

Driving it Home

Healthcare lighting on road to sustainability

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For more than two decades, the lighting industry has been addressing the energy efficiency aspects of luminaires. In the 1980s, the focus was on the energy efficiency of lamps and switched to electronic ballasts in fluorescent fixtures. Then, compact fluorescent lamps started to replace incandescent lamps. This was followed by designing more efficient fixtures with better reflectors and new diffusing materials to further shape the beam of light.

More recently, controls have been implemented to automatically reduce the amount of electric light based on available daylight or on occupancy, an especially effective lighting scenario in the hospital environment. It's now time to take the next step on the road to sustainability and address what to do with lighting products when they are no longer needed.

PRODUCT WASTE: A GLOBAL DILEMMA

The world is running out of space to dispose of used and unwanted building products. In the developed world, it is common practice to ship waste to developing countries where regulations are lax, if they exist at all. Developing populations are hungry for any source of income and are willing to take apart electronic products. Europeans have banned the export of electronic waste to developing countries as part of the Waste for Electrical and Electronic Equipment initiative; but even so, there are numerous stories in the media about shipments of e-waste being sent to Africa, Pakistan and India. The process of burning the waste releases toxic gases into the atmosphere that most certainly have a negative impact on those who are closest to it — to a lesser degree, it affects all of us. Once it is in the atmosphere, we all share it.

In the United States, Congress has been slow to act, so e-waste is being addressed on state and local levels. One solution has been to put the cost onto the consumer, charging a fee of \$6 -10 at the time of device purchase to go into a fund to pay for its recycling later — this is California's direction. In Main, Massachusetts, Minnesota and Washington, proper disposal is the responsibility of electronic manufacturers. Most of the media has been focused on computer, television and cell phone equipment because of the significant increase in volume over the last years. But many elements of concern in electronic and electrical product waste are found in light fixtures and lamps.

Fortunately, most lighting products have a longer life span than other building products, but eventually, they too will need to be discarded. Modern healthcare facilities are large consumers or resources, including lighting products and have great opportunities to make changes that can reduce consumption and waste products.

The largest component of most light fixtures, by volume, is the steel or aluminum housing. These materials are easy to recycle and recycled content raw material is readily available for use in the original manufacturing process. However, it seems the majority of lighting manufacturers cannot say with certainty what percentage of their product is made with recycled content material. In lesser amounts, fixtures contain PVC coated wires, sockets, control gear (ballasts, drivers and transformers) and diffusing materials, usually of plastic or glass. Right now, it is common practice to simply dispose of these materials in a landfill even though much of the fixture could be demanufactured with raw materials recaptured for a new use.

As in the recycled content matter, the life of a light fixture is equally hard to pin down. It is likely a commercial space will be remodeled before the light fixture runs the course of its useful life. Because the configuration of the space changes, usually the lighting must change, too. And healthcare facilities make changes due to changes in the way the healthcare is delivered, which necessitates extensive remodeling.

Light fixtures are relatively easy to recycle because most of the components can be easily separated. The problem is

Product Waste Initiatives

Reduction of Hazardous Substances Compliant: Applies to eight categories of electronic and electric equipment marketed after July 2006. They must meet certain objectives established by the European Union to reduce the amount of hazardous substances found in electronic and electrical equipment. Categories include light fixtures.

Waste from Electrical and Electronic Equipment, or WEEE, Directive: Controls the disposal of electric and electronic equipment by requiring it be recycled or re-used. It cannot be put in landfills. WEEE was passed in 2003, but is being implemented in stages. It transfers the responsibility for disposal at end-of-life from the end-users to the producers of the equipment.

Toxicity Characteristic Leaching Procedure: Defines the likelihood of the toxic materials in a lamp leaching into the groundwater if they are disposed of in a landfill. The term is synonymous with low-mercury content and does not necessarily replicate real world conditions. Lead and mercury are the two primary concerns as they are bio-accumulative.

Cradle to Cradle Certification: Evaluates products on several levels to determine overall sustainability of the product. Criteria includes environmental and human health implications of the use of the product, considerations for material re-utilization, energy efficiency of the product and the use of renewable energy in the making of the product and the implementation of socially responsible policies by the manufacturer. Manufacturers are awarded certification on a sliding scale similar to LEED certification.

the infrastructure in the lighting industry is not set up to do it. Unlike the carpet industry that was one of the first building material industries to take back and recycle their product with the acoustical ceiling tile industry following suit, the infrastructure necessary to take back lighting products is daunting, even for large manufacturers. Other industries may have been more successful at this because there are fewer companies competing for larger portions of the market and the products are more uniform in terms of materials used and size. For the lighting industry, it may make more sense for an independent recycling industry to develop rather than a product-specific one.

SIZING UP LIGHTING PRODUCTS

Just as LEED certification has become a way to understand the relative “greenness” of a building, a similar evaluation system is needed to determine the “greenness” of the products that go into our buildings. However, there isn’t a universal system of comparison for manufacturers, so it is surprisingly difficult to compare products from different manufacturers with regards to sustainability. The Pharos Project is a web-based tool that attempts to compare building materials by connecting building professionals and manufacturers to the critical health and environmental data about the production, use and end-of-life of building materials, but Pharos doesn’t currently encompass lighting products.

At least one light fixture manufacturer is Cradle to Cradle

(C2C) certified, another sustainability evaluation system for products, but this system can’t be used on a comparative basis until more lighting manufacturers are included. Sometimes lighting products will show as Reduction of Hazardous Substances, or RoHS, compliant. RoHS compliant is a requirement of the European Union that describes what level of toxicity is acceptable in a product, and some U.S. manufacturers are picking it up as a label for their products.

ROAD TO SUSTAINABILITY

Resources like the healthcare sector’s first quantifiable sustainable design toolkit called the Green Guide for Healthcare offers information that addresses overall sustainability of hospitals including construction waste. These resources help integrate enhanced environmental and health principles and practices into planning, design, construction, operation and maintenance of healthcare facilities.

On the road to sustainability, each building product matters, including light fixtures and how we choose to dispose of them. It would be ideal to see the lighting industry rally around this issue and set up a nationwide system that makes it easy to not only recycle building products that are no longer needed, but also to allow people to purchase them back for a new use. But we are far from being able to readily recycle lighting products. Although there are resources to recycle lamps and ballasts,

if you want to recycle the fixture, you are probably on your own. While Cradle to Cradle products are able to be recycled, it does not mean that they will be. That is still up to the end-user.

Many large healthcare institutions have formal programs to reduce the disposal amounts of hazardous materials. They are actively looking for alternatives to mercury-based thermometers and other measuring devices and tracking results. Similarly, reducing the mercury in lighting products can be done (see sidebar).

Consumers will drive this initiative as they have with the overall green movement. Lighting professionals and facility owners must carefully consider which manufacturers they choose based on their manufacturing processes, recycling and product waste policies. Something as simple as selecting long-life versions of lamps can reduce the frequency of re-lamping, thus reducing the volume of products that need to be recycled or disposed. Continually stepping in the right direction will get us there. ■



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Tips for Mercury Reduction

- Lamp manufacturers have reduced mercury output of fluorescent lamps. They are not a premium cost, so there is really no reason not to use them.
- Not all manufacturers' products are equal, so to minimize mercury consumption, insist on the manufacturer providing the amount of mercury in their products.



- On a per-lumen-basis, 4' T5 and T8 lamps have less mercury than compact (single-ended) lamps, so design systems to use more full-size lamps.
- Recycle all lamps. Train staff to put spent lamps into empty lamp cartons. When full, send them to a recycler. Do some due diligence — make sure the recycler is actually recycling them and not just shipping them to a third-world country.
- LEDs contain no mercury and most do not contain lead. Some manufacturers will take back modules at the time of replacement, so find out their policies and warranties before buying.