocking results was not the data itself, but the meager quantity available.** The NBI asked the owners and operators of 552 LEED-certified buildings (as many as existed when the study began) to participate. About half—250—were willing, but only 121 of that group could supply the data necessary.

Since one common complaint of the LEED process is the onerous paperwork required to achieve certification, it seems odd that the owners and operators of these lauded buildings would balk at providing the uncomplicated data requested—i.e., recent energy bills.

Carnegie Mellon professor and architect Vivian Loftness, an expert on building performance, characterizes the report's conclusions as, "Predominantly, we're doing pretty well." On average, the 121 buildings in the survey are showing better energy performance than a model code baseline building. Of course, an average is just that. In fact, a number of buildings are performing much better, while a similar number are faring worse. **This disconnect—between actual building performance and design-phase energy modeling—offers the most important and challenging lesson for the USGBC, architects, engineers, owners, and other building professionals.**

Frankel explains that more than a third of the included buildings had achieved LEED M&V credits, which require a measurement and verification plan that extends at least one year into building occupancy. "I thought we'd get a lot of M&V reports," says Frankel. "We got four." Three of those four were from a single firm that has a reputation for good follow-up. The fourth was a real cause for concern: The NBI's analysts crunched the numbers and assigned it an approximate Energy Star score—which was shockingly low. Convinced that the data were incorrect, the NBI contacted the owners, who verified the numbers.

"They had no idea their M&V report was telling them their building was a dog," says Frankel. "There was no context." Within a day, that building owner had their design team on the phone and they set about discovering what wasn't operating properly. Within a few months, they had reduced their energy use by 30 percent.

While just a single anecdote involving one participant in the study, it demonstrates the fundamental disconnect—between predicted and quantifiable performance—that still pervades the industry.

The USGBC is continuing the study with the NBI, seeking the reasons behind



## MONITORING THE PRACTICE

**Stephen Kieran**

Partner, KieranTimberlake Associates, Philadelphia

Age: 57

Education: B.S., Yale University; M.Arch., University of Pennsylvania

Long known for its interest in research, Philadelphia's KieranTimberlake has begun doing independent performance monitoring on its buildings in the past two years. Installing the monitors is neither difficult nor expensive, according to Stephen Kieran. "They can be purchased online and delivered in a day," he says. "We're talking a few thousand dollars." The firm's staff—which includes environmental scientists as well as architects—is responsible for the installation, monitoring, and analysis of the data.

Making the connection between design assumptions and actual performance is critical to Kieran's concept of the profession's role today. He compares architecture to medicine, where diagnosis and initial treatment are just the start of the process. "The building is never 'done,'" says Kieran. "It needs to be monitored and managed, and we can play an important role in making suggestions on how to upgrade and tune its performance."

## RUNNING THE BUILDINGS

**Larry Bridge**

Workplace and Infrastructure Solutions Manager, Procter & Gamble, Cincinnati  
Age: 42

**Education:** B.S., Michigan State University

Trained as a mechanical engineer, Larry Bridge has worked in facilities and real estate for Procter & Gamble (P&G) for 22 years. He's currently in charge of some 1.5 million gross square feet of general office space that accommodates 4,200 people. The company's headquarters complex in Cincinnati recently gained Energy Star certification for its increasingly sophisticated set of energy-efficient controls and practices.

All of P&G's green upgrades have been made as part of a standard maintenance program. They include better daylighting, through open office layouts, and automated systems that more tightly control everything from bathroom and conference room lighting to office temperatures, which can be tweaked a bit warmer in the summer and cooler in the winter. "You've got acceptance from employees for automation and controls," he says. "They're bothered if they don't see it." Bridge views both renewable energy and better materials as places for a lot more improvement. But it's all part of a continuing process—for him and P&G.

"You build it, make sure it's working the way it was designed, then you have to continually validate that it's operating the way it should," he says.



both over- and underperforming buildings in the LEED program. "We're trying to pin down specifics," says Owens. "There are lessons both ways." Loftness concludes, "There's a major handoff problem between engineering excellence and construction, and management excellence."

### PLUSES AND MINUSES

While only about half his firm's clients choose to participate in LEED, Stephen Kieran, a partner of KieranTimberlake Associates in Philadelphia, finds that the decision increases their aspirations in a verifiable way. Two of the firm's recent buildings—one for Sidwell Friends

School in Washington, D.C., and the other for Yale University—achieved a platinum rating. "Yale wanted a silver building, but we were able to get it [to platinum] without a lot of extra money," he says. But Kieran doesn't applaud the additive nature of the LEED system. "You get points by adding additional features to the building," he says, whereas Kieran-Timberlake prefers a holistic process, looking carefully at orientation, shading, and sophisticated envelopes. To achieve energy efficiency, "We build [it] into the form of the building without adding horsepower or material," Kieran says.

Even Loftness, a USGBC board member, acknowledges that the current Ver-



sion 2.2 of LEED allows certified buildings to skirt energy performance, since only 10 of the 69 credits are what she calls “hard-nosed energy credits.”

“Some poor performers have gone for other stuff—air quality, or land use, or transportation, or other good things,” she says. “They may be major contributors to our drive for environmental sustainability without having hit the energy checklist.” The next evolution—LEED 2009—addresses this issue by creating mandatory energy credits and increasing the percentage of energy credits within the overall framework of the rating system. (Under 2.2, 17 out of a possible 69 points are “Energy & Atmosphere” credits—that is, a little less than 25 percent. Under 2009, it’s 35 out of 110, or almost 32 percent.)

#### BUILDING PERFORMANCE RESEARCH

“Right now, there’s a lot of emphasis on high-performance design, but we don’t

according to Owens. Still, it is trying to extend its reach by funding studies with matching on a greater than one-to-one basis for anything it supports.

Loftness points to another thorny problem. “We cannot baseline our buildings,” she says. “It’s a building science and an engineering problem.” EAct, the Energy Policy Act, mandates all federal agencies to baseline their buildings, without establishing what that baseline is.

Because energy consumption in federal buildings is often a complex brew of electricity, steam, gas, and chilled water—generally metered in different ways, across multiple buildings and/or sites—establishing a simple metric for each is extraordinarily difficult. The NBI’s Frankel notes that contemporary building automation systems would seem to provide an answer, but the average system now creates as much data in 20 minutes as Shakespeare’s collected works. “When was the last time your building manager had enough time to sit down and read Shakespeare?” he asks.

## THE EVOLUTION OF LEED

### LEED 2.2

Sustainable Sites	14 points
Water Efficiency	5
Energy & Atmosphere	17
Materials & Resources	13
Indoor Environmental Quality	15
Innovation & Design Process	5
Regional Bonus Credits	0
<b>Total</b>	<b>69</b>

**37%**

CERTIFIED

CREDITS →

26–32

**47%**

SILVER

33–38

**56%**

GOLD

39–51

**75%**

PLATINUM

52+

### LEED 2009

Sustainable Sites	26 points
Water Efficiency	10
Energy & Atmosphere	35
Materials & Resources	14
Indoor Environmental Quality	15
Innovation & Design Process	6
Regional Bonus Credits	4
<b>Total</b>	<b>110</b>

**37%**

CERTIFIED

CREDITS →

40–49

**45%**

SILVER

50–59

**54%**

GOLD

60–79

**73%**

PLATINUM

80+

have a comprehensive feedback loop for evaluating that performance and learning from it,” says Kieran. And at the moment, we’re not on a sustainable path to change that.

“The federal investment in building science research is impoverished,” says Loftness, who notes that only 0.2 percent of the federal research budget even touches on issues like water, air, and energy as they affect the built environment. Science and medicine are funded by the federal government because they’re considered fundamental to the nation’s future. The USGBC maintains a \$2 million research endowment, but primary research is not a goal of the organization,

The NBI is trying to establish key performance indicators. “What are the 10 or 20 data points that allow building operators on a daily basis to understand what’s going on?” asks Frankel. And, more importantly for the industry, **how can architects understand what their input provided, and how tenant and owner activities affect building performance in real-world situations?**

In separate discussions, Frankel, Loftness, and former American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) president Kent Peterson all pointed to the buildings of the 1920s as models for energy-efficient design. These structures were designed

with daylight wells, good thermal mass, and natural cross-ventilation. "They're passive buildings," says Loftness. "You can run them easily. It's important to keep them in our portfolio."

Frankel—who has looked carefully at more LEED buildings than almost anybody—says, "If you look at the characteristics of buildings that are performing well, you don't see all these funky, cutting-edge technologies that are driving the energy." Instead, he says, what you see is really good design integration—the designers have taken a bunch of stuff

they know how to do, then put it together in a sensible package that works. "Effective design is what drives energy performance," he says.

#### GETTING TO 2030

According to the NBI report, most LEED platinum and gold buildings are already meeting the Architecture 2030 Challenge's interim target of reducing carbon emissions to 50 percent of current averages by 2010. "But LEED is still not the mainstream driver," says Loftness. "It doesn't matter how many times



## CRUNCHING THE NUMBERS

**Mark Frankel**

Technical Director, New Buildings Institute, White Salmon, Wash.

Age: 46

Education: B.A. (environmental policy), Pomona College; M.Arch., University of Utah

"Most people think I'm a mechanical engineer, but I'm not," says Frankel, a Salt Lake City native. Prior to joining the New Buildings Institute, he worked for two Seattle-based energy consulting firms and "learned more about mechanical design than any architect has a right to." At one of them, Paladino & Co., he was in charge of the firm's third-party review of the first 75 LEED projects. Since 2006, Frankel has been technical director of the NBI, where he's able to bring his expertise to national program and policy work for organizations such as the AIA, the USGBC, the Environmental Protection Agency, and the Department of Energy.

"[The] NBI is about translating the information that's out there into something architects can use," Frankel says. "There's a critical need for that." As one of the authors of the recent report "Energy Performance of LEED for New Construction Buildings," he doesn't shy away from the more troubling results. Discussing some of the "scatter"—the buildings that are either underperforming or overperforming their supposedly green designs—he attributes these anomalies to the disconnect between design assumptions and the reality of buildings in operation. "If we had good feedback systems, the scatter would tighten down considerably," he says.

we tweak LEED, it's not going to be enough unless there's a federal focus on the whole."

Platinum and gold buildings are still considered state-of-the-art. It's implausible to imagine 2030's interim goal being met on a wide scale within two years.

Although LEED may still seem to fit a boutique niche, the growth of its techniques is more widespread than the reported numbers. While only half of KieranTimberlake's clients aim for certification, the firm designs all their projects with a similar ethic and approach. Procter & Gamble is an example of a corporate citizen that takes a similar view. "Our design standards are very consistent with LEED," says Larry Bridge, workplace and infrastructure solutions manager for the company, which has not sought LEED on a project to date.

Tech company Integrated Environmental Solutions offers free software that can predict the energy use and carbon emissions of a building model in SketchUp or Revit. CEO Don McLean acknowledges that, while his VE-Ware is a good tool for implementing these strategies, tools alone won't get it done: "We've got to get back to the fundamentals of architectural design," he says. "It's about looking at building mass, shape, form."

Owens notes that **the USGBC is doing everything it can to speed up the process.**

With LEED 2009, the existing buildings category gets more attention because it offers a quicker feedback loop for improvements (not to mention the previously noted advantages that many older buildings have over new construction). While Owens remains optimistic, he notes that the scientific community is constantly recalculating the levels of greenhouse gas that need to be met. The current level of carbon dioxide in the atmosphere is 385 parts per million (ppm); a new paper suggests that the right target level might be 325 ppm. "We've been shooting at 550 for the past two years, so our trajectory is all wrong to begin with," he says.

Which gets us back to science—and specifically, building science. Our still nascent knowledge of this discipline is our inconvenient truth. For more than half a century, we've built with ever cheaper and thinner and slicker materials while we've asked our engineering colleagues to pump them full of whatever heating and cooling was necessary. In doing so, we lost a balance between buildings and nature that had been part of an architect's repertoire since before Vitruvius.

We can take some solace in the fact that architects have stepped up in the past decade and begun to rapidly address these problems. But what we don't know

## GROWING THE SYSTEM

**Brendan Owens**  
Vice President, Technical  
Development, U.S. Green Building  
Council, Washington, D.C.  
Age: 33  
Education: B.S. (engineering),  
Purdue University

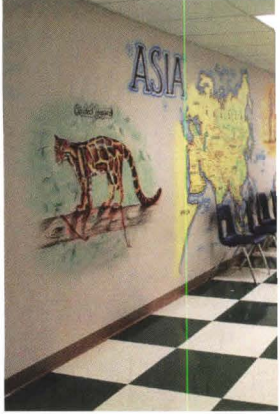


An engineer by training, Brendan Owens worked for a half dozen years with a contractor who did energy service retrofits in the Washington, D.C., area. When he joined the USGBC six years ago, there were just seven staff members. "We were the people whose phone calls weren't being returned," he recalls of his first days with the nonprofit. He's now one of 10 vice presidents, and the rapidly growing organization has more than 165 employees.

"The thing that's exciting about the conversation we're having now is that it's such an integrated discussion," says Owens. He considers the LEED framework an essential building block for this evolving dialogue between the profession and the public. LEED 2009 is the next big step, but Owens considers the LEED-Online system that will debut with the revised rating systems just as important. "We're giving the market the tools to deliver an exponentially larger number of green buildings," he says.

right now—what former Secretary of Defense Donald Rumsfeld once famously called the "unknown unknowns"—remains vast and is a result of decades when our educators and professionals chose to favor aesthetics and expedience over firmness and commodity.

"There's an urgency with 2030," says Frankel. And our responsibility to learn and change is imperative. 💡



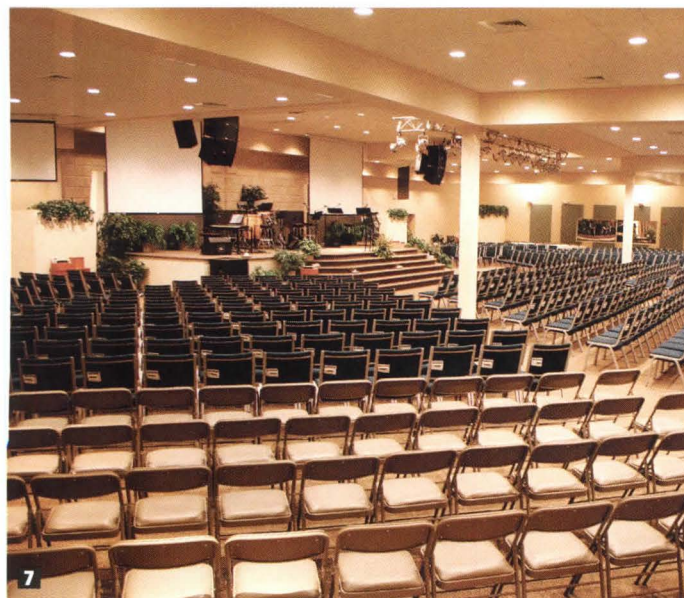


# BIG BOX

# REUSE

IS IT TIME TO RETHINK OUR LOATHING OF BIG BOX STORES? AROUND THE COUNTRY, THESE MOST UTILITARIAN AND CHARACTERLESS OF STRUCTURES ARE FINDING NEW LIVES AS HEALTH CENTERS, PRESCHOOLS, AND CHURCHES. AUTHOR JULIA CHRISTENSEN EXPLORES THE PHENOMENON IN A NEW BOOK FROM THE MIT PRESS.

**Text and Photos** Julia Christensen



**1. Charter school: Reused Kmart building, Buffalo, N.Y.** School leaders are happy with the generous, flexible space that emerged from a renovated Kmart. Wide hallways curb bad behavior, the principal says, adding, "By starting with an empty shell that we can build into, we are able to grow as we go."

**2. Centralia Senior Resource Center: Reused Wal-Mart building, Wisconsin Rapids, Wis.** Madison, Wis.-based architecture firm Vierbicher Associates has turned a disused Wal-Mart into a vibrant senior center for the town of Wisconsin Rapids, in part by knocking down 18,000 square feet of excess space. Dramatic entryways break up the monotony of the façades.

**3. Head Start Early Childhood Center: Reused Kmart building, Hastings, Neb.** In 1998, a tornado damaged the Head Start facility in Hastings. Three years later, Head Start moved into a former Kmart, which had sat empty for a decade. The new center serves 1,200 students and their families, many of whom are recent arrivals from Mexico. The playground sits on what used to be Kmart's cargo dock.

**4. RPM Indoor Raceway: Reused Wal-Mart building, Round Rock, Texas** When Wal-Mart built a supercenter across the street from its first store in Round Rock, the company was reluctant to sell that property, with a deed restricting competitive uses for up to 50 years. A real estate group was able to buy the site contingent on a noncompetitive use: go-kart racing. (The building is now leased by a more profitable Gold's Gym.)

**5. Spam Museum and Hormel offices: Reused Kmart building, Austin, Minn.** Hormel Foods Corp. purchased a former Kmart and then held a design competition, inviting four Minnesota firms to envision half the space as offices, half as a museum for Hormel's iconic product, Spam. Paulsen Architects of Mankato was the winner. The Spam Museum opened in 2001 and gets about 10,000 visitors a year.

**6. Lebanon-Laclede County Library: Reused Kmart building, Lebanon, Mo.** When the county library board took ownership of the 41,000-square-foot building in 2002, project leaders decided to fix up the façade first, to prove that the space would not look "like a Kmart." The new library is joined to a Route 66 museum and a café.

**7. Calvary Chapel: Reused Wal-Mart building, Pinellas Park, Fla.** The evangelical Calvary Chapel held services in a vacated Winn-Dixie before buying a former Wal-Mart building in 2002. In the first phase of its renovation, Calvary took over about two-thirds of the cavernous space, installing an auditorium (pictured), classrooms, a youth area, and a 3,200-square-foot lobby with a coffee bar.

→ EXCERPT FROM *BIG BOX REUSE* (MIT PRESS: 220 PAGES, \$29.95)

**THE YEARLY CONSTRUCTION** of hundreds of big box stores across the United States has been so encompassing that it is hard to conceive of where they came from, who owns them, who designs them, and who is responsible for them. Big box buildings are most commonly associated with retailers who developed the industry of one-stop shopping—Wal-Mart, Kmart, and Target among them.

But these retailers are not the only corporations to construct big boxes. A myriad of companies has followed suit, supersizing into the big box typology, including the more specifically merchandised "category killers" (like The Home Depot, PetSmart, Barnes & Noble, and Staples), grocers, warehouse clubs (like Costco and Sam's Club), and outlets (like Big Lots). The onslaught of these structures has increased continually since 1962, the year of the first Wal-Mart, Kmart, and Target stores.

At the same time, big box buildings are being vacated—not, in general, because the companies have lost business in a certain location, or because the business model has not worked. Rather, big box buildings are being vacated because the retailers are expanding to larger structures, usually within a mile of the original structure. This is especially true of Wal-Mart. At the time of this writing, the Wal-Mart Realty website ([www.walmartrealty.com](http://www.walmartrealty.com)) listed 253 Wal-Mart-owned empty buildings available for lease, all ready for future use (exhibiting the Wal-Mart corporation's land use power, as one of the country's largest commercial landlords). Twenty-six of these buildings are in the state of Texas, 15 are available in Tennessee, 13 in Oklahoma, 21 in Ohio, and 16 in Illinois.

This list does not include the hundreds of vacated Wal-Mart retail buildings owned and controlled by countless other real estate companies across the country, only those owned and controlled by Wal-Mart. And of course, these are only vacated Wal-Mart buildings, so when we include Kmart, The Home Depot, Kroger, and so forth, we are clearly looking at thousands of empty buildings from coast to coast. You can probably think of a few in your immediate region right now.

The reuse of these buildings seems unlikely, with their directly corporate associations and their aesthetically bland hulk. The buildings exude an ephemeral quality, imparted by the frequency with which corporations vacate the structures, and yet the dead weight of an empty big box building does not simply go away. In the 21st century, communities across the United States are adapting these buildings for new uses, just as people have always reused the buildings in our midst.

It is educational—and quite enlightening—to attempt to place the big box reuse phenomenon in the continuous timeline of development in the United States, contemplating not only where the phenomenon has come from, but also where it is leading, and what the future landscape holds. Communities continuously reconnect their needs and activity flow to the landscape, and by subsuming these abandoned big box buildings, they attempt to make them useful within their lives after the retailer has vacated the premises. The result is that we are beginning to see museums, community centers, churches, and other civic groups moving into adapted, abandoned corporate big box structures.

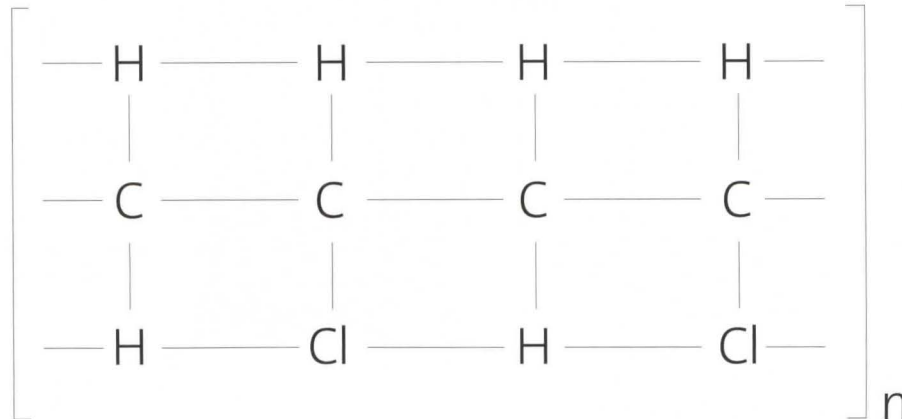
Infinite paradoxes are embedded in the process of reusing a big box. First, communities are recontextualizing this corporation-specific development through primarily nonretail adaptation and reuse. Environmentally, big box reuse offers quite a paradoxical quagmire; despite the blatant environmentally harmful construction of a big box building, reuse is a powerful tool in the fight against the increasing dangers of sprawl. For every building that is reused, another building does not go up.

Humans are incredibly resourceful when there is a need at hand, and it is no surprise that groups of creative people across the United States are successfully turning vacant greyfields into vibrant nodes of community activity. But questions persist: Is this what we want our future landscape to look like? Schools, hospitals, churches, museums, and flea markets, all within the same structure, built by the same handful of corporations, right around the turn of the millennium? ☺

*Julia Christensen is an artist and writer who teaches at Oberlin College in Ohio. "Your Town, Inc.," an exhibition of her work, is on display at the Miller Gallery at Carnegie Mellon University through Nov. 23.*

## RAW MATERIALS

## VINYL



AS THE CONTROVERSY OVER ITS USE RAGES ON, VINYL—SPECIFICALLY, POLYVINYL CHLORIDE—CONTINUES TO BE USED WIDELY IN CONSTRUCTION. WHERE DOES IT COME FROM, AND WHERE DOES IT END UP?

**VINYL IS THE MOST VERSATILE** and widely deployed plastic in the construction industry. In the 1950s and '60s, manufacturers began mass-producing building components of vinyl, or polyvinyl chloride (PVC), and expanding the use of a material developed since the 1920s as a fake rubber. Today, they turn out millions of pounds of vinyl pipe in every size and shape, as well as vinyl siding, windows, decks, fences, rails, and wire coatings.

About 3 percent of vinyl is turned into roofing. To see vinyl come into being for the building industry, ARCHITECT watched the production of vinyl roof membranes at the plant of Sika Sarnafil in Canton, Mass. The manufacturing process at the plant starts with a powdery vinyl resin shipped by train from Louisiana, and it ends, many large rollers later, with neat 400-pound packages of a soft but tough roof sheathing wrapped around a 10-foot-long cardboard tube.

Because of vinyl's chemical parentage—it is about 57 percent chlorine, taken from salt, and 43 percent ethylene, derived from natural gas or petroleum—its use in construction (as well as in toys and consumer products) is hotly debated. The environmental group Greenpeace calls PVC the "most environmentally damaging of all plastics." The Healthy Building Network cites the numerous toxic substances attending PVC's manufacture (chlorine, in particular) as reason to remove the material from buildings, and from production, entirely.

The Vinyl Institute, among others in the plastics industry, casts PVC's chlorine content as a plus because it means that less than half the material comes from fossil fuels. The trade group argues that PVC takes less energy to make than common alternative plastics and aluminum in construction, that it lasts a long time, and that it is increasingly recyclable. PVC pipes, notably, offer lower resistance to water flow than other kinds of pipe, requiring less energy for pumping. And Sika's vinyl roof membranes are white on their outer face, which enables them to reflect solar heat and keep buildings cooler than dark-colored roofs. A federal government study found that installing a "cool" roof of white vinyl can reduce air-conditioning demand at peak periods by 14 percent and throughout the day by 11 percent.

Yet, among sustainable-design specialists, vinyl is under intense scrutiny. Earlier in this decade, the U.S. Green Building Council (USGBC) convened a special panel of experts to address a push toward creating a credit in its LEED certification scale that would reward avoiding the use of PVC products in construction. After several years of study and gathering of public comments, the panel declined to support such a credit. Rather, its final report suggested that all materials, including PVC, needed both more thorough analyses of their sustainability in the context of practical alternatives and a harder focus on the end of their lifecycles, when they may wind up, for instance, in landfills or incinerators.

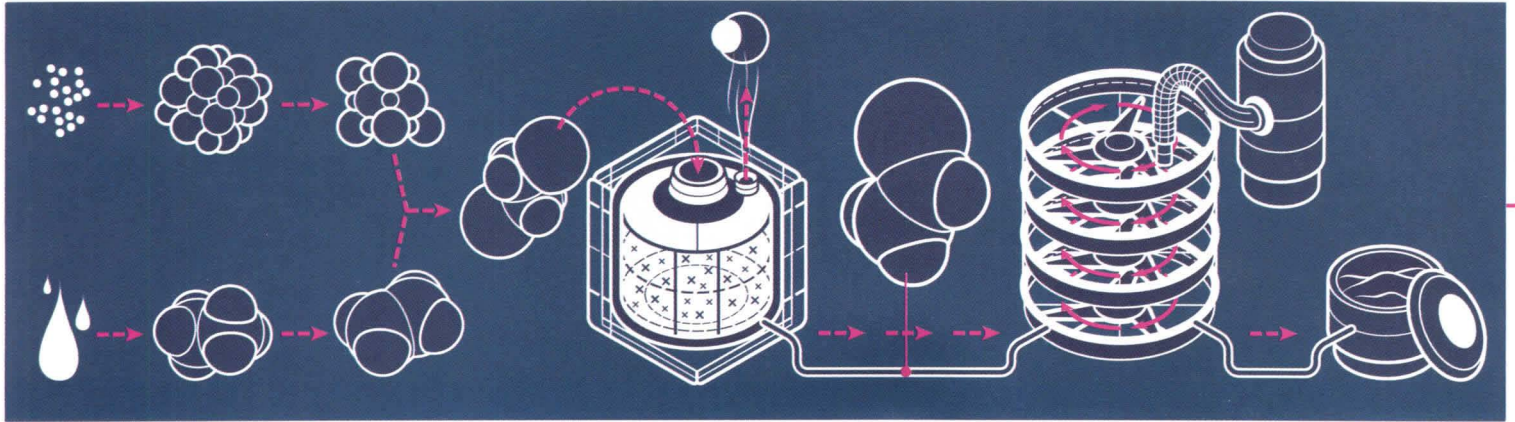
As for PVC itself, the panel concluded that formally discouraging the specification of some common PVC products, such as siding, windows, or pipes, could steer designers toward products whose impacts are, on the whole, more harmful to the health of people or the environment.

Although the PVC study panel left the material's status unchanged within the rating system, vinyl's case is hardly closed within the USGBC. The council's healthcare committee recently proposed that LEED discourage the use of materials involving substances known as persistent organic pollutants, which would rule out materials requiring the use of halogenated compounds—and, hence, rule out the use of PVC. "You couldn't make PVC without halogenated compounds," says Scot Horst, the chair of both the PVC study panel and the USGBC's LEED steering committee. "The real problem is almost always related to the chlorine molecule," which has the potential to create dioxins when it burns at low temperatures. Disposal, he says, is the crucial issue. As of this writing, official action on the healthcare committee's proposal was still pending.

"All materials have some sort of impact," says Horst. "By reducing impact in one way, you increase impact in some other way. There are trade-offs for every decision you make." Vinyl is a complicated material, the ultimate synthetic, and the current debate surrounding its use illustrates nothing so much as the enormous delicacy of evaluating any material's costs and benefits when the accounting is thorough. ☺

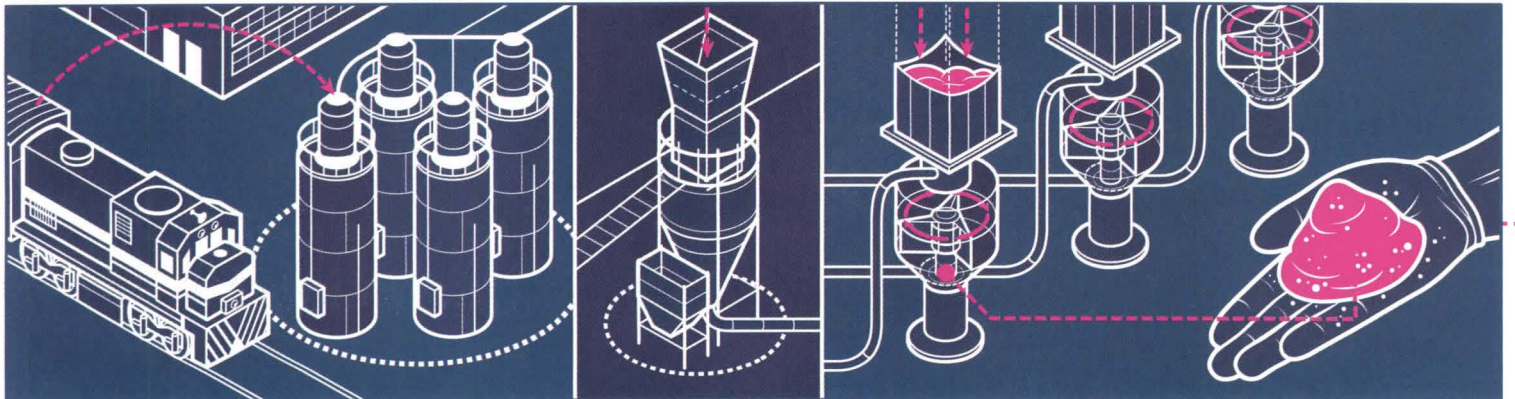


## MAKING VINYL RESIN



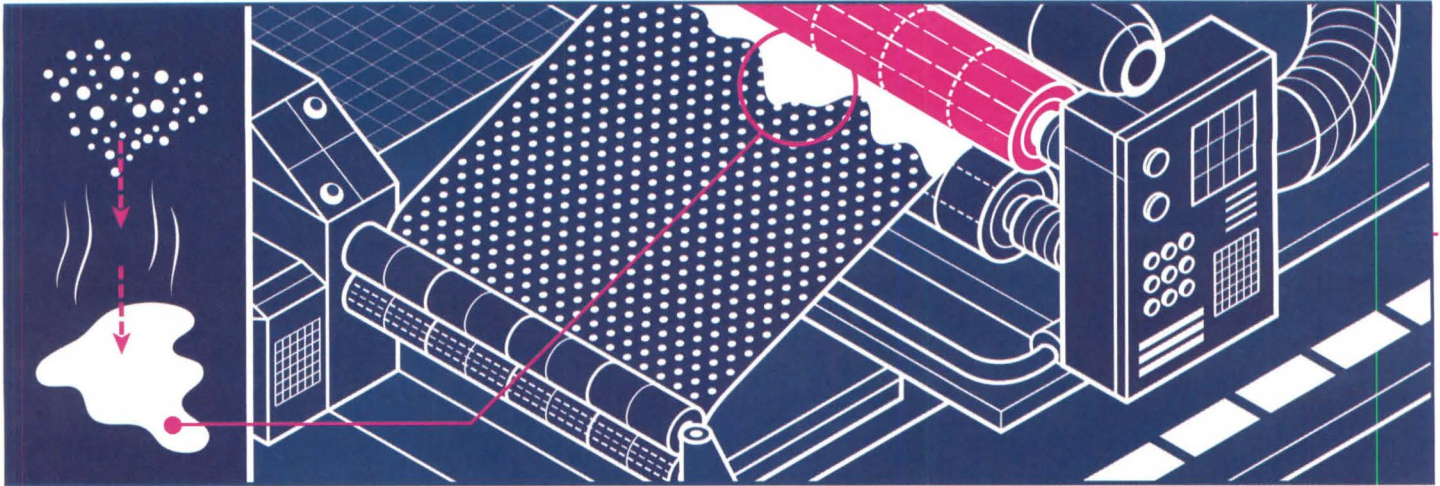
→ At the Sika Sarnafil plant, vinyl roof membranes start with a powdery vinyl resin made with chlorine and ethylene. The chlorine comes from salt (sodium chloride) relieved of its sodium by electrolysis. Ethylene comes from “cracking” ethane, found in natural gas or petroleum. Next, the chlorine and ethylene are combined to produce ethylene dichloride, which is then cooked to make vinyl chloride monomer, or VCM; its by-product, hydrochloric acid, is drawn off. Typically, the VCM is turned into a polymer, or polymerized, by several hours’ stirring in a chamber with small amounts of other chemicals that induce its formation into molecular chains of vinyl resin. Leftover VCM, which is said to be a carcinogen, is removed by vacuum and steam-stripped to prevent its presence in the finished batch of resin, which has a powdery consistency.

## MIXING



→ Vinyl resin powder arrives at Sika’s plant through the Worcester rail yards. It is stored outside in three large silos. The resin grains are blown inside the plant through ducts to overhead silos at the head of the production line. Nearby are mass quantities of dry additives hanging in fabric hoppers: They include plasticizers to enhance flexibility; stabilizers to prevent burning during processing and to block ultraviolet rays; and, sometimes, pigments. A large, cylindrical, high-intensity mixer combines the resin and additives at 200 F before cooling them to 70 F. When it’s done, this “dry blend” feels like sugar to the hand.

## MELTING AND EXTRUDING



American producers made 14.6 billion pounds of PVC in North America in 2007.

→ The granular mix is melted at 300 F to make molten plastic. The material is then fed into the extrusion line's die, where a 3,400-pound roll of base fabric, a knitted polyester scrim 10 feet wide, unspools to receive a layer of the molten material across its surface as it passes between massive pairs of steel rollers—think of a gigantic pasta machine. Looking into the machinery, you can see the syrupy vinyl coating suspended just along the rollers' receiving edges. A bottom layer goes on the fabric first; thickness is checked by a gauge to within ten-thousandths of an inch. Then, a top layer goes on between another set of rollers. Out comes a recognizable roof membrane.

The semifinished membrane is then cooled to 80 F as it moves down the production line. It passes through various sensors, connected to an elaborate control panel, that measure the temperature, plasticity, pressure, and tension across the membrane's width. The membrane next enters an automated thickness-control device, which has 125 bolts—connected to thermocouples (temperature sensors)—that can heat and cool to iron out and correct variations.

## RECYCLING

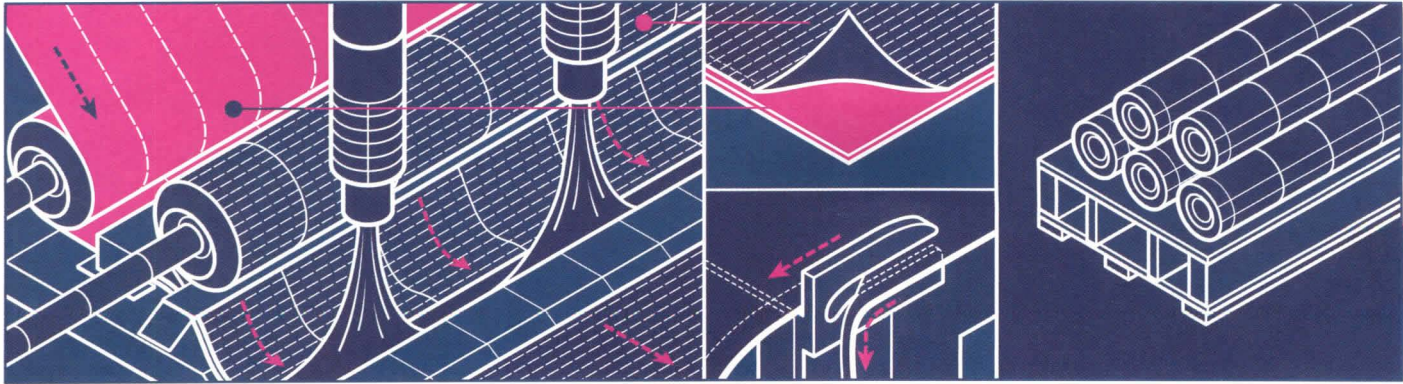
AFTERLIFE



→ Sika Sarnafil runs a separate plant at its Canton factory for recycling scrap cuttings from its production line. Because this material is clean, it is almost fully recyclable, whereas previously used roof membrane must be rid of impurities first, which is more complicated and costly. About 15 percent of Sika Sarnafil's new roof membrane is recycled material. The cuttings resemble long pieces of tape. Three grinders in a row reduce the material to progressively finer particles. The heavy PVC of the ground-up cuttings falls downward from the final crusher. The lighter portion of the material, which is the polyester backing fabric, travels upward and is compacted elsewhere for turning into construction blocks or burning for energy. The recaptured PVC, because it creates color variations, is melted to make up part of the back layer of a new membrane. "It's got to be economically viable—that's a key thing," says Dave Morse, the director of manufacturing. "And it is economically viable. We've proved that."

After additives such as plasticizers or stabilizers are factored in, the PVC content of commonly considered “vinyl” products may be anywhere from 35 percent to 70 percent.

## TREATING AND ROLLING



→ Once the membrane has been machine-inspected, it moves between rollers that coat it with a lacquer, a water-based latex that protects it from ultraviolet rays and helps to shed dirt. It then goes through a dryer to cure the lacquer. Cameras inspect the surface for defects. A layer of nonwoven, needle-punched polypropylene felt may be fused onto the membrane. On a roof, the felt helps to prevent punctures, even out rough surfaces (such as atop asphalt roofs), and cover joints to mask surface irregularities. Next, the felt-backed membrane is stamped with a logo and passes through a trimmer to cut off the incomplete edges (which go to recycling) and then an edge marker, which applies thin lines of a water-soluble ink to help roofers guide their alignments during installation, as well as markings for fasteners. It then goes directly to packaging, where it is rolled onto large cardboard tubes. Sika’s “contractor rolls” hold 150 feet of vinyl roof membrane weighing 400 pounds. They are wrapped in polyethylene sleeves and stacked, between stiff cardboard cradles, eight rolls to a pallet for shipping.

## END-OF-LIFE



→ During its useful lifecycle in most applications, PVC rated fairly well when compared with alternative materials by the USGBC’s expert panel in its 2007 study—except, notably, as flooring, given the gases it can emit indoors. But the panel expressed serious concerns about PVC’s effects on human health as it starts to degrade or burn. Even at low temperatures, safety analysts say, decomposing PVC can give off toxic phthalate plasticizer compounds into the air. When it burns, it releases hydrochloric acid and dioxins, which pose potential health threats during building fires or, at the end of its life, in a burning landfill. (About 8,400 landfill fires are reported in the United States each year, according to federal government figures.)

Allen Blakey, public affairs director for the Vinyl Institute, cites Environmental Protection Agency data that show landfill volumes holding steady and the use of PVC soaring while dioxin emissions have decreased. “Given that PVC production and use has grown, we should be seeing an upward trend in dioxin [releases],” if environmentalists’ claims about PVC are true, he says. “But we’re not. This is our most important piece of data.”

In the U.S., 70 percent to 75 percent of all PVC goes into construction products.



Text Vernon Mays Photos Michael Robinson

# SUFFRAGETTE CITY

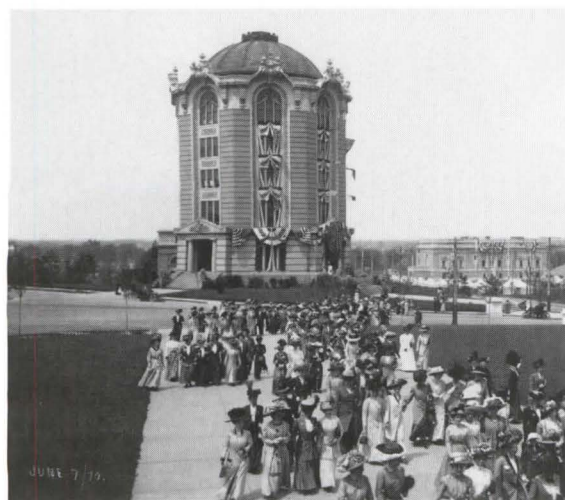
A WOMEN'S MAGAZINE BUILDING TURNED CITY HALL IN UNIVERSITY CITY, MO., IS RESTORED TO ITS BEAUX ARTS GLORY WHILE INCORPORATING BEHIND-THE-SCENES GREEN TECHNOLOGY THAT ADDRESSES THE LARGER ISSUE OF SUSTAINABLE HISTORIC PRESERVATION.

**RIISING ABOVE THE NEIGHBORHOOD** like an overdecorated wedding cake, the Beaux Arts-style City Hall of University City, Mo., is this 38,000-person bedroom community's most prominent landmark. Infused with the history of boom times in the American Midwest, the octagonal tower due west of downtown St. Louis embodies the rising—and falling—fortunes that are central to the narrative of free enterprise in the United States.

Built in 1904 as the headquarters of an ambitious publisher, and taken over as the seat of local government in 1930, the brick-and-limestone edifice has served its constituents well. But after a century of heavy use and deferred maintenance, it was starting to deteriorate badly, says city director of community development Lehman Walker. "It was important to have a building that our citizens are proud to come to—an image that reflects the importance of this building to city government."

In early 2004, citizens enthusiastically approved a \$2.9 million bond issue to finance the building's renovation. Architect Trivers Associates, of St. Louis, was hired to oversee the job, with the strict proviso that the building be brought into compliance with the Americans with Disabilities Act (ADA) and restored to a level that would earn LEED certification. The city council, in particular, wanted to produce a green showpiece to set an example for its constituents. On a bigger stage, the project represents an area of architectural practice—sustainable renovations of historic buildings—that is of growing importance to a world that's eager to reduce its carbon footprint.

University City's city council wants the renovated city hall building (opposite) to be a green showpiece, setting an example and serving as an educational tool for local residents.



## HISTORY

**ORIGINALLY KNOWN AS** the Woman's Magazine Building, the tower was built by Edward Gardner Lewis as the headquarters for his Lewis Publishing Co., which produced *Woman's Magazine* and *Woman's Farm Journal*.

Architect Herbert C. Chivers designed the tower, which springs from a limestone base and features buff-colored brick walls alternating with large, stacked windows framed by terra cotta ornament. Inside, an impressive marble staircase connects first- and second-floor offices surrounding a central rotunda. To attract attention, Lewis had a large searchlight installed on an elevator that rises out of the domed roof, sweeping it across the fairgrounds of the 1904 World's Fair in nearby Forest Park. It was great promotion, and tours were offered of the building and the adjacent printing plant.

In 1910, more than 1,000 suffragettes converged in University City for the first national convention of the American Woman's League. The general sessions were packed into a large domed room on the top floor of the building. Lewis had helped to organize the League, but the rapid rise of the organization, which helped to prop up Lewis' business, was not enough to sustain him. Before long, Lewis' empire went bankrupt and the League was disbanded. The building sat vacant, then was taken over by University City in 1930 to serve as its city hall.

**Edward Gardner Lewis** (left) built the Woman's Magazine Building (top) in 1904 to house his magazine offices (second from bottom). The building also served as a base for suffragettes (bottom) during the American Woman's League's first national convention.

## EXTERIOR RESTORATION

**WHILE THE BUILDING** was in good shape structurally, the exterior was showing signs of serious wear and tear. Trivers Associates senior architect Bill Chilton says the building had been spot tuck-pointed over the years, but a visual survey of the façade revealed many new locations where the mortar was cracked, loose, or missing. When the contractor arrived to start repointing the bricks, the problem grew in scope. "They tuck-pointed the whole building exterior," says Chilton, "which is wonderful, because it will last a lifetime." In addition, the front steps, made of Indiana limestone, were badly worn and poorly patched. New slabs of stone were ordered and—to help gain a LEED point for construction waste management—the old steps were crushed and recycled as gravel.

The most comprehensive restoration process involved the windows, whose wood sashes still contained the original single-pane glass. Rather than replace the windows with modern, insulated-glass units, Trivers completely refurbished them. All the sashes—including the round and teardrop fixed sashes at the top of the building—were removed and sent to a company that specializes in historic window restoration. They were stripped of paint, damaged sashes were repaired, and the rabbets were enlarged to receive 1-inch-thick insulated-glass panels. After they were primed and repainted, the windows were reinstalled.

**New metal handrails** installed on the exterior stairs (opposite) incorporate downlights that improve visibility at night. Accent lights at the base of the second-floor windows illuminate the building at night but had to be carefully shaded to be dark-sky compliant.



CITY  
OF  
UNIVERSITY CITY  
6501  
CITY HALL

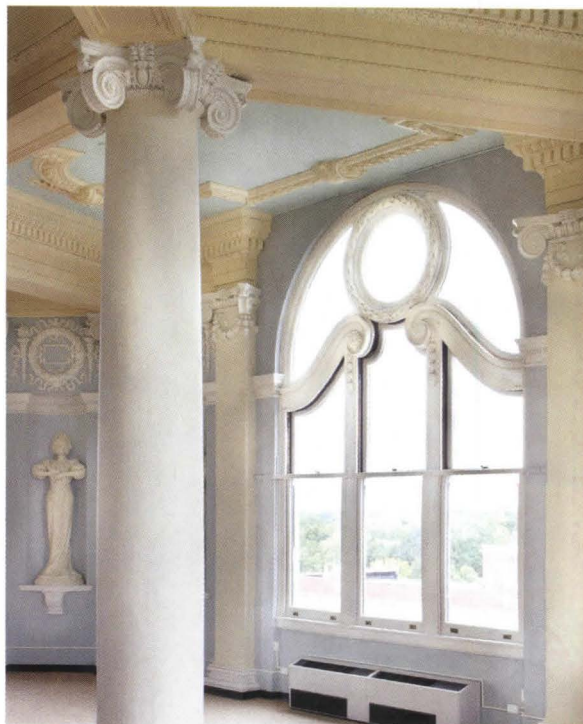
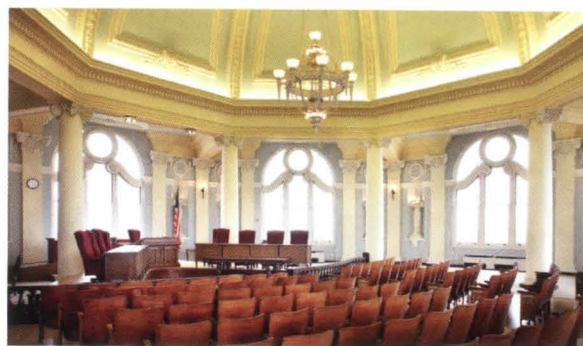
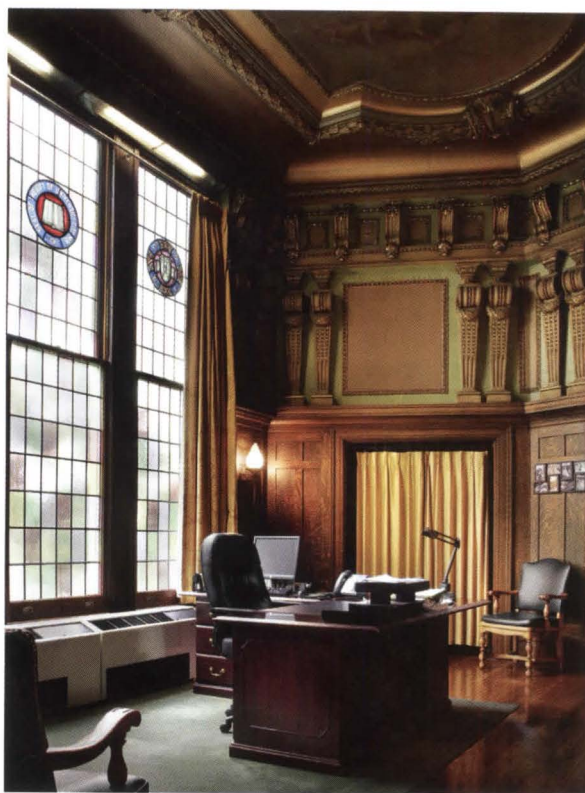
NO  
PARKING  
ANY  
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GUESTS  
ONLY

DISABLED  
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## INTERIOR RENOVATION

FORTUNATELY, THE ELABORATE public spaces inside the tower were relatively intact. Trivers Associates' job was to retain that integrity while modernizing the building. The centerpiece of the two-story rotunda—the sinuous marble stair, a popular setting for photography of local brides—simply required a good cleaning. And a few sins from the past needed to be reversed: One of the arches circumscribing the room had been filled in with a solid wall. That was torn out and rebuilt in keeping with the original oak partitions, then topped with frameless clear glass. The rotunda's original pendant light was restored, and new linear pendant lights were installed in the surrounding offices on the first and second floors. New sprinkler piping was concealed in the walls and soffits, with exposed heads placed strategically to be as unobtrusive as possible.

The building's third and fourth floors are more workmanlike offices, with dropped ceilings and little historic fabric, other than the windows. The fifth floor consists entirely of the council chambers, an elegant domed room painted powder blue and surrounded by a multitude of feminine statuary positioned at regular intervals around the perimeter. Beyond minor patching and a new coat of paint, the room received new low-energy recessed downlights, new torchlike wall sconces, and a dry-pipe sprinkler system with concealed, pop-down heads. Steel-strap reinforcing on the expansive windows, which were bending under high wind loads, was concealed. And existing fan-coil console units beneath the windows were replaced with heat pump units that, while functional, nevertheless detract from the otherwise elegant aesthetic. Throughout the building, restrooms were remodeled and expanded to comply with ADA guidelines.

Many of the historic spaces, such as the central stair (opposite), city manager's office (top right), and council chambers (middle and bottom right), needed little heavy-duty restoration work, but low-energy lighting and sprinklers were added throughout.



## CLEARING THE LEED HURDLE

**TWO OF THE RENOVATION'S** most important goals were to make the building more energy efficient and to achieve LEED certification. Complete replacement of the HVAC system was the key to meeting both objectives. At the same time, says Chilton, this change presented one of the greatest challenges. "Even though the mechanical systems needed to be larger than the existing systems," he explains, "they had to have a minimal impact on the historic aesthetic of the building."

The existing heating and cooling system—a four-pipe system with fan-coil units placed around the perimeter on all floors—was fully removed. In its place, a new high-efficiency heat pump system was installed. The ceiling-mounted heat pump units are hidden above the ceiling tiles on the third and fourth floors but are clearly visible—a definite compromise—in the first- and second-floor offices, where the large air handlers and ducts have been painted to match the ceiling color.

In surpassing the 26-point minimum for LEED certification (this project earned 29 points), the city benefited from the building's location in a dense, inner-ring suburb with available bus transportation and limited parking capacity. Placing water-conserving fixtures in the restrooms earned additional points for water use reduction. The nature of the project also limited the amount of demolition that was required, so City Hall scored high on building reuse credits. The use of low-VOC adhesives, paints, and carpets was a no-brainer. And two additional points were earned through the city's purchase of renewable energy certificates that encourage green power.

**While secreted in** most of the building's historic spaces, the new high-efficiency HVAC system can be seen in a third-floor conference room (above left) and restroom (below left). Often hidden from view, sustainable systems are used throughout the tower (opposite).

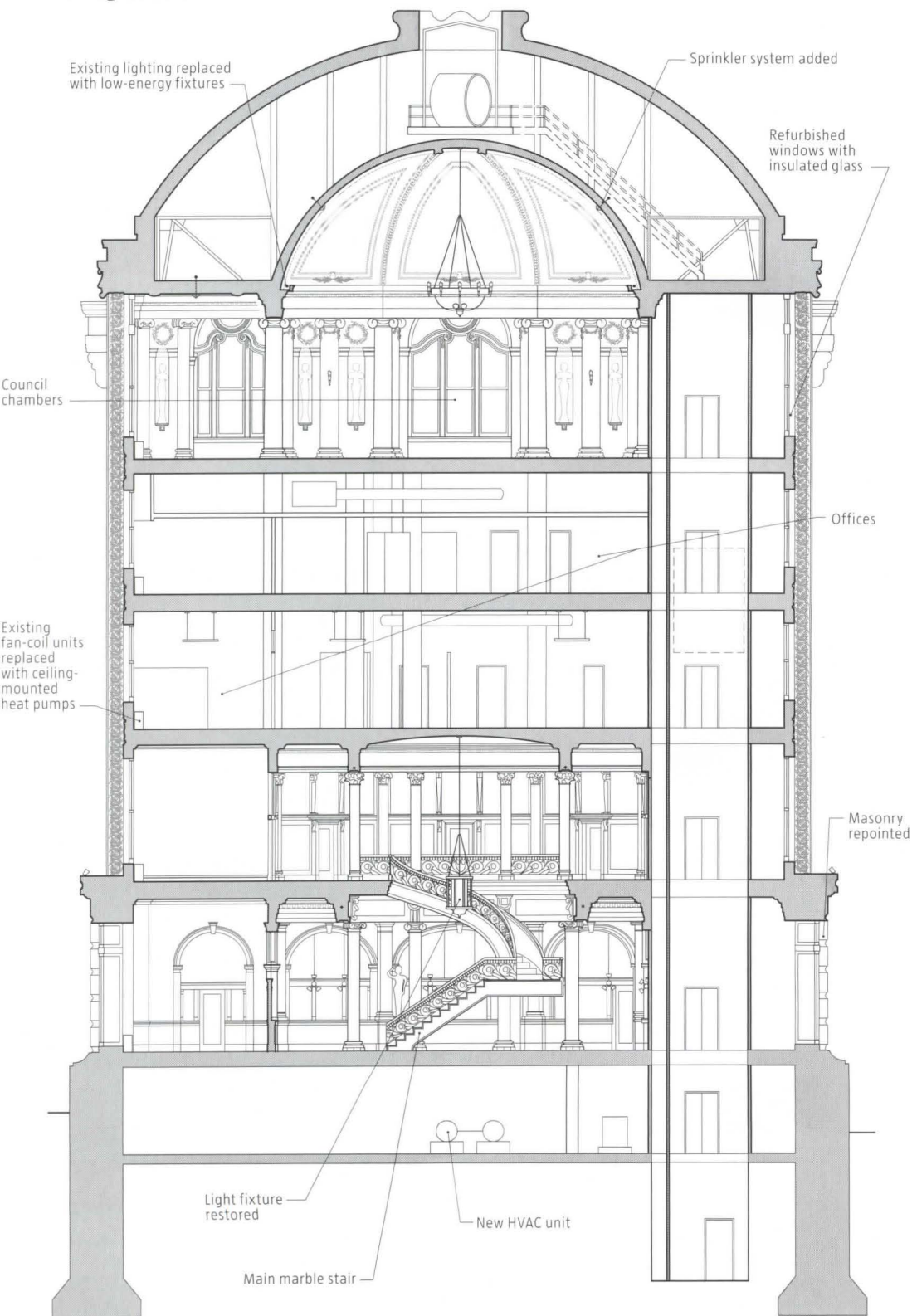
**PROJECT** Renovation and Restoration of University City Hall, University City, Mo.

**ARCHITECT** Trivers Associates, St. Louis—Andy Trivers (historical architect); Andrew Smith (project manager); Bill Chilton (project architect); Lawson Harris (project designer)

**M/E/P, FIRE PROTECTION, AND STRUCTURAL ENGINEER AND LEED CONSULTANT** William Tao & Associates—Bruce Levitt (principal-in-charge and LEED consultant); Sara Seagrist (mechanical engineer); Jim Kuba (electrical engineer); Greg Roth (plumbing engineer); Mark de la Fuente (lighting designer); Allan Seidel (fire protection engineer); Bill Manz, Mark Schell (structural engineers); Christine Ward (LEED administrator); Jerome Logan (commissioning agent)

**SIZE** 33,495 square feet

## Building Section



## TOOLBOX

### WINDOW RESTORATION

Historical Wood Windows Manufacturing • [historicalwoodwindows.com](http://historicalwoodwindows.com)



Inefficient windows were partly to blame for the old building's poor thermal performance, and many of them leaked, as well. All the windows were removed and delivered by truck to Historical Wood Windows Manufacturing, a Kansas City, Mo., company that restored the sashes and installed new insulated glass. Entirely new reproduction windows were built for the second floor, whose original windows had been replaced earlier with ones that didn't match.

### MASONRY REPOINTING

Superior Waterproofing & Restoration Co. • [superiorwaterproofing.com](http://superiorwaterproofing.com)

What began as a small-scale job evolved into a comprehensive cleaning and repointing of the brick and limestone façades. In this process, the building is cleaned with a chemical mixture and high-pressure water. Then, all the mortar joints are ground out with diamond blades to a half-inch depth and replaced the old-fashioned way. Minor reglazing of failed terra cotta was also part of the job.

### WATER CONSERVATION

Sloan Valve Co. • [sloanvalve.com](http://sloanvalve.com)



The combination of the LEED imperative and the desire to demonstrate water conservation as a public education tool led to the specification of dual-flush flushometers in the restrooms. The mode for liquid waste saves ½ gallon of water—about 30 percent—for each flush. In addition, the men's rooms are equipped with waterless urinals.



→ TALES FROM THE DOWNTURN, PART THREE

# DAN PROBST

**WILL THE RECESSION KILL THE MARKET FOR GREEN ARCHITECTURE? QUITE THE OPPOSITE, SAYS THE CHAIRMAN OF ENERGY AND SUSTAINABILITY SERVICES AT CHICAGO-BASED REAL ESTATE GIANT JONES LANG LASALLE. IN TODAY'S DOWN ECONOMY, ENVIRONMENTAL DESIGN IS A MUST-HAVE.**

**Is the slump slowing developers' investment in green architecture?**

Our clients fall into two basic categories: investors and corporate owner/occupiers. When you are an owner/occupier, there is a pretty clear return on investment. If you are saving energy, it is going right to the corporate bottom line. And a lot of corporations have social responsibility programs and public goals for reducing their carbon footprint. They recognize that a large portion of their environmental footprint is tied up in real estate. So, they have been pretty progressive.

On the investor side, investors in multitenant office buildings have been a bit slower to pick up on this. But that has begun to change quite dramatically in the last six months or so.

**Why the sudden change among investors?**

Talking primarily about existing buildings, there are a number of drivers. Investors want to lower operating expenses, so energy retrofits start to make sense. They are starting to see what is going on in the regulatory environment and want to be out ahead of it. And in down cycles, investors want to find every angle, to be more competitive in the marketplace. Their tenants are starting to ask questions. Sustainability is not number one on the list of a prospective tenant picking a location, but it is on the list. It is getting incorporated into RFPs. Then developers are saying, "Well, gee, how does my building compare? How do I stack up? Are there things I can or should be doing?" Which comes back to our acquisition of the Green Globes tool from ECG for assessment and helping someone improve their building [ARCHITECT, August 2008, "Real Estate Investor Acquires Green Globes Developer," page 21].

**What about new construction? Are you seeing enthusiasm on the part of real estate investors in sustainability?**

We are continuing to see increasing enthusiasm. It is a matter of degree. There had been some cost premium in the past to building buildings that meet certain green standards. That is quickly evaporating as new materials become available—the market for recyclable materials that was not there a couple years ago to the extent it is now—and as architects and engineers better understand green building criteria and are able to incorporate those concepts into their design.

Not every new building is going to be built to meet LEED platinum, for instance, but you are going to see good environmental design built into all new buildings. On the energy side alone, with the escalating prices, the numbers show that buildings built to LEED standards have operating expenses as much as 30 percent less than conventionally designed buildings. Those are pretty hard numbers to ignore.

You are also starting to see the impact of sustainability on location strategies. Companies are getting more focused on location strategies that enable them to be close to where their employees live or close to public transportation. Everybody's commute is part of the company's carbon footprint.

**Is there an appreciable swing away from suburban properties?**

I think it is too soon to see the impact of that thinking in the market, but it may be coming. Locating way out in some greenfield development in a remote suburb has its own implications in terms of the environment, but looking at urban infill and public transportation and transit-oriented development is going to become much more popular.

**Are we at a watershed moment? It seems like the stars are aligning.**

You know, it has really shifted to a business imperative. It is about the fact that energy costs continue to escalate, are extremely volatile. Buildings that are designed to these standards just perform better and have lower operating expenses. Corporations are feeling pressure from their shareholders about the environmental performance of the building, and they want to understand if there is some future risk because of legislation. Customers are asking companies about their environmental performance before they do business with them. Prospective employees are considering the environmental performance of a company before they go work for them. And then you do have the regulatory environment, which just increases every day. And the popular thinking is, no matter which candidate wins the presidential election, they are both advocating a more progressive legislative agenda in this area. So, there are all these forces coming at companies. The smart investors see that, and if their building is not meeting some level of environmental standards, they may become less competitive.



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# LIFE IN A P

A PLANNED PAIR OF DORMITORIES AT THE ILLINOIS INSTITUTE OF TECHNOLOGY  
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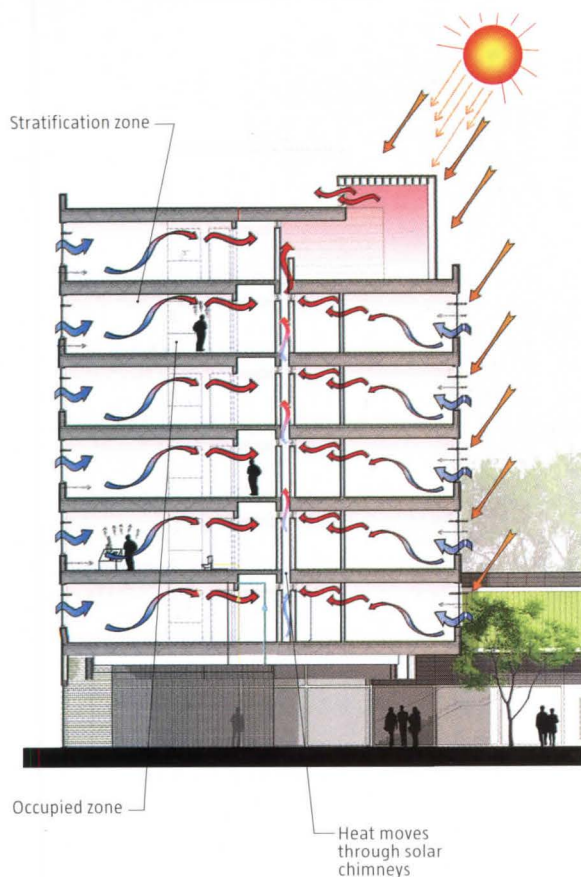
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## BASELINE NORTH BUILDING, LEED SILVER



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#### Mixed-Mode Conditioning

Cooling only at peak times • Exhaust heat recovery

#### Roof Greenhouses

Sun-driven natural ventilation • Solar heat capture in winter

#### Solar Orientation

Buildings positioned to reduce solar heat gain

#### Solar Shading and Performance Glazing

To minimize cooling load

#### Window Wind Scoops

Assisting natural ventilation

### RAINWATER HARVESTING

#### Green Roofs on Common Areas

Stormwater control

#### Water-Efficient Landscaping

Swells and bio-swales

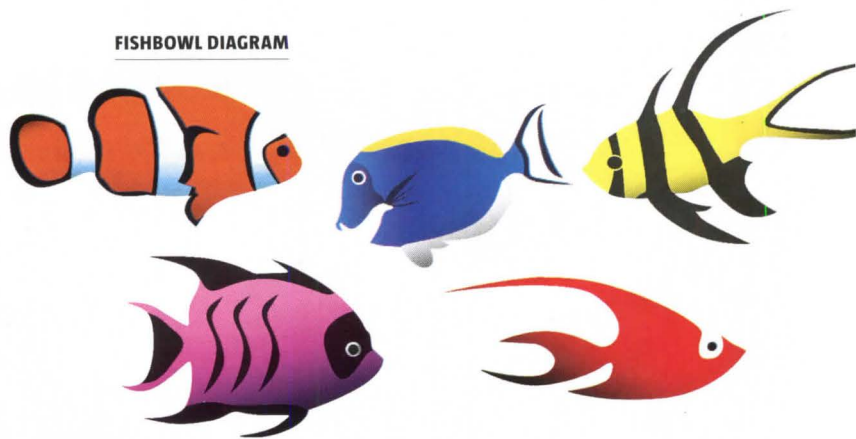
### ENHANCED DAYLIGHTING

Light shelves • Reduced interior lighting loads

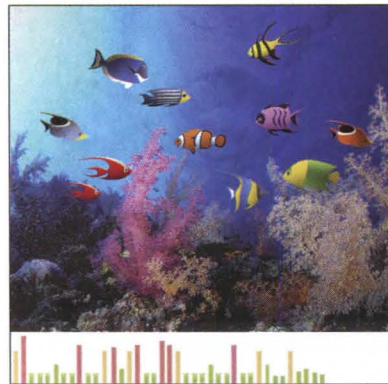
### MAIN STAIR WATERWALL

Cools façade in summer • Humidifies air in winter • Visual and aural enhancement • Color change to reflect energy load

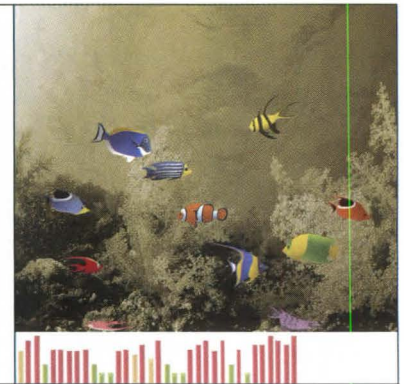
### FISHBOWL DIAGRAM



LOW ENERGY USAGE



HIGH ENERGY USAGE



**SOCIAL EXPERIMENTS IN COLLEGE** usually involve late nights, the words, "I bet you'd never...," and beer. Lots of beer. But there is a social experiment of a different kind brewing at the Illinois Institute of Technology (IIT) in Chicago—one that will use monitoring to show students the truth about their energy habits.

A planned pair of dormitories designed by local firm Dirk Denison Architects will bring 420 new beds to the main student housing complex on IIT's campus. Identical in form, the two buildings will be adjacent to and share some facilities with the existing dorms, and will incorporate enough sustainable design to achieve a LEED silver rating. But the new south building will add further sustainable technology in the hopes of reaching LEED platinum. **The performance of both buildings will be tracked and compared, and the data will be used to inform future green buildings on campus.**

Both the silver and platinum buildings will use solar orientation and mixed-mode ventilation systems, combined with a carefully configured building envelope. "We sat down with [founder Dirk Denison] to see what would make the envelope as efficient as possible," says Chris Taylor, an associate principal at Arup. "When the envelope is efficient, you don't need as much HVAC." In the summer, warm air will be moved out

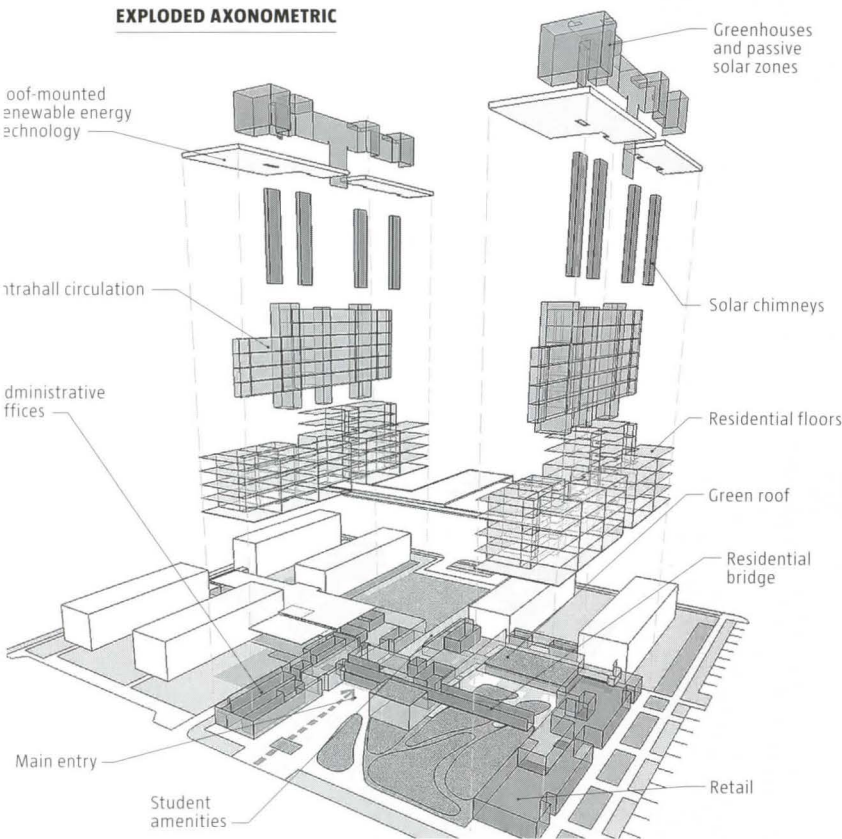
through a network of ventilation shafts and solar chimneys culminating in rooftop greenhouses. "We determined that [with this system] we can do 70 percent [of cooling] without air conditioning in the summer," says Denison. In the winter, air will be solar-heated in the greenhouses to supplement traditional heating systems. The buildings will also harvest rainwater, which will irrigate green roofs on common areas and additional landscaping.

The platinum building will take things further, with 800 square feet of integrated photovoltaic (PV) panels in the greenhouses, producing 2 percent of the building's energy. The PV panels will also power the solar water heating, which will provide some of the hot water for sinks and showers. In addition, four rooftop wind turbines will generate an additional 6 percent of the building's annual energy needs.

In order for individual residents to be aware of how their energy usage affects the greater building community, a system had to be devised to monitor each room as well as the building itself. "The idea is to create data that is real-time and very locatable," says Denison. Since the students are the ones who will be monitored, Denison used his position as a faculty member at the school of architecture to turn the problem back to them, having a class design the interface.



## EXPLODED AXONOMETRIC



The result? An electronic fish tank in the lobby of the platinum building. Each student designs an electronic fish that will swim speedily and happily around a simulated tank—if that student's energy usage is low. If the energy usage is high? The fish will be lethargic and swim lower in the tank. The building's overall performance will be indicated by water color: a vibrant blue for a healthy, low-energy ecosystem, and a murky brown for a high-energy, wasteful one. The fish tanks will be in the lobby of the platinum building (and potentially the silver building, as well), monitoring usage for all to see. "It will create this event where everyone can find their fish and compare it to everyone else's," says Denison. "I think what we're going to find is that it is not giving them information about their own use, but on other people's in comparison—that is the crux." What will be interesting is not only how the buildings are performing, but how students react to the very public record of their energy usage. Will the wasteful change their behavior? Or will the troublemaker in Room 214 leave all the lights on to throw off the results?

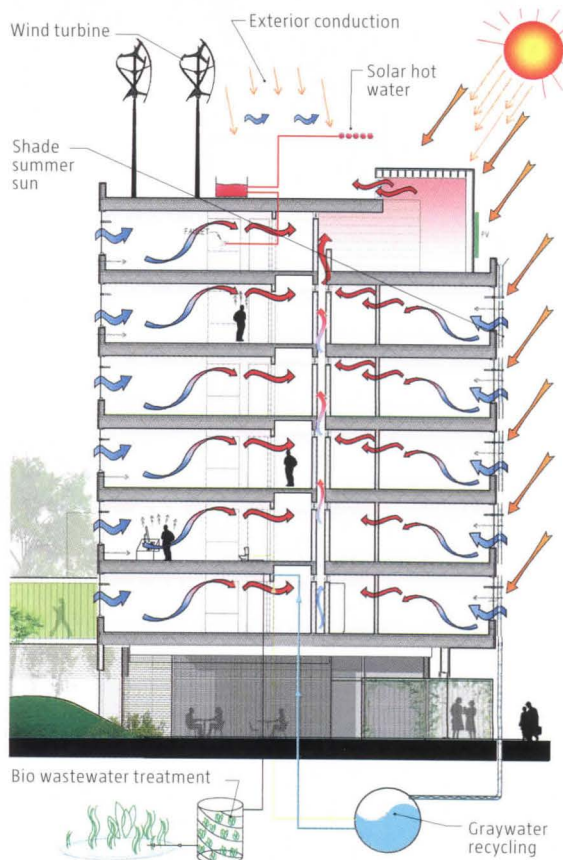
The other, more looming, question is: How will this level of monitoring be achieved? The actual system of sensors is still on the boards. "There are products

out there now that you can wire into the power source," says Patrick Papczun, project architect, "that can tell you how much power is being used from each outlet." What Papczun and others are weighing are the merits of working with an off-the-shelf product versus using the resources of the university's engineering school to design a unique sensor system. The final decision will be based on cost and effectiveness, and will be made closer to the groundbreaking in spring 2011.

As for the public interface, it is likely that more classes will be held in spring 2009 to refine the fish tank principle. "I think students are the best people to come up with creative, off-the-wall ideas," says Taylor. And other groups are already taking notice. A local utility company is closely following the project—as an adviser, but also to see if there may be an opportunity to adopt a similar the system for private homes.

The potential is there to take this social experiment from a single university dorm through the campus level and into the larger community, with or without corporate support. Students living in these dorms will be able to apply the same principles to projects later in their careers. But in the meantime, they at least have a social experiment they can actually email home about. ☺

## UPGRADE SOUTH BUILDING, LEED PLATINUM



## NATURAL VENTILATION

## Mixed-Mode Conditioning

Cooling only at peak times • Exhaust heat recovery

## Roof Greenhouses

Sun-driven natural ventilation • Solar heat capture in winter

## Solar Orientation

Buildings positioned to reduce solar heat gain

## Solar Shading and Performance Glazing

To minimize cooling load

## Window Wind Scoops

Assisting natural ventilation

## Renewable Energy Production

Solar water heating • Photovoltaics • Wind turbines • Geothermal/Earth duct

## RAINWATER HARVESTING

## Green Roofs on Common Areas

Stormwater control

## Water Efficient Landscaping

Swells and bio-swales

## Graywater Recycling

## ENHANCED DAYLIGHTING

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Cools façade in summer • Humidifies air in winter • Visual and aural enhancement • Color change to reflect energy load

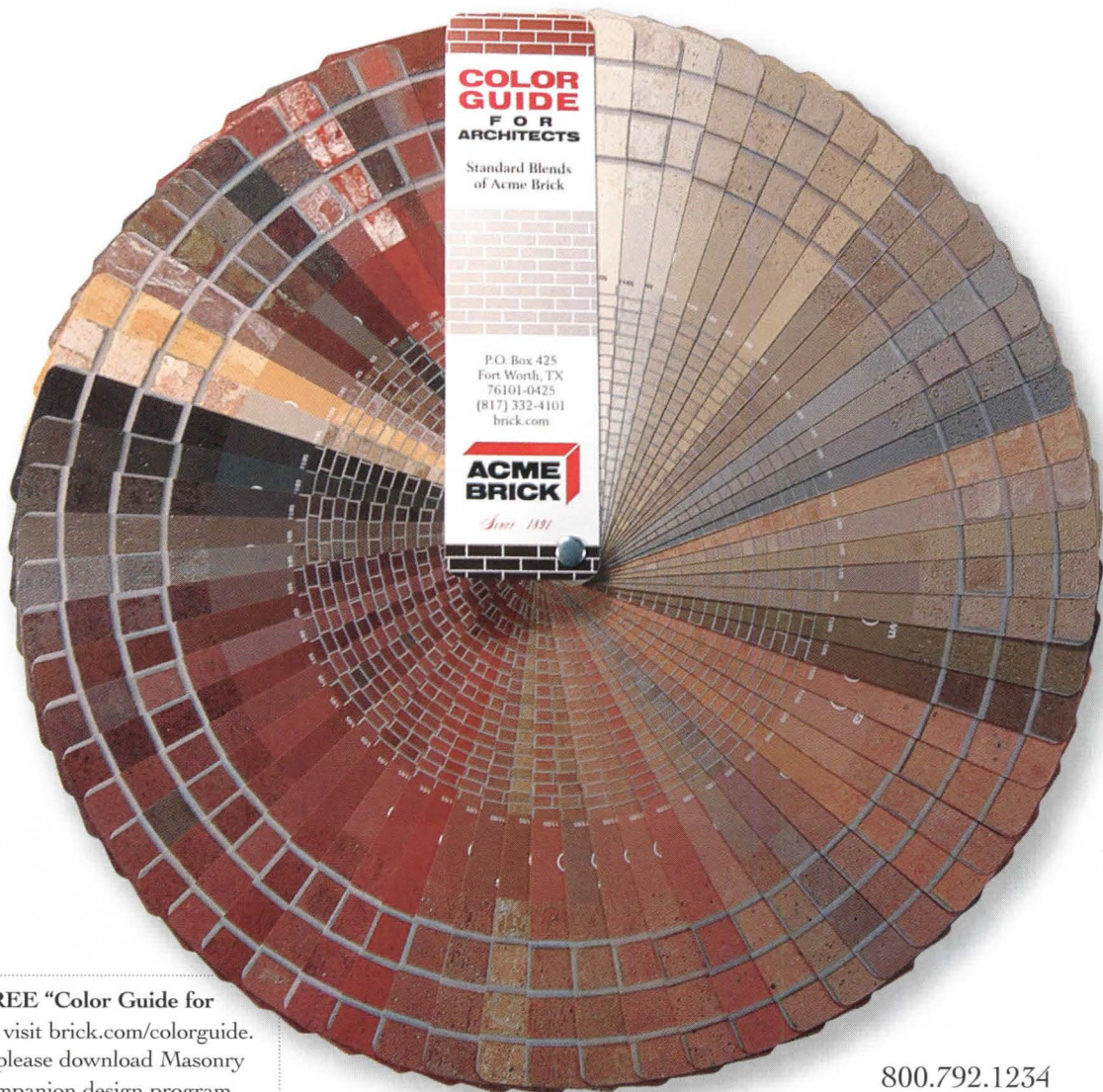
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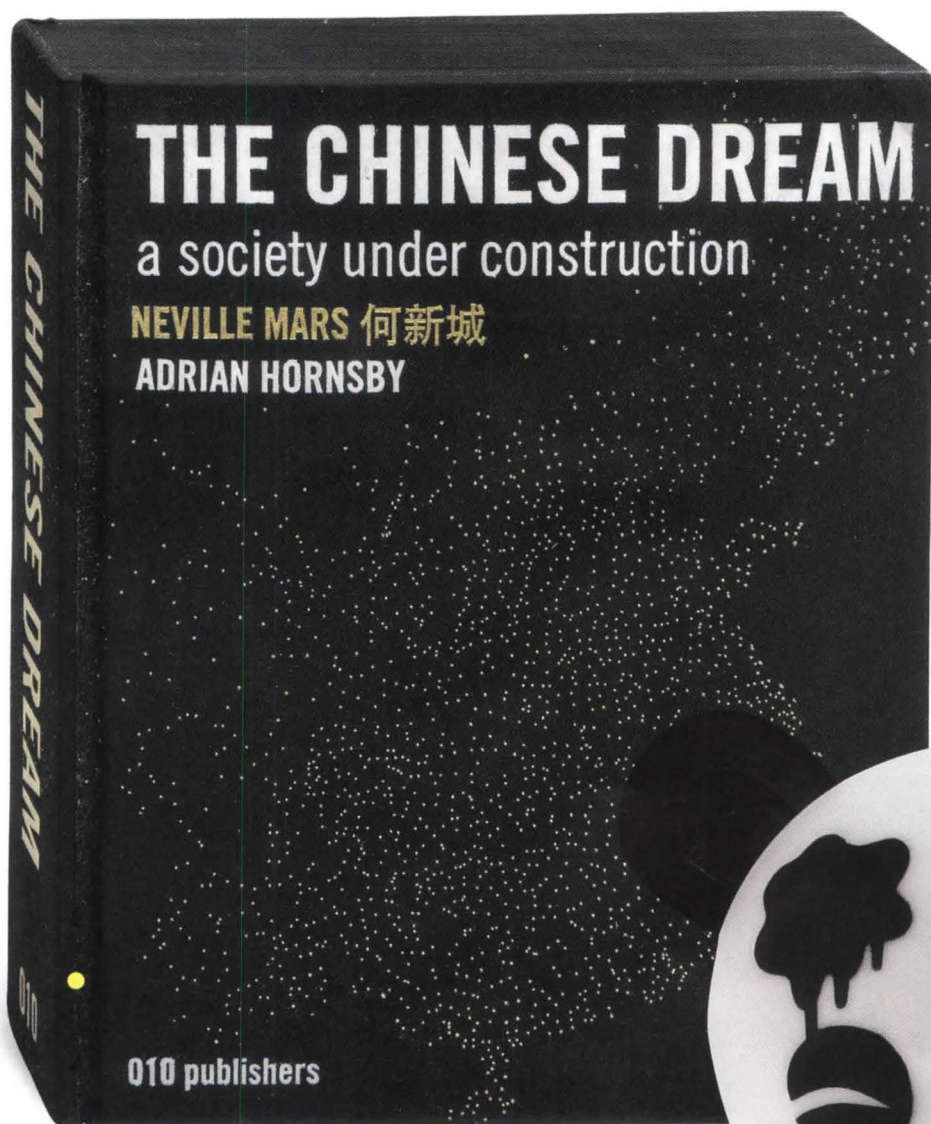
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Text Hannah McCann

# CULTURE

BOOKS, EXHIBITS, OBJECTS



## BOOK • EXHIBIT

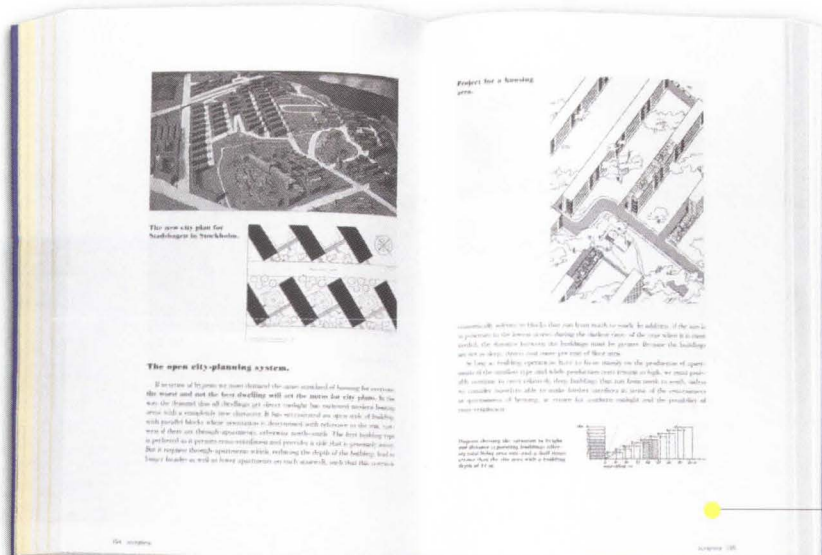
Witness an aftereffect of the 2008 Olympics in Beijing: a curiosity, at home and abroad, about the guarded host country that is home to 20 percent of the world's population. A new book by Dutch publishers 010, *The Chinese Dream: A Society Under Construction* (by Neville Mars and Adrian Hornsby; €49.50; [010publishers.com](http://010publishers.com)) tackles China's growth in 784 pages and 1,800 images and infographics. The book is as dense as its subject and nearly as overstimulating but welcome in its candor. • Aaron Betsky presents Chinese fashion designers, graphic artists, and architects in *China Design Now* (Cincinnati Art Museum; Oct. 18 through Jan. 11; [cincinnatiartmuseum.org](http://cincinnatiartmuseum.org)). Structured as a journey, the show was designed by Yung Ho Chang, Chinese architect and head of MIT's Department of Architecture.





**EXHIBIT**

**Museo Aero Solar • Franconia Sculpture Park, Franconia, Minn. • Oct. 18 through 19 •** Argentinian artist Tomás Saraceno arrives at the Walker Art Center in Minneapolis on Oct. 4 to lead local residents through the process of building a giant balloon from thousands of used plastic bags. The construction launches in the St. Croix River Valley two weeks later. Saraceno has done this before, adding bags from each host country (Italy, UAE, Colombia, France, Switzerland, Albania) and borrowing aerospace technology to make the thing fly. Saraceno says he builds balloons as a means of escape, an idea borne during the French Revolution and useful today in confronting population growth and changing climates. *walkerart.org*



**BOOK**

**Modern Swedish Design: Three Founding Texts • Introduction by Kenneth Frampton •** Nobody questions the widespread influence of Swedish design, but few could examine its roots until now, with the first English translations of three seminal texts—made all the more convincing when laid out as near facsimiles of their original publications. Ellen Key wrote in 1899, Gregor Paulsson in 1919, and Paulsson and five architects who formed the Stockholm Exhibition in 1930. Together they advocate a philosophy that has trickled down over the past 100 years to reach every Ikea shopper: Society benefits when good design is affordable to all. *Museum of Modern Art; \$35*



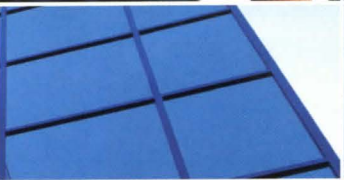
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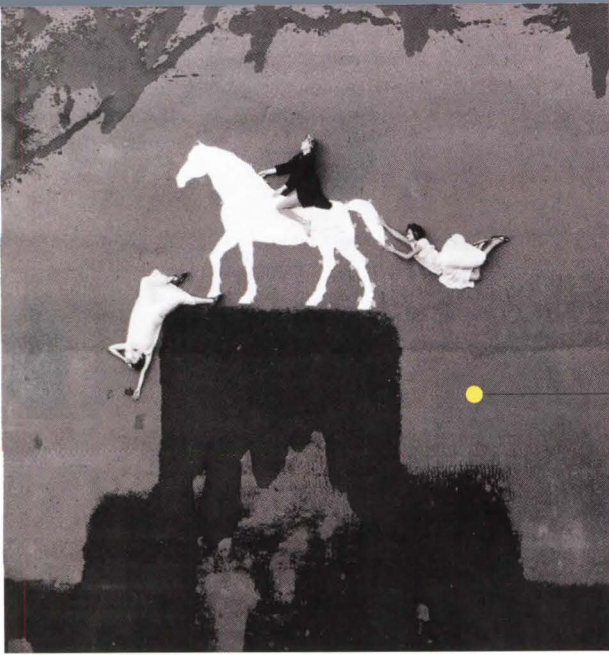


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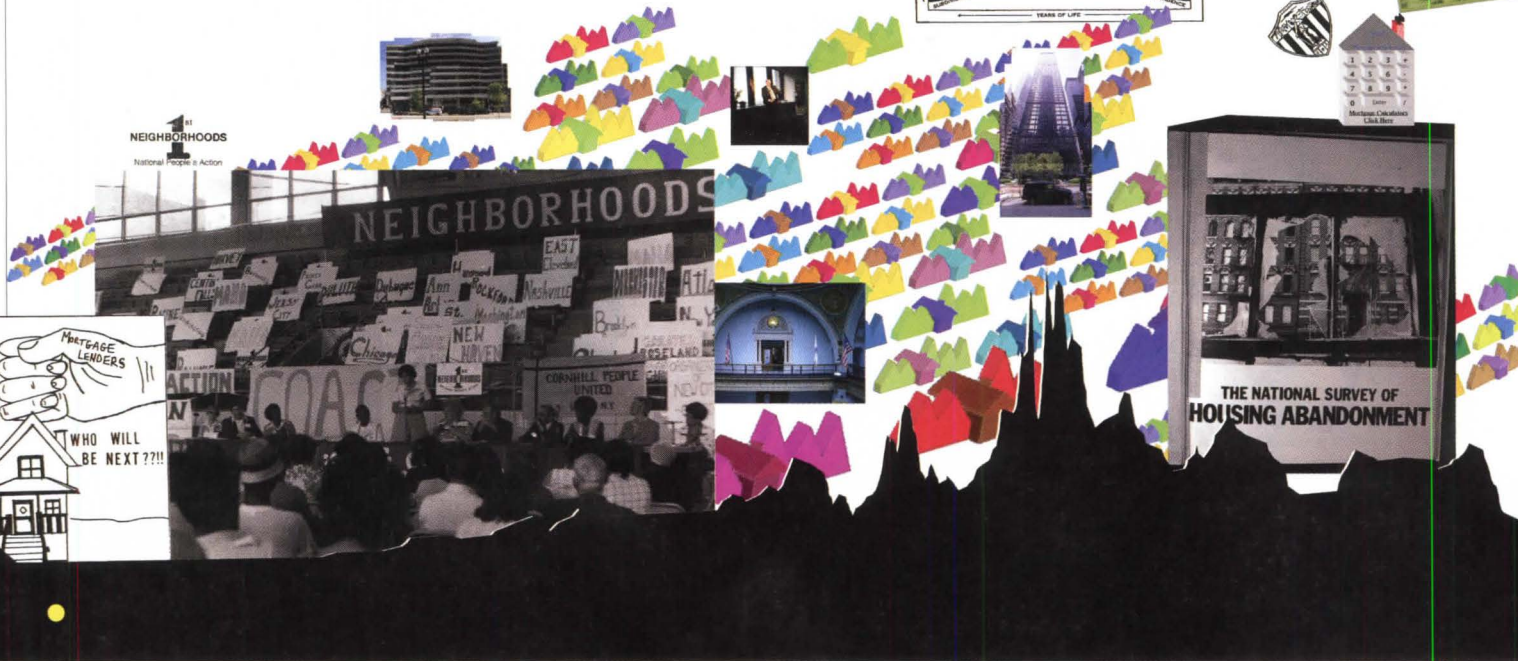
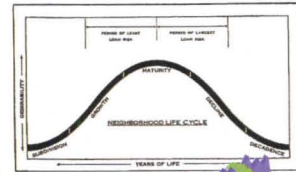
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EXHIBIT

**First Doubt: Optical Confusion in Modern Photography** • Yale University Art Gallery, New Haven, Conn. • Oct. 7 through Jan. 4 • One hundred confusing photos challenge the assumption that a camera conveys clearly what stands in front of its lens. Optical confusion is a little-discussed but universally fooling field of photography, with examples stretching back to early experiments with the medium. What began as frustrating accidents became intentionally ambiguous in the hands of scam-artists, Surrealists, and Photoshoppers alike. [artgallery.yale.edu](http://artgallery.yale.edu)

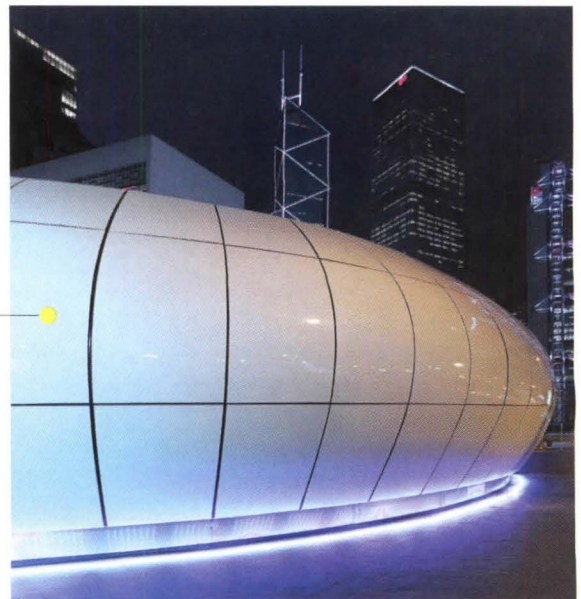


EXHIBIT

**Red Lines, Death Vows, Foreclosures, Risk Structures: Architectures of Finance from the Great Depression to the Subprime Meltdown** • MIT Museum, Cambridge, Mass. • Through Dec. 21 • Designer Damon Rich and the Center for Urban Pedagogy team up to present an installation of models, photographs, videos, and drawings documenting the relation between finance and architecture and the rise and fall of capital and buildings. Rich spent a year surveying the darkening market and interviewing players from mortgage brokers in bars to the Comptroller of the Currency in Washington, D.C. [mit.edu/museum](http://mit.edu/museum)

EXHIBIT

**Chanel Contemporary Art Container** • Central Park, New York • Oct. 20 through Nov. 9 • A glamorous spaceship lands in New York after stops in Hong Kong and Tokyo, en route to London, Moscow, and Paris. At the request of Karl Lagerfeld, Zaha Hadid designed the nautilus-shaped container, clad in white polymer panels that suggest the quilting on a Chanel bag, as a kit of parts that can be deconstructed and reassembled. "Why did I choose Zaha Hadid?" Lagerfeld asks. "She is a kind of Coco Chanel of today, not in fashion, but in architecture." Inside, a free exhibition leads ticket holders through a multidimensional, multi-artist meditation on the handbag. Curated by *Beaux Arts Magazine* editor in chief Fabrice Bousteau, the show includes work by Leandro Erlich, Lee Bul, Stephen Shore, and Yang Fudong. [chanel-mobileart.com](http://chanel-mobileart.com)

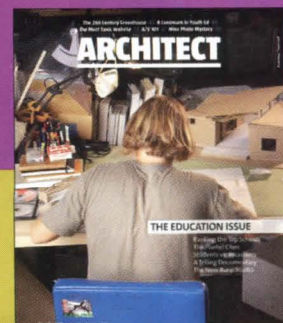


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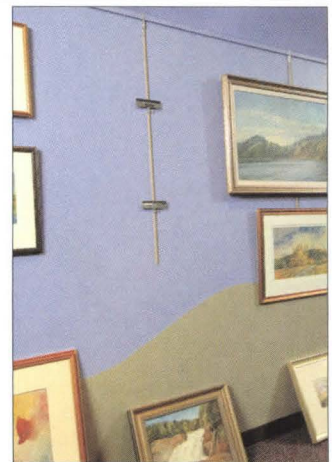
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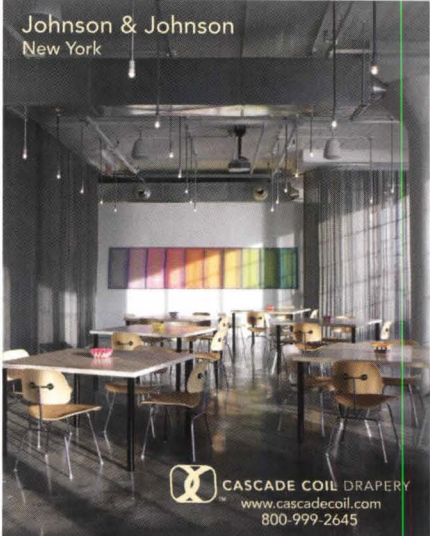


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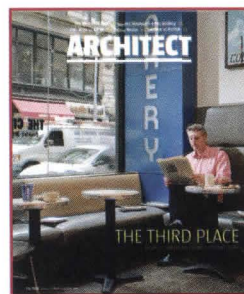
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## Q&amp;A

Kent Peterson

# THE CLIMATOLOGIST

Interview Edward Keegan Photo Michael Darter

THE DEPARTING ASHRAE PRESIDENT TALKS ABOUT THE TRADE GROUP'S EFFORTS TO HELP DOCUMENT BUILDING PERFORMANCE AND THE EVOLVING PARTNERSHIP BETWEEN ENGINEERS AND ARCHITECTS.

## AGE 45

**ROLE** A consulting engineer based in Southern California, Peterson just completed a one-year term as president of the American Society of Heating, Refrigerating and Air-Conditioning Engineers.

**MORE** Last May, he appeared before the U.S. House of Representatives Select Committee on Energy Independence and Global Warming to give testimony on ASHRAE's efforts to provide advanced energy guidance.

### What are the responsibilities of ASHRAE as we evolve our methods regarding sustainability today?

It's important for architects and engineers to work together to provide very good indoor environments and reduce the energy that's being consumed, not only from operating these buildings, but from constructing the buildings and the embodied energy that's in the materials we select.

### How have you seen the relationship between architects and mechanical engineers change over time?

I credit the U.S. Green Building Council with getting architects and engineers to work together at the early stages of project conceptualization to discuss sustainability and understand the impact of the engineering decisions. Through integrated building design, we can make decisions with respect to the proper amount of insulation that reduces the size of the cooling systems and heating systems in buildings. Implementing daylighting in the envelope reduces the amount of power that's going to be required in the lighting. We can design a building that doesn't cost any more, consumes much less energy, and provides good indoor environments.

### A recent New Buildings Institute study notes a gap between building performance and building design. What is ASHRAE doing about this?

Performance is what it's all about. We have to have feedback about building operation, and we lack the benchmarks that would lead to better design tools. ASHRAE has a number of projects under way. One, on building performance measurement protocols, is going to be out this fall. We are working closely with the Chartered Institution of Building Services Engineers on energy benchmarking for different building types. We're working on a database analyzing sustainable and high-performance buildings. Owners are asking for other metrics: productivity in the space, how the space is leased, and what the lease rates are. We have to get these benchmarks, and the only way to do that is to get data in existing buildings and set targets as we design future buildings.

### What are the differences between ASHRAE 90.1, which is part of LEED, and the proposed 189.1?

The model energy code is 90.1, and the 2010 version has a 30 percent energy reduction from the 2004 version. ASHRAE 189.1 goes further: It's about energy, indoor environmental quality, and materials. It's setting the baseline and writing code-intended language that a local jurisdiction could adopt.

### Mechanical engineering has often been based on a closed-system model—interiors sealed from the outside to permit maximum control of indoor air quality and temperature. How can we think about mechanical and natural ventilation working together?

A lot of consultants design for peak conditions, but there are many times throughout the year when we can use mixed-mode, natural ventilation to reduce energy consumption. The other issue is how we operate buildings and how occupants interact. If we have a simple control system that turns off the ventilation system and lets people open windows because the conditions are correct, that's the best. People can tolerate other types of conditions for comfort—we don't need to heat the building in the winter to the same temperature that we cool it in the summer. We can use natural ventilation to get cool air to come in and exit at the top. It's an education for the engineering community. It's an education, for the architects and the building operators, on how to use these strategies.

### What's necessary to make sure architects and mechanical engineers are working together to move our knowledge base quickly in order to meet these challenges?

We're starting to look at building science, saying mechanical engineers aren't just there to provide guidance on how to size an HVAC system—they're working with the architect to decide what type of strategy to implement in the building envelope. How can we get daylighting and some passive heating at the same time? How can we get better thermal insulation to reduce the size of the mechanical system and provide a more comfortable space? We don't work just in our single discipline.

→ Audio of this Q&A is available online at [www.architectmagazine.com](http://www.architectmagazine.com).





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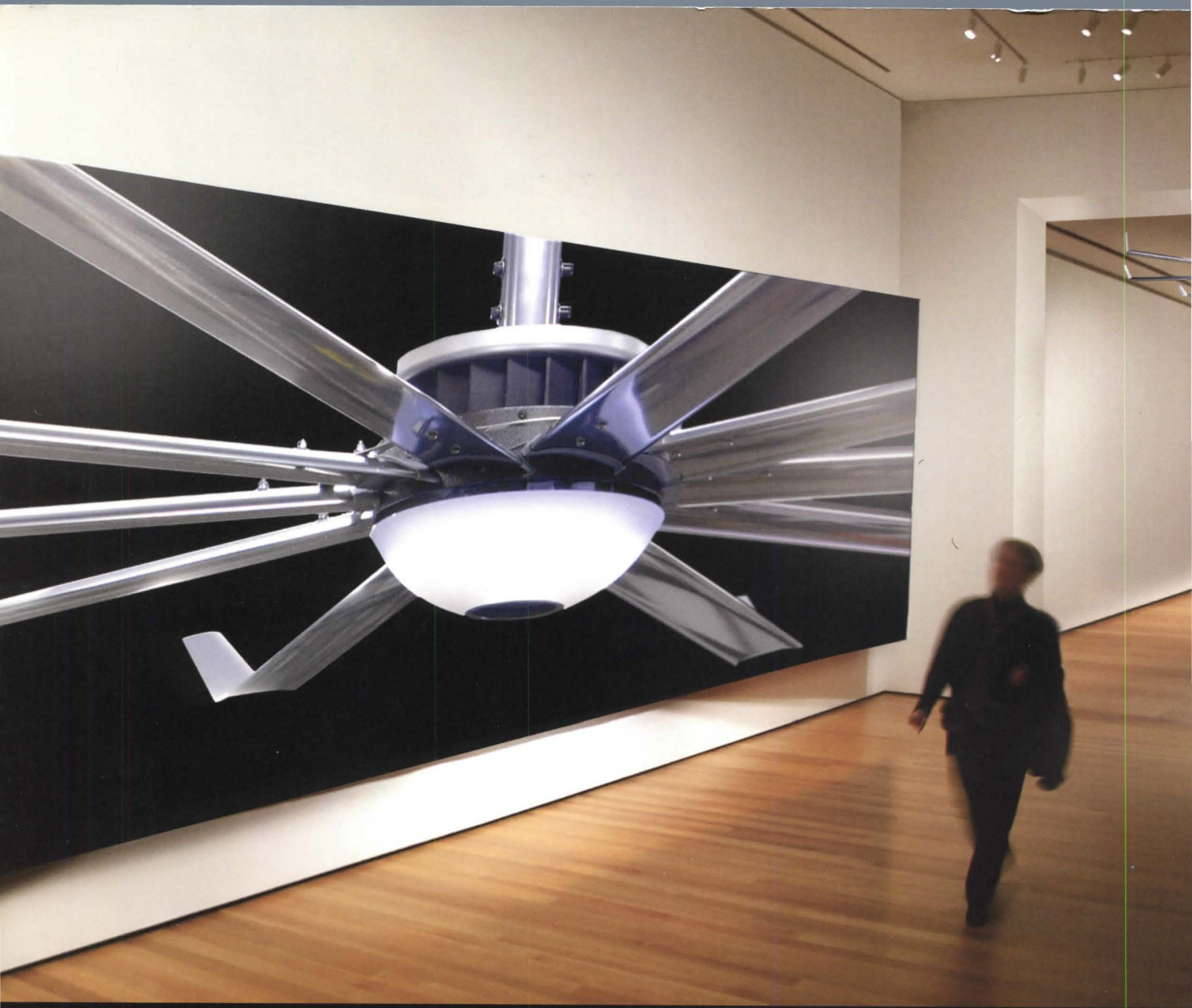
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