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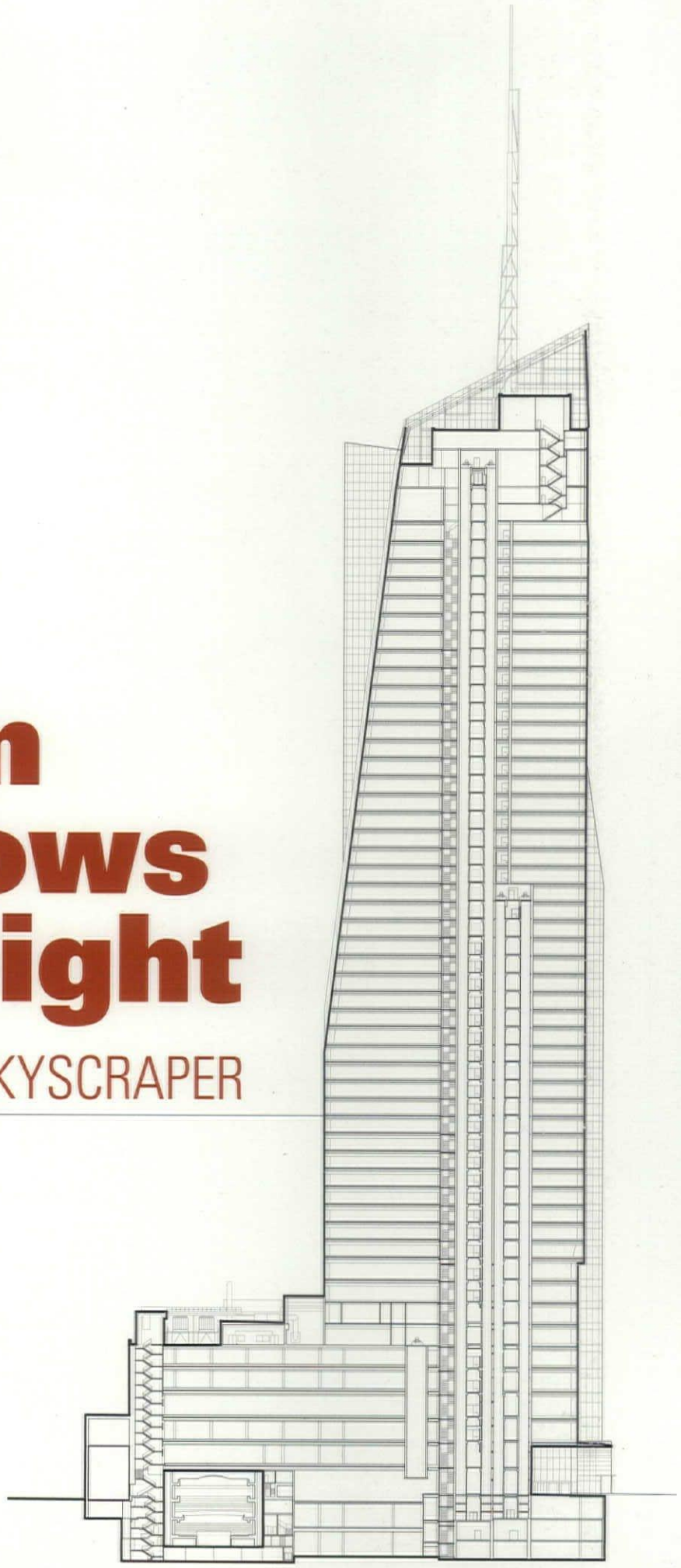

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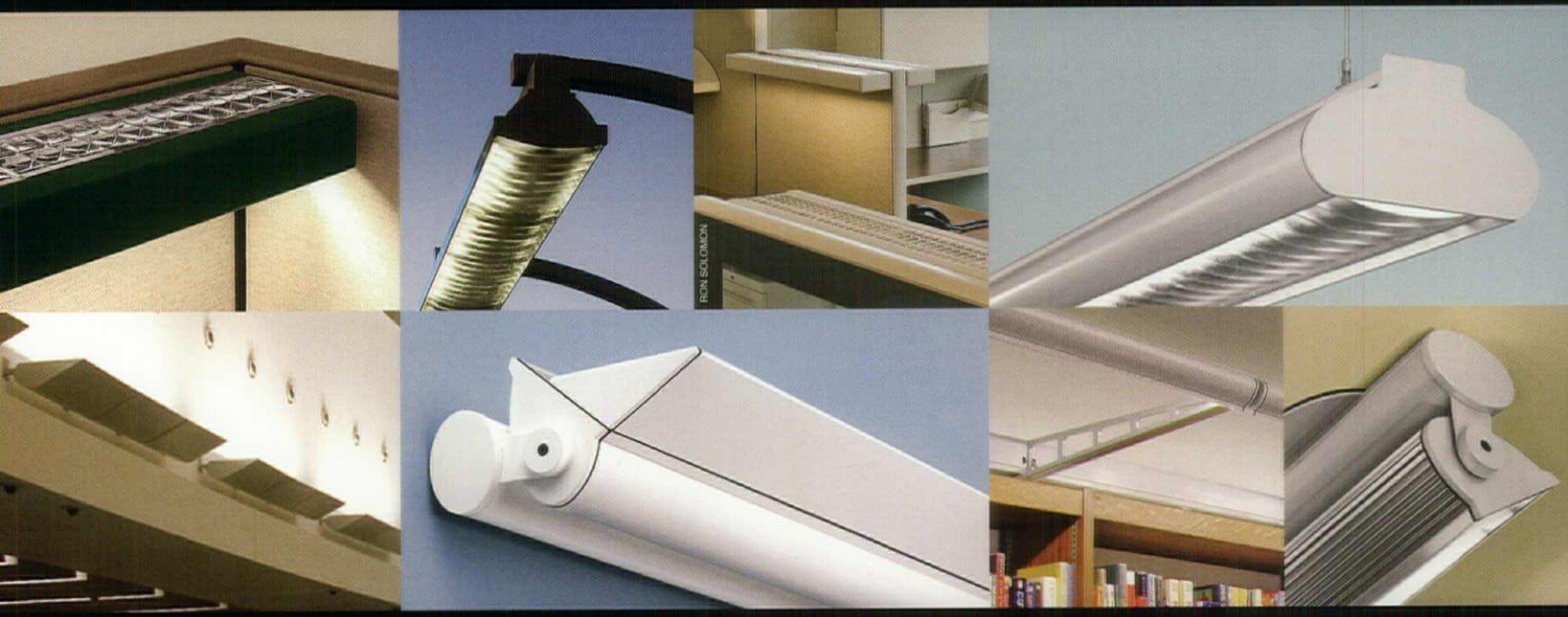

energy efficiency through

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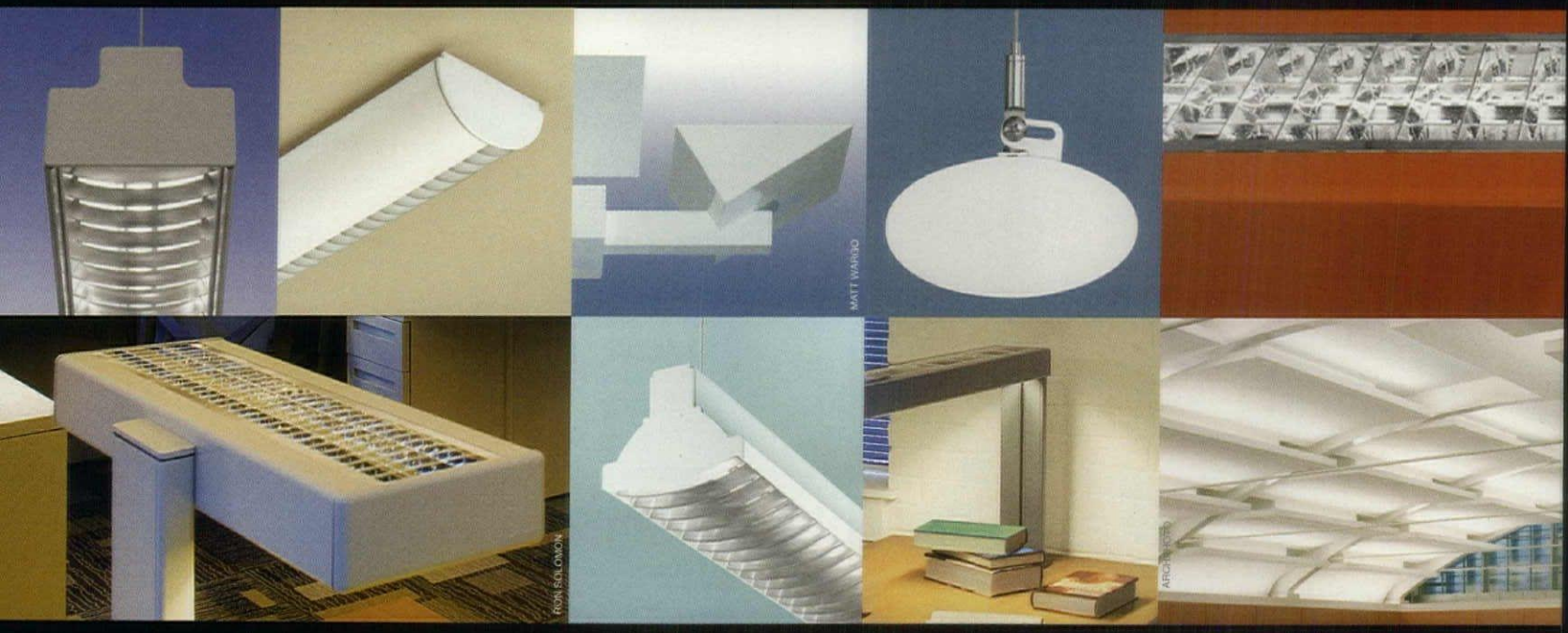
– One goal



design and innovation

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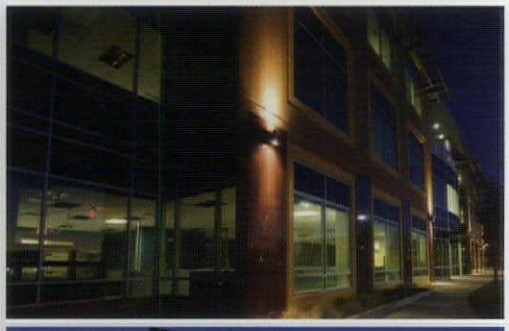
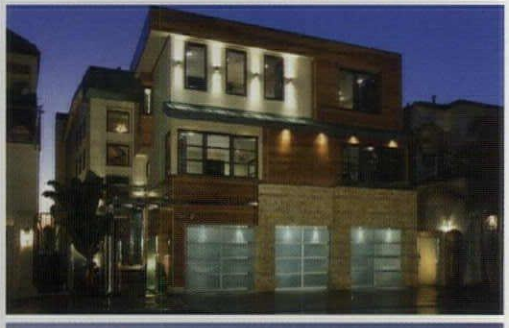
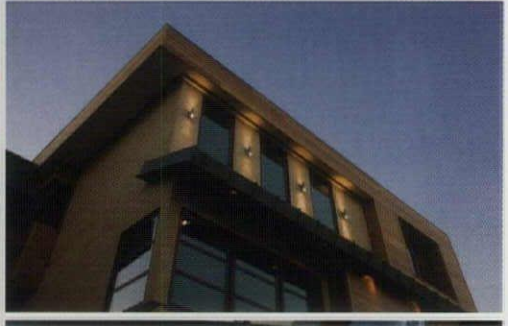
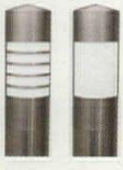
If you think of Intense as only indoor lighting, think again

VT VORTECH









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A|L architectural lighting

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VOL 23, NO 2

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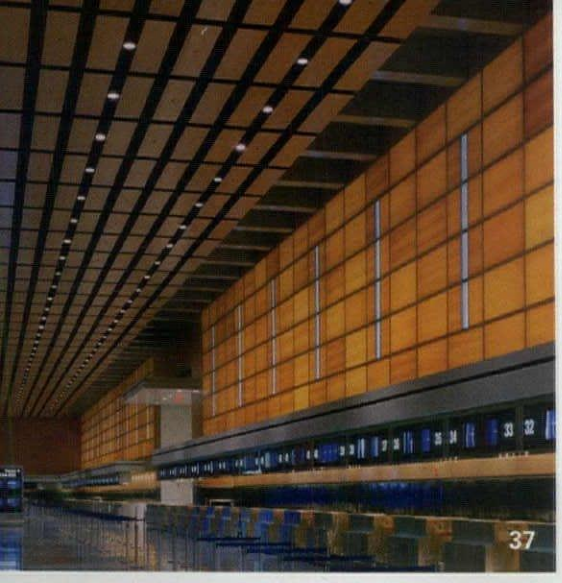

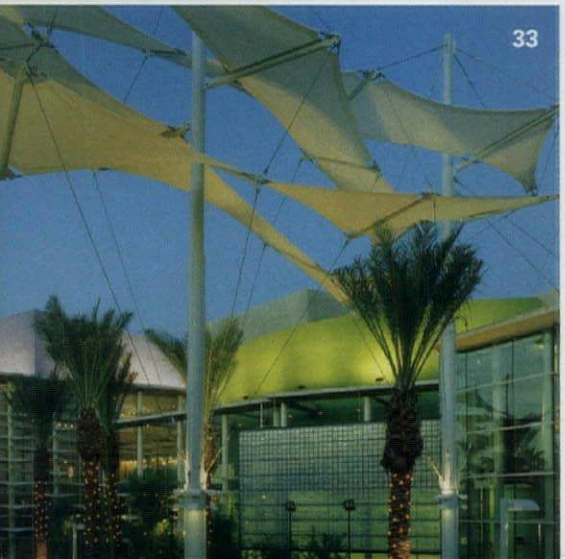

MARCH 2009

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Cover: A section drawing of One Bryant Park in New York.
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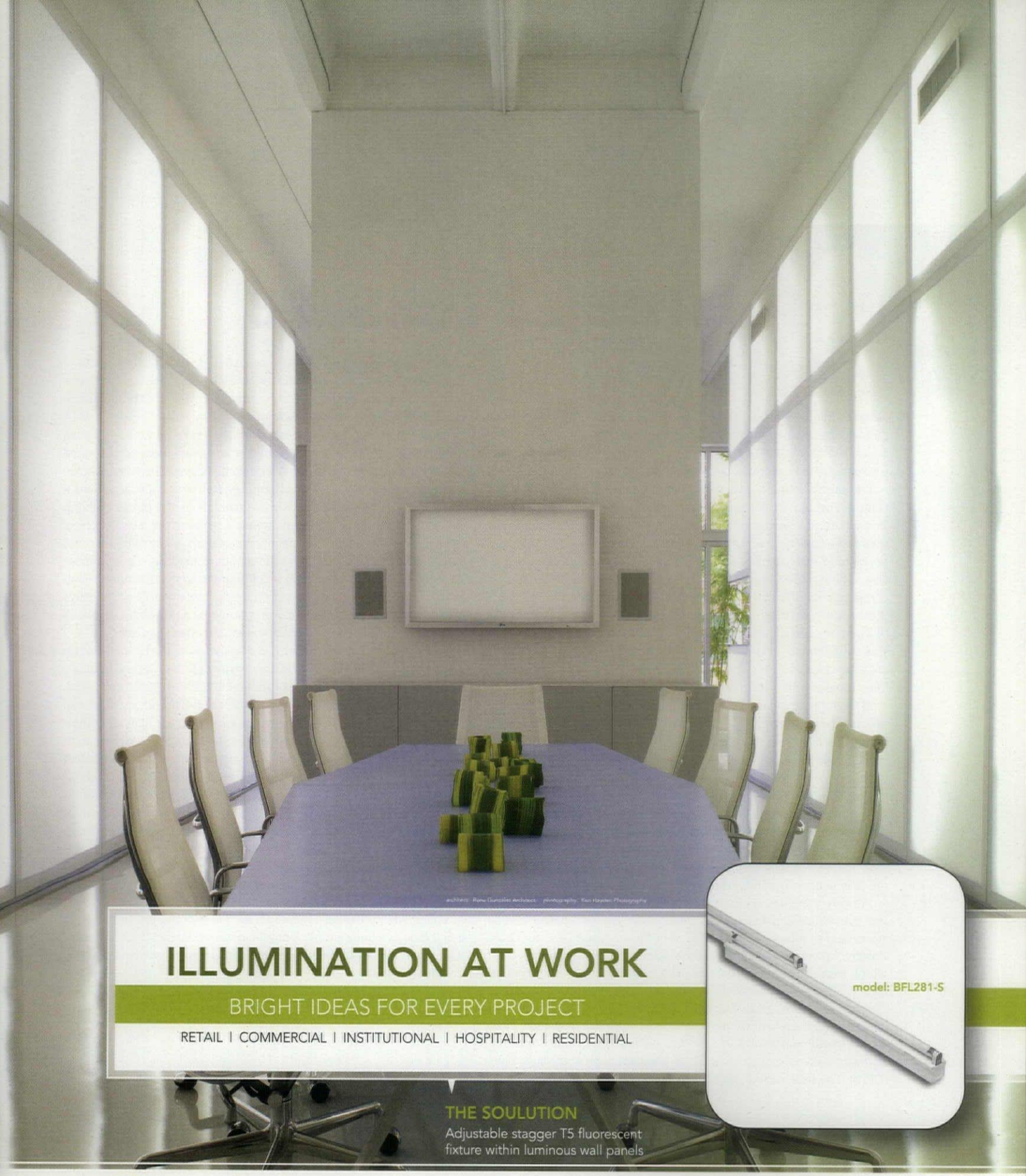

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Green Pressure

It's difficult to maintain a glass half full mentality in these precarious economic times. The U.S. Department of Labor's announcement that 600,000 jobs were lost in January alone and 3.6 million jobs have evaporated since the recession officially began in December 2007 is not the kind of news that inspires confidence. And we continue to be plagued by the question: Have we hit bottom yet?

It's hard to remain optimistic, when circumstances seem out of control. That is why it is critical, in these times of economic hardship, that we do not let sustainable practices fall by the wayside and let their value be determined strictly by cost. The challenge is hardly new: positioning sustainability so that clients perceive it not as an expensive add-on, but as an essential. But the task has become even more complex, with difficult decisions being made daily about financial priorities. If we can control green, we can control our future.

There is no doubt that sustainability is on everyone's minds. This was in evidence as more than 150 people gathered for a program ARCHITECTURAL LIGHTING held on Jan. 28, 2009, in New York City. Titled "The Present and Future State of Green Lighting," the event examined what green means for the lighting industry, in an effort to move beyond the incandescent vs. compact fluorescent lamps issue around which green lighting discussions have stalled. A distinguished group of panelists—lighting designers Kathy Abernathy, Mark Loeffler, Martin Lupton, and Michael Mehl—discussed the green initiatives of the Illuminating Engineering Society, the International Association of Lighting Designers, and the Professional Lighting Designers' Association. Despite the efforts of all three organizations, what was clear is the frustration that designers, manufacturers, public agencies, and clients feel about a code system and marketplace that do not fully support green lighting practices.

Already there are signs that current economic pressures are forcing individuals and businesses to forgo the energy-efficient choice. According to a report in *The New York Times*, "Dark Days for Green Energy," alternative energy sources such as wind and solar power, which experienced substantial growth in the past several years, are now in decline because of the credit crisis and a lack of financing. At the consumer level, according to the National Electrical Manufacturers Association, the recent 4.8 percent drop in its Lighting Systems Index for the fourth quarter of 2008 reflects a decline in consumer spending on energy-efficient products such as compact fluorescent light bulbs (CFLs). The reason cited: higher first cost in comparison to traditional incandescent sources. It is hard to believe that with the phasing out of incandescent lamps and the billions of CFLs being produced in developing nations, where labor costs are shockingly low, that a CFL's price point still remains double to triple that of Edison's light bulb.

One way to ensure the green movement's survival is to reorganize the system in which it operates: Rather than reward those who practice green, through tax breaks and other incentives, penalize those who do not. A first step toward a monitoring system would be to require a digital counter in the lobby of every commercial and public building displaying electricity usage, materials consumption (i.e., concrete, steel, glass, and plastic), and greenhouse gas emissions. With this data made visible, building owners and tenants would have a more immediate understanding of the impact of their respective footprints—and so would everyone else. Shame is a powerful incentive. These displays wouldn't have to be large, although it would be a refreshing use for all those LED media façades to show something other than ads.

Imagine if buildings incorporated displays along the lines of the National Debt Clock. Created in 1989 by Seymour Durst, the late Manhattan real estate developer, to call attention to the then $2.7 trillion debt, the electronic billboard lived on the corner of 42nd Street and Sixth Avenue in New York. For a brief moment during the Clinton administration, when the U.S. had no national deficit, it seemed as though the sign would become an artifact of a bygone era. That didn't last long. The sign was moved to a less prominent spot on the corner of 43rd Street and Sixth Avenue when the Durst Organization began to develop the 42nd Street site into One Bryant Park, which ironically is the headquarters of Bank of America, recipient of some $45 billion in federal bailouts. Doubly ironic, the sign needs more digits to accurately display the national debt, now in excess of $10 trillion. (The Durst Organization says it will update the sign next year.) Placing an energy debt counter on every building would have a serious impact.

Sustainability cannot happen on an "as you feel like it" basis, or when time or money permit. If anything, the economic crisis will show who is in it for the long haul and distinguish the green advocates from the green washers.

ELIZABETH DONOFF
EDITOR

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LAMP SOURCES

In response to the Method article, "Choosing Illumination Sources," in the Sept/Oct 2008 issue:

The author states that she did not list one source. Actually, she did not list two sources. Besides LEDs, she did not list screw-based cold cathode. They are excellent for situations where lights get turned on and off often, and for situations where frequent dimming is needed. They come with clear or frosted glass in seven shapes and can be a color that resists fading. Clearly, they are a good choice for business, particularly with blinking lights. Cold cathode is not just linear anymore.

Further, in terms of the application description for electric arc, self-ballasted—"A good alternative to the standard incandescent lamp if energy efficiency is more important than light quality."—not so. Good quality fluorescent light is available! Try Neptun Light's 20W PAR CFL flood. It outperforms previous 75W PAR incandescent flood lamps in width and brightness, emits less heat, is dimmable, and offers amalgam technology that holds the mercury when cool.

Finally, the classification of shapes seemed to get a bit muddled. "Shapes: not applicable"—I don't think so. Linear is linear even if it can be bent into most any configuration. If a designer does not know the shape of a light source, it cannot be considered for a design.

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CLARIFICATION

July/Aug 2008 issue:

The photographer for the cover image of the July/Aug 2008 issue is Sanna Fisher Payne at BDP Lighting, London. Theresa Shiban at BDP Lighting assembled the photomontage.

CORRECTION

Nov/Dec 2008 issue:

In the article "Anatomy of a Lighting Course," Matt Latchford should have been properly identified as an original co-creator and instructor of the course. Also, Dan Weissman was recruited to join Lam Partners by principal Paul Zaferiou.

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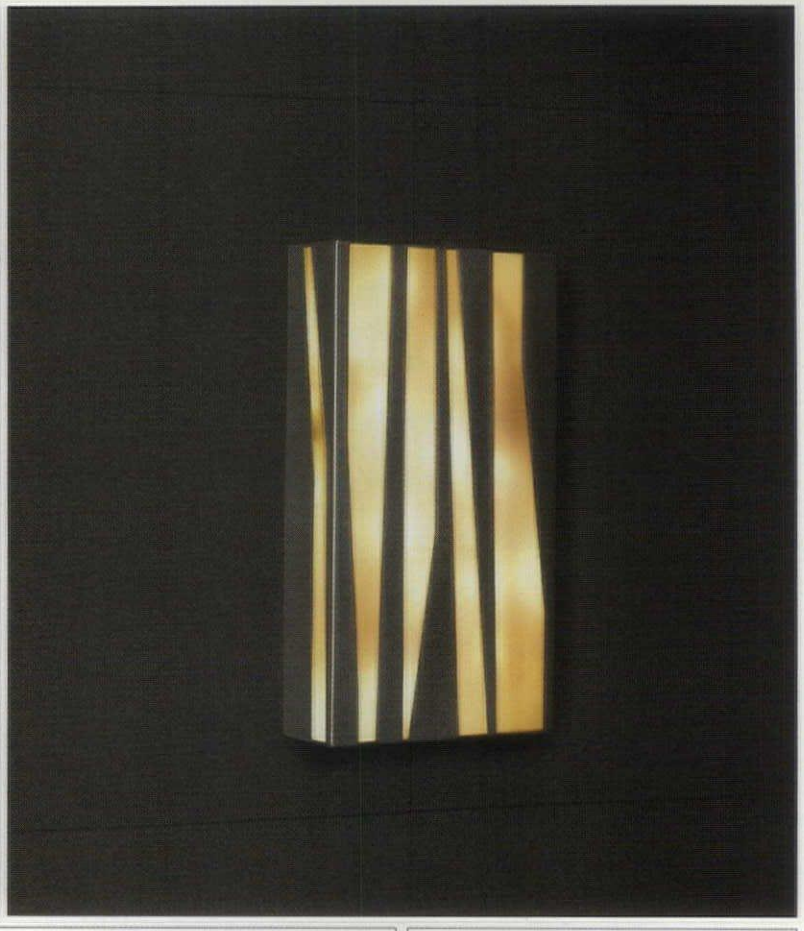

Silvus Family

Interior/exterior lighting fixtures designed by Roger Duffy of SOM

The modularity of these luminous elements allows for a wide range of applications—single unit, column or field. Its LEDs and carved inner surface evoke the gentle motion of light across water, filtered by foliage.

Shown: **Silvus30** (30"x7.5"x6.5") and **Silvus24** (24"x13"x6.5")
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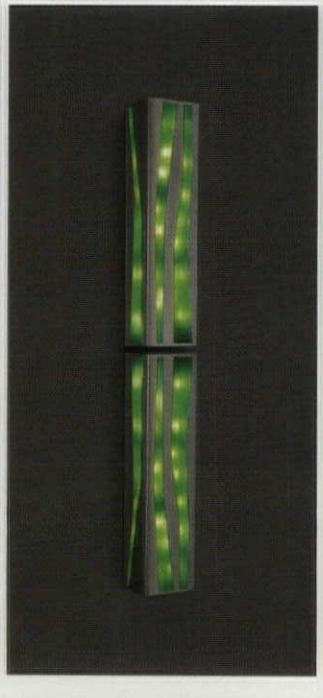
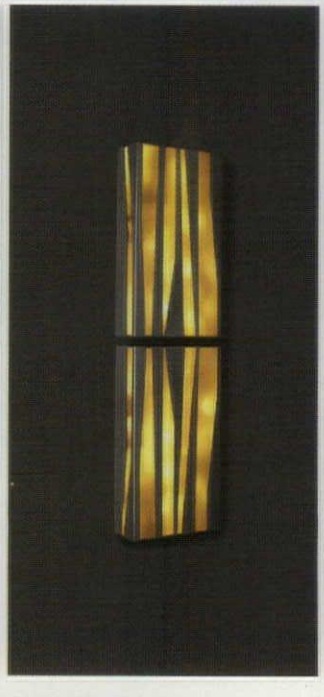
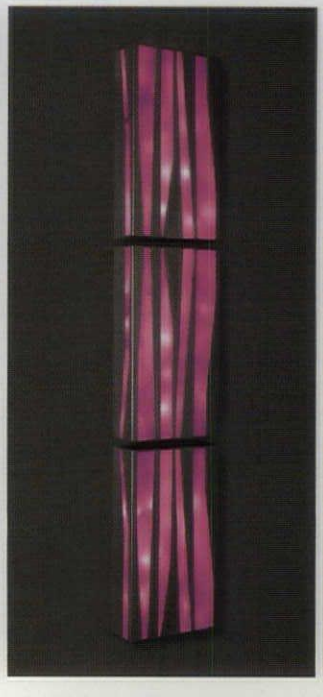
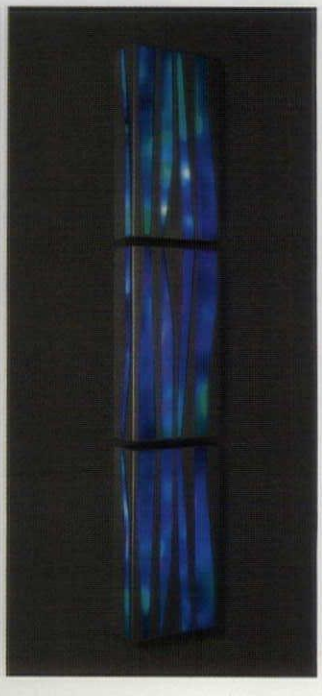








EDITED BY JENNIFER LASH

L.A. Is No. 1 On EPA List

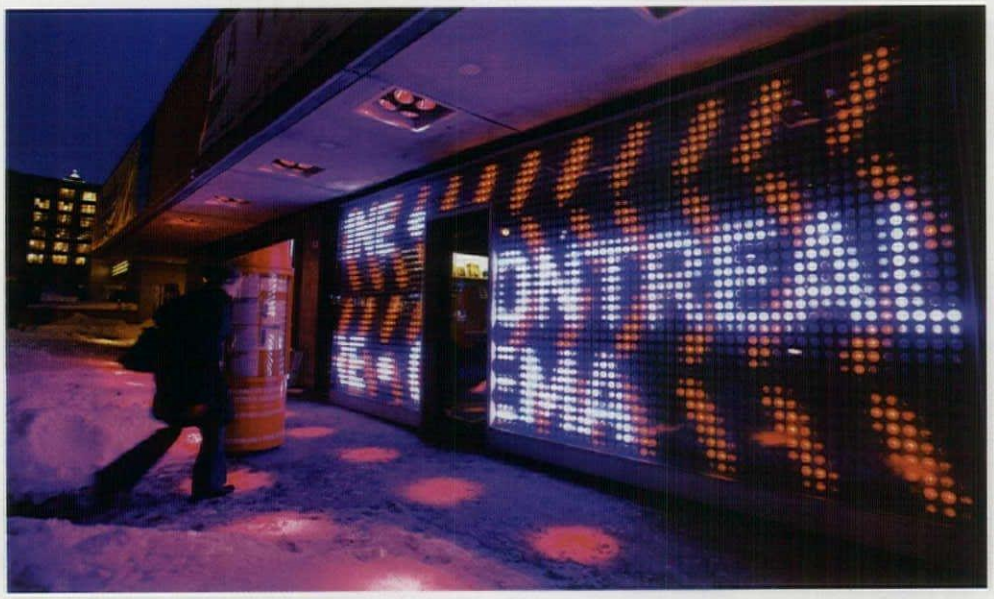
Los Angeles tops the EPA's 2008 list of U.S. cities with the largest number of energy-efficient commercial buildings that have earned the Energy Star rating. The list, released on March 3, includes a total of 25 cities.

Currently, there are more than 6,200 Energy Star qualifying buildings and plants in the U.S., resulting in an annual utility savings of more than $1.7 billion. According to the EPA, Energy Star buildings typically use 35 percent less energy and emit 35 percent less greenhouse gases than average buildings. The top 10 cities on the EPA's list had a total of 1,379 Energy Star qualified buildings between them in 2008 and more than $450 million in cost savings. More information is available at energystar.gov/buildinglist.

Top 10 U.S. Cities With Most Energy Star Buildings

1. Los Angeles	**3.** Houston	**5.** Dallas–Fort Worth	**7.** Denver	**9.** Atlanta
2. San Francisco	**4.** Washington, D.C.	**6.** Chicago	**8.** Minneapolis–St. Paul	**10.** Seattle

Montreal Illuminated



Despite the cold temperatures of winter in Montreal, the city enticed residents and visitors outdoors with its High Lights Festival from Feb. 19 to March 1. The festival, celebrating its 10th year, encompasses many areas of town including the Quartier des spectacles, an area in the city's downtown home to 30 performance halls in addition to other cultural venues. La Vitrine (above) is Montreal's "cultural window" that provides information and sells tickets for most cultural events in the region. La Vitrine's façade offers passersby an interactive experience with luminous forms displayed on the screen, which is lit by 35,000 LEDs. Visit archlighting.com for more images from the High Lights Festival and Quartier des spectacles venues.

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CLIPS

New UL Division

In January, Underwriters Laboratories created a new division called UL Environment (ULE). The wholly owned subsidiary provides third-party environmental assessment, validation, and certification services to product manufacturers and companies. ULE's services include Environmental Claims Validation, which helps consumers and manufacturers identify third-party claims, and Sustainable Products Certification, which will be launched in the near future and certify products to industry standards as well as new ULE standards that currently are being developed. Additional services such as training and advisory services will be available in late 2009 and early 2010. More information can be found at ulenvironment.com.

Economic Impact

The National Electrical Manufacturers Association's (NEMA) Lighting Systems Index (LSI) shrunk 4.8 percent from the third to fourth quarters of 2008, the largest quarter-to-quarter drop in the LSI's 11-year history. The index is an 11.2 percent decline from the fourth quarter in 2007. While NEMA's report shows a decline in shipments for every major lighting category, it does single out large lamps and fixtures as the worst hit by the downturn.

Educational Opportunities

Cooper Lighting has released the 2009 class schedule for the Source, which provides lighting workshops and seminars at Cooper's headquarters in Peachtree City, Ga. With the January 2009 opening of the Cooper Technology Center in Houston, the Industrial Lighting Solutions seminars and some others will be held at this location. Also, the Source will host its Healthcare Lighting Solutions and Energy Solutions seminars in Universal City, Calif., in conjunction with tours of the Cooper Lighting facility in Van Nuys, Calif. More information and a complete course schedule is available at cooperlighting.com/education.

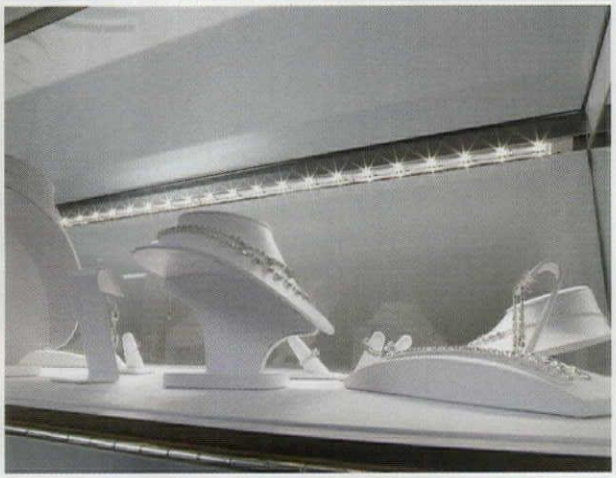
LED Funding

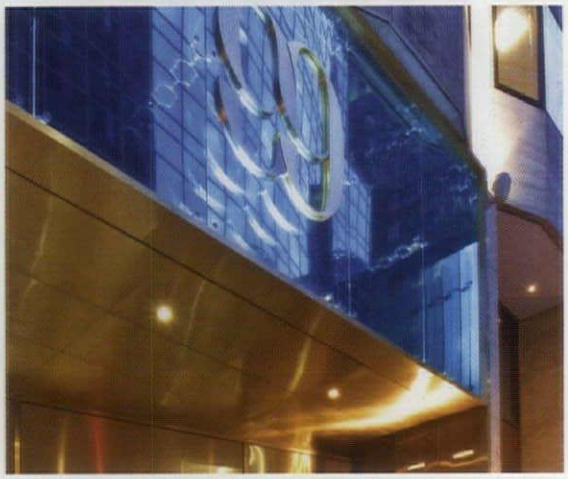
While several cities in the United States, such as Ann Arbor, Mich., and Anchorage, already have switched to using LED technology in their streetlights, more cities want to get on board. At least 30 U.S. cities have asked for more than $104 million in federal stimulus funds to help make the change to LEDs for their streetlights, according to a March 2 *USA Today* article. Converting to LED technology for streetlights can reduce energy use and maintenance upkeep, resulting in fairly significant savings.

DOE Workshop

The DOE is hosting a Solid-State Lighting Manufacturing Workshop on April 21 and 22 in Fairfax, Va. The two days will be spent examining how to reduce the cost of LED products to competitive levels, accelerate introduction of organic LED products, and ensure product quality and consistent performance. More information is available at ssl.energy.gov.

LED Luminaire Award Winners





Winners of the first annual Next Generation Luminaires awards, launched at Lightfair in May 2008, were announced in February at the Strategies in Light conference in Santa Clara, Calif. Sponsored by the DOE, the Illuminating Engineering Society of North America, and the International Association of Lighting Designers, the competition recognizes design efforts of energy-efficient LED commercial lighting luminaires.

Of the 68 entries, 22 received awards in the market-ready category, and three of those fixtures also were chosen as "best in class." The best in class winners are shown above (from left to right): GE's Immersion LED case lighting; the Azara LED luminaire by Journée Lighting; and Winona Lighting's Step03 LED steplights. Also, five products not yet market-ready were selected as noteworthy in the emerging category.

A panel of 14 judges made up of lighting design professionals selected the winners. For a list of winners, judges, and more information, visit ngldc.org.

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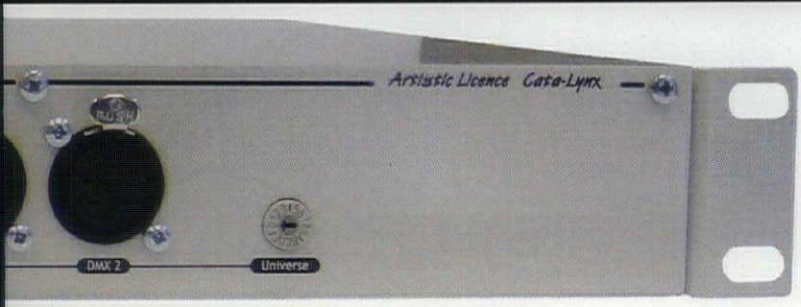
The Green Light occupancy sensors use ultrasonic and passive infrared technology to continually monitor a space and adjust the connected devices accordingly. The idle-time setting is adjustable on the sensor itself, but it will learn the occupants' habits over time and adjust the idle-time to suit the space's usage. Models cover areas from 540 square feet to 2,500 square feet. The GLS-ODT-C-2000 (shown) has a 4.2-inch diameter and offers 360-degree, 2,000-square-foot coverage. • *crestron.com* • CIRCLE 125

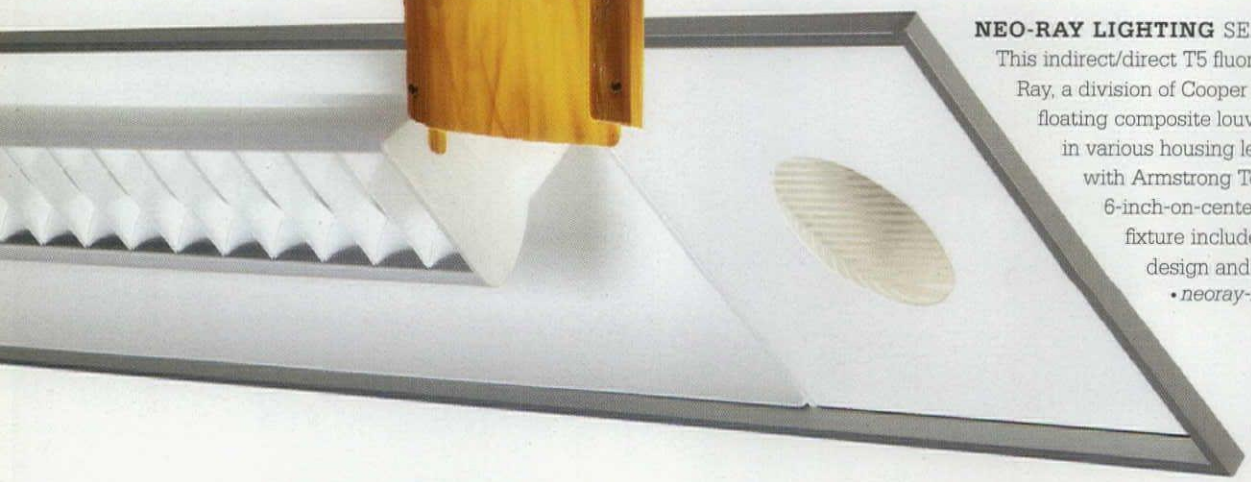
HESTIA SCHRÉDER LIGHTING USA
This aluminum-and-glass streetlight is the latest offering from Schréder Lighting USA. Using the Sealsafe Optical System, Hestia offers a high-tech optical system in a small package, and with its hermetic seal it prevents dust and water from damaging or interfering with the system. The light uses metal halide arc-tube lamps up to 150W. • *schreder.us* • CIRCLE 126

DOMO HINSON AND CO.
Designed by Antoni Arola for Metalarte in Europe, Hinson now offers Domo in the U.S. as part of a three-piece collection of indoor/outdoor fixtures. Made with tempered white glass, Domo is available as a 20-inch floor lamp or a 14-inch table lamp (shown). The top panel comes in blue or red, and the luminaire uses either an incandescent or self-ballasted fluorescent lamp. Also available are Dojo and Samu, which have stainless steel ribs over the white-glass sides. • *hinsonlighting.com* • CIRCLE 127



CATA-LYNX ARTISTIC LICENCE
These converters unite lighting and video control technologies in a 19-inch rack. The Cata-Lynx I/P is a DMX512-to-Art-Net converter for two universes and is designed for Art-Net compliant media servers or visualization software; it has an XLR loop through for each incoming DMX. The Cata-Lynx O/P is an Art-Net-to-DMX512 converter and adds remote device management; it has a splitter for the outgoing DMX connectors. The units are configured on the front panel or across the network with DMX-Workshop software. • *artisticlicence.com* • CIRCLE 128

DEREK MARSHALL LIGHTING
CONSTELLATION
The latest chandelier from Derek Marshall Lighting consists of three sections of American art glass, which is available in a variety of colors. Constellation's glass is cut, curved, and polished in an overlapping pattern that allows the fixture to give off both task and ambient light. The chandelier is 32 inches in diameter, and each light takes either incandescent, halogen, or compact fluorescent bulbs up to 100W. • *derekmarshall.com* • CIRCLE 129



NEO-RAY LIGHTING SERIES 1B
This indirect/direct T5 fluorescent luminaire from Neo-Ray, a division of Cooper Lighting, features a free-floating composite louver. Series 1B is available in various housing lengths and is compatible with Armstrong TechZone ceilings and other 6-inch-on-center ceiling grid systems. The fixture includes a single lamp modular design and has frosted acrylic side rails. • *neoray-lighting.com* • CIRCLE 130

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TRACK ADAPTOR
The Track Adaptor for one- and two-circuit Lighting Services Inc. track is now provided to any end user or manufacturer and features an integral on/off switch in addition to mechanical safety interlock. The Lexan adaptor is available in black, white, silver, or graphite, and it also can be painted a custom color to match any fixture. • *lightingservicesinc.com* • CIRCLE 131

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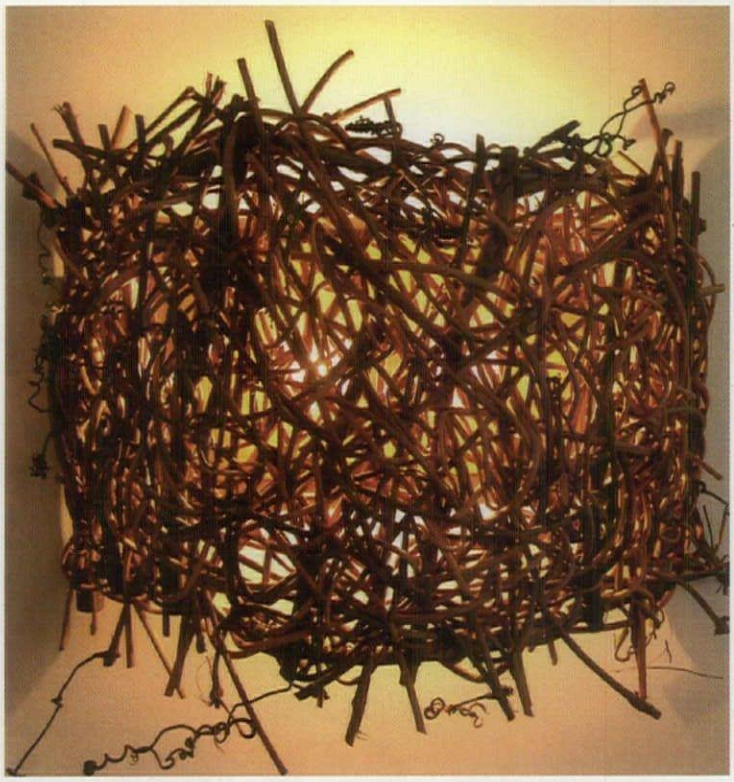
STUDIO ITALIA DESIGN GRAFFITI
This cutting edge design by Studio Italia Design follows the school of thought that graffiti is art. The Graffiti Collection includes a sconce, suspended pendant (shown), table lamp, and floor lamp, all made up of hand-blown glass with either black or white sketching. Wattages range from 60W to 150W, depending on the luminaire. Each fixture is handcrafted at the company's factory in Venice. • *sid-usa.com* • CIRCLE 132



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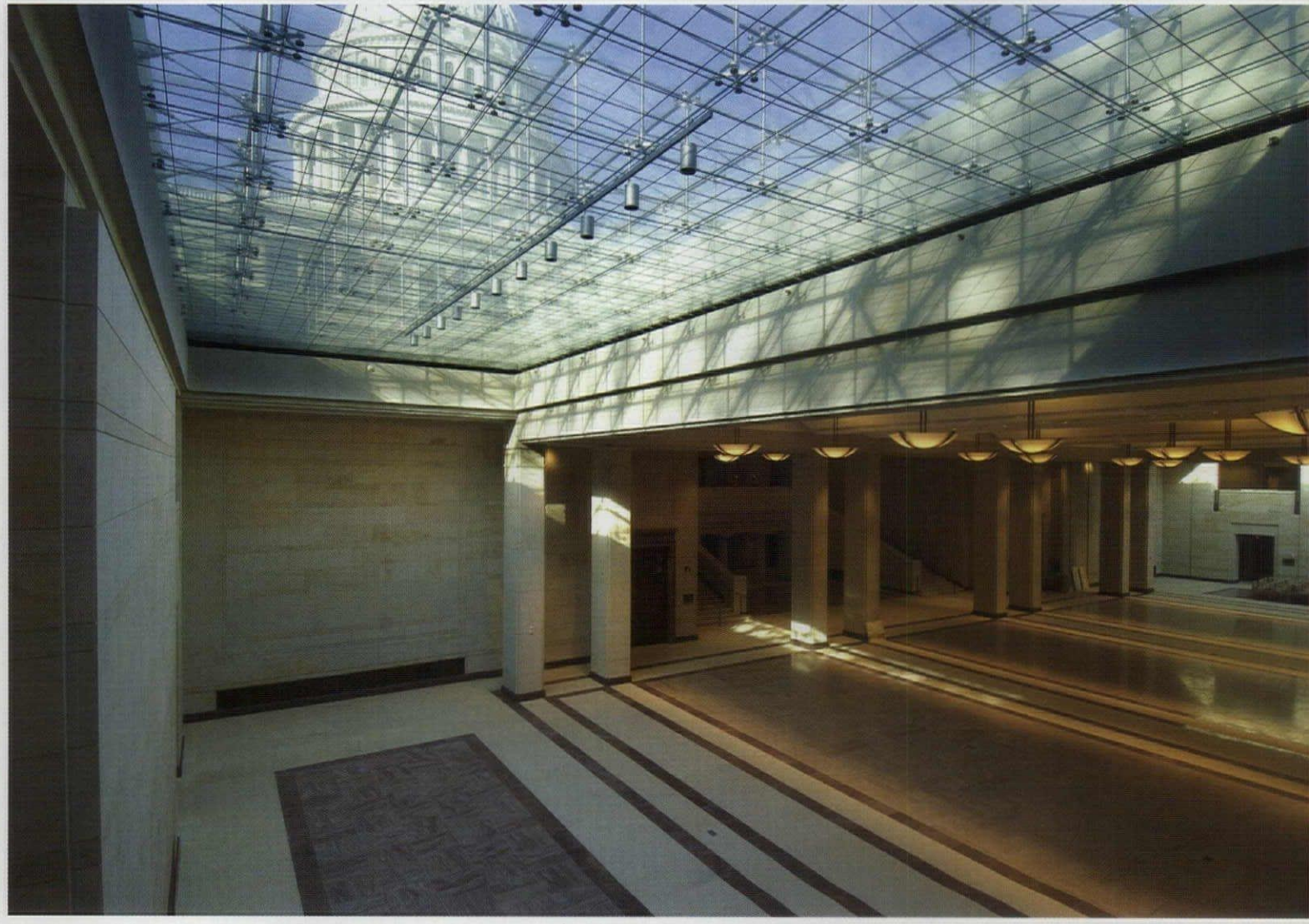


COURTESY OF THE ARCHITECT OF THE CAPITOL

The Capitol Visitor Center's two 70-foot-by-30-foot skylights bring natural light into the underground space and allow impressive views of the Capitol dome. With fixtures that are modern interpretations of the ones in the Capitol, the center delivers adequate lighting, but the lamp sources are not as energy efficient or as up-to-date as they should be.

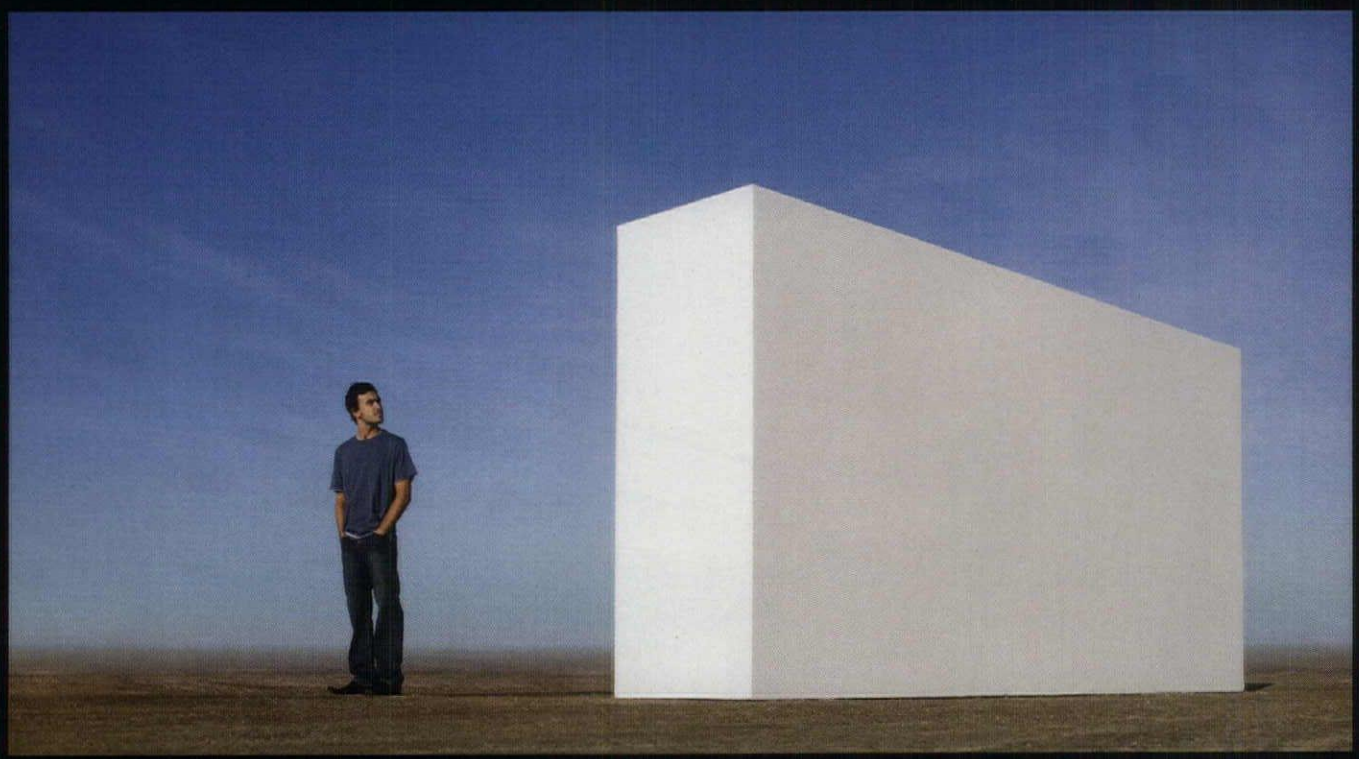
The Capitol Visitor Center in Washington, D.C., opened its doors on Dec. 2, 2008, but it's been in the works for years—decades, even. The D.C. office of architectural firm RTKL Associates has design studies for the center dating back to the 1980s, although the project didn't really take off until 1999, says senior vice president Rod Henderer. The construction of the 580,000-square-foot underground facility, started in 2002, became somewhat of a joke over the years as deadlines repeatedly got pushed back and costs escalated at every turn. Initially, the center was to cost $265 million, with $100 million of that privately raised. In the end, taxpayers footed the majority of the $621 million bill.

Did we get what we paid for? On the outside, yes. The center lies beneath a new plaza on the east side of the Capitol, facing the Supreme Court and Library of Congress. RTKL designed the plaza to fit in quietly with Frederick Law Olmsted's historic Capitol landscape, and the lighting is appropriately subtle, illuminating the grounds at night while making the Capitol and its dome the primary focus. Restored Olmsted post lanterns with metal halide sources ring the plaza, each emitting about 2 footcandles onto the East Front. Floodlights atop the visitor center's two elevator towers illuminate the iconic dome. "The dome is lit from 360 degrees for the first time ever," says Scott Matthews, partner at New York–based Brandston Partnership, which executed the center's lighting design.

Two 70-foot-by-30-foot skylights—surviving elements of RTKL's original design proposal—might be the most striking design element of the center's interior. Located in the Great Hall, they afford visitors grand views of the Capitol dome. Following Sept. 11, 2001, numerous security features were added to the center's design, and "one of the concerns I had as a result of 9/11 was that we would lose the skylights," Henderer notes. "But after extensive review by different agencies, everyone recognized the importance for views of the dome and natural light." Four 20-foot-by-20-foot skylights, all on a line adjacent to the Capitol, are located above the orientation theaters and stairways of the House and Senate spaces.

Budget overruns aside, one regrettable result of the project's missed

WHAT'S NEXT?



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deadlines is a lighting design that's not as cutting edge as it should be. In the past few years, lighting technology has advanced significantly and energy efficiency has emerged as a prominent issue.

While nothing officially has been proposed, there already are rumblings about updates to the lighting design just months after the center's opening. "We are contemplating a retrofit program to see whether it is feasible to go back in and work with the manufacturers to retrofit [the lamps] out," Matthews explains. "Think about the installed base of incandescent and halogen lighting—it's immense. It'd be good to come up with a retrofit program for those." It would be a lengthy research and development process before any plans even could be proposed to the Architect of the Capitol, but starting the discussions now might be wise as the phaseout of incandescent bulbs by 2014 takes effect and energy efficiency is a continuing concern.

In March 2007, Speaker Nancy Pelosi started the "Green the Capitol" initiative, striving to make the House of Representatives more environmentally responsible. A message from House Chief Administrative Officer Dan Beard on the Green the Capitol website states, "Energy saving technologies like changing all the light bulbs is not 'rocket science,' but in the U.S. Capitol, where many of the lamps and chandeliers are antiques, it can be daunting." While that might be true of the original luminaires in the Capitol, one would think the situation would be different in the brand-new visitor center. But with delay after delay, the ability to enact change became harder and harder. "With a project of this scale, once you start the process, it's extremely difficult to change course," Matthews notes. He adds that during construction, sources

In the entrance lobby, custom fixtures made of solid bronze frames and stone plates are backlit by 42W rectangular compact fluorescent downlights (top). Exhibition Hall primarily uses LED technology to make the display cases the main focus (above).

COURTESY OF THE ARCHITECT OF THE CAPITOL

Restored Frederick Law Olmsted lanterns using metal halide sources line the perimeter of the Capitol's East Front Plaza.

COURTESY OF RTKL ASSOCIATES

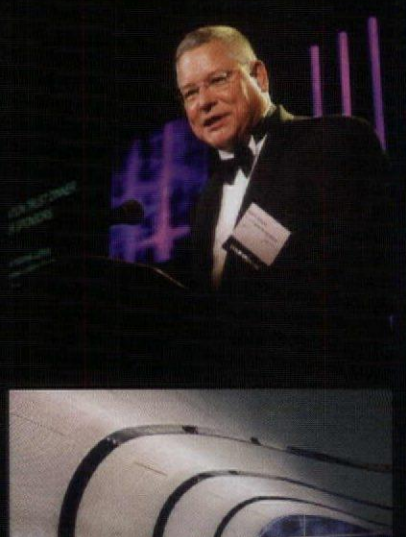
such as ceramic metal halide lamps and LEDs came of age. "These sources, they existed, but not in the variety and in the usable sizes that we have now." As a result, the majority of the center's lighting is fluorescent, compact fluorescent, and, where the designers needed a long-throw focused beam, incandescent.

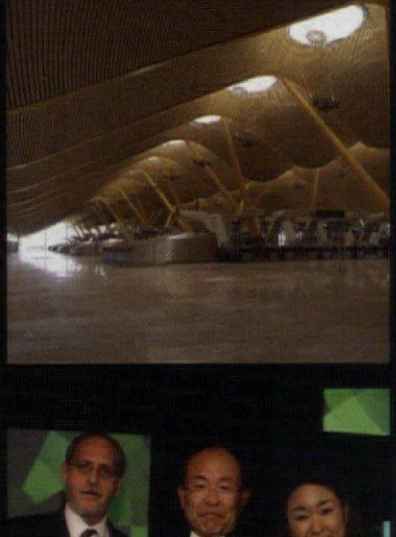
One area of the building that uses an up-to-date light source is Exhibition Hall, which is noticeably darker than the rest of the center to protect the delicate artifacts on display. It's primarily lit with LEDs, achieving a 5-footcandle environment. Matthews explains that the space incorporates the latest lighting technology because its lighting design was contracted separately from the rest of the center.

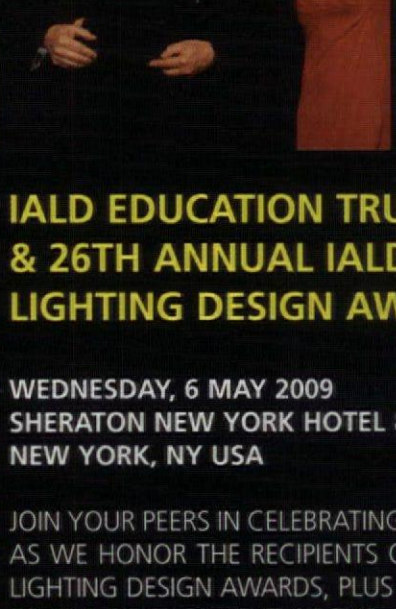
The project, Matthews says, is "unusual in the sense that we needed to make the spaces underground relatively bright but also make reference to this historic context that the visitors find themselves in." While the luminaires in the center—many of them custom-made—were designed with the historic Capitol's aesthetic in mind, they are modern interpretations.

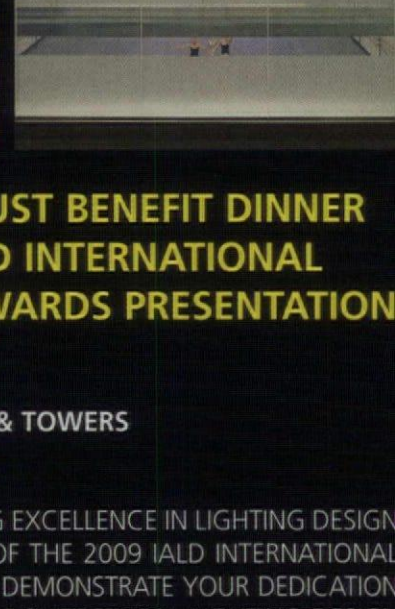
Working on a project of this scale is no easy task, especially considering that decisions had to pass through not only the typical channels but also be approved by members of Congress. "We could all write a book on getting this project done," RTKL's Henderer says. "It was a tough experience, but it was fulfilling. The project's been very controversial, but I think it will stand the test of time and endure." While the lighting in the center is successful enough and achieves the designers' visions, it's likely only a matter of time until the current antiquated light sources undergo a retrofit and are replaced by more energy-efficient technology. **JENNIFER LASH**

SAVE THE DATE









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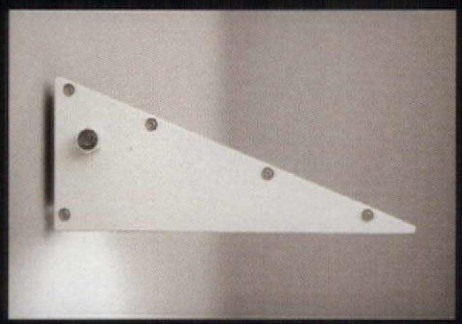

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EARNING LEED CERTIFICATION MIGHT BECOME EASIER FOR LIGHTING DESIGNERS AS THEY LOOK TO PLAY A MORE PROMINENT ROLE IN THE DEVELOPMENT OF NEW LEED CREDITS AND GUIDELINES

Propelled by government initiatives and client demand, the U.S. Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED) rating system is front and center in the burgeoning green building construction market. More than 16,000 buildings have obtained LEED certification through November 2008. Here, we examine the role lighting plays in the LEED process, along with how that role might change in 2009 and beyond.

GATHERING/OBTAINING/ACQUIRING POINTS

To become LEED certified, buildings must earn a certain number of points in various credit categories laid out in the program checklist. Buildings that earn more points receive higher levels of certification: silver, gold, or platinum. Several programs make up the active LEED system, including LEED for New Construction (based on a total possibility of 69 points), Existing Buildings: Operation and

Maintenance, Core and Shell, Commercial Interiors, Schools, Healthcare, and Retail. Many credits across the different LEED programs directly or indirectly affect a building's lighting design: energy performance, controllability of lighting systems, daylight and views, light pollution reduction, and innovation in design. This article solely focuses on LEED for New Construction Version 2.2.

Energy performance is a bucket of 10 credits that require building designers to meet energy-use standards. Designers must use a whole-building performance method to achieve the maximum number of points. This requirement fosters an integrated design approach. "It's been developed to encourage more discussion and trade-off between all the systems of the building," says Jeffrey Boynton, an associate with Santa Barbara, Calif.–based lighting design firm Ann Kale & Associates and chairman of the Illuminating Engineering Society's sustainable lighting committee.

The controllability credit requires giving a percentage of a building's occupants control over light levels, which most easily is achieved by task lighting, says Nancy Clanton, who serves on a LEED Technical Advisory Group team and is president of Clanton and Associates in Boulder, Colo. The credit in part stems from Light Right Consortium (LRC) project manager Carol Jones' research on the benefits of personal lighting control. (The LRC is a research effort overseen by the Pacific Northwest National Laboratory and operated by Battelle, which manages labs for the DOE.)

Daylight and views are two separate credits requiring access to natural light and views to the outdoors for either 75 percent or 90 percent of

MANY CREDITS ACROSS THE DIFFERENT LEED PROGRAMS DIRECTLY OR INDIRECTLY AFFECT A BUILDING'S LIGHTING DESIGN: ENERGY PERFORMANCE, CONTROLLABILITY OF LIGHTING SYSTEMS, DAYLIGHT AND VIEWS, LIGHT POLLUTION REDUCTION, AND INNOVATION IN DESIGN.

a building's occupants. "It's getting people more illumination and is an opportunity to dim the electric lighting," Clanton says.

The light pollution reduction credit requires designers to minimize light pollution and light trespass. "It came from a well-founded idea that shining light into the sky diminishes your ability to appreciate the night sky," says Mark Loeffler, director of Atelier Ten's lighting design practice and founding co-chairman of the International Association of Lighting Designer's

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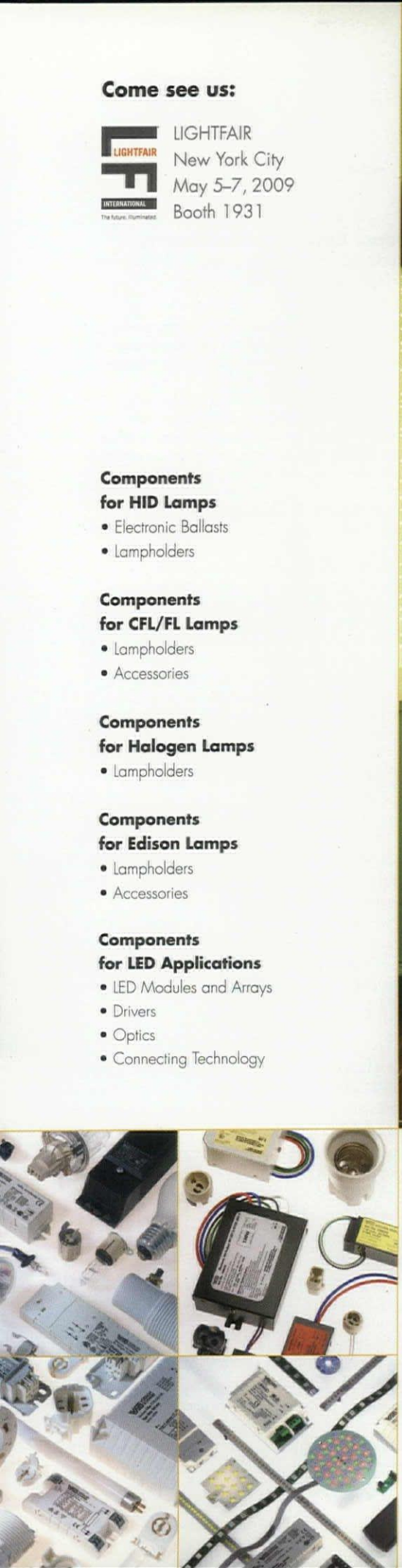

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LEED CREDITS FOR LIGHTING*

Sustainable Sites
Credit 8: Light Pollution Reduction
1 Point

Intent: Minimize light trespass from the building and site, reduce sky-glow to increase night sky access, improve nighttime visibility through glare reduction, and reduce development impact on nocturnal environments.
Explanation: This credit sets a limit for lighting power coming from an area or façade, for the amount of light crossing the property line based on lighting zone, and for light leaving the building through the windows, with an exception made for lights using an occupancy sensor.

Energy and Atmosphere
Credit 1: Optimize Energy Performance
1-10 Points

Two points mandatory for all LEED for New Construction Version 2.2 projects registered after June 26, 2007

Intent: Achieve increasing levels of energy performance above the base line in the prerequisite standard to reduce environmental and economic impacts associated with excessive energy use.
Explanation: This group of credits is where lighting can have the most impact. Designers can choose from a prescriptive method, which limits watts per square foot and includes mandatory control, or a whole-building energy simulation, which allows designers to achieve the maximum number of credits.

Indoor Environmental Quality
Credit 6.1: Controllability of Systems, Lighting
1 Point

Intent: Provide a high level of lighting system control by individual occupants or by specific groups in multi-occupant spaces to promote the productivity, comfort, and well-being of building occupants.
Explanation: This credit requires individual lighting controls for a percentage of a building's occupants. Designers say this credit is one of the simplest to meet by adding task lighting in occupied areas.

Indoor Environmental Quality
Credit 8.1: Daylight and Views, Daylight for 75 Percent of Spaces
1 Point

Intent: Provide building occupants with a connection between indoor spaces and the outdoors through the introduction of daylight and views into the regularly occupied areas of the building.
Explanation: Although this credit does not directly affect electrical lighting systems, it does require that designers ensure that regularly occupied spaces receive certain levels of daylight. Designers can calculate the glazing factor, computer simulate the amount of daylight, or assess daylight through records of indoor light measurements.

Indoor Environmental Quality
Credit 8.2: Daylight and Views, Views for 90 Percent of Spaces
1 Point

Intent: Provide building occupants with a connection between indoor spaces and the outdoors through the introduction of daylight and views into the regularly occupied areas of the building.
Explanation: This credit requires outdoor views for a percentage of people in occupied spaces, which can be difficult in cubicle farms where the privacy needs are balanced with the value of the view. Two points can be achieved if both Credit 8.1 and Credit 8.2 are met.

Innovation & Design Process
Credit 1–1.4: Innovation in Design
1-4 Points

Intent: Provide design teams and projects the opportunity to be awarded points for exceptional performance above the requirements set by the LEED for New Construction Green Building Rating System and/or innovative performance in green building categories not specifically addressed by the LEED system.
Explanation: This credit is achievable by selecting lighting that is locally sourced or uses recycled materials. While lighting is exempt from the Materials and Resources credits that require regionally produced and recycled-content materials, designers get innovation credit by going further to include electrical lighting.

***LEED for New Construction Version 2.2**

(IALD) energy and sustainability committee. The problem, he says, is that the credit was not written in concert with lighting professionals and the manufacturing design community, making it difficult to achieve.

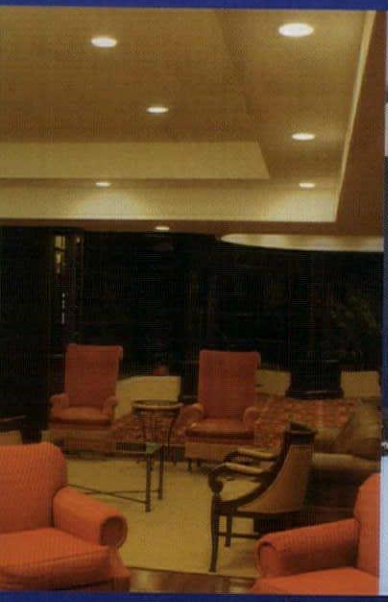
The innovation in design credit offers points for going beyond the call of the stated requirements, similar to an extra credit project. Clanton says one way to earn this credit is to use lighting that is made of recycled materials or is regionally sourced, because lighting is exempt from the credits for using recycled or regional materials.

EQUAL REPRESENTATION

There are important aspects of a lighting specification, such as lighting quality, that do not impact a building's LEED credits. "Lighting as a critical system in the built environment is underrepresented," Loeffler says. "There's little acknowledgement of lighting as opposed to mechanical systems and their controls." While some designers agree lighting is, for the most part, accurately represented by LEED, others say more input is needed from the lighting industry. The IALD and the USGBC are working to refine certain credits and perhaps add credits for lighting quality in future versions of LEED. But the future also will mean changes in the certification process, which could give lighting a larger role. LEED 2009, the program's third major iteration, was approved by USGBC members in November 2008 and will be introduced in March 2009. Projects no longer will need to be registered under the separate LEED systems. LEED 2009 will align credits for each type of construction and reweight them, creating a 100-point system more focused on climate change and energy efficiency.

While a LEED 4.0 is still a ways in the future, lighting designers predict it could overhaul certain lighting-related credits and even result in new credits, influenced by members of the lighting community. JEFFREY LEE

Jeffrey Lee covers the apartment industry for units, *the magazine of the National Apartment Association.*

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SHADOW WALK, MESA, ARIZ.

CHALLENGE: CREATING AN "OASIS"—AN OUTDOOR CIVIC SPACE FOR GATHERING OR HOSTING EVENTS—WHILE MEETING THE DEMANDS OF THE REGION'S EXTREME CLIMATE RANGE

Project Shadow Walk, Mesa Arts Center, Mesa, Ariz. **Design Team** BOORA Architects, Portland, Ore. (design architect); DWL Architects + Planners, Phoenix (executive architect); Martha Schwartz, Cambridge, Mass. (landscape architect); Auerbach Glasow French, San Francisco (lighting consultant) **Photographer** Timothy Hursley, Little Rock, Ark. **Project Cost** $70 million **Project Size** 210,000 square feet **Manufacturers** Bega, ETC, Hydrel, Insight Lighting, Kim Lighting, Lumière, Shaper Lighting

Fabric canopies standing approximately 50 feet tall stretch along the Shadow Walk plaza. Providing shade along the walkways during the day, at night the canopies are illuminated with 48W fluorescent uplights and 24W compact fluorescent downlights. Each canopy mast has three uplight and three downlight fixtures.

A planter filled with cactuses sits adjacent to a wall of colored glass on the Shadow Walk outside the Mesa Arts Center. At night, the walls of these smaller, more intimate garden spaces throughout the project are illuminated by low-voltage halogen floodlights, which light the surrounding areas and create shadows against the panes of glass.

SOLUTION The Shadow Walk, a series of landscaped spaces organized along a major pedestrian spine in front of the Mesa Arts Center in Mesa, Ariz., is designed to be a gathering place in an often inhospitable climate. Portland, Ore.–based BOORA Architects and landscape architect Martha Schwartz were tasked with creating a welcoming outdoor space that serves many functions. The region's climate extremes—from warm days and cool evenings in the winter to intense heat in the summer—added to the project's complexity, as the linear park is intended to engage its patrons regardless of the time of day or year. The architecture and landscape contribute to the end result, providing a cool, shady environment during the day while animating the area at night.

The 210,000-square-foot arts center incorporates four theaters, contemporary art galleries, and an arts education facility with 14 studios for performing and visual artists. "When you combine all of these elements into a single complex, you get the synergy of all those aspects of the arts interacting with each other," says BOORA project design lead Michael Tingley. His team created numerous accessible areas that offer different views of the Shadow Walk itself and its events.

Running perpendicular to the north-south movement along the plaza are tensile fabric canopies, strung on poles about 50 feet above the ground. During the day, the canopies provide shade at the building's entry points and for people moving along the Shadow Walk's pathways. At night, the fabric is uplit with 48W fluorescents and downlit with 24W compact fluorescents, so it appears as a "beacon on the skyline and helps signify and mark the building entry," Tingley explains.

The art center's galleries are tucked below grade, with windows opening into a sunken courtyard and translucent-glass skylights that punctuate the Shadow Walk. At night, LED strips at 7.5W per linear foot illuminate the perimeter of each box. The LEDs are programmable with the ability to create 600-plus color combinations. A series of intimate gardens are scattered throughout the landscape characterized by raised or sunken grass areas, and planters filled with cactuses sit adjacent to walls of colored glass. The walls are illuminated by low-voltage halogen floodlights, resulting in a "shadow pattern of the silhouette of the cactus and the people occupying those spaces against the glass panes," Tingley says. "It's a brilliant punctuation of moments that you can see from a distance as you're walking through the Shadow Walk."

Along the eastern part of the promenade is a continuous water feature called an arroyo, the Spanish word for "stream." The idea is drawn from water channels in the desert. The system was developed so that the basin fills with water, which is then discharged on the north end and flows the entire length of the 300-foot-long channel. "The basin kind of dries out and the whole process can reoccur," Tingley notes, adding that the arroyo, lined with lava stone blocks, is "such a favored element on the site that [the arts center] rarely turns it off." Ambient light from the arroyo's surrounding spaces and buildings provides sufficient illumination.

To attract visitors at all hours, shadows and light play a large role in animating the outdoor area. By using elements such as the glass wall, fabric canopies, and frosted glass boxes around the skylights, Schwartz and the BOORA team successfully created a space that brings the artistic expression from inside the arts center to the exterior, resulting in an engaging oasis amid the city's bustling downtown. **JENNIFER LASH**

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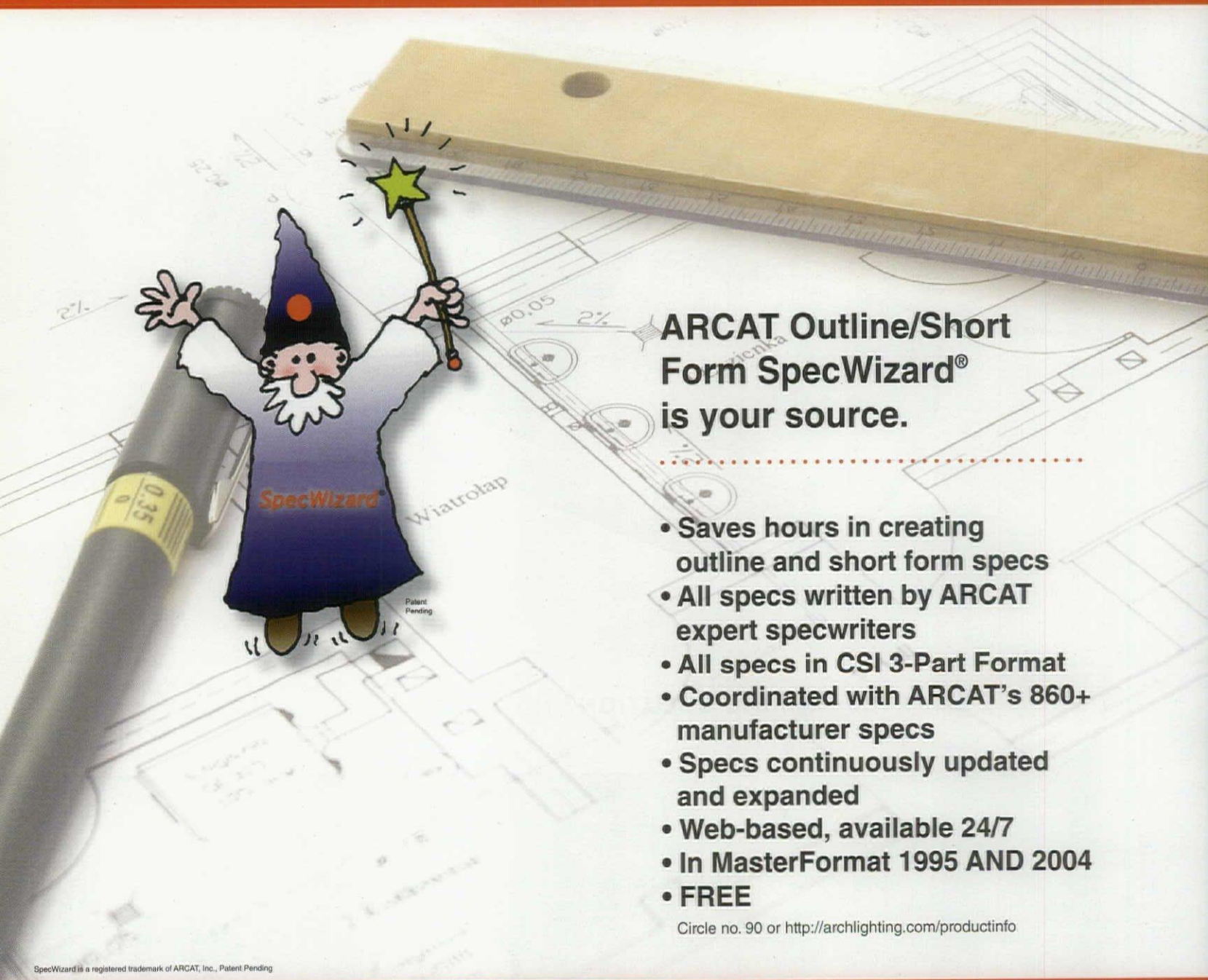

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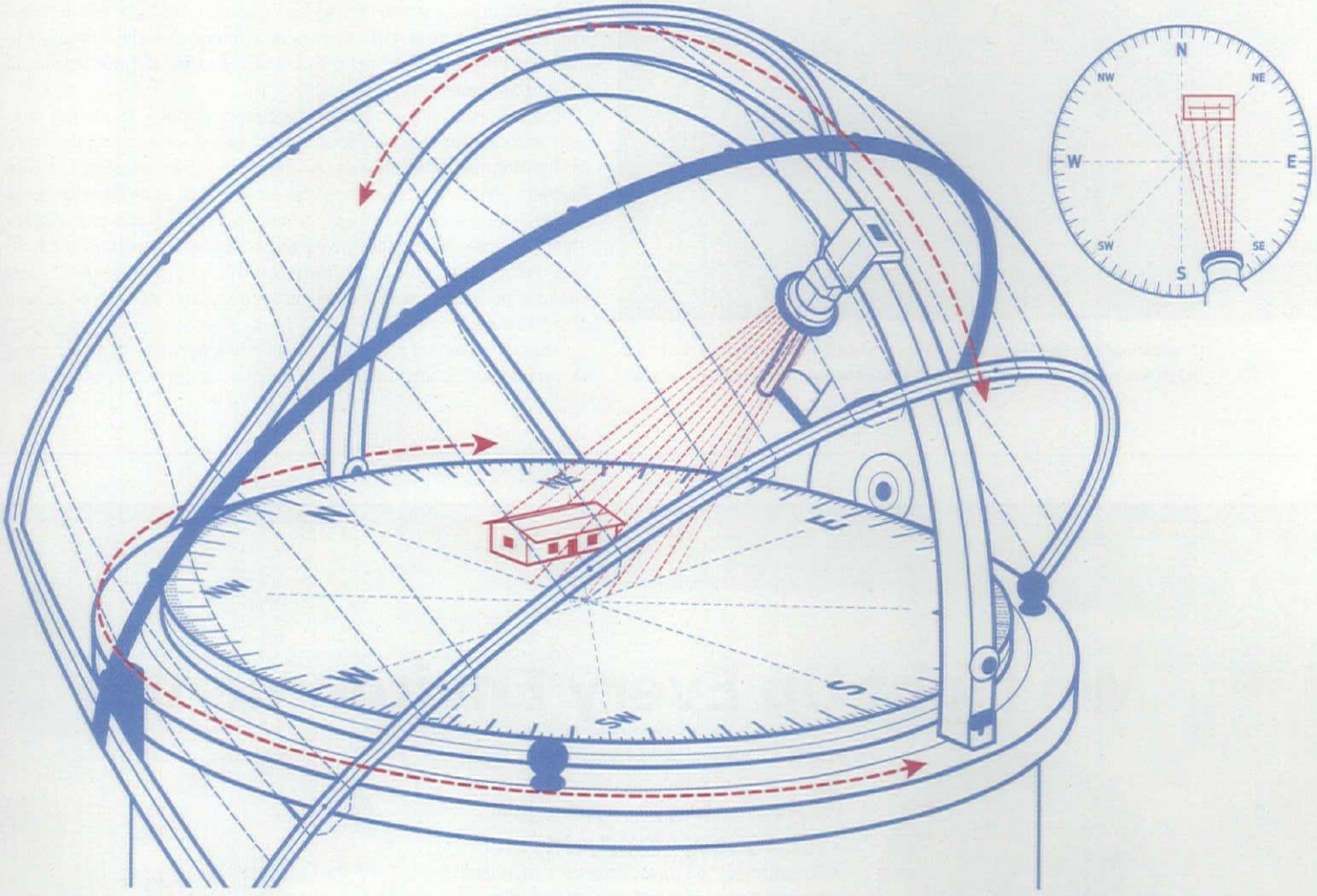
Tools for Daylighting Studies

THE INTUITIVE BENEFITS OF PHYSICAL MODELING DAYLIGHT ANALYSIS



JAMESON SIMPSON

In recent years, as green building practices have infiltrated mainstream architecture and construction, the term daylighting has been adopted as a broad way of describing sustainable approaches to lighting. Design professionals often apply the term without a comprehensive understanding of the myriad techniques it describes, such as toplighting, sidelighting, and solar shading. But as daylighting seemingly becomes more complicated, lighting designers and architects can turn to traditional physical modeling tools and techniques that may help simplify matters.

Some of the confusion arises from the fact that daylighting strategies have been used widely in a new generation of high-rise buildings that incorporate sophisticated curtain wall assemblies. Given such high-end associations, it is easy to assume that daylighting is a complex technique requiring a suite of advanced software.

But this is not always the case; in fact, daylighting is rooted in basic architectural principles of siting and location. Elaborate calculations and software are not a prerequisite to form a daylighting strategy. As a result, traditional physical modeling tools such as sun angle calculators, sun path diagrams, sundials, and heliodons often are overlooked as resources for performing daylighting analyses.

ADVANTAGES OF PHYSICAL MODELING

"Physical modeling is an extremely intuitive way to interact with the built form of whatever you are studying," says Keith Yancey, principal at Cambridge, Mass.–based Lam Partners, a firm known for its focus on daylighting. A traditional architectural model can serve as a quick, hands-on study tool, helping designers understand what is happening to daylight inside the space, and outside as well.

Physical modeling tools, such as a helidon—a tilt-table where a model is placed and a light source applied—enable designers to see how light moves through a space.

DOUGLAS A. SALIN

"With electric lighting, daylighting has become an amenity in lieu of the primary source of illumination for interiors," Yancey explains. "Architects used to make their decisions about building geometry and space allocation based on a solid understanding of solar dynamics such as the sun's relative movement across the sky or its changing color and quality throughout the day or year." Physical modeling techniques reclaim a connection to fundamental principles of how best to use sunlight, climate, and site.

Besides the immediacy a physical model offers in seeing how light will move through a space, another benefit is an improved understanding of the materials to be used. For instance, by adding clear acrylic to a model's window openings, it is possible to simulate spectrally accurate interreflectance—the bouncing of light off surfaces. The use of materials and textures in a model provide a level of dimension and reality to the space, nuances that still are limited in computer simulations.

The 3-D computer models that architects work with are not typically constructed in a way that is best suited for incorporation into daylighting analysis software. As Jamie Perry, an associate at Lam Partners, explains, "Nowadays the architect is starting with some sort of 3-D model. It's very easy to take that model and put it in another program. It no doubt gives you some very important information, but it is difficult to replicate the dynamic quality of the way sunlight penetrates a space and interacts with materials without a physical model."

Another benefit of physical modeling is a decrease in set up time. Compared to the amount of time involved in preparing some com-

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puter models for accurate daylight simulation, given each program's rendering times, a good physical model can enable an architect or lighting designer to make a relatively quick study of multiple scenarios for times of day and year. "It's all right there in the model. It's fast, accurate, very flexible, and intuitive," Perry says.

THREE STEPS, THREE TOOLS

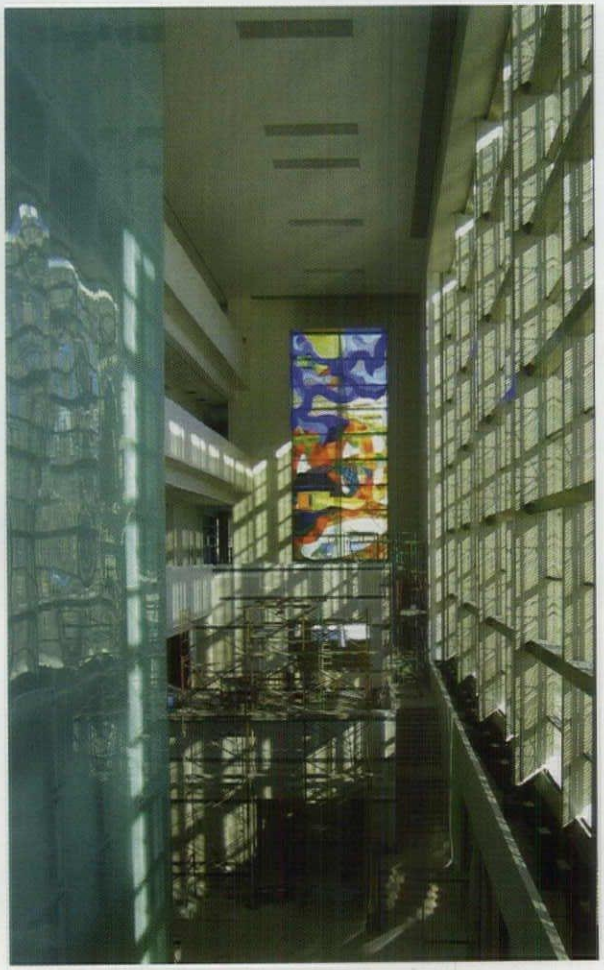
1. The Sun Angle Calculator

For a snapshot of daylighting effects in a building, all one needs is a plan or section drawing and a sun path diagram—commonly referred to as a sun angle calculator. This determines the effects of direct sunlight at specific times of day and year, and at specific points on the globe. The calculator registers the azimuth and altitude angles of the sun's position in the "skydome," an imaginary hemisphere above a flat ground plane.

Particularly useful is the sun angle calculator's ability to identify the profile angle, the angle of the sun relative to the ground plane of the building site. When applied to a building section, the profile angle determines sunlight penetration into interiors and the effectiveness of exterior shading devices in different seasons. A helpful tool for these 2-D diagraming studies is the Pilkington Sun Angle Calculator Manual, which is available for free download from the Society of Building Science Educators website: sbse.org/resources/sac/PSAC_Manual.pdf.

2. The Model and the Sundial

For an even more precise reading of the sun's movement over the course of a day or a year, designers can turn to the good old fashioned sundial. When used with a physical model in daylight or under electric light, a sundial can help evaluate the nuances of daylight penetration for more complex forms and surfaces, such as a sloped roof or a curved wall.



Modeling studies aid in understanding material qualities. Adding glass or Plexiglas to represent windows, interreflectance—the bouncing of light off surfaces—can be simulated. Physical modeling was key in Lam Partners' studies for the new Orlando Federal Courthouse in Florida.

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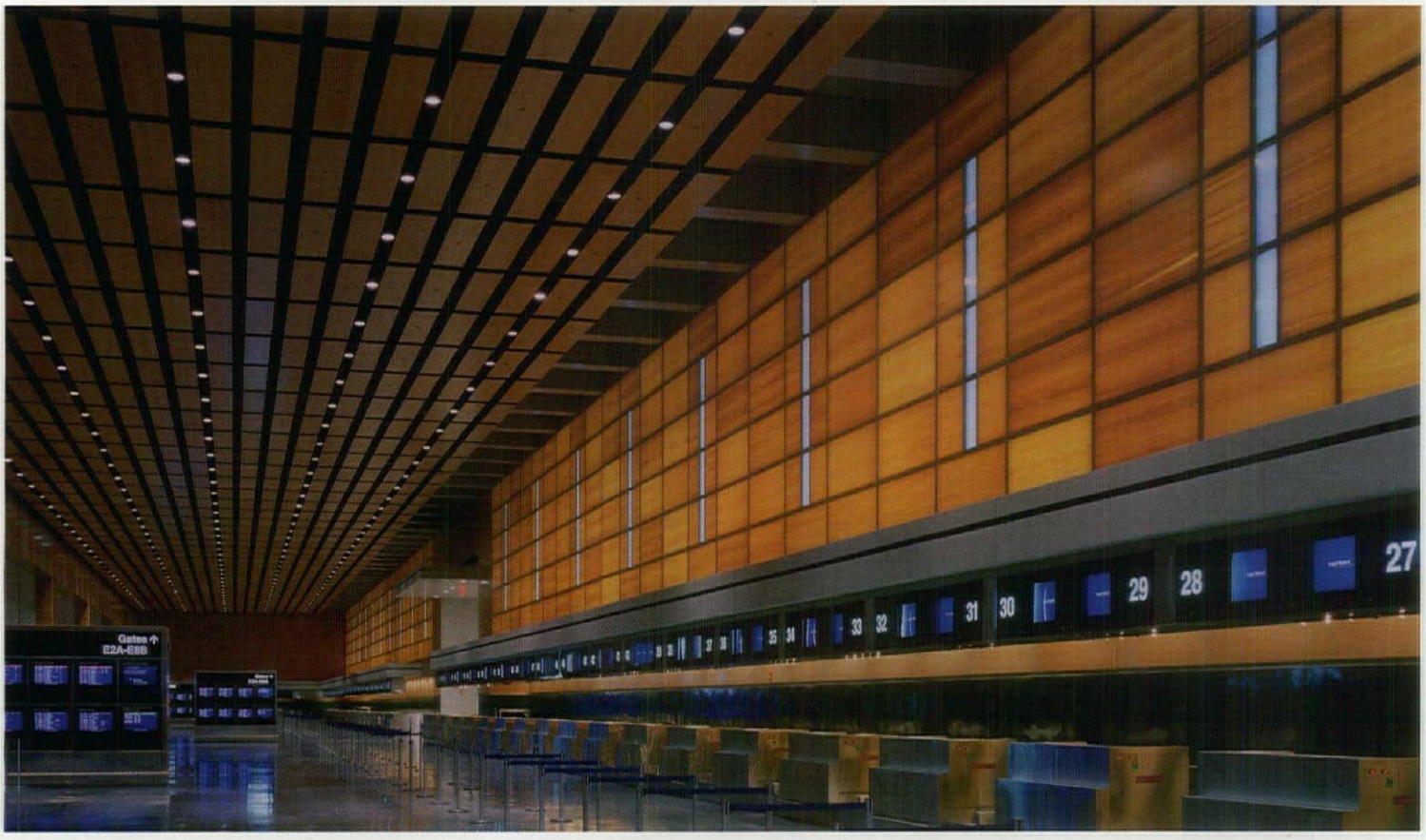

At Logan International Airport's Terminal E ticketing hall in Boston, light-absorbing materials, such as wood paneling, and light-reflecting materials, such as metal counter surfaces and a terrazzo floor, provided numerous challenges in understanding how to illuminate the space by day and at night. Daylight modeling helped evaluate the contrast ratios and material reflectance issues.

3. The Heliodon

Of all the physical modeling tools for daylighting, a heliodon offers the most accurate and dynamic evaluation. There are two types of heliodons: one where the sun (light source) moves around a fixed model, and one where the model itself moves on a tilt-table. Through rotation, a heliodon allows one to take a physical model from sunrise to sunset at any time of day, at any point on Earth. This method of physical modeling can be repeated accurately because the model and light source are securely positioned. It also allows a quick study of different lighting variations. This information can be recorded with a video camera to create presentation-quality movies. Additional quantitative data can be gathered by placing light sensors within the model.

The size of the heliodon table should be proportional to the size of the model. In a typical heliodon, the model is positioned at counter height—approximately 36 inches off the floor. The model's height can vary, but if it is too low then full rotation will be impossible, and the table itself may cast shadows on the model. A heliodon offers more accuracy than a hand-held model with a sundial; it provides smoother rotation through a typical day. If the model is proportionally correct and the materials used have similar or the same reflectances as the materials being considered for the finished building, you will get accurate light level readings.

Although there are just two types of heliodon, there are different ways to build each type, and there are various online reference resources. Some lighting design and architectural firms will actually build their own, which allows them to customize it for their own use. Lam Partners, for example, is on its fourth-generation heliodon, which incorporates motorized rotation and was designed for transport. Firms that only require occasional access to such a tool can use the daylighting labs at nearby architecture and engineering schools.

SYNTHESIZING DATA AND PROCESS

The progression from plan and section diagrams to hand-held model study to heliodon analysis is relatively linear. Project variables will dictate the number of studies required; there is no magic number. Over the course of a project's development, designers can go back and forth between analysis and design to fine-tune details. "You have to take the most typical conditions, but you also have to work with the complexity of the space," says Lam associate Justin Brown.

Physical modeling techniques offer many advantages. They are quick, provide a real-time and accurate understanding of how light and architecture interact, and can depict nuances of a material's qualities. Physical modeling enables qualitative information to be balanced with quantitative results. The immediacy of working with a model and mapping out sun paths gives the designer a sound connection to real-world lighting effects, helping the designer make prudent decisions about daylighting.

Of course, computers are necessary for certain types of calculations, including energy usage and electrical illuminance. Nevertheless, physical modeling, from diagram to heliodon, offers foundational tools that should not be overlooked. "Daylighting, like architecture itself, has to be designed," Yancey says. "Shaping the architecture, coming up with something from nothing makes the physical models so important; the architecture itself should be the daylighting machine." **ELIZABETH DONOFF**

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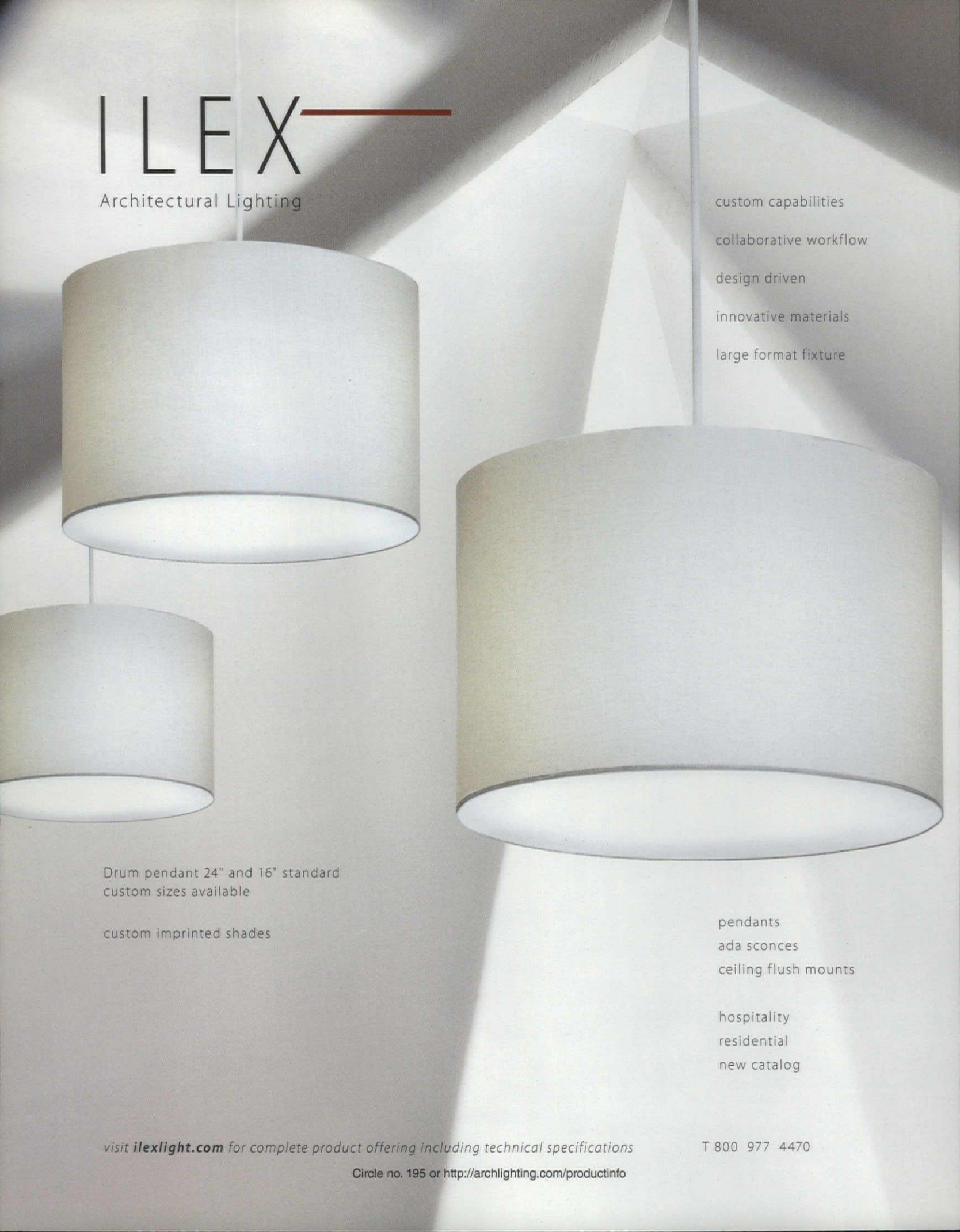

Load Shedding and Lighting: The New Frontier

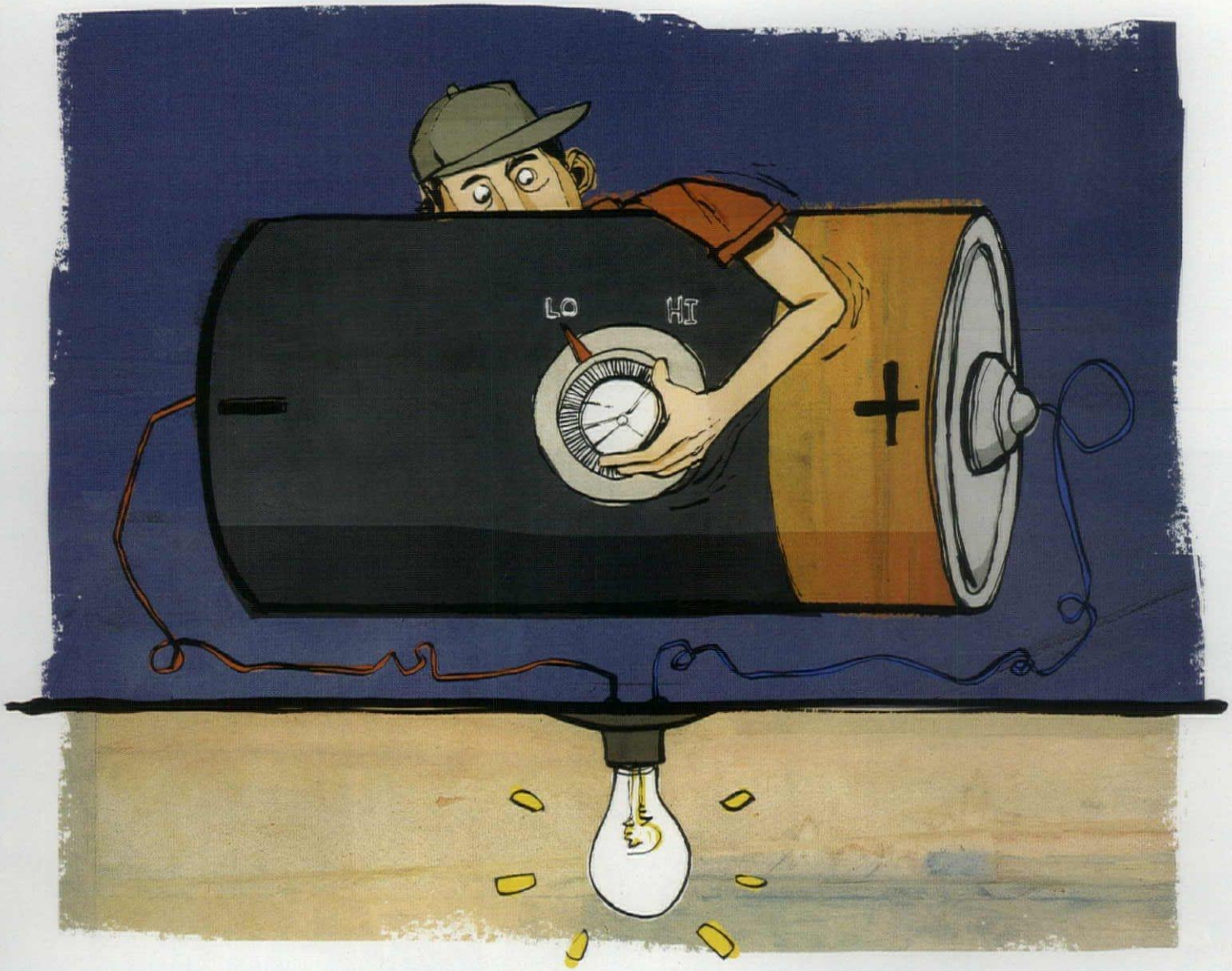

ILLUSTRATION BY PJ LOUGHRAN

The energy crisis in the early 2000s highlighted the fragile state of the nation's power infrastructure. High demand quickly outpaced available energy, leaving many people in the dark during the hottest days of the year. The rolling blackouts continued for months in some parts of the country, and many scientists and researchers searched for ways to curtail energy needs in times of emergency—a process referred to as load shedding or demand response. The curtailment saves the power grid from overloading, preventing widespread blackouts and broken equipment that can prolong the crisis.

HOW IT WORKS

The load shedding process is simple in theory: The utility company or demand response service provider sends out an alert (usually via the Internet or wireless signals to an automated system within the building), and either the building engineer or the building automation system responds by adjusting air conditioner and heater set points, shutting off auxiliary equipment, and stopping other nonessential systems. Power companies provide incentives to building owners for participating in several ways, depending on the severity of the crisis.

Some programs pay for new equipment or offer rebates, others pay for the amount of energy use reduced (New York's Con Edison, for instance, pays $0.45 per kilowatt-hour saved under its emergency demand response program), and a few programs give a preferred rate but charge penalties for energy use over a certain amount during peak hours. Most utilities make a combination of these offerings available, allowing customers to participate in different ways. For example, some load shedding programs provide as much as a day's notice before the power supply needs to be limited, while others may alert a building only an hour or two in advance. Also, some programs might require a building to comply with the load shedding for as long as one workday or only during peak hours, usually at midday.

"The whole basis of this [load shedding] project is to achieve the demand reduction without infringing on the work environment."

—Con Edison lighting specialist Peter Jacobson

SHEDDING THE LIGHTING LOAD

Lighting, however, has played a limited role in this process because of the expense and complexity that can be involved in dimming lights to save energy. Many lights used commercially today cannot be dimmed, even with the presence of lighting control systems, because the fixtures would need to be upgraded to utilize dimming ballasts. While some new buildings have lighting control systems, many older buildings might need to be rewired but all would have to replace a large portion of the lighting equipment at great cost prior to being able to install a control system. "The building engineers love simple and they hate variability or uncertainty, so if you bring a control system into a space for a retrofit that has a lot of questions: Will it be compatible? Will I need more wires? Will I need to interface with a complicated control box? People don't want to budget for the complicated controls and are reluctant to because they don't want to lose money on the job," explains Jim Frey, Osram Sylvania's ballast product marketing manager. The other option is to shut the lights off completely, but working in the dark would have a negative effect on productivity.

This is where the Troy, N.Y.–based Lighting Research Center (LRC) at Rensselaer Polytechnic Institute stepped in. The LRC worked with the DOE on a project investigating step dimming for fluorescent lighting. LRC professor Andrew Bierman says they were able to dim the lamps and cut the power used by the fixtures, but it had few practical commercial applications. The one application they did see was to use the system for load shedding in office buildings, which became the focus of the LRC's new project. The prototype ballast developed by the LRC replaced most instant-start ballasts, which are used in 80 percent of fluorescent light fixtures. Because the technology the LRC developed amounts to reballasting, they saw it as great option for load shedding: building engineers are trained to install a new ballast, and the building owner could use the same fixtures already installed. By using a power line carrier, the ballast responds to a signal sent from

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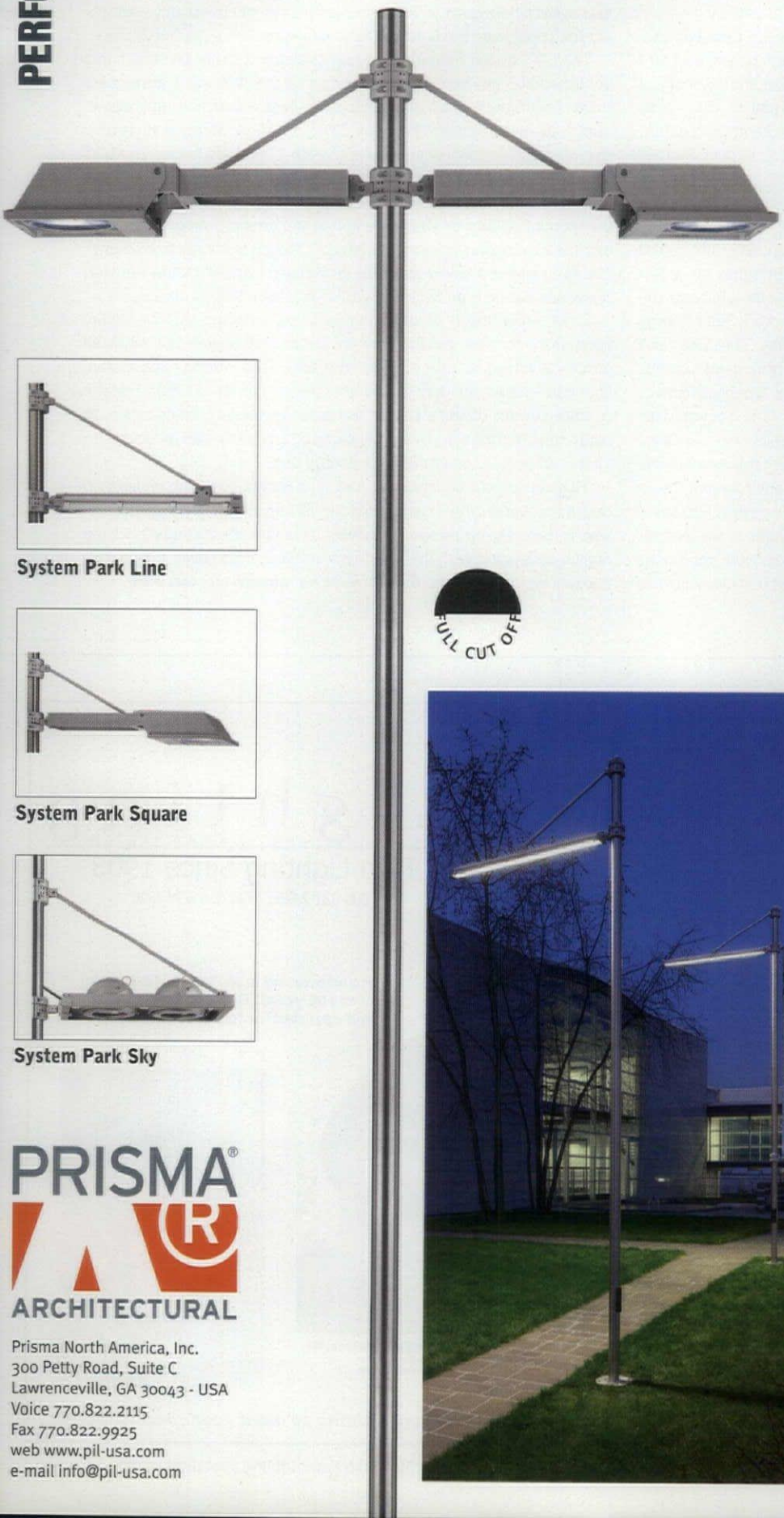

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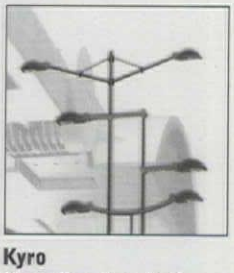

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the wires already in the ceilings, obviating the need for running extra wires to the fixtures or installing expensive wireless solutions. With the signal activated, the fluorescent lamps dim by 33 percent.

The LRC's system requires three steps: install the new ballasts; relamp the ballasts with compatible, highly efficient lamps; and hire an electrician to install the power line injector at the lighting control box or circuit breaker. The injector adds the signal to the power lines and can be controlled by a switch, plugged into a building automation system, or connected to the Internet to receive signals from the power company.

TESTING

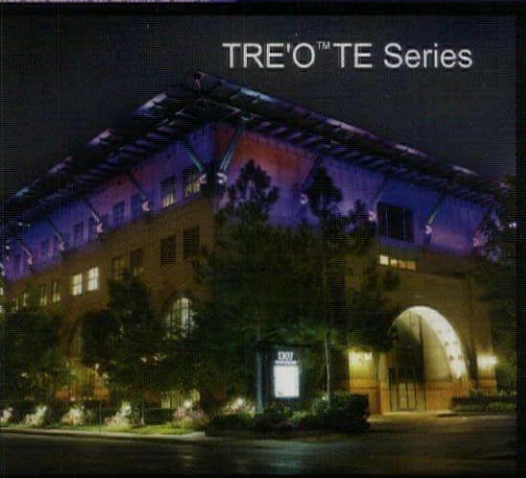
Once the LRC saw the opportunity for this technology, it started research separate from its work with the DOE. Bringing on a few partners (including Osram Sylvania and Con Edison), the LRC took the next step in summer 2006 with its sponsor, the New York State Energy Research and Development Authority (NYSERDA). The LRC and NYSERDA tested the system at Con Edison's Rye, N.Y., headquarters, where they ran surveys and conducted studies of the environment created by dimming the lights to save energy. The system was activated six times, and the LRC evaluated the employees' responses to the new conditions. "The whole basis of this project is to achieve the demand reduction without infringing on the work environment," says Con Edison lighting specialist Peter Jacobson. "Through a controlled dimming capability, this technology reduces the light to an amount where we feel that it doesn't take away from people's work conditions and their visual environment." The LRC survey found that Con Edison's employees were not bothered by the dimming and that many didn't notice the change at all. On the whole, the employees encouraged the new system because it would help during a power emergency—which, in turn, could keep the lights on in their homes.

The LRC tapped Sylvania to create a version of the ballast that could go to market. They have worked together for the past two years to meet three challenges: make it affordable, make it easy to install, and make it minimally invasive to the end user. "This is a three-pronged effort here that was truly started as an idea in the lab," Jacobson says. "The LRC asked, 'What if we can do this? What if there were a product available that could talk through an existing lighting system and then reduce the amount of light as well as reducing the amount of power, but not disrupt the existing work environment?' The project went from there." The end result is the now-available Powershed High Efficiency Demand Response Ballast from Sylvania, which Jacobson helped create.

Load shedding's proliferation will be encouraged by utility companies to help stabilize the availability of power, but all three groups involved in this project—the LRC, Con Edison, and Osram Sylvania—point out that it also is a great way for building owners to take control of their power usage. It presents a new option in controlling lighting's power consumption, which can account for almost 25 percent of a building's energy use.

This version of load shedding also is an attractive option for lighting designers working in existing spaces. The system allows an energy-saving feature to be introduced to existing environments without a large capital outlay, and with the incentives available from power providers it can pay for itself in fewer than three years. **ANDREW SLOCOMB WEST**

LED
ARCHITECTURAL LIGHTING



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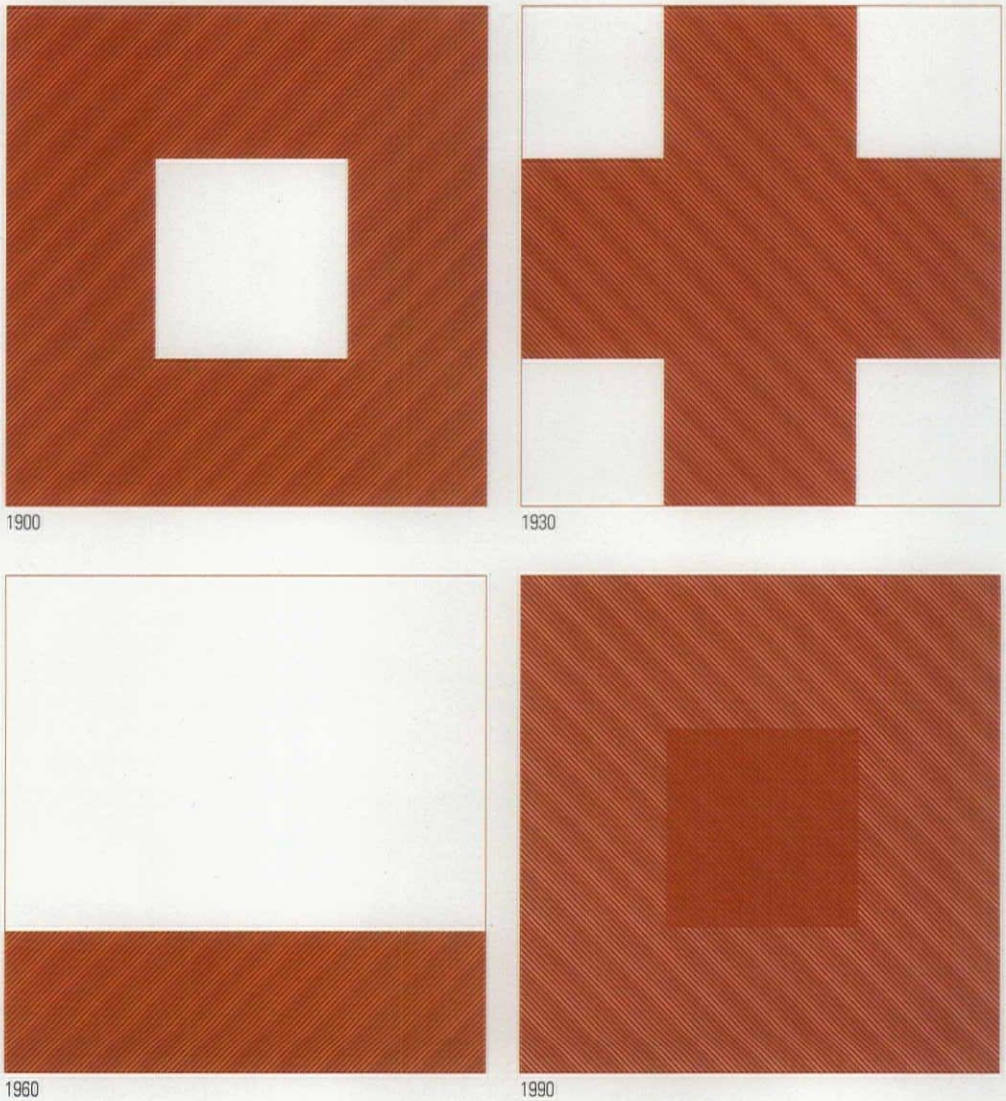

A brief history of the skyscraper: **1.** The earliest incarnations of the building type, such as Burnham & Root's Rookery Building and other products of the late 19th and early 20th century Chicago School, often were designed as square doughnuts in plan. The resulting central courtyards promoted air circulation and the distribution of daylight through buildings that often were no taller than 12 stories. **2.** Structural advances and economic pressures compelled developers and architects to build even taller, causing a "canyon effect" of deeply shadowed streets. In 1916, New York City instituted a zoning ordinance dictating setbacks at specific heights in the mass of skyscrapers, allowing more light and air to reach pedestrians and the occupants of adjacent buildings. By the onset of the Great Depression, architects had elevated the regulation into an aesthetic hallmark of the Art Deco style, as in the stepped profiles of the Empire State Building and Rockefeller Center. **3.** When commercial construction resumed after World War II, a new paradigm rapidly emerged in skyscraper design: the Modernist monolith, a glass box set back from the street on an open plaza. Its great promoters were European émigrés such as Ludwig Mies van der Rohe, architect of the Seagram Building, and American converts to Modernism such as Skidmore, Owings & Merrill. **4.** By the end of the 1970s oil crisis, however, energy costs had plummeted. Air conditioning and electric lighting were cheap, encouraging developers to build to the lot line and dictate ever deeper floor plates, with greater leasable area. As a result, the skyscraper typology effectively devolved, and natural light and air were forced to leave the building. Fortunately, a new, more sustainable model is re-emerging today.

THE SKYSCRAPER EVOLVES

LIGHT, PLAN, FORM

Skyscraper. High-rise. Tall building. Office tower. Call it what you want, there is no denying that this building type plays a critical, ongoing role in architecture's lexicon. A uniquely American innovation that defines the skylines of New York, Chicago, and so many other cities, the skyscraper is the ultimate expression of modernity in building and inspires architects and engineers to push technical and aesthetic boundaries. But the evolution of this building type is not determined solely by architectural influences. Economics, zoning regulations, cultural expectations, and, yes, light, have played major roles in shaping skyscrapers over time.

In *Form Follows Finance*, a seminal work on the topic, Carol Willis, architectural historian and founder and director of the Skyscraper Museum in New York, observes that no matter the variations in building shape or height, one constant is the desire to maximize rentable square footage. For half a century, until the Great Depression put a halt to office construction, the availability of natural light governed office dimensions. "The quality and rentability of office space … depended on large windows and high ceilings that allowed daylight to penetrate as deeply as possible into the interior," Willis writes. "What the industry called 'economical depth' referred to the fact that shallow, better-lit space produced higher revenue than deep and therefore dark interiors." In other words, architects' ability to bring natural light into the workplace helped landlords "sell" their buildings.

The advent of air conditioning and fluorescent lighting in the 1940s and '50s largely removed daylight from the equation, and led to the construction of skyscrapers with tremendously deep floor plates and unpleasant, artificially lit workspaces. The three projects discussed in this issue—the New York Times' headquarters, the Hearst Tower, and One Bryant Park, all in Manhattan—effectively restore daylight to its rightful place. Together they exemplify a new generation of tall buildings, the product of emerging design trends, architectural and lighting technologies, attitudes toward sustainability, and complexities of building, lighting, and energy codes. Each building responds to a particular set of project criteria and presents a diverse set of solutions, but, taken as a group, the lessons they offer are universal. **ELIZABETH DONOFF**

ONE BRYANT PARK

Project One Bryant Park, New York **Clients** The Durst Organization, New York, and Bank of America, Charlotte, N.C. **Architect** Cook + Fox, New York **Interior Architect (Bank of America tenant floors)** Gensler, New York **Lighting Designer (base building)** Cline Bettridge Bernstein Lighting Design, New York **Lighting Designer (Bank of America tenant floors)** HDLC, New York **Project Size** 2.2 million square feet (overall); 1.63 million (Bank of America) **Watts Per Square Foot** 1.04 (average) **Photographer** Paul Rivera, New York

One Bryant Park, located just a block from Times Square on 42nd Street and Sixth Avenue, is scheduled to be the first LEED Platinum–certified skyscraper in the United States. Designed to house the New York offices of Bank of America (BoA), the building aspires to be a landmark, both for its distinctive architectural form and its energy performance.

The sculpted tower envelope, with its low-iron glass curtain wall, houses multiple program requirements: lobby, office space, trading floors, and mechanical rooms. Serge Appel, associate partner at Cook + Fox Architects, the building's designers, describes the desire to create a tower that, "changes during the course of the day." Indeed, the transparency of the cladding ensures that offices and the lobby are bathed in natural light, a quality that has been capitalized on by the base building lighting designers—Cline Bettridge Bernstein Lighting Design (CBBLD)—in specifying fixtures that are energy efficient, dimmable, and zoned concentrically to allow for energy savings.

The lighting design for a transparent tower presents unique challenges. Nighttime lighting of the structure requires that it be lit from within since the clear glass surface does not reflect light. Michael Hennes, senior associate at CBBLD, explains, "The strategy for the night lighting was to accentuate the faceted geometry of the massing by highlighting the wedge facing Bryant Park." CBBLD also worked carefully with the architects to coordinate the lighting effects with the façade's other demands: maximum transparency, floor-to-ceiling glazing, and minimized mullion sizes.

BoA will occupy approximately 75 percent of the tower, with the other 25 percent leased to individual tenants. Rocco Giannetti of Gensler, which designed the bank's offices, describes the interiors as a synergy between daylighting, air quality, and materials. "Good design enhances employee satisfaction, and that is sustainable design practice," he says. The office lighting follows suit. Lighting design firm HDLC, who designed the BoA lighting, found that nothing on the market could meet BoA's 50-footcandle workspace requirement and limit wattage consumption without overlighting the space, so the firm instead developed a custom fixture: a hybrid T5 direct-ambient troffer with a custom ballast. Although the system utilizes daylight dimming, the key, according to lighting designer Michael Castelli, is the fixture, which allows the lighting system to be efficient with or without daylighting controls.

One Bryant Park negotiates the disparate requirements in the making of a signature building: tactical detailing to support architectural gestures with an overall strategy of daylight, zoning controls, and luminaire selections. The result is well-illuminated spaces, but within the restrictive watts per square foot parameters of energy consumption limits set by LEED. **ERIC HÖWELER**

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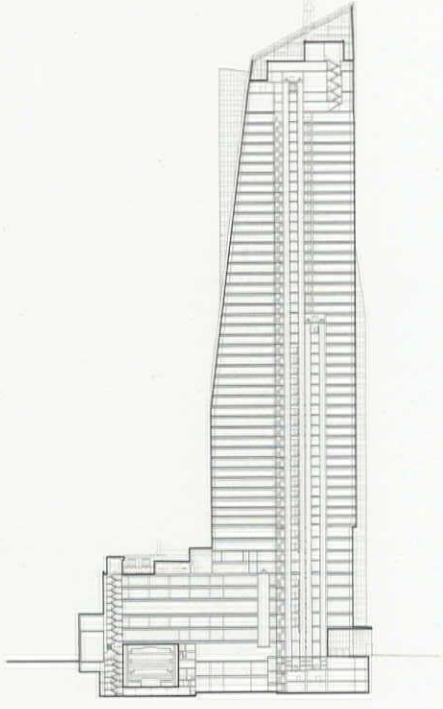
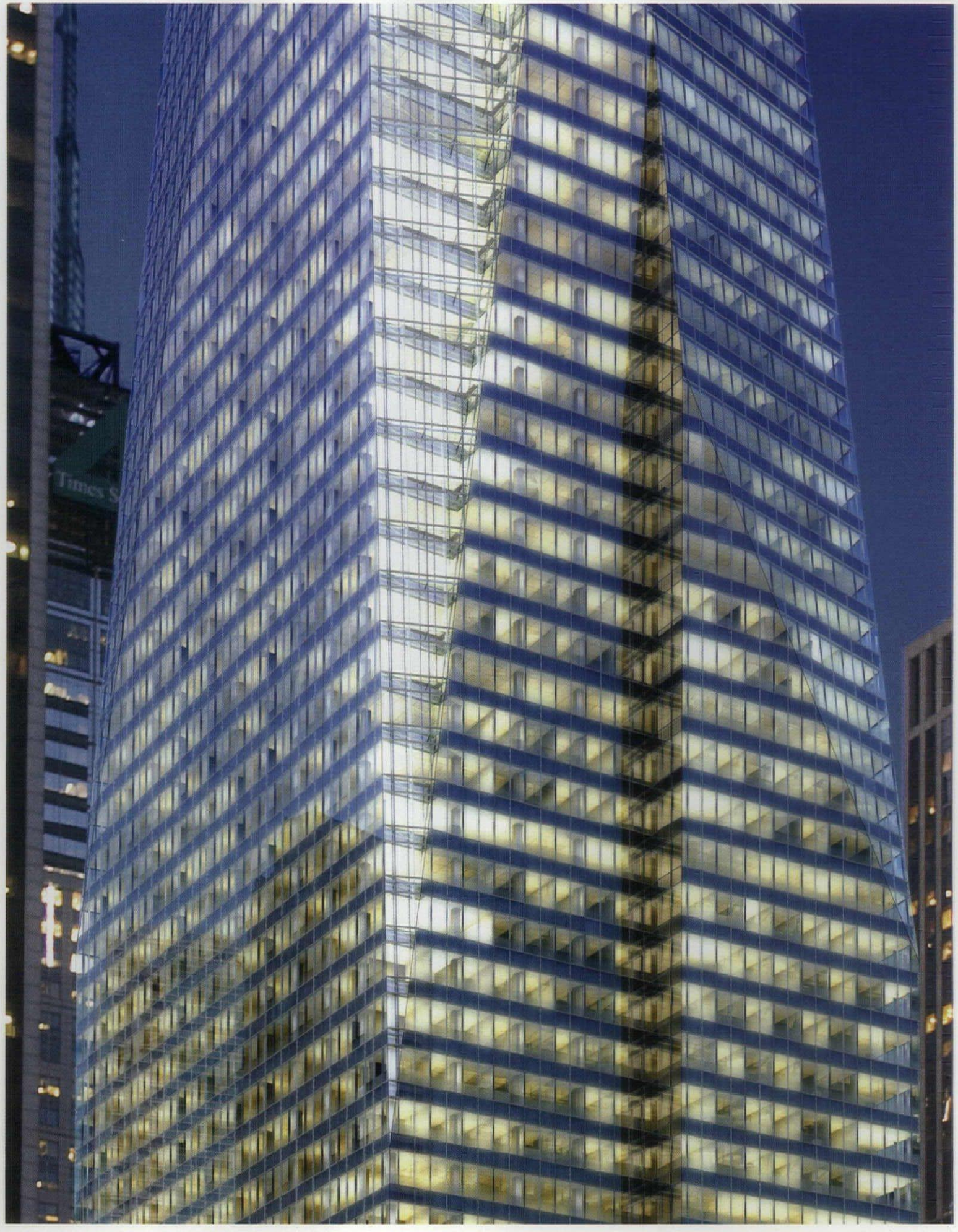
Section

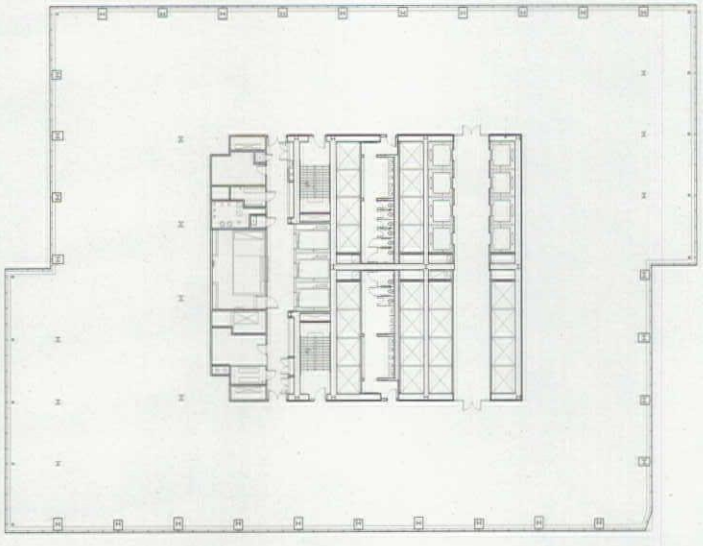


The building skin is designed for transmission, not reflection, and the nighttime lighting strategy illuminates the building from within and articulates the divergent planes of the façade.

FACING PAGE: RENDERING COURTESY DBOX/COOK+FOX ARCHITECTS



Typical Floor Plan



BOTTOM LEFT: RENDERING COURTESY DBOX/COOK+FOX ARCHITECTS

3

1. The design of the open-plan offices encourages daylight penetration by keeping workstation partitions at a height of 48 inches, which allows for privacy while seated but a degree of openness when standing. The warm color palette of the carpet and furnishings creates a saturated interior, in contrast to the mute monochrome of the building's exterior façade.

2. A perspectival section through a typical office floor reveals a number of the systems incorporated into the tower's design, including floor-to-ceiling glazing and a raised floor system for integrated underfloor air with individual controls.

3. Linear fluorescent luminaires "slide through" the perimeter office partitions, reinforcing visual continuity from exterior to interior. The fixture, a custom-designed T5 direct-ambient troffer with a custom ballast specification to limit the maximum output, is integrated into the ceiling and coordinates with the 5-foot-wide modular planning grid of the curtain wall, ceiling, and office partition modules. The electric lighting achieves 50 footcandles—a client requirement. The minimally detailed floor-to-ceiling glass partitions encourage visibility and allow daylight to permeate the space. Perimeter offices maximize daylight by orienting furniture and opaque partitions perpendicular to the glass.

1

1. T5 linear fluorescent strips are recessed into the structure of the stair that internally connects the Bank of America floors in the lower portion of the building. The stair's vertical core wall is illuminated from within by T5 fluorescent strips with a linear prism optic to accentuate the wall's red panels.

2. Natural and electric light complement one another to illuminate the conference rooms and is controlled through a vertically integrated lighting control system. Freestanding furniture partitions delineate the multiple meeting areas, while recessed ceiling "lightboxes" sourced with LEDs correspond to the actual location of the furnishings and 20W PAR20 ceramic metal halide point source downlights add an extra punch at the ceiling edge.

3. A custom-designed T5 direct-ambient troffer luminaire with a custom ballast specification was designed with wattage consumption in mind and to meet and the client's 50-footcandle requirement for the offices. According to lighting designer Michael Castelli of New York–based HDLC, who designed the lighting scheme for the Bank of America office floors, the custom ballast was developed to "under-drive the lamp." The lighting designers researched what was the lowest level the lamp could be pushed to without upsetting the lamp life, and found that they could go to 85 percent of the nominal lamp watts/lumens. The corridor ceiling outside the perimeter offices is punctuated with 26W fluorescent downlights.


The New York Times

NEW YORK TIMES

Project The New York Times Building, New York **Client** The New York Times Co. and Forest City Ratner Companies, New York **Architects** Renzo Piano Building Workshop, Paris and Genova, in association with FXFowle, New York **Interior Architect (NYT tenant floors)** Gensler, New York **Lighting Designer (base building)** Office for Visual Interaction, New York **Lighting Designer (NYT tenant floors)** Susan Brady Lighting Design Studio, New York **Watts per Square Foot** 1.28 (offices) **Project Size** 1.5 million square feet (total); 700,000 square feet (NYT)

When the New York Times chose Renzo Piano Building Workshop's soaring glass and ceramic rod design in a limited competition for its Manhattan headquarters, it was looking to re-present the fabled "gray lady" as a cutting-edge 21st century information organization, through both literal and metaphoric transparency. But the literal transparency of the low-iron glass posed a challenge to the firms working on the interiors—New York–based Susan Brady Lighting Design Studio (SBLD) and architectural firm Gensler. The open office plans that the Times desired meant that every level has floor-to-ceiling glass facing each direction of the compass. "We needed a solution that could be done without touching the exterior," says SBLD's Attila Uysal.

Ceramic rods on the façade cut direct daylight entering the space by about half, says Gensler project architect Rocco Giannetti—but they don't reduce light levels and glare enough to make working in the space comfortable. Ultimately, the light quality in the building is a result of several critical specifications—the fixtures, the furniture layout, and the mechanical shading system—which are all interrelated, according to Uysal. "The shade selection was the hardest part," he says, as it required careful quantification of the shading algorithm. A full-size mock-up and the expertise of the Advanced Building Technology Group at Lawrence Berkeley National Laboratories—a member of the team that the research-minded New York Times brought to the project—helped solve the daunting problem. After extensive analysis, the team decided on a brightness of 2,000 candela as the maximum permissible level of natural light within the space. Above this threshold, shades automatically are deployed. Likewise, the brightness of the light fixtures never exceeds that level.

The design of the ceiling and the fixture selection were related to both Piano's building design and specific concerns of the client. Recessed linear fixtures all run in the same direction and reflect the clean and open aesthetic of the architect's façades. Shadows were to be avoided, which led the lighting designers to increase the number of fixtures while lowering the brightness from each lamp.

Uysal estimates he could have designed the project with half the number of fixtures used. The use of a digital addressable lighting interface system for control—the first large-scale installation of its kind in the United States—was particularly useful in tuning the overall quality of the light. "We get high-quality ambiance from direct lighting," Uysal says.

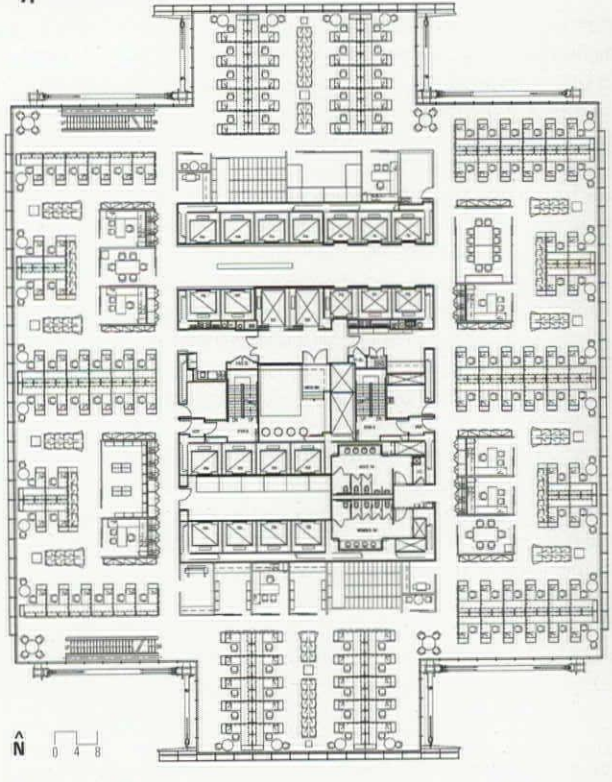
The amount of hands-on, scientific research and constant fine-tuning during the building's commissioning reflects the New York Times' passion for learning and its commitment to providing a quality workspace for its employees. Pushing the envelope, as well as the architects, interior designers, and lighting consultants, is just another day's edition. EDWARD KEEGAN

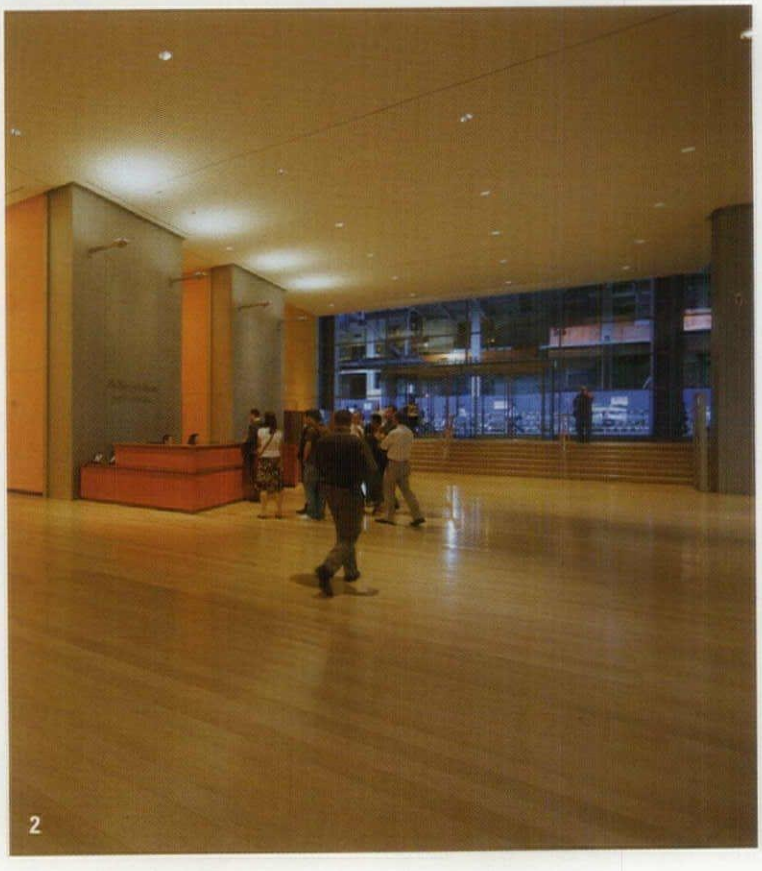
OPPOSITE: FRIEDER BLICKLE COURTESY OF OVI

The exterior of the 856-foot-tall tower is lit solely by 250W metal halide fixtures located at the perimeter glass canopy. A graduated effect from bright at the base to a soft glow at the pinnacle is achieved by the selection of narrow to wide optical reflectors. The entire façade is illuminated by only 42,000W—80 percent less than what is used for just the top of the Empire State Building.

1

Typical Floor Plan

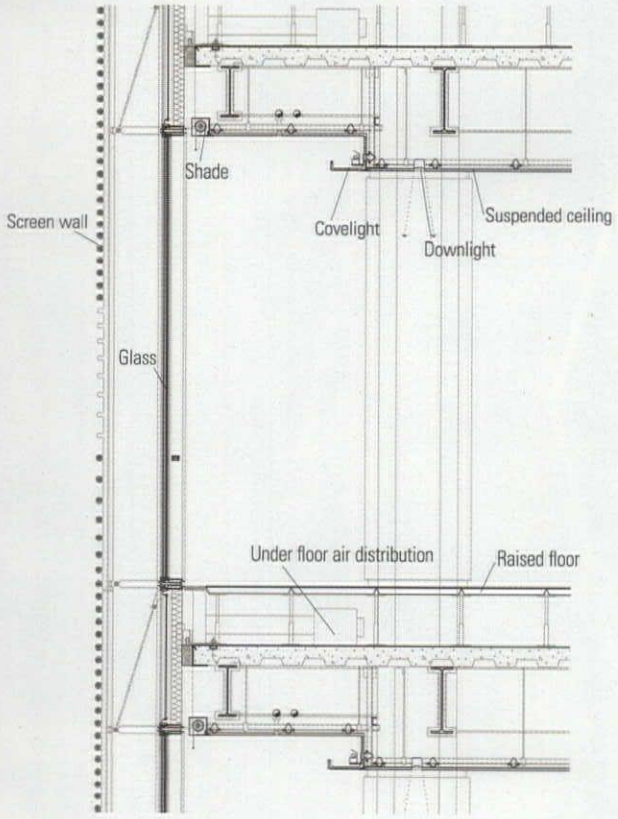




2

TOP AND FACING PAGE TOP: NIC LEHOUX; BOTTOM: FRIEDER BLICKLE COURTESY OF OVI; SECTION DRAWING COURTESY OF RPBW IN ASSOCIATION WITH FXFOWLE ARCHITECTS

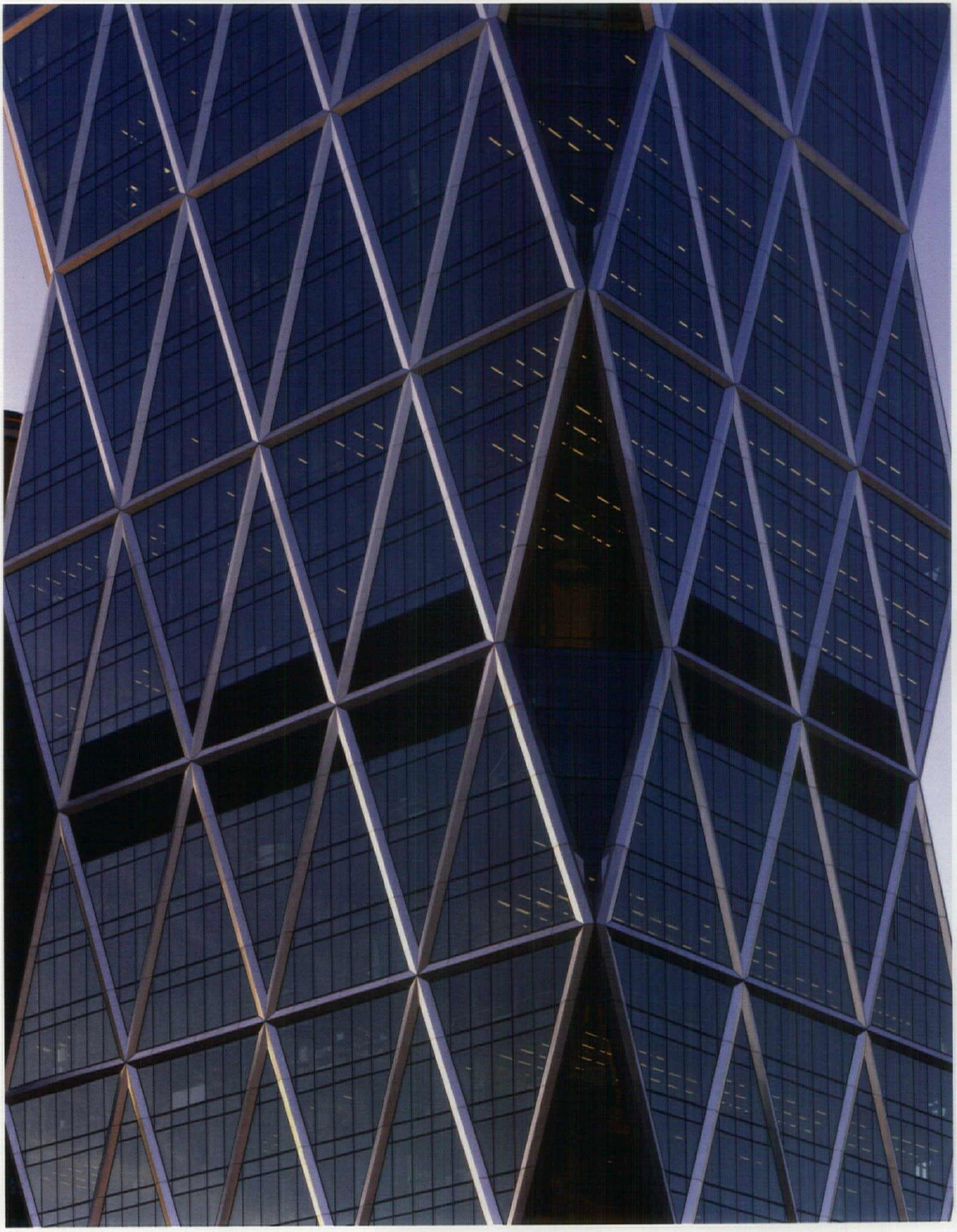
Façade Section



1. "Transparency was a big issue for Renzo Piano," says lighting designer Attila Uysal of SBLD Studio. The New York Times' desire for flexibility was met with an interior lighting scheme of subtle uniformity, best seen at night.

2. A variation on the metal halide luminaires used for the tower's exterior lighting scheme, custom metal halide uplights on an armature punctuate the building elevator cores at the main lobby. The fixtures create individual clouds of light on the ceiling. White glass diffusers eliminate the green tint of ordinary glass and maintain the theme of cool clear light that permeates every detail of the building.

3. Horizontal ceramic tubes, positioned outboard from the glass curtain wall, were part of Renzo Piano's original, competition-winning design for the building. The rods provide some sun shading and help create a distinctive aesthetic. The New York Times' interior architect, Gensler, helped establish optimal views for the occupants by removing rods at select locations. They worked with Renzo Piano Building Workshop and architects FXFowle to establish the heights of the rods from an interior perspective, according to Gensler project architect Rocco Giannetti.



HEARST TOWER

Project Hearst Tower, New York **Client** Hearst Corp., New York **Architect** Foster + Partners, London **Associate Architect (base building)** Adamson Architects, Toronto **Interior Architect (tenant floors)** Gensler, New York **Lighting Designer (base building)** George Sexton Associates, Washington, D.C. **Lighting Designer (tenant floors)** Kugler Ning Lighting Design, New York **Watts per Square Foot** 1.09 (offices) **Project Size** 1 million square feet **Photographer** Chuck Choi, Brooklyn, N.Y.

When the Hearst Tower was completed in 2006, it became the first office tower in New York City to be certified LEED Gold by the U.S. Green Building Council for both its core and shell as well as its interior fit out. In part, it garnered this distinction for its use of daylighting controls, which mitigate the amount of power used for electric lighting. And while the project's employment of this natural resource to achieve energy efficiency certainly is admirable, a closer examination of Hearst's systems reveals that its implementation conserved capital expenditures more so than electricity.

"Hearst took advantage of daylighting basically for a LEED point," says Jackson Ning, principal of Kugler Ning Lighting Design, the firm responsible for the office tower's interior lighting scheme. "They evaluated it and decided that they wanted to have the green aspect and the LEED point, but it was cost prohibitive, so they did daylighting where they could."

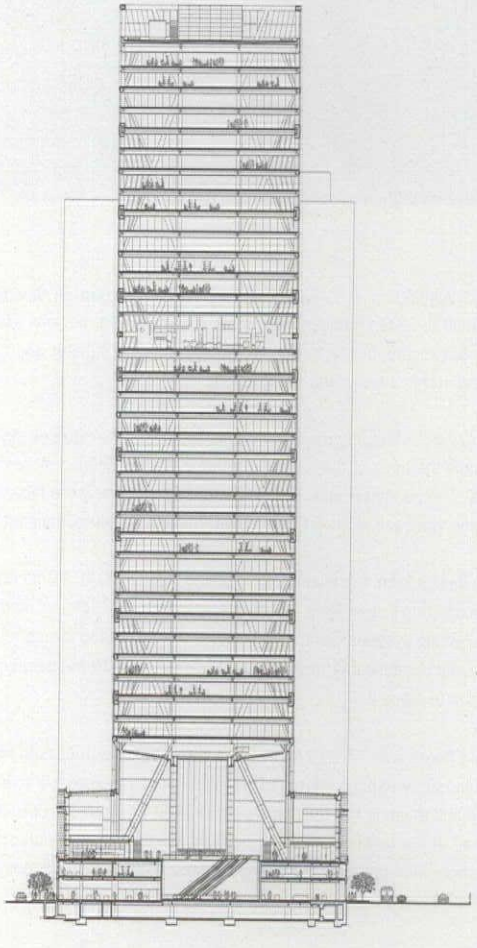
Of the tower's 46 floors, only two—the executive levels—employ daylight dimming systems at all perimeter spaces. The rest of the office floors were outfitted with daylight switching systems only on the east face, where there is a 5-foot-wide circulation corridor abutted by open workstations. Unlike dimming systems, which use sensors to adjust electric light levels in balance with the amount of natural ambient light, switching systems keep the electric lights off when sunlight is present, and turn them on when sunlight disappears.

One might assume that the east face was chosen for the switching system because it receives the greatest amount of daylight, but this was not the rationale. "The east side was the easiest one to implement," Ning says. "They only had to run one extra circuit to those sensors."

The electric lighting itself is as energy efficient as any commercial project these days. Most of the office floors utilize recessed 17W T8 high-quality color-rendering fluorescent fixtures. On the executive floors, where more art is on display, the fluorescent lamps were used in tandem with 37W halogen downlights. Hearst was able to use these more energy-intensive fixtures in the building by averaging the energy usage of all of the floors: "Workers get high-quality color rendering fluorescent lights, and executives get halogen art lighting and dimmers," Ning explains. "When it's two floors versus the rest of the building, and you're saving 4,000W per floor, you get quite a trade-off."

Of course, Hearst can't be entirely denounced for pinching pennies in its quest for sustainability. The company has gone further than most in the green direction. But the story told here does illuminate a particular failing of the LEED system: That the accumulation of points does not necessarily equal the smartest or more energy-efficient design. **AARON SEWARD**

Section



Lighting system meets structural system as the office floors' linear lines of fluorescent recessed fixtures play out against the façade's pattern of large-scale triangular mullions.

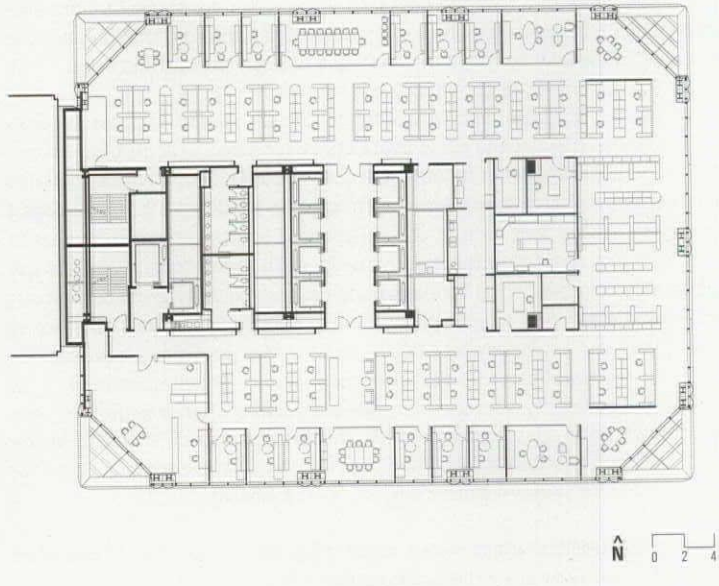
1. For the Hearst Tower's lobby, Washington, D.C.–based lighting design firm George Sexton Associates integrated 500W PAR56 tungsten halogen tracklights in the skylight mullions and 250W PAR38 tungsten halogen downlights in the ceiling to provide ambient lighting and to heighten the presence of the bold architecture of the daylit atrium.

2. Architect Norman Foster is known for bringing daylight into his buildings. The massive skylights and clerestories that encase the base of the new tower make electric lighting more or less unnecessary during the day. The perimeter wall, with its punched windows, is the façade of the original 1928 Hearst building, the base of an Art Deco tower that was never completed.

3. The Hearst Corp. directed the design team to conserve energy and achieve a LEED Gold rating. New York–based lighting design firm Kugler Ning, which oversaw the office lighting, made use of daylight dimming and switching systems. Switching systems were installed throughout the east elevation of the building, not because this face receives the most daylight, but because it was the least expensive location to place it.

4. By outfitting most of the office floors with 17W T8 fluorescent lamps in linear recessed fixtures, Kugler Ning was able to conserve enough energy to illuminate the two executive levels with 37W halogen lamps, while still meeting the building's overall LEED goals. A 5-foot-wide corridor runs along the east wall of the building, allowing daylight to transmit unimpeded to adjacent workstations. This configuration prevents the daylight switching systems that control the lighting along the corridor from turning off the lights over workers' desks.

Typical Floor Plan



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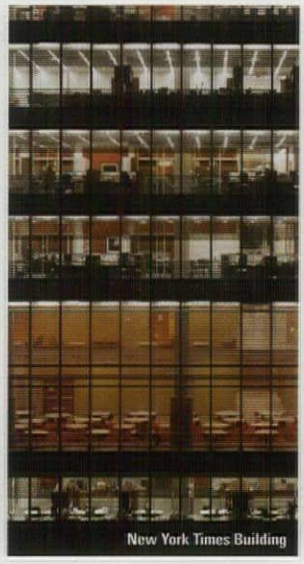
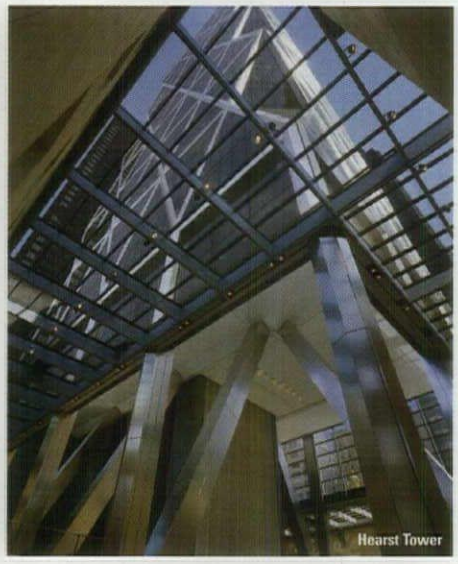
SPECS


One Bryant Park


New York Times Building


Hearst Tower

One Bryant Park, New York

Base Building

Electronic Theater Controls/Barbizon Electric: Lighting control system

Elliptipar: T5HO uplights at façade double-wall mechanical levels

io Lighting: Dimmable white LED strips within lobby desk and façade wall coves

GE: Chromafit lamps at roof-level double-wall extension

Lighting Science Group/SGF Associates: Elevator lobby LED edge lighting

Lightolier: Metal halide PAR20 adjustable downlights in lobby

Lite Raze: Metal halide framing projectors for Bank of America sign in lobby

Metrolight: Electronic metal halide dimming ballasts

Nichia: 3000K LEDs at elevator lobby edge lighting

Philips Color Kinetics: Linear exterior DMX-controlled LED color-changing fixtures at rooftop spire

Starfire Lighting: Metal halide PAR20 custom cylinder downlights and cove-mounted metal halide PAR30 perimeter wall grazer in lobby

Sterner Lighting: Metal halide uplights at roof-level trusses and floodlights for double-wall extension at roof deck

Bank of America tenant floors

Amerlux: Ceramic metal halide PAR20 downlights

Kurt Versen: 26W fluorescent downlights

Lutron: Eco-System daylight dimming system and integrated Grafik6000 for conference room controls

Mercury Lighting: T5 fluorescent strips at coves

Neo-Ray: Custom-designed T5 direct/ambient troffer luminaires throughout

Philips Color Kinetics: RGB LED lighting effects

Starfire Lighting: 26W fluorescent downlights at core

Winona: Linear RGB LED arrays at luminous ceiling

Universal: Custom static ballast for all T5 applications

New York Times Building, New York

Base Building – Façades

Erco: 250W metal halide floodlights with three different optics for narrow-to-wide beam distributions on principal façades; 70W metal halide floodlights on Eighth Avenue façade; 39W metal halide spotlights at building's notched corners; 50W–250W T4 and PAR halogen floodlights at pedestrian retail arcade

Base Building – Lobby

Edison Price Lighting: 250W PAR38 halogen downlights, wallwashers and adjustable fixtures

iGuzzini: 50W T4 halogen floodlights in garden courtyard

Lucifer: 50W MR16 downlights at elevator header

RSL: 300W T3 halogen uplight with custom double-blade arm profile and white glass diffusers

New York Times tenant floors

Lutron: Quantum lighting control/management system

MechoShade: Shading system

Zumtobel Lighting: 14W two-lamp T5 linear fluorescent fixture with recessed troffer with center louver for direct downlight, and acrylic diffusers for ambient light

Hearst Tower, New York

Base Building

B-Light: 10W xenon wallwashing system at façade

Edison Price: 250W PAR38 tungsten halogen adjustable downlights at entrances; 150W PAR38 tungsten halogen wall grazer at lobby desk

Elliptipar: 150W metal halide uplights at atrium skylight; 1000W PAR64 tungsten halogen wallwasher at atrium core; 250W T4 tungsten halogen uplight at main entrance

Erco: 500W PAR56 tungsten halogen adjustable downlights and wallwashers at lobby atrium skylights

Nulux: 250W PAR38 tungsten halogen linear slot/trough system at entrance lobby

We-ef: 100W T3 tungsten halogen accent luminaires at exterior façade

Zumtobel: T5HO linear fluorescent luminaire at main elevator lobby

Hearst office floors

A&L: Linear fluorescent strip covelights

Alkco: Undercabinet T8 linear fluorescent tasklights

Baldinger: Custom low-voltage decorative pendant on executive floors

Creative Light Source: Linear lighting system, and low-voltage MR16 tungsten halogen accent fixture on executive floors

Danalite: Undercabinet low-voltage G4 halogen striplight on executive floors

Edison Price: Recessed compact fluorescent downlights, PAR56 wallwashers, low-voltage AR111 accent lights on executive floors

Leviton: 120V, 20-amp, 2-pole, 3-wire clockhanger receptacle for picture lights on executive floors

Litecontrol: Pendant-mounted continuous linear T8 fluorescent stacklight on office floors

Lucifer: MR16 downlights on executive floors

Lutron: Dimming ballasts

National Cathode: Cold cathode system for uplight cove on executive floors

Neoray: Linear T8 fluorescent fixtures at office floor restrooms

Osram Sylvania: Lamps throughout

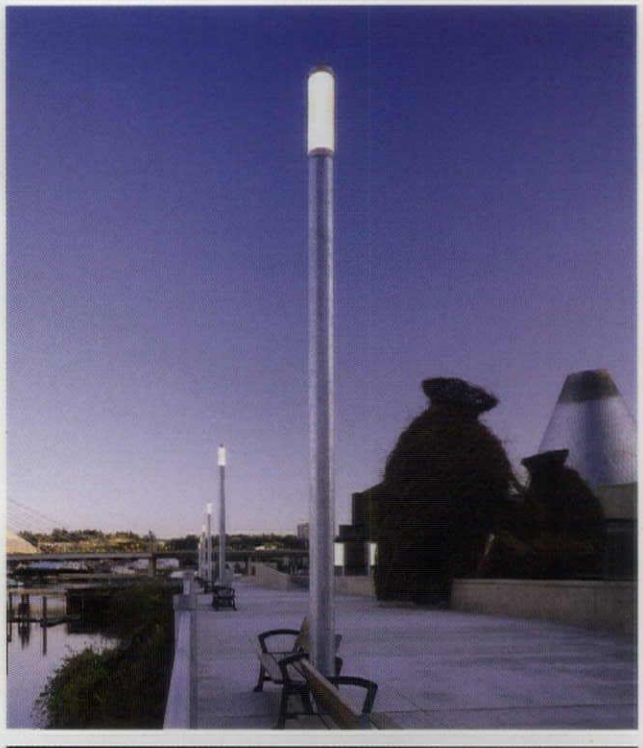
Specialty Lighting: MR16 linear wallwashers and downlights on fitness level

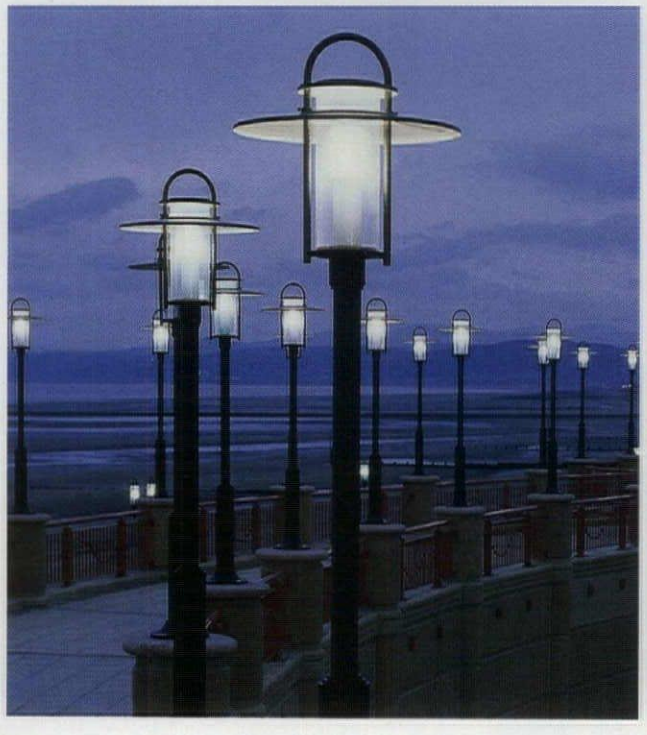
Targetti: Low-voltage AR111 tungsten halogen accent fixture on executive floors

Tivoli: Cove-mounted low-voltage xenon quartz striplights on executive floors

Zumtobel: Ceiling-mounted T8 linear fluorescent luminaires on office floors

LEFT TO RIGHT: PAUL RIVERA; NIC LEHOUX; CHUCH CHOI





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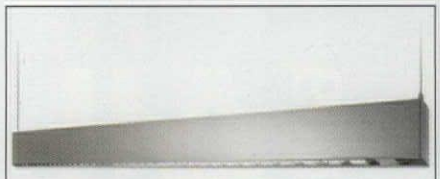

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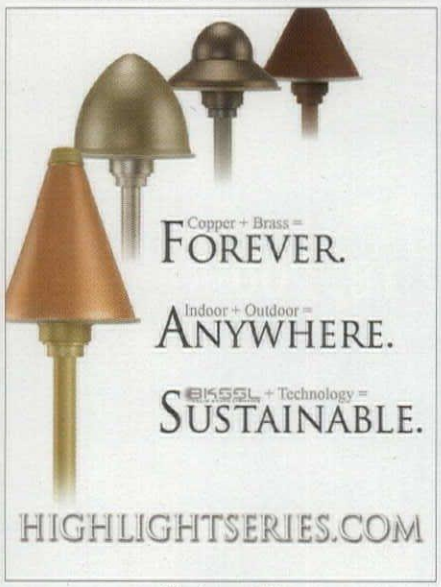

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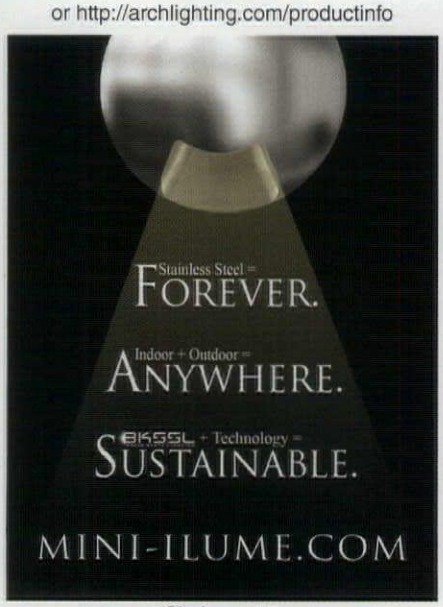

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May 13, 2009 (regular entry) **May 18, 2009*** (late entry)

Architectural Lighting magazine announces the SIXTH ANNUAL AIL LIGHT & ARCHITECTURE DESIGN AWARDS honoring outstanding and innovative projects in the field of architectural lighting design.

The A|L DESIGN AWARDS recognize and reward excellent lighting design within the specific criteria relevant to each category (Residential, Interior, and Exterior). To acknowledge issues of notable importance in today's practice of lighting design and techniques particular to lighting, A|L also presents a series of awards that achieve the Best Use of Color; the Best Incorporation of Daylight; and the Best Lighting Design on a Budget—three issues that are increasingly important considerations for designers. Winning projects are published in the July/August 2009 issues and featured on archlighting.com.

Design professionals practicing worldwide may enter one or more projects in multiple categories. Submissions are encouraged from all design professionals—architects, lighting designers, interior architects, interior designers, and landscape architects. Projects must have been completed after July 2007.

Full details are available at **www.aldesignawards.com**

* Late Entry Fee Applies per project submission

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Hayden McKay

AN INTUITIVE APPROACH TO ENVIRONMENTALLY SENSITIVE LIGHTING DESIGN

With more than 30 years experience in architecture and lighting, Hayden McKay is one of the leading experts in daylighting and solar analysis. Formally trained at the school of architecture at UCLA, McKay headed to the U.K. upon graduation to learn firsthand about new developments in daylighting metrics. With an innate understanding of how light interacts with architectural form, environmentally sensitive lighting design and energy conservation always have been the tenets of McKay's work. ELIZABETH DONOFF

How has architecture informed your viewpoint about lighting?
I've always gravitated to architecture that is sensitive to nature and to architects who use natural light as an intrinsic design element. Wright, Kahn, Aalto, Le Corbusier, and Saarinen are still my favorites.

How has daylighting informed your viewpoint about lighting?
Daylight and electric light are both part of a continuum of perception and form-giving. All the basic principles of lighting design apply.

What role does daylighting play in a project?
Daylighting should uplift the spirit, even in the most mundane types of spaces. There are endless variations in color, direction, and intensity that can be formed and experienced. Balance that with the need for visual and thermal comfort, and sun control becomes an integral part of the lighting design.

What is the biggest misconception about daylighting?
That natural light is better than electric light. They are different sources with different qualities and drawbacks. I'm not a fan of diffusing daylight so that the connection with nature is lost. The power of daylight is in its natural rhythms. If occupants know it is natural light, then they are much more tolerant of wider variations in luminance ratios.

How have sustainable issues informed your thinking?
I have designed through a number of energy crises, and watched interest in daylighting and energy conservation wax and wane. The focus should be on energy consumption, so the best quality lighting can be provided when it is needed, and reduced when it is not. The energy codes emphasize connected load, which is simple to measure but doesn't really encourage the best use of energy.

What will it take for sustainable practices to become fully integrated in the design process?
Involving lighting designers at the very beginning of a project, architectural education, physical modeling, and testing facilities.

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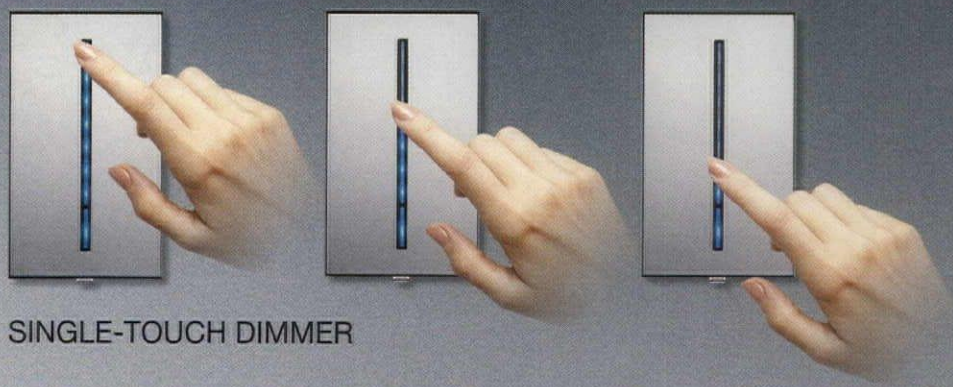

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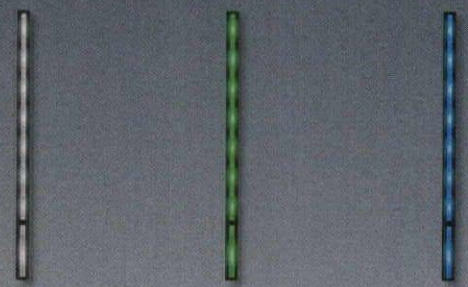

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