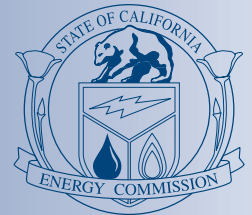


# Advanced, Energy-Efficient LED Lighting for Residential and Commercial Lighting Applications

PIER Buildings Program

Research Powers the Future

www.energy.ca.gov/pier



## The Problem

Recessed downlights are the fastest growing product in the luminaire market. There is a need to develop a specification-grade, highly efficient small aperture downlight (4"), producing at least 1000 lm to compete with compact fluorescent-based luminaires in size and light output, and with ceramic metal halide-based luminaires in life and cost.

## The Solution

Develop an advanced, energy-efficient LED lighting system for general lighting applications in homes and similar commercial settings based on the Lighting Research Center's (LRC's) patent-pending Scattered Photon Extraction (SPE™) technology, which has been shown to significantly improve the efficacy and light output of current generation LED technology.

## Features and Benefits

The LED lighting system developed in this project has a target efficacy of 100 lumens per watt (lm/W), far exceeding current incandescent, LED, and compact fluorescent lamp (CFL) technologies. This technology will be particularly well suited to general commercial lighting applications and some residential applications because it will:

- Reduce lighting energy use by 50% to 70% compared to traditional incandescent and CFL technologies;
- Provide significantly longer life (5 to 10 times) than other available lighting technologies;
- Far exceed the requirements of the ENERGY STAR® specifications for residential lighting products;
- Allow for much more compact and flexible designs for general lighting products;
- Be easily dimmed, allowing for flexible and demand responsive lighting; and
- Be cost effective to purchase, install, use and maintain.

## Applications

The primary market for the new LED lighting system will be ambient lighting applications in retail and hospitality (i.e., hotel, restaurant) industries, some residential applications, and institutional (i.e., assisted living, dormitory) applications.

## What's Next

The LRC has worked with Lightolier to develop prototypes, which will be tested over a period of time to assess their performance and reliability. The LRC and Lightolier have developed a plan for product commercialization.

## Collaborators

- Lighting Research Center (LRC)
- Lightolier

## For More Information

This project is part of the latest PIER portfolio—Lighting California's Future (LCF).

- Lighting Research Center Director of Research N. Narendran, Ph.D., at narenn2@rpi.edu
- Lighting Research Assistant Professor Jean Paul Freyssinier, M.S., at freysj@rpi.edu

The Lighting Research Center's patent-pending Scattered Photon Extraction (SPE™) technology has been shown to significantly improve the efficacy and light output of current generation LED technology. Below is an SPE-based LED light engine.

