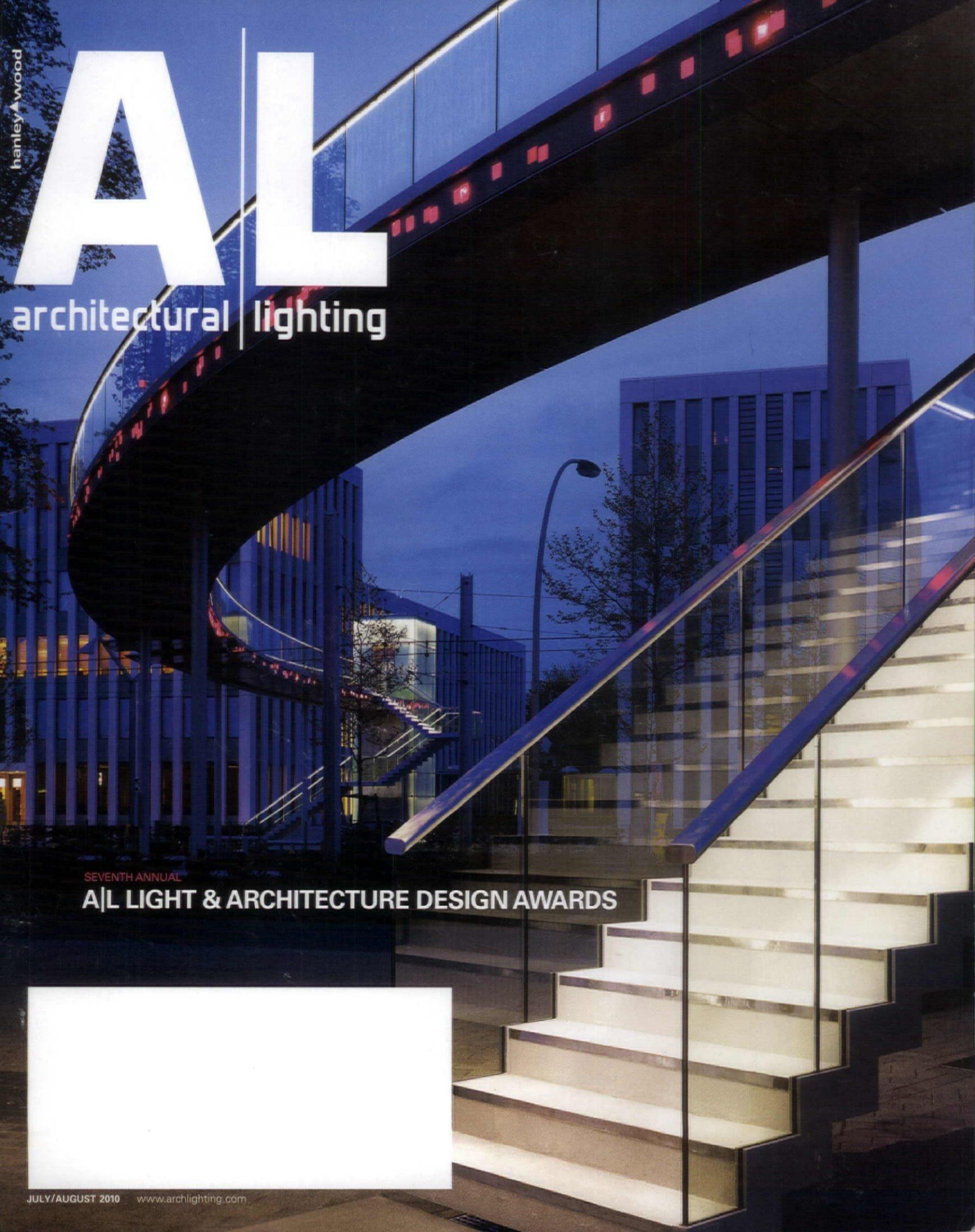

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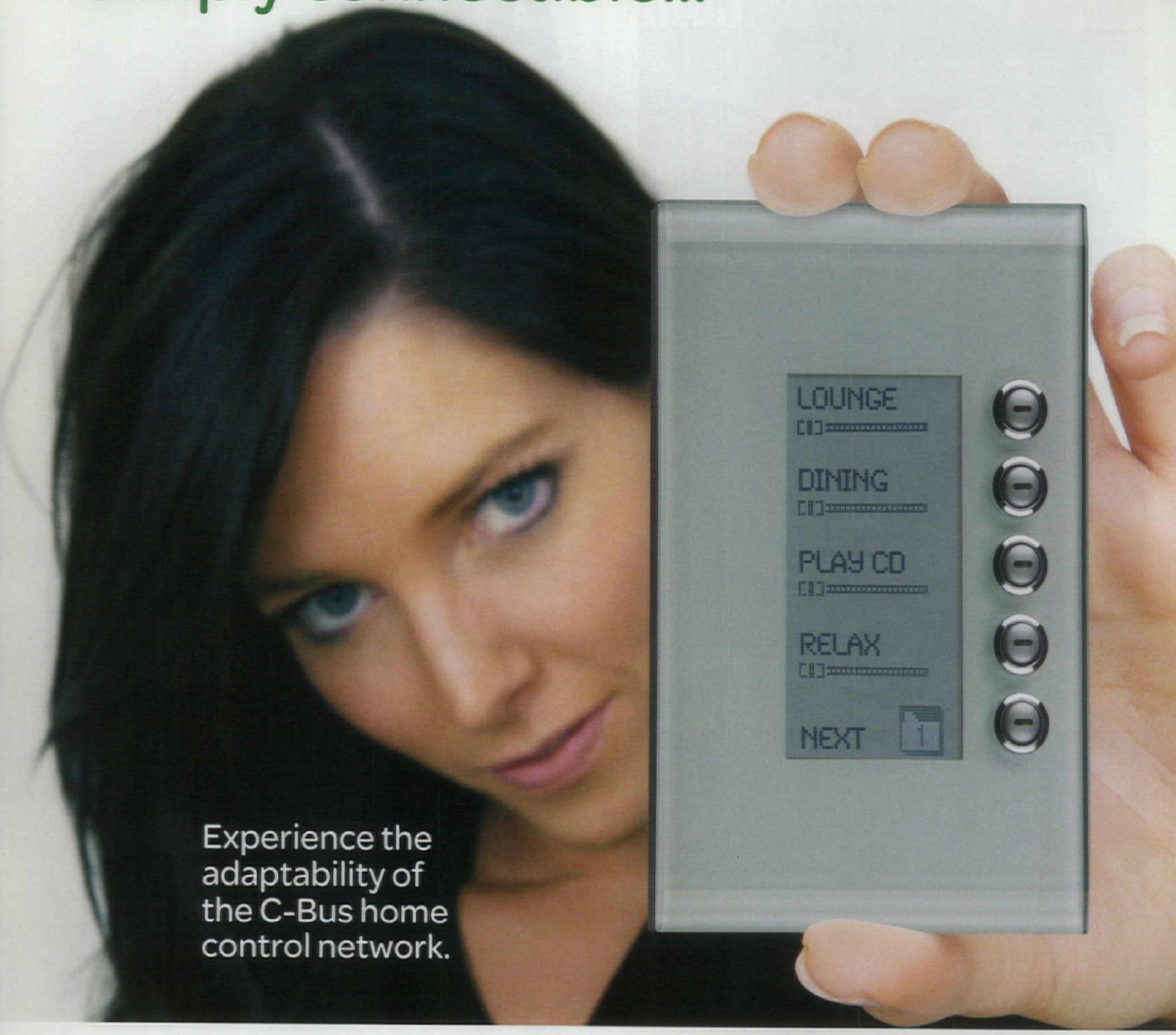

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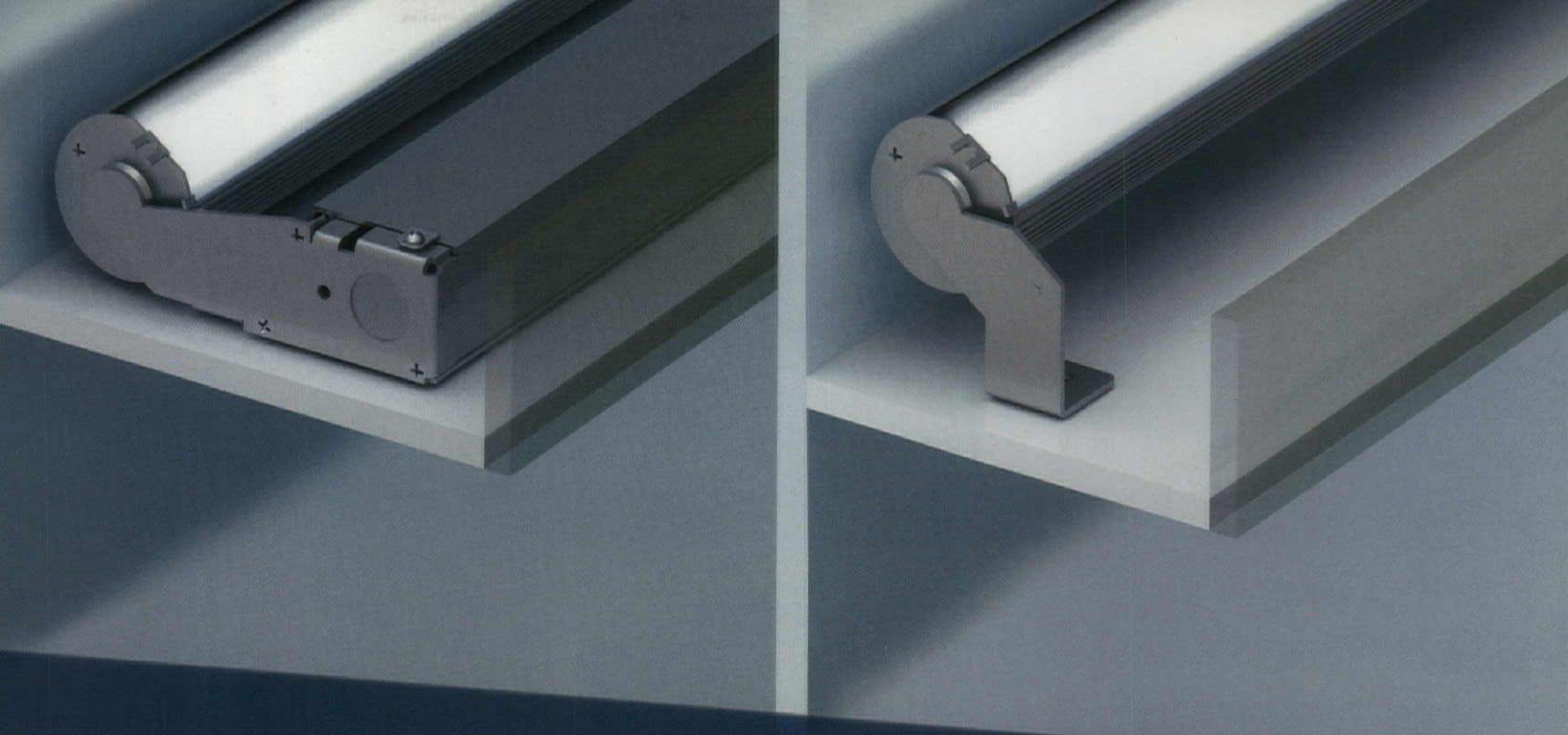

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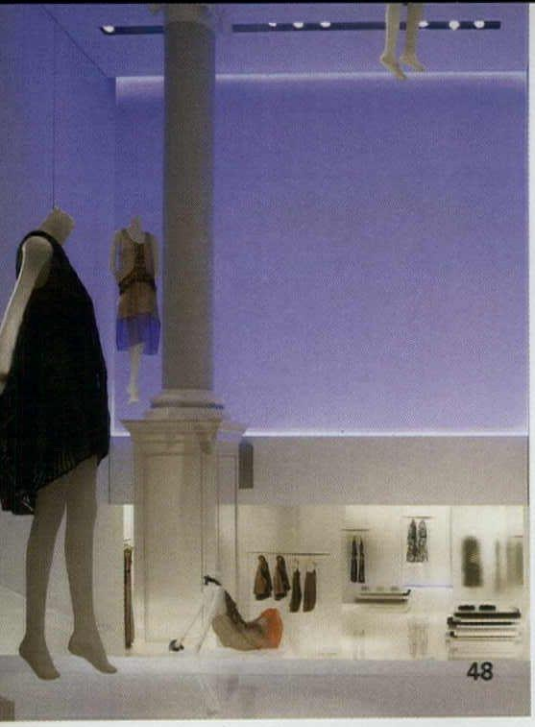

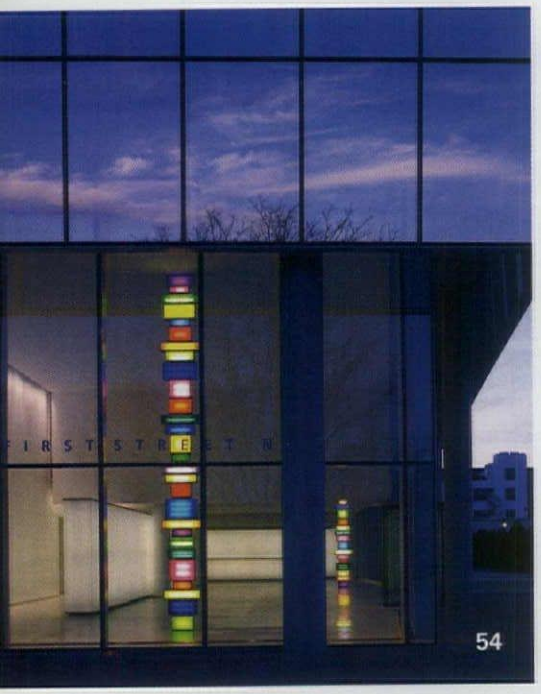

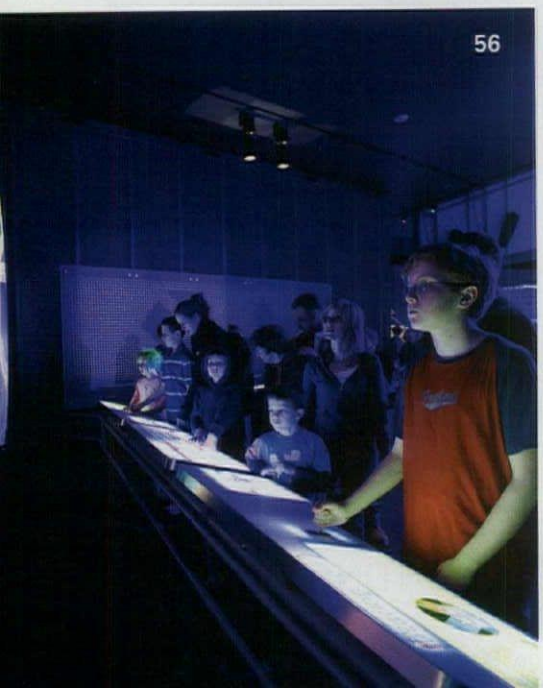

JULY/AUGUST 2010

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PHOTOGRAPHER: LUKAS ROTH

THIS PAGE (TOP TO BOTTOM): PAUL WARCHOL PHOTOGRAPHY; ANICE HOACHLANDER; J.B. SPECTOR/THE MUSEUM OF SCIENCE AND INDUSTRY IN CHICAGO

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The "Proverbial" Light Bulb

A major change is on the horizon when it comes to the light sources we use to illuminate our homes. In 2012, 100W incandescent A-lamps will no longer be available for retail sale. Then, 75W lamps go out of production in 2013. By 2014, the manufacture of 40W and 60W lamps will be completely suspended. Currently, consumers are completely unprepared, and research by manufacturers confirms this. A recent study from GE Lighting reveals that nearly 77 percent of consumers do not know that federal legislation, as outlined in the 2007 Energy Independence and Security Act, will ban the manufacture of the incandescent light bulb starting in 2012.

With such an important change, you would think that consumer education initiatives would be well under way—but they are not. Although the Department of Energy (DOE) is mandated by the legislation to create and run consumer awareness campaigns, they only just announced (in mid July) their plans to start thinking about what these consumer education initiatives will entail. Even more shocking, although probably not a surprise, is the fact that the DOE is not practicing what it preaches. As reported in *The New York Times*' Green blog, an audit by the department's inspector general, released at the beginning of July, revealed that across the 24 sites it operates, the department is still buying incandescent lamps. How embarrassing!

And it's not only at the consumer level that changes to light sources are going unnoticed by decision makers and purchasers. On July 1, 2010, it became illegal to manufacture or import T12 magnetic replacement ballasts. However, according to the National Lighting Bureau (NLB), while the phaseout of T12 magnetic ballasts in new lighting fixtures has been ongoing for the past several years, 500 million T12 lamps are still in use. As the NLB reports, there is even a "cash-for-clunkers"-type program in place, but not enough owners of commercial buildings know about it and are taking advantage of it. So they have been missing out on potential tax deductions, not to mention the savings they would be getting to their energy use and operating costs.

Building owners have two options for replacing their lighting systems that use T12 lamps; switching to T8s or, even better, T5s. According to Mike Colotti, vice president, brand management and marketing communications for NLB sponsor Osram Sylvania, switching to T8s or T5s could save close to half of the $8 billion it costs to operate T12s. Also, these more-efficient lamps have lower mercury contents. Switching to T8s could cut mercury infiltration by 43 percent and a switch to T5s could cut mercury infiltration by 56 percent. These are not insignificant numbers.

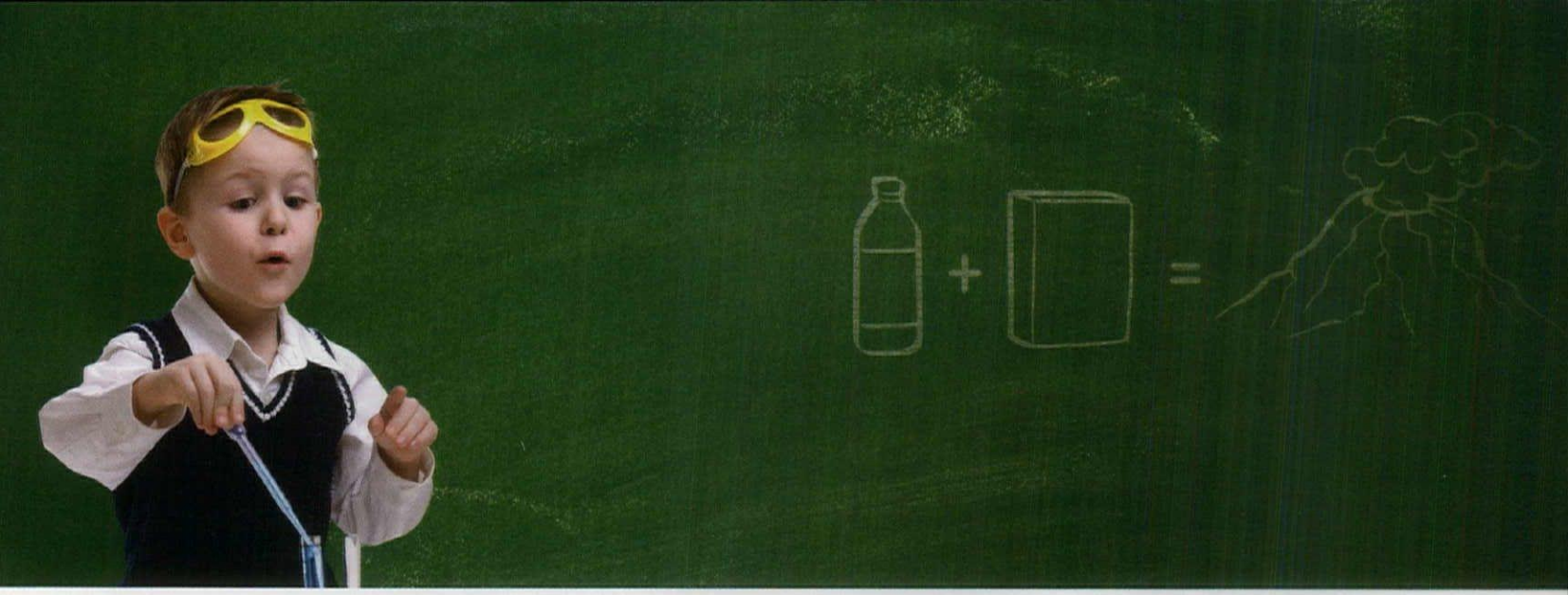
Given this situation, there's a real opportunity for the lighting community to play the role of hero. Educating clients to make informed evaluations concerning their project's lighting has always been part of the lighting practitioner's responsibility. Now it's even more important, and the lighting design community is starting to take proactive steps when it comes to reaching out to decision and policy makers.

In June, the International Association of Lighting Designers (IALD) partnered with the Illuminating Engineering Society and the American Lighting Association to issue a brochure titled "What's Your Quality of Light?" This was the first step in the IALD's campaign to inform decision and policy makers that lighting is not just a numbers game based on connected loads. Instead, it's a more complex assessment, one where human factors need to be weighed against architectural and energy considerations.

So where does that leave us? With an enormous need to focus education initiatives inside and outside of the lighting community. Every member of the lighting industry—designer and manufacturer alike—needs to speak with a single voice as we educate ourselves, our families, our friends, and our colleagues about these current and impending changes to the tools we use to light our homes, schools, and workplaces. We need to help everyone determine the best ideas—that image of a "proverbial" light bulb that we all know so well—to find the best replacement for the incandescent light bulb that will be leaving us very soon.

ELIZABETH DONOFF
EDITOR

SPENCER LUM



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LIGHTFAIR

Lightfair 2010 attracted its largest West Coast audience ever in Las Vegas with 22,000 attendees. The trade show floor was packed for the better part of the two-and-a-half-day show as attendees sought information about the latest product offerings, particularly new LED developments.

Lightfair 2010 in Las Vegas was as busy as ever. The five-day conference and two-and-a-half-day trade show was packed with manufacturer product exhibits, educational workshops and seminars, press conferences, the Cooper, GE, and International Association of Lighting Designers (IALD) design award presentation ceremonies, and a bevy of manufacturers' evening get-togethers. In fact, the show broke its West Coast attendance level with 22,000 attendees; a positive sign of industry support despite the difficult economic conditions.

But what was particularly significant about this year's show was the way in which it illustrated the paradigm shift under way in the lighting industry, as solid-state lighting and LEDs take hold of the market. Both keynote presentations on the opening days of the conference were focused on solid-state lighting topics and on the trade show floor it was all about LED components and replacements lamps. More than one designer jokingly remarked that Lightfair might need to rename itself LEDfair. Still, once you got past the fact that there were very few luminaires on display, there were important new product offerings waiting attendees' attention.

Most notable were the LED modules from Bridgelux and Molex (in partnership), Cree, GE, Osram, Philips, and Xicato. These modules aid manufacturers in creating luminaire designs that acknowledge an LED's different form factor. Also impressive was NXP Semiconductor's dimmable LED controller, and it was exciting to see this and the Helieon LED module from Bridgelux and Molex rewarded for their technical achievement at the Innovation Awards.

This year the show floor hosted a new pavilion focused on building integration products, which is a testament to Lightfair's ongoing work to create a show that responds to the latest technical and design developments in the lighting industry. Along with the Daylighting, Design, and Global Light pavilions, this pavilion offered a cohesive way in which to navigate the manufacturer exhibits.

An equally exciting development was the use of different forms of social media, particularly to share news about products and to direct people to various activities. A year ago, if you had asked someone if they were on Twitter or Facebook, they probably would have looked at you with a blank stare. This year, lighting manufacturers set up accounts on both portals to communicate with attendees.

ARCHITECTURAL LIGHTING also joined in, and we organized the first ever Tweet-up at Lightfair. It was a chance for people who communicate regularly via Twitter to meet in person. About a dozen folks gathered at the A|L-sponsored Design Lounge on the show floor, and it was a fantastic way to connect with our readers. Moreover, it represents Lightfair's commitment to staying in tune with what's happening in the industry and beyond, and to create a first-rate event that promotes lighting not just for the industry but the larger design community. **ELIZABETH DONOFF**

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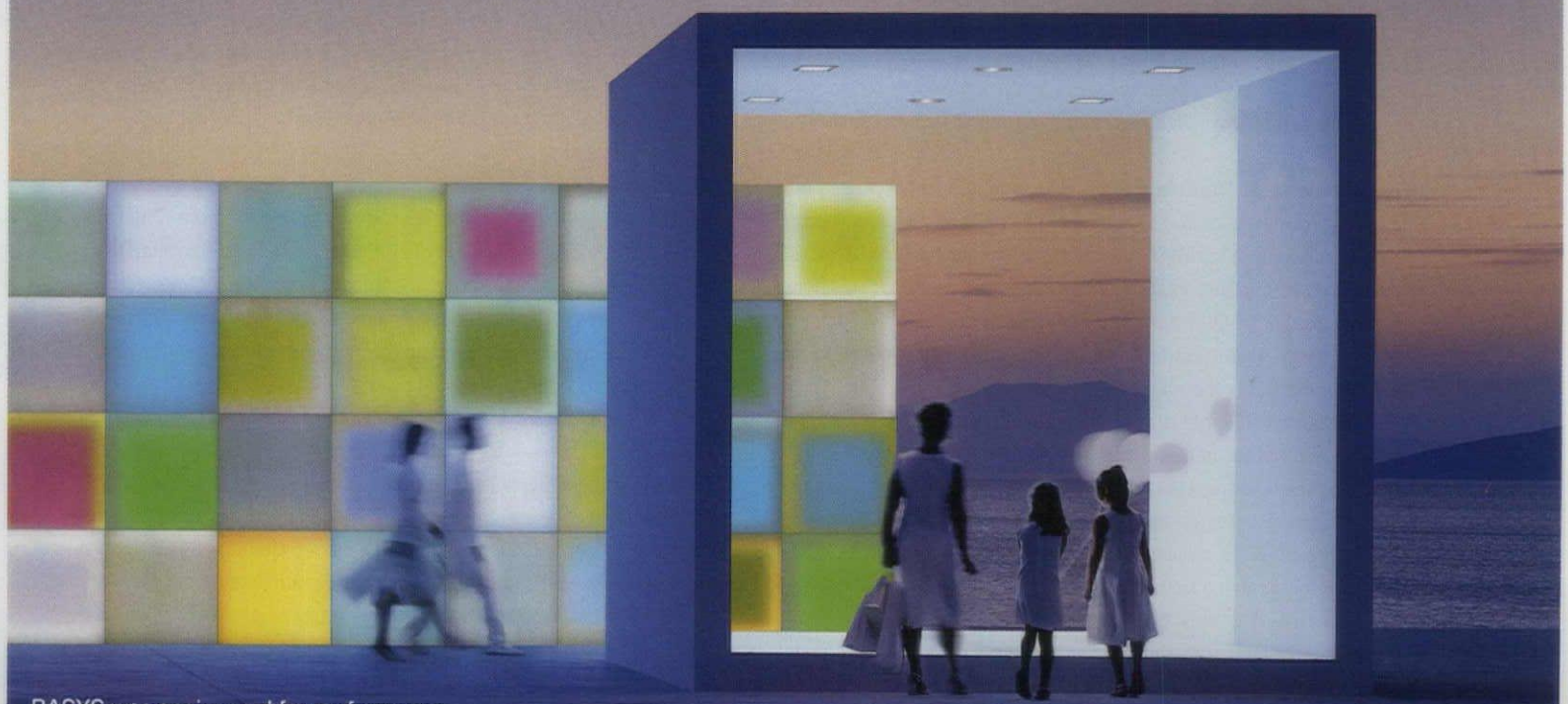

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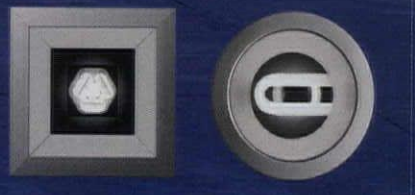

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LIGHTFAIR: TWO DESIGNERS' PERSPECTIVES

MICHAEL F. ROHDE, IALD, PLDA, director
L-Plan Lighting Design, Berlin

Bio: Director of Berlin-based L-Plan Lighting Design, Rohde studied architecture at Karlsruhe University and acquired a Master of Science at the Bartlett School of Architecture at University College London. Since September 2006, he has been teaching at the University of Technology, Business and Design in Wismar, Germany.

Impressions of Lightfair: Less than one month between Light & Building in Frankfurt and Lightfair 2010 in Las Vegas is quite a challenge, in terms of travel, but it was worth visiting both fairs. Given current economic circumstances, it was good to see that there were a record number of attendees and exhibitors at these lighting industry trade shows. Attending both provided a good overview of advancements and trends on both sides of the Atlantic.

Witnessed at Lightfair was the advancement of the white LED. After the initial excitement, and one might say gratuitous use of RGB LEDs in recent years, it is reassuring to see some manufacturers taking a serious approach to the development of white LED technology. Although, given the way some manufacturers display their products, it was helpful to have a pair of sunglasses to battle the glare!

However, it is still difficult to decipher manufacturer literature when many claim that their LEDs can produce a certain amount of lumens per watt, which even the manufacturers themselves admit is the result of laboratory tests. Who knows how these claims will really map over to actual applications and if we can still expect to achieve the same amount of lumens per watt in the field?

There are those manufacturers who are able to recognize and communicate to designers that LEDs are not threatening to replace all other lamp types. Some manufacturers even presented side-by-side comparisons of their luminaires utilizing LED, halogen, or metal halide lamp sources to better explain the advantages and disadvantages of each, showing that the application will determine the most appropriate lamp source, not the latest press release.

An interesting addition to both fairs was the presence of some of the world's leading electronics manufacturers. Although they might not be as familiar with traditional light sources, the LED has introduced many new manufacturers to the lighting industry. Also, since many LEDs are packaged as complete luminaires, traditional luminaire manufacturers now have a host of new competitors.

Other events, such as the IALD Education Trust and Gala Awards Dinner, were also a great pleasure, and I was very pleased to see two Wismar students who had received IALD scholarships. It was a pleasant surprise to meet Mirjam Roos (with Steensen Varming), a Wismar graduate who received an IALD Award for her work on the National Portrait Gallery in Canberra, Australia.

SAGE RUSSELL, IALD, senior project designer
Candela, San Diego

Bio: Russell has a strong belief in the unique role lighting plays in human perception and psychology. As an educator at the Design Institute of San Diego and as an IALD member, he remains up to date on the tools and technologies that are available. Russell is also the author of *The Architecture of Light*.

Impressions of Lightfair: For me, Lightfair 2010 delivered numerous jolts of optimism but also left me wanting a bit more. The most shockingly progressive aspect of Lightfair this year had nothing to do with product per se, but rather the impact and energy of networking technology onsite. The constant stream of Twitter updates, blog posts, and direct e-mails kept me aware of must-see products, impromptu gatherings, and on-the-fly meeting opportunities. These updates allowed my time to take on a completely new form. Rather than wander the show floor, I relied on a stream of updates to direct me along a focused path specific to my industry role. This efficiency meant that I was able to spend more time with standout products. Impressive among these were LED lamp modules, next-generation linear fluorescent products, and sophisticated lighting controls technologies.

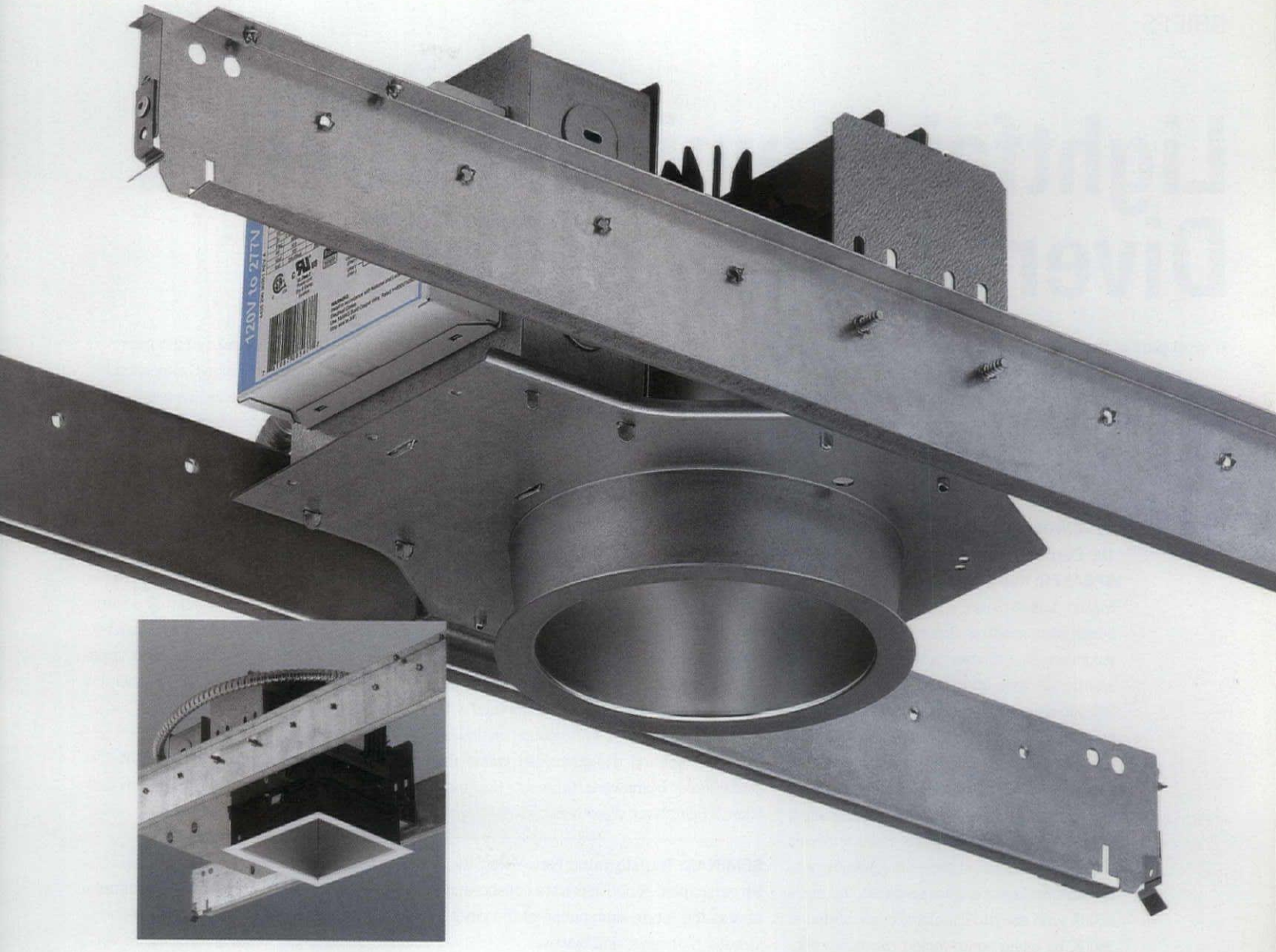
I was pleased to see LED lamp manufacturers driving towards modules directed at OEMs. Directional, high-color-rendering modules from Osram, Philips, and Xicato showed promise with their standardized platforms and an eye towards maintainability. Luminaire manufacturers such as Bruck and Dasal that had embraced these platforms exhibited some very impressive task and accent products.

Linear fluorescent products—overhead lay-in and linear pendant profiles—showed continued evolution. It was encouraging to see efficient optics and sublime light textures offering even more options to troffers and parabolics. Zumtobel, Axis Lighting, and Peerless showed some standout products.

Lighting control systems offered some promising solutions, as occupancy-sensors, photo-sensors, and time-clocks were put to good use. Lightfair is a unique opportunity to try these technologies in a hands-on, interactive manner to see how they really perform.

The only disappointment of my visit was that so few booths and products target studio designers and specifiers. If Lightfair can lure exhibitors back to the main hall, and they return to using Lightfair as a platform for new product launches, perhaps this downward spiral toward a "rep-fair" can be reversed. If not, then Twitter and blog posts will inform my trajectory through the exhibit hall next year.

Perhaps the brevity of product experience is part of the evolution of Lightfair. But whether it is a solution or reaction, the flurry of networking and the focus on outreach, such as the IALD booth, have created a great sense of solidarity and visibility within the industry.



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Lightfair Seminars Cover a Diverse Array of Topics

A vital part of the Lightfair experience is education. This year's show staged 72 courses over a five-day period, and topics included everything from the basics of lighting to in-depth energy efficiency practices. Also included in the 220 credit hours were two new conference tracks: the Design Symposium, design-related courses presented by architects; and Building Integration, which had a companion pavilion on the trade show floor. "The goal is diversity," explains lighting designer Chip Israel, who served on the 2010 conference advisory committee. "We're trying to provide educational content that will appeal to the beginning and seasoned lighting designer alike, as well as a range of technical and design discussions." To that end, Lightfair is also working hard to create content that will appeal to not only lighting designers, but the broader community of architects, landscape architects, and interior designers. VILMA BARR

SEMINAR: Changing the Orientation by 180 Degrees at 6500K
SPEAKER: Ken Lewis, president, AC Martin, Los Angeles

Lewis discussed his firm's design/build collaboration that devised a technique to bring additional daylighting into a new four-level, 265,000-square-foot open office. Designed and built on a two-year, fast-track schedule, a precast concrete beam and column system was used to meet the tight deadline and allow for the open atrium design. With ceiling heights at 15 feet, partitions were arranged so that workers could see to the outside or to the atrium. Lewis's team balanced the sun's 6500K with electric illumination calibrated at 3500K by using south-facing clerestory windows and a system of charcoal gray louvers. He said that glazing products now on the market are 67 percent transparent with only a 27 percent heat gain. This made it possible to position the building on a southern orientation to take advantage of more abundant daylight and bring daylight into the atrium. The project was awarded LEED Silver.

SEMINAR: Better, Brighter, Smarter on a Strict LPD Diet
SPEAKER: Bernard Bauer, principal, Integrated Lighting Concepts, Thousand Oaks, Calif.

Bauer, a retail lighting design specialist and long-time advocate of cost-efficient illumination, emphasized that design, technology, and codes are driving retail lighting today. Successful designs, he pointed out, will strike a thoughtful balance among the three. With the increased complexity of today's retail lighting projects, close interaction between the lighting design practitioner with the client and other disciplines, such as audio/visual components, is essential from the outset. "A full palette of new technologies and stringent energy codes are coming on line at the same time," Bauer said. By maximizing the allowed power under code combined with the best-use lighting equipment—including controls—lighting designers can create the illumination framework to meet the merchant's operations objectives.

SEMINAR: Transforming New York City Streetscapes, A public-private collaboration tackles the future illumination of the city's streets, highways, and byways
SPEAKERS: Margaret Newman, chief of staff, City of New York, Dept. of Transportation, New York; Marc Ledbetter, Pacific Northwest National Laboratory, Portland, Ore.; and Philip Jessup, Climate Group, Toronto

PlaNYC calls for a 30 percent reduction in New York City's greenhouse gas emissions by 2030. Included are standards and guidelines for sustainable lighting—a NYC lighting master plan—and finding the right technology to make it happen in all five boroughs.

Under consideration is the use of LEDs for streets, parks, cemeteries, and other open spaces; vacant land; and buildings and parking lots. Full-cutoff lighting and Dark Sky preserves will also be evaluated. One of the current test areas is Central Park, where five variations of LED post-top luminaires for pedestrian use are currently under assessment. Researchers noted that the test luminaires, which will be in place for one year, utilize approximately 46 percent less energy than the park's current metal halide fixtures. A second pilot project, evaluating another four luminaire designs, is under way on a section of the FDR Drive. Future test areas include the Eastern Parkway in Brooklyn and the Belt Parkway to Long Island.

SEMINAR: Task-Ambient Office Lighting, How layered lighting saves energy and improves quality
SPEAKERS: Owen Howlett, senior research project manager, Heschong Mahone Group, Fair Oaks, Calif.; Michael Mutmansky, principal, Clanton & Associates, Boulder, Co.; Thor Scordelis, senior program manager, emerging technologies, PG&E, San Francisco; and Michael Seaman, California Lighting Technology Center, UC Davis, Davis, Calif.

This group's message was that uniform lighting from the ceiling wastes energy; layered lighting not only saves energy, but improves the quality of light for the user. They referred to calculations that showed that a typical office uses from 1.5W to 3W per square foot, while California's Title 24 and LEED levels indicated that from 0.9W to 1.1W per square foot are allowable. They favored task-ambient lighting at 0.5W to 0.65W as the most use-efficient and the highest in quality. They made the following points: light from the ceiling is inefficient for office tasks; cubicle tasklighting alone will not meet ambient needs; tasklighting should be balanced with ambient lighting to function as a system; and control systems are recommended to add flexibility and comfort.

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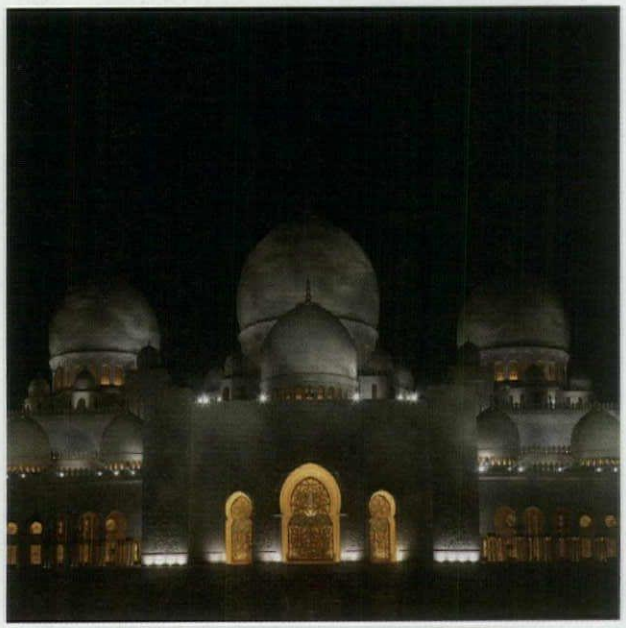
27th Annual IALD Awards



The Sheikh Zayed Bin Sultan Al Nahyan Mosque in Abu Dhabi.

COURTESY IALD

On May 13, in a gala dinner to benefit the International Association of Lighting Designers (IALD) Education Trust, the 27th Annual IALD Awards were presented at the Renaissance Las Vegas Hotel in Las Vegas. Twenty-three projects were recognized in the categories of Awards of Excellence, Awards of Merit, and Special Citations. The projects are reviewed by a seven-person jury of lighting, architecture, and design professionals.

The main award of the evening, the Radiance Award for Excellence, was presented to Speirs and Major Associates for their exterior lighting design of the Sheikh Zayed Bin Sultan Al Nahyan Mosque in Abu Dhabi, United Arab Emirates. Principal Jonathan Speirs accepted the award on behalf of the firm, whose work was also recognized with an Award of Excellence for the Infinity Bridge in Stockton-on-Tees, United Kingdom, and an Award of Merit for the Sands Bethworks Retained Edifices in Bethleham, Pa. A testament to the firm's extraordinary work, this was the third year in a row they won the Radiance Award.

The winning projects represent firms from 12 countries. Awards of Excellence were also presented to ArcLight Design, Ljusarkitektur, Randy Burkett Lighting Design, RDG Planning & Design, and Hansen & Henneberg. An Award of Excellence and Sustainability was presented to Arup Lighting for their work at the New Acropolis Museum in Athens. Awards of Merit went to Architectural Lighting Solutions, Clanton & Associates, The Flaming Beacon, Fisher Marantz Stone, Lam Partners, Licht Kunst Licht, PointOfView, Schwinghammer Lighting, Steensen Varming Australia, and Total Lighting Solutions. For details about all of the winning projects, visit iald.org/about/awards/award.asp?year=2010. **ED**

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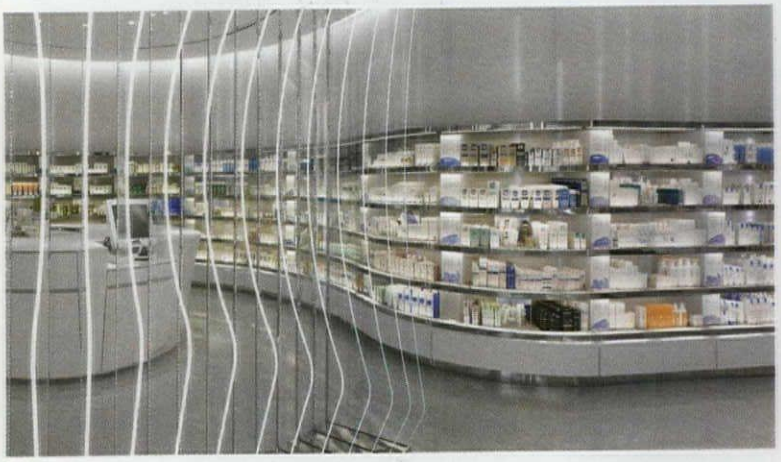

The 33rd Annual **Cooper Source Awards** were presented on May 11, 2010, during a keynote luncheon at Lightfair. Eight projects received awards at the professional level in addition to five student awards. Toronto-based Lightbrigade won for their project Murale (above). For full details of all the award winners, visit cooperlighting.com/content/source/awards.cfm.

The **GE Edison Awards** were presented at an evening ceremony. Licht Kunst Licht received the Edison Award for EnBW City (above). Fifteen awards were given in Excellence, Merit, and Special Citation categories. For more, visit geconsumerproducts.com/pressroom/press_releases/company/company/2009_Edison_Award_Winners.htm.

LEFT: BEN RAHN/A-FRAME, COURTESY COOPER LIGHTING; RIGHT: LUKAS ROTH, COURTESY GE LIGHTNG

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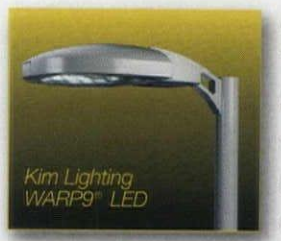

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Lightfair Innovation Awards

Recognizing innovation and technical advancement in luminaire product design, this year's Lightfair Innovation Awards recognized 15 companies for their products. Presented on the first morning of Lightfair every year as a precursor to the opening of the trade show exhibit floor, this year's ceremony was presented as a news-style morning show titled, "The LFI Morning News." It made for an entertaining presentation and a clever way to acknowledge the approximately 200 product submissions.

Four principal awards were given. The program's highest honor, Most Innovative Product of the Year, was awarded to the Helieon Sustainable Light Module System (top left). This LED light module results from a development partnership between lighting manufacturers Bridgelux and Molex. Traxon USA received the Design Excellence Award for their e:cue Light-Drive Elite lighting control (bottom). The Technical Innovation Award, which recognizes the most forward-thinking advancement in lighting technology, went to NXP Semiconductors' dimmable SSL2102 LED controller (top right). The Judges' Citation Award went to LightLouver's Daylighting System (not shown), a patented reflective slat module installed over a window.

In addition, 11 Best of Category Awards were also given. For complete details about all of the winning products, visit bit.ly/9PFA9o. **ED**

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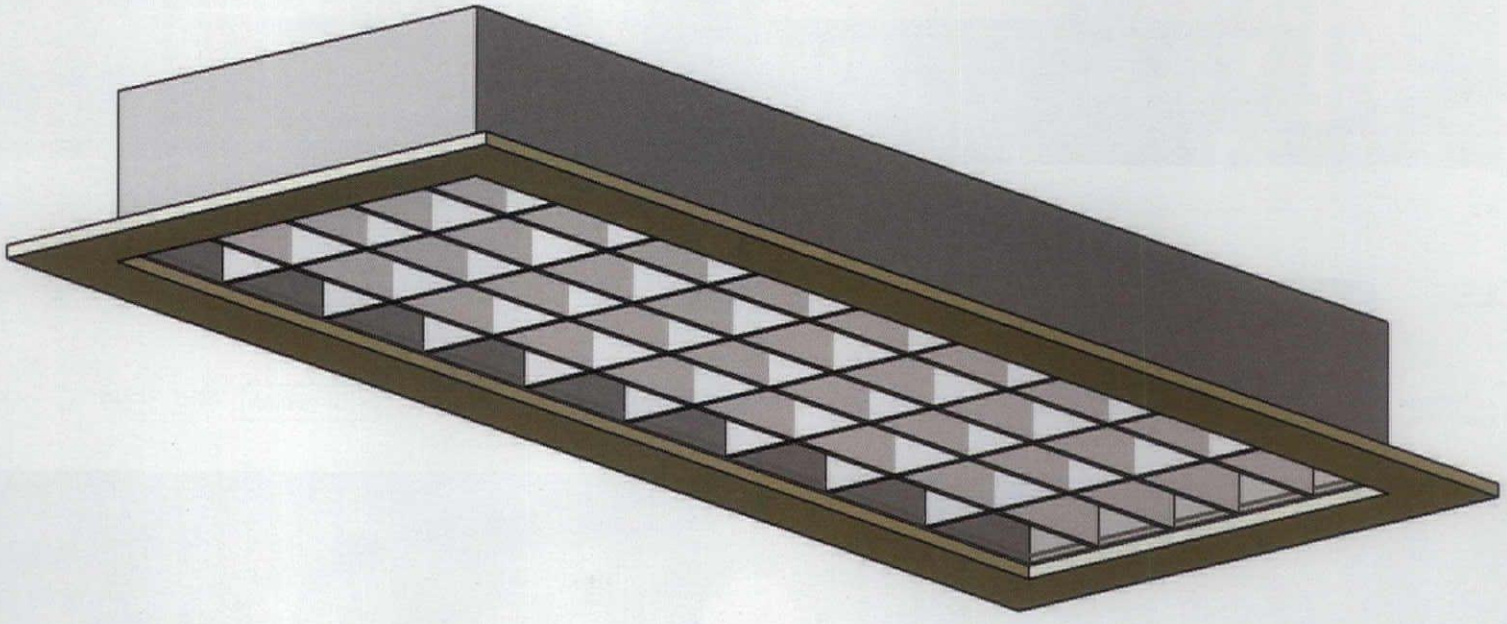

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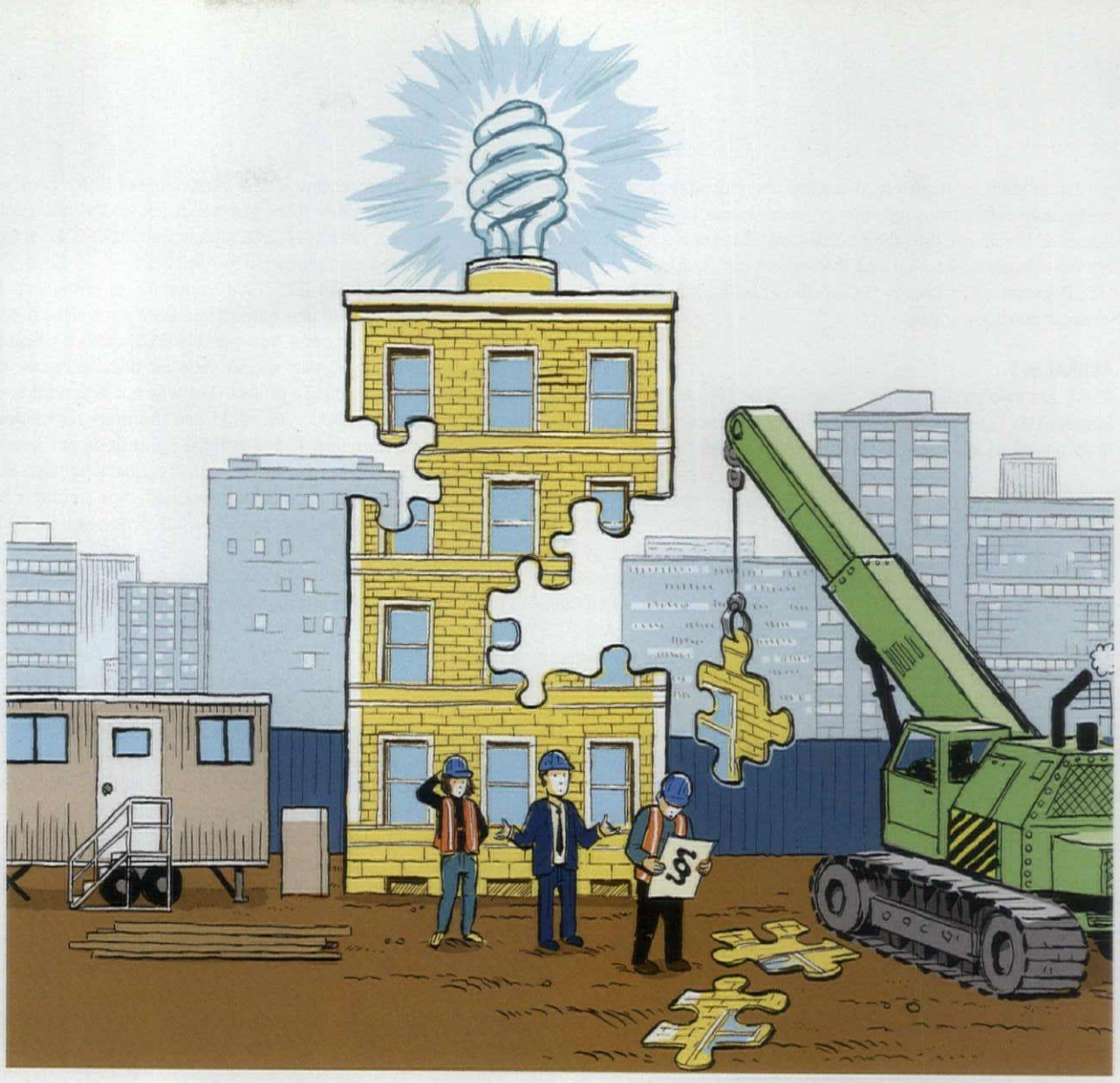


ILLUSTRATION BY PAUL HOPPE

Rubik Code

DECIPHERING WHAT TODAY'S ENERGY CODES MEAN FOR LIGHTING PRACTICE

Ask any lighting designer what today's big issues are, and, after your get an earful about LEDs, you'll probably hear about energy codes and the U.S. Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED) ratings systems. Energy codes and other "green" regulations and standards have become a hot topic, and the reasons are twofold. First, these codes and standards are becoming more stringent and more prevalent, so designers are running up against their limits more often. Second, lighting designers and their professional organizations, such as the International Association of Lighting Designers (IALD), have become more involved with code development. But there is also confusion, as energy codes and green building standards are notoriously complex and getting more complicated.

What do lighting professionals need to know? Let's start by looking at energy codes.

ENERGY CODES: THE STARTING POINT

In trying to sort out the energy code development process in the U.S., the first thing to remember is that energy codes are generally adopted by states as part of their building codes. There are national model energy codes, but there is no federal energy code. Since 1992, federal legislation has required that states adopt an energy code as stringent as a model energy code (currently ASHRAE/IES 90.1-2004), but there is no mechanism to force states to do so. This means that the U.S. potentially has 50 different energy codes. In practice, most states fall into one of three groups:

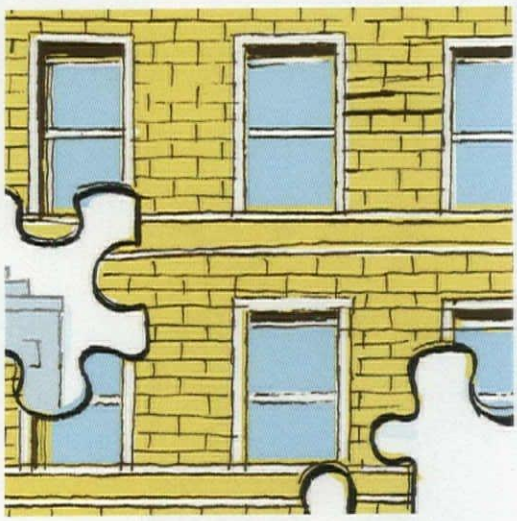
- *Those who have adopted some version of the International Energy Conservation Code (IECC):* The IECC is revised every three years, so you have to know which version is in effect in a particular state. Some states use the IECC as a model code but then make their own modifications when they adopt it.
- *Those who have their own in-state-developed code:* California, Florida, Oregon, and Washington each have their own code and code development process.
- *Those who have no code at all:* Eight states have no energy code for commercial buildings, and 10 others have energy codes that are less stringent than required by federal legislation. But in states with no mandatory statewide commercial energy code, there may be a code that applies to public buildings, or something that has been adopted by a local county, city, or municipality.

It is important to determine which version of which code is in effect in a

particular state. Fortunately, there are two websites that have comprehensive information on energy code status in each state. The first is available through the Online Code Environment & Advocacy Network (bcap-ocean.org) and the second can be found through the U.S. Department of Energy (DOE)'s Building Energy Codes Program (energycodes.gov/states).

ASHRAE 90.1

There are two model energy codes in the U.S., ANSI/ASHRAE/IES Standard 90.1 and the International Energy Conservation Code (IECC). Both are comprehensive building energy codes, but the IECC has been the code of choice in recent years.



ANSI/ASHRAE/IES Standard 90.1 Energy Standard for Buildings Except Low-Rise Residential Buildings, known as "ASHRAE" or "90.1" has its roots in the response to the energy crises of the 1970s. It is developed by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) and the Illuminating Engineering Society (IES). Standard 90.1 is the most familiar because it has been around the longest, and because IES and IALD members have been active on the 90.1 lighting subcommittee for decades.

The standard is developed according to ANSI and ASHRAE procedures in an open process centered on committees of experts. In the case of the lighting portion of 90.1, the hard work of developing the standard is overseen by the lighting subcommittee who work constantly on code development, proposing improvements, and organizing the development process. But anyone can propose a change to the standard by contacting the subcommittee, and all proposed changes go out for public review and comment. All comments must be responded to by the relevant subcommittee, with the goal to resolve each comment in a way satisfactory to both the subcommittee and the commenter. The standard is always being worked on in a process known as "continuous maintenance," with complete new versions published every three years. The next version, 90.1-2010 is expected this fall.

THE INTERNATIONAL ENERGY CONSERVATION CODE (IECC)

The IECC is the relative newcomer. First issued in 1998, it is developed by the International Code Council (ICC), the organization that develops building codes in the U.S., and has become the code that states are adopting. It is also developed in an open process. Like 90.1, anyone can propose a change to the IECC. But instead of being considered by subcommittees of experts, proposed changes are debated in formal verbal testimony at open hearings, which last about a week and occur once every three years. The results of those hearings (where a committee rules on each proposal) are published, and then written public comments are accepted on the change proposals. Then, about one year after the first hearings, testimony is heard again at the "Final Action" hearings where only those ICC members who are code officials—and who show up at the hearings—vote on each change proposal. Proposals that pass will become revisions to the code. ICC staff then compiles and reconciles the results of the voting on each change proposal and publishes the next version of the IECC. New versions of IECC are issued every three years (but not on the same schedule as 90.1). The next version of IECC, known as IECC-2012 is in development and slated for publication in April 2011.

To understand the IECC, it's important to know that the IECC references 90.1 as an alternate compliance path. This means that if IECC is the adopted code, you can use IECC or 90.1. Originally, IECC was regarded as an easy-to-use code for basic projects, but if you had a complex or unique project that was not well addressed by the provisions of the IECC, you could use the more sophisticated (and complicated) Standard 90.1. The IECC lighting section was originally based on 90.1 and still contains some identical language. But as new versions of the IECC have been developed, new language and provisions have been added and the IECC has diverged from 90.1 and has grown more complex.

Before IECC-2009, you could mix and match the codes by discipline. For example, a lighting designer on a project could use 90.1, but the mechanical engineer could use IECC. With the 2009 version, you must choose one code for the entire building. Depending on which version of the IECC is in effect in that state determines whether the lighting designer has the flexibility to choose which energy code he or she will follow. Lighting designers who work nationwide need to be conversant in several versions of each of the two codes.

The IECC is the code that states are adopting when they update their energy code, or when they adopt a code for the first time. This is probably because the IECC is produced by the ICC, the source of other building codes used in the U.S. As of July 1, 31 states have adopted some version of the IECC. Only five states use a version of 90.1 by itself.

However, 90.1 will most likely remain significant for several reasons. First, the 1992 federal Energy Policy Act established it as the standard that the Department of Energy must use to evaluate state codes. If the code is not efficient enough, a state is required to adopt an equally stringent code within two years. (Although there is currently no way to enforce this.) Second, 90.1 is the energy performance standard used by LEED, and most LEED project must follow 90.1. Third, the work of the 90.1 committees and the addenda review and commenting process are an effective and valuable code development engine where new ideas are tested and refined. This is directly supported by the DOE with resources to perform modeling and analysis. For anyone interested in a more in-depth explanation of the energy code development and adoption process, read the Department of Energy's "Building Energy Codes 101," which can be found at: energycodes.gov/training/pdfs/codes_101.pdf

ON THE HORIZON

So what should architects and lighting designers expect to find in the forthcoming 90.1-2010 and IECC-2012? Because the 90.1-2010 development period came to a close in June and the final published version is expected soon, it is possible to list changes to 90.1 with some confidence. Most notable will be significant changes in lighting power allowances. The modeling used to determine the lighting power allowances for each building and space type was reviewed and revised to reflect current technology and design practice. Mainly because of improvements in light-source efficacy, such as in super T8 and ceramic metal halide, most lighting power allowances are going down.

But the allowances for a few space types are going up; the analysis showed that the power allowances had been incorrectly set too low. According to recent modeling performed by the Pacific Northwest National Laboratory for the DOE, buildings designed to the 90.1-2010 standard will use 30 percent less energy overall than buildings

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designed to the 2004 standard. Here are some lighting-related changes to expect:

- Interior lighting power allowances revised (mostly down, some up). Additional allowances for high room-cavity ratios (tall, skinny spaces)
- Separate lighting power allowances for exterior Lighting Zones 0 through 4. Projects in lower density, less developed areas get less.
- Reduced lighting power allowances for retail displays
- Manual-on (no auto-on) in many spaces
- Control factors—additional power allowance as an incentive to use advanced controls
- Bi-level switching
- Stairwell occupancy control
- Hotel room master switch
- Exterior "after hours" control
- Skylights required in some large spaces.
- Window-to-wall ratio (WWR) reduced to 30 percent in the prescriptive method. A 40 percent WWR will be allowed in some climate zones if there are daylight responsive controls and the building is the right shape (long and skinny or with light wells).

IECC-2012

Because the final action hearings for IECC-2012 do not occur until October, it is more difficult to predict what that code will look like. Based on the published proposals, however, expect a major rewrite of the entire document. This includes large chunks of the lighting section such as the lighting power allowance tables. Expect reduced lighting power allowances, and the addition of a space-by-space method for determining lighting power density.

Another concept that has been proposed is "Additional Efficiency Package Options." To comply, this means a project will have to pick one option from a menu of energy-efficiency provisions such as more efficient mechanical equipment, on-site renewable energy, or reduced lighting power allowances. Here's a list of likely changes:

- Lower lighting power allowances
- Addition of the space-by-space method
- Occupancy sensors required in some space types
- Hotel room master switch
- Separate metering of lighting, HVAC, and plug loads
- Additional efficiency package options
- Skylights required in some large spaces
- WWR reduced to 30 percent in prescriptive method

It is important to remember that when a new version of a model code is published, it is not code until a state adopts the new version. Just because a state uses IECC does not mean that they automatically use the newest version. So far, the current version of IECC (IECC-2009, published in Jan. 2009) has been adopted by only nine states.

ENERGY CODE TRENDS

With the push for the architecture, engineering, design, and construction communities to reduce carbon footprints by significant amounts over the next 25 years, several trends are under way that will affect lighting regulation. The first is increased code efficiency. There is a big push from the DOE to revise the codes so that buildings will have to use significantly less energy than if they were built under previous versions. The targets for building energy performance are as follows:

U.S. federal goals for energy codes (compared to 90.1-2004) for total building energy:

- 30 percent reduction by 2012
- 50 percent reduction by 2017
- 55 percent reduction by 2020
- 60 percent reduction by 2023
- 65 percent reduction by 2026
- 70 percent reduction by 2029
- 75 percent reduction by 2032
- Zero Net Energy reduction by an unknown date

The second trend is less lighting "power allowance lag." Lighting power density limits are developed to limit the maximum connected lighting load using the most efficacious light-source technology that is appropriate, without sacrificing lighting quality. In the past, the lighting power allowances have lagged behind light-source technology,

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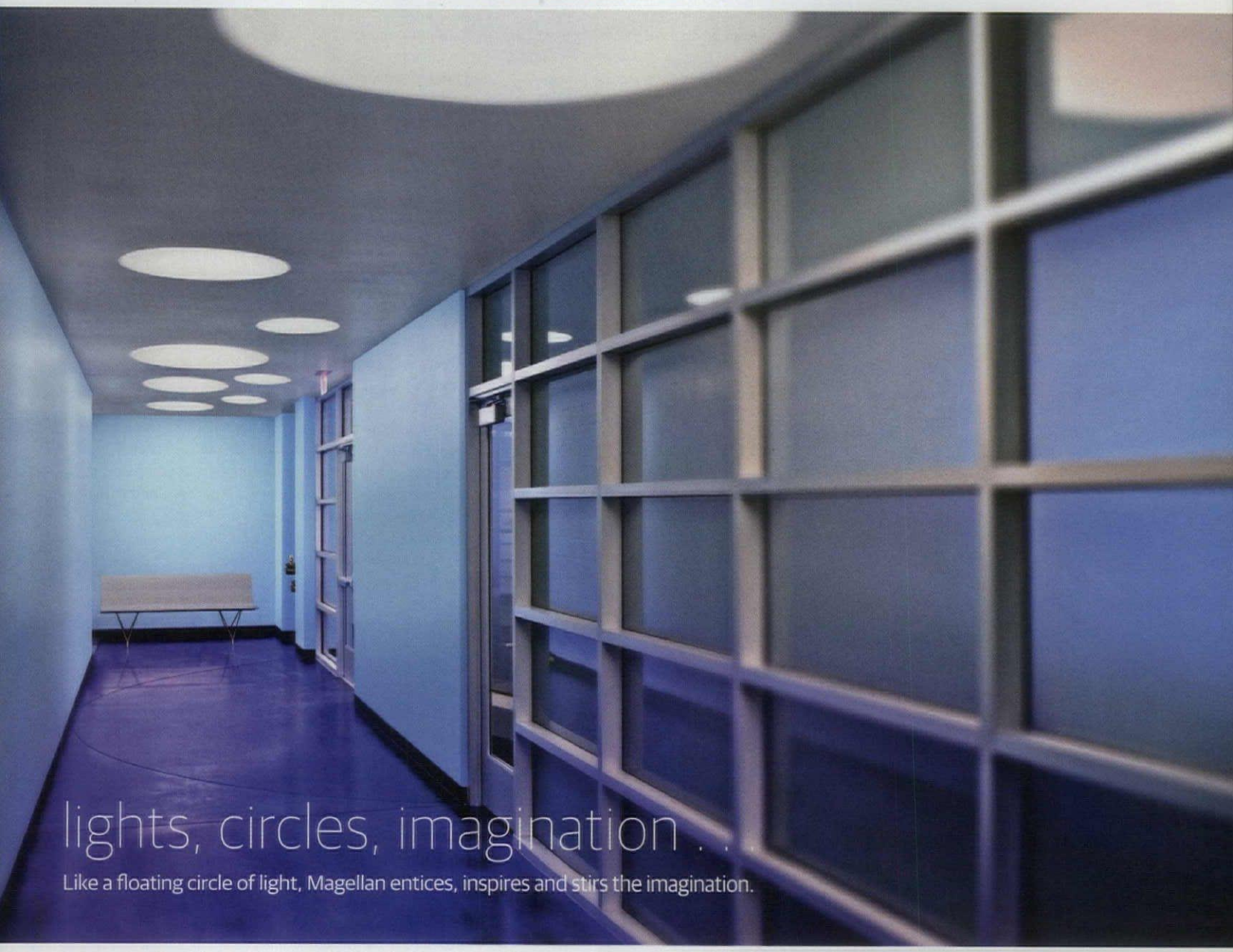

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leaving the designer with some cushion. Prior to 90.1-2004's release, it was easy to design lighting without worrying about bumping into code limits. This was because codes had not yet caught up with energy-efficient technologies and design practices.

Starting with 90.1-2004, lighting power allowances were reduced significantly, and you had to pay more attention to the limits. But it's still pretty easy to produce quality lighting design without much additional effort. The lighting power allowances that will be in 90.1-2010 are based on using high-performance T8 and ceramic metal-halide sources wherever appropriate. Quality lighting will be possible, but it will require extra effort and very careful design choices and light-source selection. IECC-2012 lighting power allowances will be even more stringent. Designers will have to be very careful with their use of energy in order to meet code. Expertise in lighting design will require a deep knowledge of code requirements, and the skill to get the most out of limited power budgets.

The third trend is less "adoption lag." Getting states to adopt the latest code is easier said than done. Currently, only 10 states have adopted the most recent standard, IECC-2009 or 90.1-2007. Ten states have either no statewide energy code at all, or are using standards older than 90.1-1999. The remaining states use something in between the two. This lag is typical, but I expect that its length will decrease, given the global push to reduce energy consumption and greenhouse gas emissions. Often it can take states years to get through the process of adopting new energy codes. But if more states follow the recent example of Massachusetts, then code lag adoption time will be very short in the future.

Last year, Massachusetts not only adopted IECC-2009 but wrote into law that newer versions of the IECC will automatically become code soon after publication. Also, if a federal energy bill gets through Congress it is likely to have in it financial carrots for states who adopt and enforce stringent energy codes (and sticks for states who don't). Every state, in accepting money from the American Recovery and Reinvestment Act, has certified its intent to adopt a building energy code that meets or exceeds the requirements of 90.1-2007, although it is not clear if this will be enforced.

The fourth trend is outcome-based codes. From the design professional's point of view, the ideal energy code would tell us what the results need to be, and let us figure out how to get there. For example, don't tell us how much connected load we can have for lighting, or what type of HVAC equipment we need to use, just tell us how much energy our building can use and let us figure out how to get there. Of course this is easier said than done, but the code development community is starting to investigate how this could be accomplished in practical, usable, and effective ways.

The promise for designers is flexibility. But with that freedom would come the need for a truly integrated design process, expertise in building-energy-modeling software, and, for the lighting designer, the capability to design sophisticated lighting control systems. Once you establish a limit for how much energy a building can use, regulators could start requiring building owners to certify actual energy usage, instead of merely certifying that the building should perform to code based on its design. If codes start to regulate actual performance, design professionals will have to grapple with the professional liability issues. Can we be held responsible for the energy performance of our building design when we are not responsible for its operation?

The final trend is to go beyond code programs. Some local governments, businesses, and institutions understand that energy codes only set a minimum baseline for acceptable performance. They desire tools to push their community's energy use and carbon footprints even lower. Expect more better-than-code standards such as the Massachusetts Stretch Code. This is an appendix to the Massachusetts energy code that individual municipalities can adopt for their jurisdictions. It applies more stringent provisions on top of the energy code.

Anticipate increased energy performance requirements in green building ratings systems such as LEED and the Collaborative for High Performance Schools. And then there are the green building codes in development, which we will discuss next issue. **GLENN HEINMILLER**

Glenn Heinmiller, IALD, is a principal at the architectural lighting design firm Lam Partners, based in Cambridge, Mass., and is the chair of the energy and sustainability committee of the International Association of Lighting Designers.

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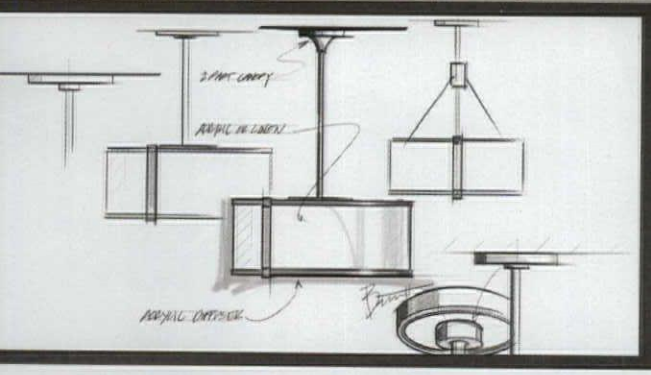

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Bradley & Diegel Salon

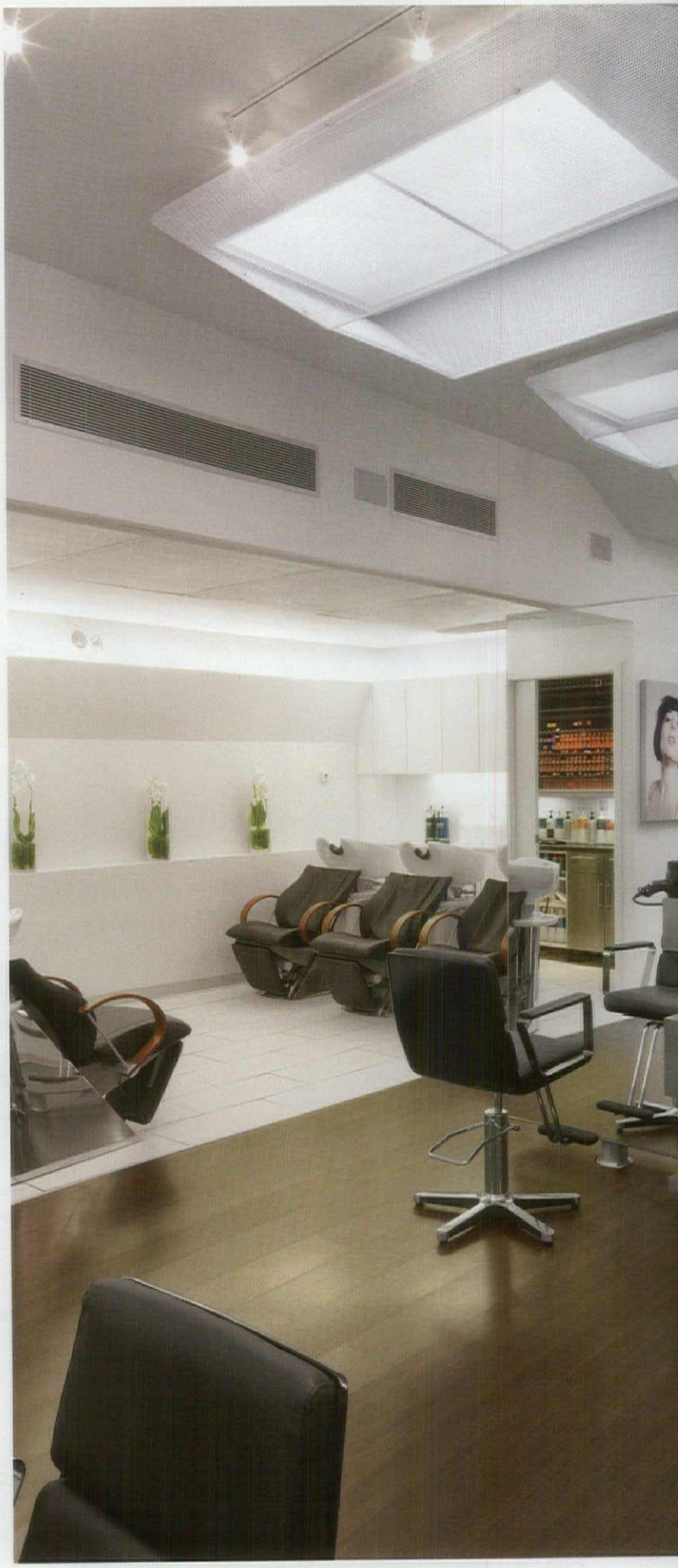
GEOMETRIC SKYLIGHTS ILLUMINATE AND DISTINGUISH A LINEAR SPACE

When Peter Bradley and Dirk Diegel opened their new salon, they wanted the shop to be recognized for its elegant but effortless atmosphere. After finding the ideal location—a second-story through-floor space on Newbury Street in Boston's Back Bay—the duo approached Studio Luz Architects to design an environment that would be both beautiful and functional.

The 1,200-square-foot space previously had been home to a spa that was divided into several small rooms. The spa also had covered over three skylights. Following the clients' directive to create a loftlike gallery setting, Studio Luz converted the interior into one long styling room and uncovered the skylights to introduce more natural light. However, given that there were only three working skylights, the architects had to design additional "skylights" for the remainder of the stylists' stations and develop a lighting solution that would mimic the appearance of daylight. "We saw limitations as opportunities," explains Studio Luz principal Anthony Piermarini of their new system of "skylights," which serve as the defining architectural feature.

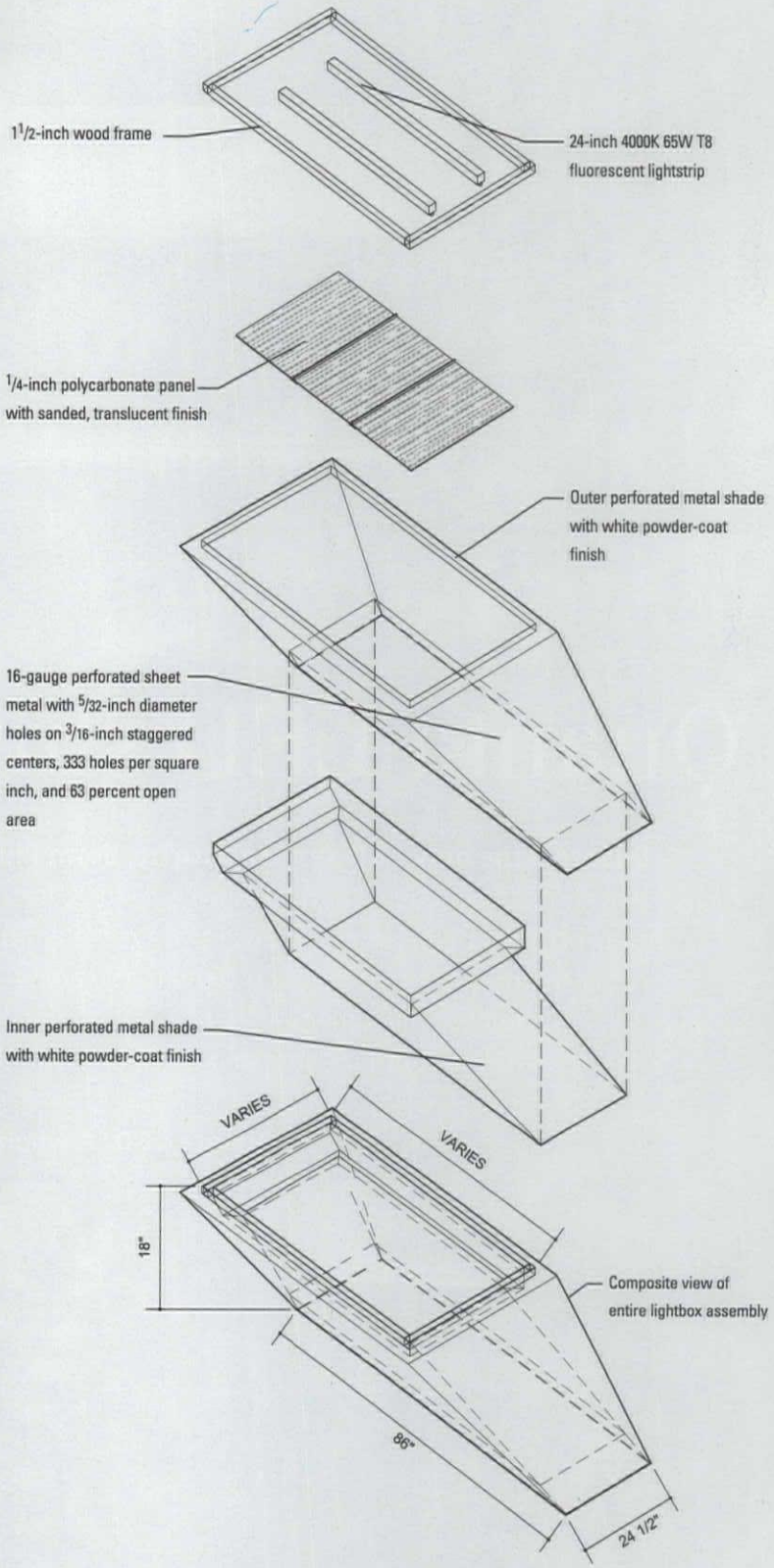
The shape of each parallelogram-shaped skylight box was custom designed to direct light where it was needed. Measuring approximately 5 feet long by 3 feet wide and extending 15 inches below the finished ceiling plane, a total of nine custom-shaded coverings were integrated into the space and correspond to each bank of stylist stations below. Constructed of perforated metal, the shades were finished matte white to produce diffused light. (The perforations create a desired moiré effect and help to filter the light and minimize glare on the mirrors.) A translucent polycarbonate lens over each skylight makes the appearance more uniform and aids in softening the light. Four new coverings are used at the existing three skylight locations. Two fluorescent lightstrips mounted inside each of these shade frames provide balanced light at night. The five new skylight boxes use dual 4000K 65W T8 fluorescent strips in a lightbox recessed into the ceiling.

Bradley & Diegel required a multifunctional space worthy of the salon's reputation for high-quality hair cutting, coloring, and styling. And Studio Luz delivered. Light is used to differentiate the salon functions: low-voltage halogen track at the stylists' workstations; fluorescent for the edge-lit mirrors, and a glare-free undercabinet detail at the hair-washing area that allows customers to comfortably look at the ceiling. The combination of sources provides full color-rendering, while the visual rhythm of the custom-shaded skylights provides the space with diffuse, ambient lighting. The result is a seamless blend of light and architecture into a singular design element. JENNIFER BICKFORD

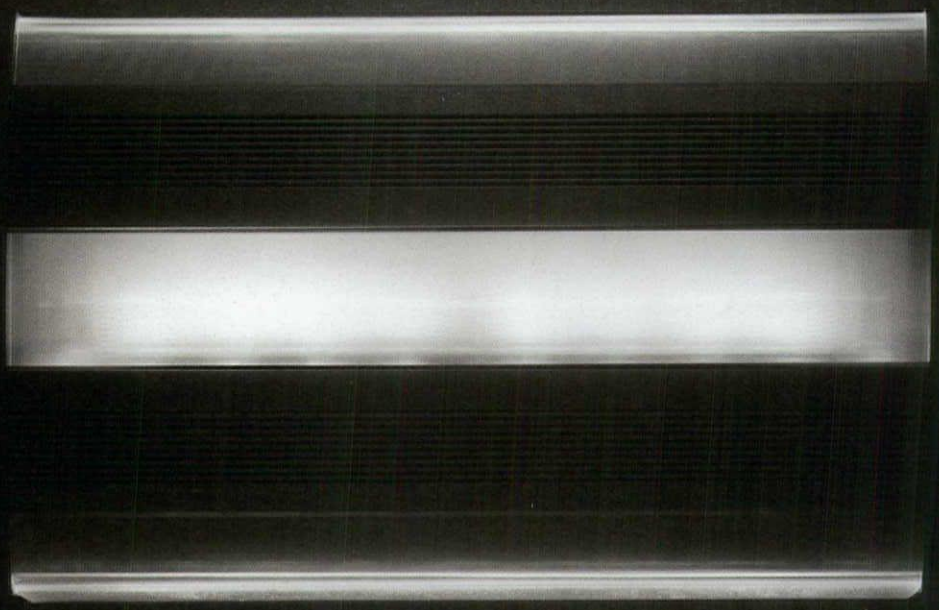


Project Bradley & Diegel Salon, Boston, Mass. **Architect and Lighting Designer** Studio Luz Architects, Boston, Mass. **Structural Engineer** Sarkis Zerounian & Associates, Newton, Mass. **MEP Engineer** Ibrahim & Ibrahim, Boston, Mass. **Photographer** John Horner, Somerville, Mass. **Project Size** 1,200 square feet **Manufacturers** Chloride Systems, Columbia Lighting, Prescolite, Tube Lighting

SKYLIGHT (LIGHTBOX) DETAIL



To create an inviting but understated space for the Bradley & Diegel Salon, Studio Luz Architects created a series of sculptural lightboxes to emulate existing skylights, and to infuse the long, linear space with more natural light (left). The lightbox assembly uses dual T8 strips, custom matte-white perforated metal shades, and a translucent polycarbonate lens (above).



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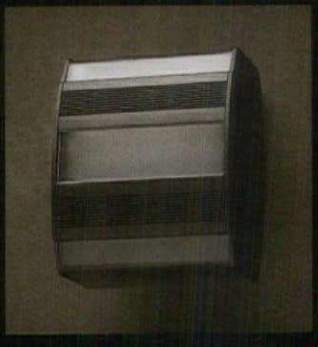

For more information, visit **luminis.com/quanta**

Circle no. 212 or http://archlighting.com/productinfo

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