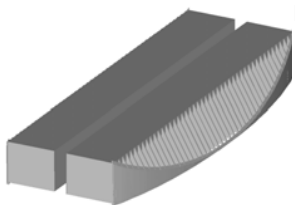


LED LIGHTING: PROMISING BUT CHALLENGING

Task lights, commonly used in offices, homes, and dormitories, often use incandescent lamps because they are inexpensive and offer good optical properties. However, they have high energy use and are often hot to the touch. Compact fluorescent lamps (CFLs) are sometimes used, but they are bulky, requiring large fixtures and posing difficulties in focusing the light.

Light emitting diode (LED) lighting, a new solid-state source, shows promise because of its small size and energy efficiency potential. However, its basic efficiency is similar to incandescent and it is an emerging technology that is not widely used for general lighting.

With its small size and high energy efficiency potential, LEDs are a viable consideration for task lighting. Researchers from Lawrence Berkeley National Laboratory (LBNL) developed a high-performance prototype LED task light using state-of-the-art technology. The 11.5 Watt unit uses two rows of one-Watt LEDs to provide lighting coverage equivalent to a 40 Watt incandescent or 18 Watt CFL task lamp.



Cooling fins are used to enhance LED operation.

LED TASK LIGHT USING NEW MATERIALS TO IMPROVE PERFORMANCE

LBNL RESEARCHERS DEVELOPED AN LED TASK LIGHT USING HIGH BRIGHTNESS LEDs, AN ADVANCED OPTICAL DESIGN, AND NEW MATERIALS TO REDUCE THERMAL STRESS. THE ADVANCED OPTICS ALLOW THE LED SYSTEM TO USE 70% LESS ENERGY THAN A COMPARABLE INCANDESCENT UNIT, EVEN THOUGH THE TWO LIGHT SOURCES HAVE SIMILAR ENERGY EFFICIENCY.

IN ADDITION TO THE ENERGY PERFORMANCE, THE FIXTURE USES A CONSUMER FRIENDLY DESIGN TO SPEED MARKET ACCEPTANCE.



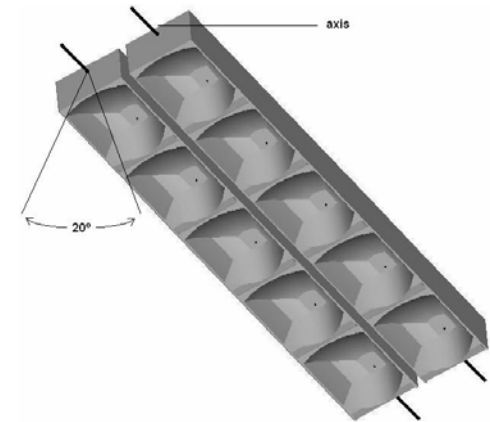
Prototype LED Task Light

LBNL's project team included four manufacturers:

- Permlight... thermal management
- Advanced Transformer... ballast with variable intensity
- Cree Lighting... LEDs
- Luxo... luminaire

LED MATCHES CFL PERFORMANCE WHILE CUTTING ENERGY USE

The prototype LED task light offers great promise to provide high-quality lighting while cutting energy use, all in a sleek luminaire.



Three-dimensional simulation of the lamp reflector looking up into the reflector cups

Benefits

- Cuts energy use by 70% compared to incandescent and 40% compared to CFL task lights
- 50,000 hour LED life expected, far exceeding 750 hours for incandescent and 10,000 for fluorescent
- Specialized optics provide proper light distribution on the workplane
- New assembly board and unique cooling fin design improves thermal management, giving long LED life and high light output

INTERESTED?

LED task lights are ideally suited for office buildings, single- and multi-family dwellings, dormitories, and, hotels. Building managers and owners along with individuals may all benefit from LED task lighting.

Key next steps include:

- Develop a next-generation prototype with lighting colors appropriate for a range of applications.
- Demonstrate the LED task light in various applications.
- Develop a commercial product.
- Educate building owners, home owners/renters, university dorm officials, and utilities about product availability and benefits
- Work with retail outlets to stock the units after they are commercially available.

This product is expected to be available in late 2005 or early 2006.

This project was part of the PIER Lighting Research Program. To view the project results, as well as other current research activities, visit www.energy.ca.gov/pier.

Additional information about this technology can be found on the following web sites:

- PIER contractor site:
www.archenergy.com/lrp/advlight_tech/project_2_2.htm
- PIER researcher site:
http://lighting.lbl.gov/l_sources



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LIGHT EMITTING DIODE (LED) TASK LIGHT



A NOVEL AND ENERGY
EFFICIENT APPROACH
TO DESK LIGHTING



Public Interest
Energy Research