

Abstract for NeoCon Conference

Achieving Sustainable LED Lighting: A Product Design Guide
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Solid State Lighting, using light emitting diodes (LEDs), has great energy saving potential over conventional incandescent and fluorescent currently in use. However, although there are great energy savings in the use phase of the lamps, the remainder of the product lifecycle is not so cut-and-dried.

LED products rely on on-board or sometimes off-board power supplies and other electronic circuits. Aluminum heat sinks may be required for heat management to maintain long lifetimes. Adhesives or fasteners are necessary to hold all the constituent components together. All of this added complexity has an environmental footprint, especially when considered against the relative simplicity of fluorescent tubes and screw-in incandescent bulbs.

Only by evaluating the entire product lifecycle, from raw material extraction to manufacturing to use through end-of-life, can the overall ecological impacts of the lamps be determined.

ilumisys and NCMS have partnered, through a grant from the US Department of Energy, to review and quantify the impacts of LED lamps and incandescent and fluorescent benchmark lamps over a product lifecycle. Based upon the knowledge gained, a design guide is being developed to aid lighting designers and engineers to make design decisions that consider environmental impacts in all phases of the life of a product.

Critical information in the lifecycle analysis is the useful life of the product as well as its performance. There are products on the market making claims such as “60 watt replacement,” when the light output is nowhere near that of a conventional 60 watt incandescent lamp. Testing is being conducted at ilumisys to quantify the light output and quality as well as the expected useful life of the lamps through physical testing. Knowing the power consumption, light output, and useful life of a lamp allows a more realistic comparison across products.

While the delivery of the design guide is not due until early 2011, some of the functionality and the thought process driving it will be demonstrated at NeoCon.