

# Lighting

## LED Retrofits



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### **Lighting Retrofits for LEDs Require Understanding Facility Needs**

**A**re your facilities using LEDs yet? By now, many institutional and commercial facilities have started using them to some degree.

Some maintenance and engineering managers have used LED replacement lamps when cost, function or maintenance characteristics make them more attractive than their fluorescent counterparts. Some have retrofitted entire buildings with LEDs. What is the appropriate strategy for a particular facility?

To select the most appropriate LED products for a retrofit project, managers first need to identify the needs of the space. What is the quality of intended light? Does the project include requirements, recommendations or requests for light levels? What are the required controls functions — individual, dimming, automatic daylight, preset, manual dimming?

When it comes to lighting system maintenance, will technicians be able to reach the fixtures with a ladder, or will they need special equipment? Is maintenance on a fixture restricted by time of day? Does the process require tools?

Once managers identify these needs,

they can move on to selecting a range of fixtures. Because this category of products is changing so quickly, managers also might need to specify performance. If managers only specify a product and several months or years elapse between specification of the product and shipping, it is likely to have changed. Specifying performance instead — illumination level, uniformity, etc. — ensures that even if the fixture changes, managers will get the intended performance.

Effectively specifying an LED product involves a combination of fixture performance and intended results. When specifying products with traditional light sources, it generally is enough to specify one product and then, by comparing product size and performance, list one or more equivalent products.

That strategy is not possible with LEDs unless the manufacturer uses a known LED module and several manufacturers use the same module. If a manufacturer has developed its own unique module, then it might be difficult for managers to specify an equivalent alternative without doing some additional research.

### **Benefits and Challenges Associated with LEDs**

Not since the beginning of electric lighting have managers seen such a rapid change in technology or such

rapid acceptance and implementation of it. The potential energy savings LEDs provide and the reduced frequency of maintenance has generated a great deal of excitement, and both are music to managers' ears.

Lighting designers and building occupants like the generally excellent color quality LEDs provide, as well as the ability to dim. They also like the smaller housings and the ability to put light in places where it previously had been impossible.

While LEDs can bring all of these benefits, they are not without challenges. The technology is changing so fast that every six months or so, manufacturers make improvements that make it impossible to create long-term, project-standard specifications. Instead, performance specifications are needed to ensure consistent performance of LED products over time.

Even with this rapid acceptance, LED technology can create pitfalls, especially in retrofit situations. Though most LEDs are dimmable, not every LED is compatible with every dimmer. In existing buildings, this situation can be frustrating because in some cases, the only way to determine compatibility is by creating mock-ups.

But it can be very time consuming and costly to perform a physical test of an entire circuit to judge a product's performance, especially if the fixtures are

difficult to access. Some manufacturers publish product compatibility lists on their websites to help specifiers match technologies, but because of the rapid change in products, these lists are never fully up to date or complete.

LED products are available for most fixture types that exist in institutional and commercial facilities, and many of them are as efficient or more efficient than their fluorescent or HID counterparts. While the cost of LEDs has decreased over the last few years, managers still will pay a premium for them.

### **LED Specification Strategies**

Acknowledging that cost is a driver for every project, how do managers know when the additional expenditure for an LED product is worth it? Is the first cost the primary consideration, or do energy savings, the cost of maintenance over time, and greater controls flexibility add to the value of an LED system? The way each manager models this cost will determine the potential benefits of an LED system to a given facility.

Comparing LED products among manufacturers is challenging because manufacturers do not have a uniform way of describing their products' performance on their cut sheets. Some manufacturers provide partial photometric files. They can include various types of information, including lamp lumens, fixture lumens, fixture efficacy, distribution pattern, and wattage.

Invariably, the two products a manager wants to compare will not have the same information, so the only way to compare them on paper is to review their complete photometric file. But even with this comparative information in hand, managers can judge other performance characteristics only by seeing the actual fixture. For instance, does a fixture flicker when it dims? Reviews of many so-called dimmable fixtures revealed that some flicker noticeably at the low end of the dimming range.

To compare products' color quality — color temperature and color rendering index (CRI) — managers also need to view the units in question. Two

fixtures with the same CRI and color temperature can have vastly different color appearances when they are LEDs. This is not true of traditional sources, which are relatively predictable with these two numbers. Overall, managers can clearly observe the glare control of fixture optics but cannot determine them from information on a cut sheet.

It is critical to the success of a retrofit that the LED, control hardware and software are compatible. Specifying three manufacturers for the LED and three manufacturers for the controls can be a recipe for disaster. The compatibility is so specific that it is better to write a specification around specific products.

Rather than waiting until bid day, managers should go through a pricing exercise early in the design process to identify the products that are the best fit for the project and write a comprehensive specification for fixtures and controls around one group of products.

This strategy is a change in the way the lighting profession traditionally does business, and it requires trust and commitment from all involved parties. It will not be easy, but it will provide the best solution. The process should be a team effort led by a lighting design professional who can bring knowledge of a range of products and help direct managers to the most appropriate products for a particular retrofit project.

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