

Project 10: Advanced Energy-Efficient LED Lighting for Residential and Commercial Applications.

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Goals

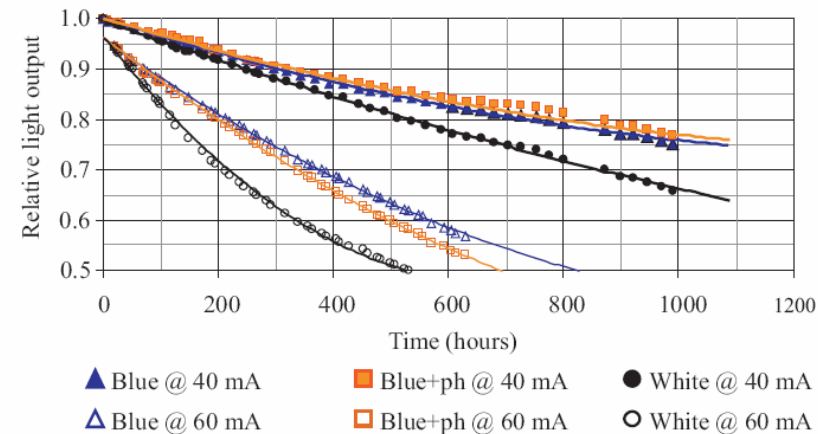
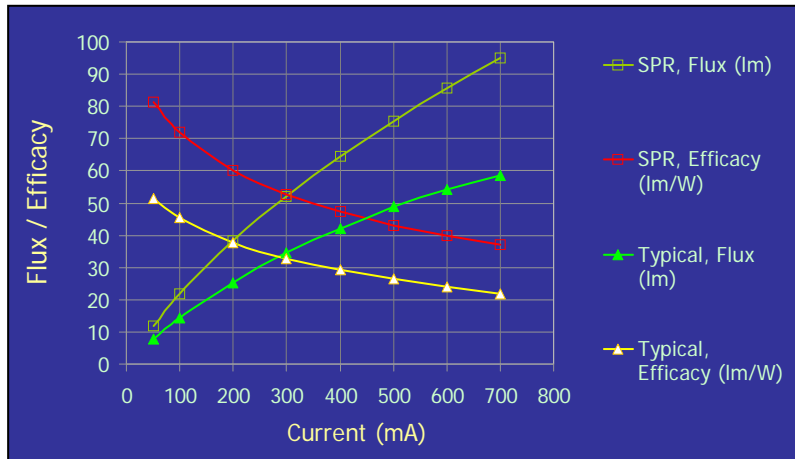
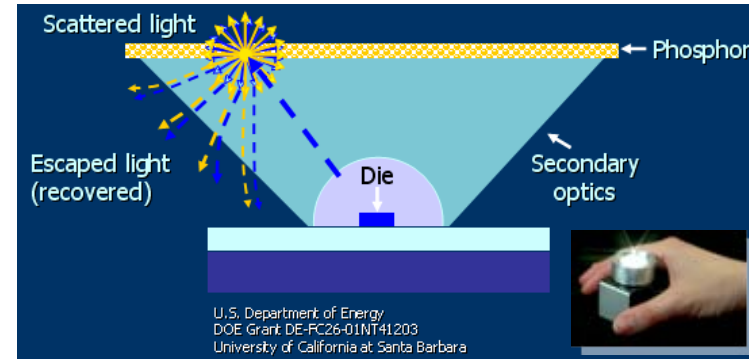
- To develop an advanced, energy-efficient LED lighting system for homes and commercial buildings that:
 - reduces lighting energy use by 50% to 70% over current state-of-the-art technologies
 - is cost effective to purchase, install, use and maintain
 - is compatible with building-based control systems (e.g., occupancy and daylight controls); and
 - is capable of load-shedding

Current Activities

- Conference calls and meetings between LRC and Lightolier to:
 - Define the product
 - LED downlight using SPE technology
 - Discuss and address challenges
 - Performance, manufacturing, cost, marketing, etc.
 - Define project approach
 - SPE module options
 - Luminaire features and options

Current Activities

- Benefits of SPE technology:
 - Over 60% improvement in light output and luminous efficacy
 - Longer lifetime



Narendran, N., Y. Gu, J.P. Freyssinier-Nova, and Y. Zhu. 2005. Extracting phosphor-scattered photons to improve white LED efficiency. *phys. stat. sol. (a)* 202 (6): R60-R62.

Current Activities

- Preliminary specifications:
 - Family of downlight, wall washer, and accent luminaires
 - Target: 100 lm/W and 50,000 hours life at L_{70}

PHOTOMETRIC

- 1000 lm
- CRI of 85 at 3000 K to 3500 K
- Three beam spreads (for different ceiling heights)
- 50-degree cutoff

ELECTRICAL

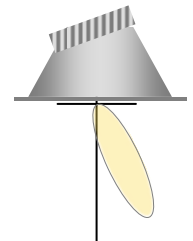
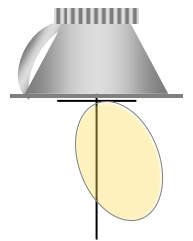
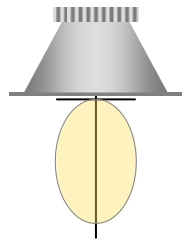
- Dimmable
- Compatible with occupancy, photosensor and load-shedding controls
- Capable of being used in emergency circuits or have its own battery backup

MECHANICAL

- 4-inch diameter
- Ideally less than 5-inch height, but not more than 6-inch height
- Non-IC rated

ECONOMICAL

- Target manufacturing cost (just materials) of \$50
- Target selling cost less than 20-watt metal halide comparable fixture



Planned Demonstrations

- The end result of this project is a fully functional prototype. Future demonstrations will depend on additional funding for this purpose.

Input

- Do you know of a potential demonstration site?
 - A site projected to start construction by the end of 2008 that could benefit from this technology:
 - Light commercial
 - Office
 - Retail
 - Hospitality