

## January-February 2010

# Slashing Lighting Costs

Facility managers and building owners are starting to pay more attention to their lighting needs.

By Dan Rafter

Photo: Estrella Mountain Community College



Vincent Rieselman faced a challenge. The senior designer needed to provide adequate lighting for a combination lecture hall/computer lab at Estrella Mountain Community College in Avondale, AZ. The problem? The space he needed to light was cavernous, measuring 60-feet-by-60-feet.

Rieselman decided that a creative solution was his best option. He went with a two-pronged approach, first calling for canopy lights to hang above 70 computer workstations in the lecture hall. He also called for the installation of seven rows of strip pendant lighting fixtures that would dangle from the space's ceiling. Rieselman, satisfied with this solution, submitted his plans to the college in late August.

For Rieselman, senior designer at Phoenix, AZ-based Orcutt/Winslow, an architecture, planning and interior design firm, this approach was the only way to cost effectively provide the best lighting possible for the college's students, and to make sure that the lecture hall was transformed into a more pleasant learning environment.

"We had plenty of natural north light coming into the space, but that space is just too big for it; it isn't human scale," says Rieselman. "I wanted to create another layer of light to help give the space that human feel. That's what the level of canopy lights gives the area. It gave me a way to add indirect lighting; it added an extra dimension to the space that could not have been accomplished in any other way."

Students working in the lecture hall can now type their reports and craft their projects without squinting from a lack of light. They won't have to shield their eyes, either, from glare bouncing off their computer screens. The officials at Estrella Mountain College were wise enough to hire someone to focus on their lighting needs.

This is becoming more common, say the manufacturers of lighting products. Facility managers and building owners are starting to pay more attention to their lighting needs. They want their buildings lit as often as possible by natural daylight, lighting systems that consume as little energy as possible, light bulbs that last longer, and they want fixtures that are easy to maintain and repair.

The reason behind this attention is simple: Lighting buildings can be a costly endeavor. For companies in a weak economy looking to save dollars in any way possible, it makes good economic sense to install lighting systems that are efficient and relatively maintenance-free.

Of course, building owners and managers can't do this if they don't first take a close look at their own facilities. Hotels, for instance, have different lighting needs than do university classrooms or retail stores. Lighting systems that work well in offices may not perform as effectively in industrial settings.

This is where building managers often fall down, say lighting industry experts: They know they want to save money on their lighting bills. They're just not sure how to best accomplish this at their own sites.

"It all comes down to sustainability," says Tim Smith, vice president of sales at Houston, TX-based Arcalux Corp., a company that designs and sells energy efficient lighting systems. "Building owners have to consider whether the lighting they're putting in is a short-term fix to their higher energy costs, or whether it's a sustainable system that will not only meet today's needs, but give building owners the opportunity to adapt and continue to save energy as their companies grow and change over time."

The problem with many building and facility owners, lighting experts say, is that they don't take this approach. Instead, they often remain focused on saving money immediately. Instead of paying a bit more for a more efficient lighting system that may save them considerable money over the years, many building owners and facility managers are still choosing to purchase the least expensive lighting fixtures and bulbs that they can buy.

Part of the problem, Smith says, is that different people within a business have different desires for how lighting systems perform. The facility manager may be focused on acquiring light fixtures that are easy to maintain because his custodial staff is now spread thin thanks to economic cutbacks. The property manager may be interested in energy savings because she is interested in slashing building costs as much as possible. A regional manager may be most focused on maintaining and boosting the value of the building.

The trick is to work with these diverse managers to discover which lighting system can meet as many people's needs while reducing energy costs over the long-term, Smith says.

"It is our hope, and generally this holds true, that the maintenance manager, the facility manager, the building manager and the regional manager are all interested in some level on reducing energy costs and reducing maintenance time," says Smith. "That may be a bit of an oversimplification, but we think this usually holds true."

### **Changing the Mindset**

Convincing building, regional and maintenance managers to think this way often requires changing the mindsets of these professionals.

Lighting manufacturers, for instance, will often have to preach the benefits of savings over the long-term to convince facility managers to authorize the installation of lighting equipment that may cost more upfront but pay off in reduced energy costs year after year.

To do this, manufacturers can focus on the cost-saving nature of these more efficient lighting systems: Some systems will require that buildings have fewer fixtures, spaced farther apart, meaning that maintenance staff will not have as many fixtures about which to constantly worry. Other systems take advantage of the natural daylight that buildings already receive. Instead of burning full blast when the sun bathes rooms in natural light, the fixtures adjust so that lights are burning softly or not at all, resulting in significant savings. Other systems automatically shut down lights after hours, so that energy is not wasted by lights burning brightly long after employees have left for the day.

Of course, not all of these systems work equally well in every building. Hotels, for instance, can't shut down all their lights at the end of the day. Daylighting systems, which take advantage of natural daylight, work best in larger, more open warehouse spaces, and aren't quite as effective in multi-level office buildings.

"It's about finding the right solutions for the right situations," says Robert Vessie, vice president of business development with Pfister Energy, a manufacturer of efficient lighting systems in Paterson, NJ. "These more efficient systems, though, are finding their niche. I believe they will only continue to get more popular."

### **Saving Money in Maryland**

Like most government entities, Howard County, MD, is looking to save money. Budgets are tight, and county officials are looking to slash every expense possible.

Fortunately, the county may have found a way to do this by installing energy-efficient light fixtures throughout county government buildings.

The county has already installed T5 SmartFixture fluorescent lights, manufactured by Arcalux, in a county courtroom and a backup 911 center. The county will also install the lights, replacing both T8 and T12 lamps, in its main 911 center, a project slated to begin this November.

Depending on how these lights function, the county may replace more lights in its buildings with the higher-efficiency SmartFixture fluorescents, which provide annual energy savings of 25% to 50%, says Richard Lee, energy manager for Howard County.

“We did our math for this project,” says Lee. “Money is tight. This project had to fight off other competing projects. There are only a few projects like this alive in the county right now. We figured out that with this investment, with this fixture, this project will be paid off in just a few years. Economically, it’s a strong project for us.”

That is the key, lighting manufacturers say. To inspire more government entities or private building owners to install energy-efficient lighting systems, manufacturers and distributors must first convince them that they’ll soon see their initial investments paid off. And then they’ll be able to fully enjoy the reduced energy costs that their new lighting systems bring them every year.

But without appealing to facility managers’ or government officials’ bottom lines, growth in energy-efficient lighting systems won’t happen nearly as quickly.

Building owners and facility managers often need to be presented with a full life-cycle analysis of a lighting system’s costs to understand just how much money a particular system can save them over that system’s projected lifespan, Smith says.

This life-cycle analysis should cover more than the energy savings that specific lighting systems provide each year, Smith says. It should also cover the cost of maintenance. Some lighting systems don’t require as many bulbs or fixtures. This means that maintenance staffers won’t have to spend as much time replacing light bulbs or replacing fixtures, which will result in a lower cost of labor over the years.

“A lot of people still only focus on the payback period,” says Smith. “They want to know how long it will take before the energy savings cover their initial investment. That’s really a very shortsighted way to look at a lighting system. A system may pay you back in a short period of time, but over a longer period of time, it may actually cost you money. You have to first set the life cycle. Then, you can analyze all the costs in the life cycle. Then, you can compare the two systems to decide which one brings the best life-cycle cost. You’ll find that it’s not always the system that is the least expensive upfront.”

For Lee in Howard County, it’s also helped that the new fixtures in the county’s backup 911 center actually provide a better quality of light. Workers here, of course, deal daily with life-and-death emergencies. They need to see clearly the computer screens at which they sit. The new lights provide far less glare.

“So far, we’ve been very pleased,” says Lee. “The computer screens our workers are using are getting bigger and bigger. We commonly hear the workers complaining about glare on these larger screens. That has jeopardized our productivity. The employees get headaches.

“These new light fixtures, though,” he says, have reduced glare significantly.”

And that—a boost in employee productivity—is exactly the kind of cost benefit that facility managers and government officials need to consider when analyzing the costs of a lighting system over its lifespan, Smith says.

The problem is that it can sometimes be a challenge to spread this message. “Some people at different levels of a company’s management aren’t really empowered to make these decisions,” adds Smith. “Often times, they are told by their bosses that they have to stick to certain parameters when searching for a new system. If someone gives you \$10 to go Christmas shopping, you only have \$10. You may want something that is better value, but you only have what you have.”

For that reason, Smith says, it’s important to for lighting system distributors and manufacturers to approach those people who have the authority to properly weigh the long-term costs and benefits of a lighting system.

For instance, a higher-level manager may decide that it makes more sense to purchase slightly costlier light fixtures if they will require less maintenance. It may take maintenance staffers 20 minutes to change the ballast in a cheaper fluorescent lighting fixture. Maybe a fixture that is slightly more expensive will require that same maintenance personnel fewer than two minutes to change. A higher-level manager might be able to make the decision that the more expensive fluorescent fixture makes more economic sense, then, in the long run.

### **An Emphasis on Efficiency**

Lou Calvo, director of sales and marketing with Wheeling, IL-based Waldmann Lighting, says that he likes to emphasize a lighting system’s efficiency when showcasing it to building managers.

By doing this, he says, it’s possible to get facility managers and decision-makers to focus on factors outside of a system’s initial cost.

“A lot of fixtures, some of the decorative ones, are really nice to look at, but they are very inefficient,” says Calvo. “It’s important to understand the efficiency of the products you are looking at. The further you can space those fixtures apart, the more efficient they are. You don’t need as many of them, and that ultimately results in less maintenance.”

Building managers can significantly slash their lighting costs by choosing the right type of system, too, Calvo says.

Building managers, for instance, can choose from direct or indirect lighting systems. Others go with a combination of direct/indirect lighting. Systems such as these send some light downward, and other light up.

To Calvo, this combination approach, with fixtures that send light out of both of their sides, is most effective for hotels, which need a pleasant lighting system to maximize the aesthetic value of their lobbies and common areas, and office space, which needs lighting that will make it easier for employees to efficiently do their jobs. The combination approach will light an office space, while not being unnaturally, and distractingly, bright, Calvo says.

“Indirect light creates a cloudy day effect,” says Calvo. “There is no down light to give a sense of brightness. The employees are not as comfortable as they are if there is some direct-lighting component. If you only have direct light, it creates a bit of a cave effect. There is darkness at the ceiling line. There is a lot of contrast that isn’t as pleasing.”

A growing number of building owners and facility managers are also exploring daylight harvesting, Calvo says. This means that, if an office or educational facility has a conference room that is awash in natural light during the day, the building’s lighting system automatically either shuts off or burns less brightly.

In general, Calvo says, it’s best to rely as little as possible on artificial light and as much as possible on natural sunlight. This is especially true in multi-level office buildings, Calvo says.

That’s why many lighting systems today come with controls that allow them to react to the amount of natural lighting coming into a building.

“You want to utilize controls to minimize the amount of artificial light in a space,” says Calvo. “If you don’t, you often find that a space is overlit. The lighting systems ignore the natural daylight already coming into a space. That wastes energy. Controls can stop this. You can run fixtures at 20% of their normal output when a lot of daylight is entering a room. You can then gradually increase that power as the amount of sunlight lessens.”

Another inefficiency found in most office buildings is that every worker usually is granted the same type of workspace lighting. Building owners could save a significant amount of energy costs, though, if they gave their workers some measure of control over the lighting at their cubicles or workstations, Calvo says.

For instance, younger workers may not need as much artificial light at their stations as might older ones. In most offices, though, workers don’t have the ability to regulate how much light they receive.

“Regardless of if you are older or younger, everyone gets the same light or amount of light,” says Calvo. “That tends to be wasteful. Younger folks working on computers don’t require the same illumination levels as middle-aged workers doing paperwork. Task lighting allows them to control the light at their own work stations.”

Calvo says more companies are investing in LED task lighting because it consumes a lower amount of energy than does standard fluorescent lighting, yet allows for bright light to reach the work stations of those employees who want it.

Waldmann Lighting, for instance, is working with an architectural firm to replace the company’s incandescent task lighting with LED task lights. With only 8 W of power, versus 60 W to 75 W for the incandescent lights, the firm’s architects will be able to clearly view their blueprints.

“That could result in a reduction of energy consumption by a factor of almost 10,” says Calvo.

Officials at Pfister Energy are seeing a growing demand for that company’s Daylighting lighting system.

Daylighting refers to the use of direct, diffused, or reflected sunlight to provide lighting for building interiors. Daylighting systems—in which controls turn electric lights off as sunlight increases—are especially useful for warehouses, manufacturing facilities and classrooms, Vessie, from Pfister Energy says.

These systems aren’t as difficult a sell to many building owners, because they typically boast a short payback period of just two to three years since they save so much energy on an annual basis. Pfister Energy estimates that daylighting systems can cut energy use by 50 cents or more per square foot.

“The systems are a great fit for the right type of facility,” says Vessie. “They lend themselves well to gymnasiums, warehouses, manufacturing facilities—basically, to single-story buildings with high-bay ceilings. If you can find facilities that meet those criteria, these systems are a no-brainer.”