

Welcome to Bright Ideas, your source for information on outdoor lighting issues, products and ideas. Georgia Power's Lighting Services group works to bring you the most up-to-date information about the industry and your options for outdoor lighting.

In this issue, you can find the latest on outdoor lighting and crime prevention, industry-wide technology updates, development of testing standards and new installations.

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outdoorlighting.georgiapower.com for more information about Georgia Power Outdoor Lighting. Our lighting experts will be happy to help you learn more about creating a bright, inviting outdoor environment for your business.

Crime Prevention through Environmental Design (CPTED) in Parking Facilities

Security is one of the most critical issues facing the owners and operators of parking facilities. Parking facilities are more likely settings for both violent and property crimes than all other real estate except residential, according to a U.S. Department of Justice, National Institute of Justice, research brief.

Local government officials are also concerned about security at these facilities – some of which are owned and operated by them – because parking affects the economic viability of a community.

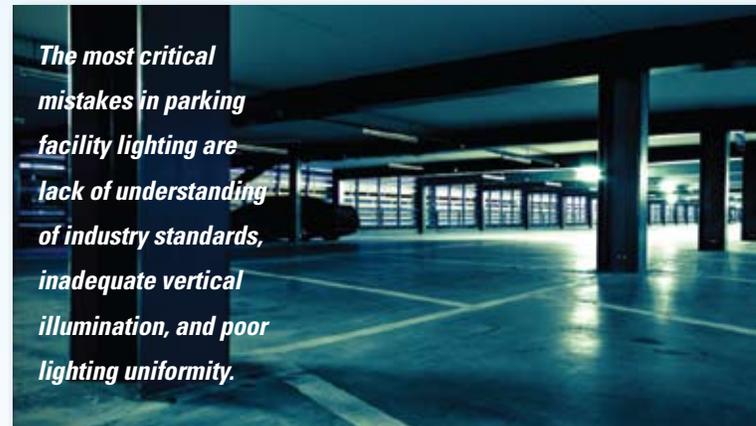
The reason violent crime is more likely to occur in a parking facility than any other commercial facility is because they are comprised of large areas with relatively low levels of activity.

Typical suburban shopping centers have 1.5 square feet of parking space for every square foot of retail space (office buildings usually have one square foot of parking space for every square foot of office space). A one-million square foot shopping center will normally have 1.5 million square feet of parking.

On a busy day during peak hours, a shopping center may have 10,000 shoppers inside but only a small number will be in the parking lot, which is 1.5 times as large as the mall, often attracting people with criminal intent. The result is an increased likelihood that an individual can be isolated in a parking lot and targeted for an attack.

Other aspects of parking facilities that make security difficult include:

- Parked cars impede the distribution of light and provide hiding places.
- Most parking facilities are open to the public.
- Offender's cars are unlikely to be memorable or seem strange in a public parking facility.
- Because land is valuable, particularly in urban areas, there is an increasing preference for parking garages over parking lots,



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and they offer much less natural surveillance than open, single-level parking lots.

- Parking facility security tends to be reactive rather than proactive and is often addressed only after an incident occurs.

CPTED is particularly applicable to parking facility design because its principles of natural surveillance, access control, and territoriality all have roles in preventing crime in a parking facility. While it is relatively easy to incorporate CPTED concepts in parking facilities at the time of construction, it can be difficult and expensive to upgrade security at a later date, especially in parking garages.

For parking facilities, the single most important CPTED security principal is lighting. Good lighting deters crime and provides a more

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Crime Prevention through Environment Design

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secure atmosphere and is one of the few facility features to have been documented as reducing crime in parking facilities.

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The following basic lighting principles illustrate the relationship of lighting design and security:

Illuminance is the intensity of light falling on a surface measured in footcandles. Both horizontal and vertical illuminance are equally important in parking facility lighting.

Uniformity is the avoidance of walking or driving through light and dark areas, especially difficult while driving because of the inability of the eye to adjust rapidly. Uniformity is also getting light to the edges of parking areas, not just into driving aisles. Maintaining a proper uniformity ratio of maximum illuminance to minimum illuminance avoids these problems.

Glare can reduce the contrast of objects against backgrounds, making it hard for the eye to perceive depth accurately. Glare is a potential hazard for all drivers and is especially dangerous for people with weak or impaired vision. Glare can be minimized by careful selection and positioning of lighting fixtures.

Lighting fixtures selected for a parking facility must do more than just provide ample, glare-free lighting. As a key component of the security system, they must also be reliable, easy to maintain, able to withstand the elements, and protected from vandalism in addition to meeting the standards for lighting design in parking facilities of the Illuminating Engineering Society of North America.

The outdoor lighting experts at Georgia Power can conduct a free lighting analysis of your property and design and install an outdoor lighting system to help protect your employees, customers and property.

LIGHTING INDUSTRY NEWS

U.S. Department of Energy sponsors Municipal Solid-State Street Lighting Consortium

To leverage the efforts of multiple cities pursuing evaluations of LED street lighting products, the U.S. Department of Energy (DOE), through the Office of Energy Efficiency and Renewable Energy (EERE) and its Solid-State Lighting program, recently formed a Municipal Solid-State Street Lighting Consortium. The Consortium will collect, analyze, and share technical information and experiences related to LED street and area lighting demonstrations.

In addition, it will provide an objective resource for evaluating new products on the market intended for street and area lighting applications. The Consortium is intended to be a user's group focused on the needs of participants making investments in street and area lighting. It is designed to disseminate best practices and lessons learned through national and regional meetings, webcasts, web-based discussion forums, and other means.

Membership in the Consortium is open to municipalities, utilities, and energy efficiency organizations, with participation at various levels from other interested parties.

- **Primary members** include municipalities, power providers, building owners, and other decision makers who invest in street and area lighting.
- **Advisory members** are solicited from organizations with a known history for promoting quality lighting and energy efficiency (i.e. educational institutions, environmental monitoring

agencies, etc.) and will be selected to fill specific Consortium needs.

- **Guests** include individual employees of organizations who meet the requirements for membership but whose organizations have chosen not to join.
- **Manufacturers** are excluded from membership but may be invited to present information on select topics and may also be given an opportunity to review draft specifications and other materials prior to their issuance.

Georgia Power and its Lighting Services business unit are pleased to have been approved as Primary members of the Consortium. We are also pleased to announce that Mike Stevens, Lighting Services materials team leader was appointed to the Executive Committee of the Consortium. Other members of the Executive Committee are from Seattle City Light, City of Los Angeles Bureau of Street Lighting, City of Portland Office of Transportation, the Illuminating Engineering Society Roadway Committee/Kauffman Consulting and the Virginia Tech Transportation Institute. Working Groups and subcommittees are now being formed to begin the work of the Consortium.

For additional information or to join the Consortium, please visit the Consortium website at <http://www1.eere.energy.gov/buildings/ssl/consortium.html>

LIGHTFAIR 2010

LIGHTFAIR 2010 - the world's largest annual architectural and commercial lighting trade show and conference – was held in Las Vegas, Nevada this past May.

LIGHTFAIR 2010 had over 22,000 pre-registered attendees and more than 475 exhibiting companies in the 160,000 sq. ft. exhibit hall. The conference featured almost 100 seminars, courses and workshops covering a wide variety of lighting topics.

LED lighting was a part of almost every exhibit, demonstrating that the LED is no longer the new technology curiosity as we've seen during the last two LIGHTFAIRs. It appeared that LED technology has become much more accepted by both lighting manufacturers and buyers as having real significance and was by far the predominant lighting technology on display.

While there were a fairly large number of new LED outdoor lighting products being displayed by new companies, the exhibits of the large traditional outdoor lighting vendors offering LED products were, with a few exceptions, the ones with the largest crowds during the entire show. While many of the LED products from new vendors looked good, it will be interesting to see how they compete with established companies in terms of quality, performance, lifetime and other key metrics.

Department of Energy Solid-State Lighting Market Introduction Workshop

The fifth annual Department of Energy (DOE) Solid-State Lighting market introduction workshop was held in Philadelphia in late July. This annual event provided a vendor-neutral forum for more than 300 lighting leaders from government, industry, energy efficiency organizations, utilities, municipalities, designers, specifiers, retailers, distributors and others to share updates and insights on the fast moving solid-state market and the rapidly evolving technology.

While a number of topics were covered in the two day workshop, two of the key themes that emerged were the continuing

need for the development of standards for all aspects of solid-state lighting technology and the need for consumer education on this new technology. At the workshop, the DOE announced plans for a new consumer education initiative that will be timed to the upcoming changes in general use light bulb regulation. The initiative will provide greater awareness of the overall benefits of the legislative changes brought about as part of the Energy Independence and Security Act of 2007 and new "greener" technologies such as LEDs and CFLs.

TECHNOLOGY UPDATE

LED Lighting – Lumens versus Watts

A recent e-mail posting from Jim Brodrick, manager of the Department of Energy (DOE) Solid-State Lighting program, presents some interesting thoughts about equivalency statements used on LED and CFL lighting compared to incandescent lighting. While the posting is aimed primarily at the indoor lighting market, the same issues are becoming apparent in evaluating outdoor lighting products. Summarized below are some of the key thoughts from this posting:

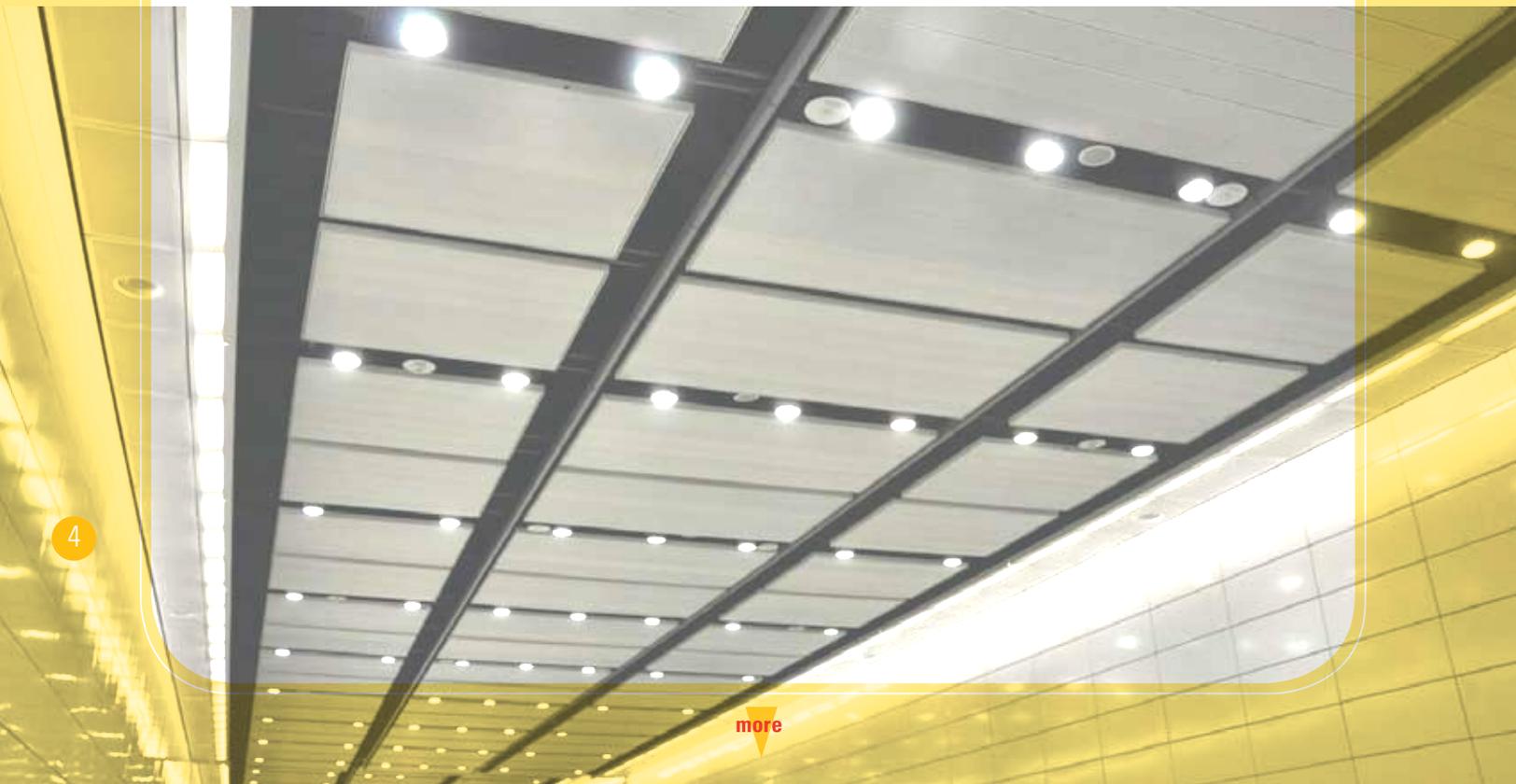
- DOE CALiPER (Commercially Available LED Product Evaluation and Reporting) testing has found manufacturer equivalency claims for LED products are often inaccurate, either because of excess enthusiasm on the part of manufacturers, or because they haven't yet figured out a good way to measure and convey equivalency. Many times a manufacturer mistakenly presents LED device data as luminaire data and overlooks the thermal effects of steady-state operation or other components – driver, heat sink and optics – that can affect light output.
- To determine a lamp's light output, people traditionally look at wattage – a measure of the electric power required to operate at rated voltage – an approach that works well with incandescent lamps. For more efficient lighting technologies such as SSL and CFL, or between technologies, it's best to look at lumen output.
- Relying on wattage can be misleading. Since LED and CFL products produce light more efficiently than conventional lighting, lower wattage doesn't mean they emit less light. The wattage needed to attain a given light output can vary considerably across these energy-efficient technologies. When it comes to useful light, what matters is what's coming out, not what's going in.
- The habit of thinking about light bulbs in terms of their wattage is deeply entwined in our incandescent roots and will be hard to shake. The DOE feels that it's clearly time to start shifting emphasis from watts to lumens and to educate consumers accordingly. Wattage is still an important metric but more as an indication of energy consumption.

LED Lighting – Development of Testing and Performance Standards

To facilitate the development and adoption of solid-state lighting, several organizations in the lighting industry, including the Department of Energy, are working to develop standards and test methods for product performance and safety. Summarized below is an overview of current standards development initiatives:

- The recent publication of a white paper on dimming by the National Electrical Manufacturers Association (NEMA). The paper, LSD 49-2010, describes current LED product dimming issues and offers best-practice guidance on application. It serves as the precursor to a NEMA standard that, when completed, will provide appropriate metrics for evaluating LED dimming performance and capability.
- Another recently published NEMA white paper, LSD 45-2010, discusses interconnect issues for LED products and their integration into luminaires.
- Underwriters Laboratories (UL) recently published a safety standard for LED products, UL 8750 "Safety Standard for Light Emitting Diode (LED) Equipment for Use in Lighting Products."
- A number of other SSL standards are in various stages of preparation. NEMA SSL-1, "Electric Drivers for LED Devices, Arrays, or Systems," is in final draft stages and is expected to be published this summer. IES methods for measurement of high-power LEDs and IES light engine measurements are in draft development. Additional LED definitions are currently in the approval stages to supplement the existing IES RP-16 Nomenclature and Definitions.
- The Illuminating Engineering Society of North America (IES) is currently working on a method of estimating the lumen depreciation of LED packages and modules, IES TM-21, which is intended for use with IES LM-80 (Approved Method for Measuring Lumen Maintenance of LED Light Sources).
- A Color Quality Scale (CQS) is being developed by the CIE TC1-69 committee of the International Commission on Illumination (CIE), with support from the National Institute of Standards and Technology (NIST). CQS is intended to replace or supplement the current Color Rendering Index (CRI) metric, which is not accurate for some light source types, including LEDs, which can receive low or modest CRI scores yet be perceived by users as having high light quality. It is believed that CQS will better capture what most humans perceive as superior color rendering.
- A NEMA standard for LED binning, NEMA SSL-3, is in the approval process and is expected to be published by mid-2010. This binning characterization is important to luminaire integrators to ensure that the appropriate LED packages are applied for the desired luminaire characteristics of high-power white LED packages used in general white-light applications.

These standards, and others yet to come, are an integral part of the development, adoption and advancement of solid-state technology for indoor and outdoor lighting applications.



LED Outdoor Lighting Test, Demonstration and Installation Sites

The last issue of Bright Ideas noted the upcoming LED test installation at a Georgia Power customer manufacturing facility to be conducted by Georgia Power in conjunction with the Electric Power Research Institute (EPRI). In January of this year twelve of the thirty 400 watt metal halide cobrahead fixtures at the facility were removed and replaced with twelve 215 input watt GE Evolve™ area light fixtures producing 12,600 lumens each.

This two-year test program will measure energy consumption, light levels, lighting uniformity, and performance of the LED fixtures. In addition, subjective customer input will be solicited regarding light levels, visibility, safety and security and other metrics. Shown below are before and after photos of this test installation site:



In March of this year, in conjunction with the city of Atlanta's Department of Public Works and the Division of Sustainability, Georgia Power installed four 105 input watt EvoLucia™ LED Cobrahead fixtures from Sunovia Energy Technologies producing 5,565 lumens each. These LED fixtures replaced four 150 watt high-pressure sodium fixtures on a city street in downtown Atlanta. This 12-month demonstration installation will allow the city of Atlanta and Georgia Power to evaluate the brightness, light uniformity, visual recognition and performance provided by these LED fixtures and collect feedback on the new lighting from area residents. Shown below are before and after photos of this demonstration installation site:



Georgia Power's largest and most recent LED outdoor lighting demonstration site is at the company's headquarters in Atlanta. In June, 56 high-intensity discharge light fixtures were removed and replaced with LED fixtures at the main entrance drive, parking lots, parking deck entrance and on-site day care center. The new fixtures are 105 input watt LED Generation post-top units producing 2,850 lumens each and Ventus LED area light fixtures with input wattages ranging from 103 to 309 watts producing 6,894 to 21,637 lumens each, all from Cooper Lighting.

The fixtures they replaced were 175 watt (post top) and 400 watt (area) metal halide units. The new LED fixtures provide uniform white lighting to the areas in which they are installed and provide significant energy savings compared to the high-intensity discharge lights they replaced. Watch for before and after photos of this installation in a future edition of Bright Ideas.

The Lighting Services business unit of Georgia Power completed its first LED customer installation in late May for the Savannah-Chatham County public school system at its new Godley Station Pre-K – 8th grade school. The school system's green initiative for this new state-of-the-art facility included outdoor lighting. The leased LED outdoor lighting system from Georgia Power was selected to support the initiative and reduce the outdoor lighting system's impact on the environment by reducing energy consumption. Thirty-seven GE Evolve™ area lights mounted on 30' fiberglass poles were installed in the parking areas and bus loop of the school.

