

LEDS



DOE PROGRAMS

Add Credibility to a Developing TECHNOLOGY

By Susan Conbere

LED technology (light-emitting diode) is moving fast, and with justification, some facility managers have viewed it with a wary eye.

"We've tried about half a dozen LED products and we haven't been overly impressed," says Marlowe Leafy, assistant director for electrical systems at the University of Maryland, College Park. "The lamp will last [as long as advertised], but the driver doesn't. I'm also not convinced yet that LED technology has settled down. My big concern is maintainability. Will you be able to get parts down the road once you put those products in, since technology is changing so quickly? We're standing back and watching to see how the technology develops."

To date, Leafy's concerns have been quite valid: some LEDs on the market do not perform as promised, and the technology is changing rapidly. But new developments from the U.S. Department of Energy (DOE) now make it easier for facility managers to find LEDs that meet manufacturers' claims for light quality, life expectancy, and efficiency.

DOE has invested significant effort in supporting LEDs, which, due to their much greater durability and potential for efficiency, DOE calls a revolution in lighting. In December 2008, DOE released the first ENERGY STAR criteria for LED fixtures. DOE also announced the creation of Solid State Lighting Quality Advocates, a new program designed to help purchasers find a wider range of high-quality LEDs.





LEDs brighten this hallway beautifully.

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ENERGY STAR AND QUALITY ADVOCATES

ENERGY STAR began qualifying seven types of residential LED products:

1. Under-cabinet kitchen lights
2. Shelf-mounted display and task lights
3. Portable desk lamps
4. Recessed down lights
5. Outdoor wall-mounted porch lights
6. Outdoor step lights
7. Outdoor pathway lights



ENERGY STAR qualified LEDs are not only efficient, but exceptionally durable, with residential products lasting 25 times longer than incandescents and more than twice as long as compact fluorescents (CFLs). If you like the idea of never changing a bulb, LED lighting fixtures have great appeal: commercial-grade products must last 35,000 hours or 35 times longer than incandescents to earn the label. What's different here is that you aren't installing a bulb, but a fixture, which requires no replace-

ment until the end of its useful life. The fixtures last over ten years,¹ use 75 percent less energy than incandescent bulbs to produce the same amount of light, and, unlike many CFLs, are compatible with dimmers and daylight sensors.² Residential LED fixtures that have earned the ENERGY STAR are also highly durable so they won't break like bulbs, and they're suitable for renovations and new construction. They are also guaranteed to provide excellent light quality that remains constant over the rated lifetime without flickering, dimming, or shifting color.

On February 1, 2009, ENERGY STAR added the following types of products to the original list of seven:

More Bright Ideas

To get energy use as low as possible, Leafy recommends that facility managers focus on hallway lighting first, where lights are often left on 24 hours for security. "You'll get bigger savings there than in offices, where lighting is on typically 9 hours a day." Leafy is using 2 x 2 linear fluorescent fixtures with 2 T-5s, placed 24 feet on center (max), and dropping light levels down to IESNA standards.

"We're running anywhere from one-quarter to a third of a watt per square foot and we're putting in lighting that gives us at least 6 foot candles. One-quarter to one-third of a watt—there are few buildings that are able to get that right now."

That one-quarter to one-third of a watt is achieved during the middle of the day when hallways are at full brightness. Leafy has also installed step dimming ballasts in those fixtures, which give either 50 percent or 100 percent light output. Using digital lighting relays through the campus' central monitoring system, the university turns the lighting down to 50 percent after hours. "We're squeezing out as much energy as we can."

Residential Applications

1. Surface and pendant-mounted downlights
2. Ceiling-mounted luminaires with diffusers
3. Cove lighting
4. Surface-mounted luminaires with directional heads
5. Outdoor pole/arm-mounted decorative luminaires

Commercial Applications

6. Surface and pendant-mounted downlights
7. Wall-wash luminaires
8. Bollards

DOE is waiting for LED technology to mature before qualifying additional products. In the meantime, quite a few LEDs are on the market that come with wildly exaggerated claims, and then flicker, dim, or shift color after less than a year of use. To prevent these poor performers from souring the market, DOE has introduced the Lighting Facts™ label to help purchasers find products that perform as promised. Luminaire manufacturers who take the SSL Quality Advocates pledge agree to accurately report on product performance in five areas: lumen output, efficacy, wattage, correlated color temperature and color rendering index. Purchasers can find a list of manufacturers who have taken this pledge and a list of products at www.lighting-facts.com. DOE is hoping that utilities and other efficiency advocates will use the Lighting Facts label to select products for their rebate programs. Facility managers can also use the Lighting Facts™ label as a basis for their own purchasing criteria.

ECONOMICS

LEDs save money on electricity and maintenance in the long run, but they often cost a good deal more than conventional fixtures. Leafy has tested one screw-in LED light source that cost \$80. "A big selling point is that you screw it in and never have to replace it," he says, "but you could buy a heck of a lot of compact fluorescents for \$80." As the university's criterion is a three- to four-year payback on all lighting upgrades, LEDs don't yet make the grade.

DOE expects demand to increase and prices to decrease with the new ENERGY STAR criteria, based on its experience with other ENERGY STAR products. Quality Advocates should also help purchasers feel more comfortable with LEDs and boost demand.

One way to lower the price of LED lighting is bulk purchasing. *QuantityQuotes.net* is a DOE-sponsored website that helps large buyers find suppliers of ENERGY STAR qualified



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products and then negotiate a contract at a competitive price. CFLs are now listed and LEDs are coming soon.


LED APPLICATIONS

For colleges and universities, one of the best applications for LEDs is lighting that's hard to reach. "LEDs are great for those areas where you've got to use scaffolding or a crane to get to a light, like atriums," says Leafy.

There are tremendous savings to be had in outdoor lighting as well, where the greater durability of LEDs is an advantage. Here, purchasers can look for ENERGY STAR qualified wall-

mounted porch lights, step lights, and pathway lights.

"We've got our hands full doing interior lighting retrofits now, but this may work in our favor," says Leafy. "Once we can get to the outdoor lighting, maybe the technology and prices will have settled down."

Leafy, and his educational facilities colleagues will be watching. 

NOTES

1. Based on an average daily use of 12 hours per day, 5 days a week for commercial-grade lamps. Life expectancy for commercial-grade lamps is 4 years if lamps are left on 24 hours a day.
2. Check with the manufacturer for a list of approved controls for each fixture.

Susan Conbere, who can be reached at sconbere@drintl.com, writes about better building practices on behalf of ENERGY STAR, a program administered by the U.S. Department of Energy and the U.S. Environmental Protection Agency. Learn more at www.energystar.gov. This is her first article for *Facilities Manager*.

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