LCF LIGHTING CALIFORNIA'S FUTURE

This California Energy Commission Public Interest Energy Research (PIER) Program focused on lighting technologies for the built environment. The goal was to meet California's growing needs for energy efficiency and demand response by creating and introducing energy-efficient, advanced lighting technologies. The program, managed by Architectural Energy Corporation (AEC), involved nine technical projects and a cross-cutting market connection project. It concluded in fall 2010.

Improved Daylight Performance of Tubular Daylighting Devices

What: Develops, demonstrates, and commercializes new diffuser elements that redirect a significant portion of emitted daylight towards the ceiling and precisely filter and spread the rest, producing a direct/indirect luminaire effect.
Why: Increase the acceptance of TDD by introducing systems with luminance ratios that are closer to the accepted norms for interior spaces.
Who: Solatube International, Inc., California Lighting Technology Center (CLTC), Southern California Edison (SCE)
Result: Solatube developed several indirect/direct TDD prototypes. However, the performance of the units did not meet the research team expectations.

Cost-Effective Demand Response (CEDR)

What: Develop, demonstrate, and commercialize a novel demand response (DR) lighting control technology capable of receiving a utility demand reduction signal and transmitting a load-shed signal to multiple receiver devices, using an existing building's power lines.
Why: CEDR takes a low-technology approach, doing only one simple task inexpensively—reducing loads during DR conditions.
Who: NEV Electronics, CLTC, SCE
Result: NEV Electronics produced a prototype system for testing. Based on feedback from the Underwriters Laboratories®, the CEDR system had to be further modified at the component level. NEV Electronics plans to continue development and testing of the system with private funding.

Integration of Electric Lighting Controls with Utility DR Signals

What: Identify and demonstrate the most cost-effective and reliable combinations of utility DR signals and electric lighting controls to implement automated DR capabilities with bi-directional communication capabilities.
Why: Resulting systems will allow utilities to get feedback on achieved lighting load reductions during DR conditions and is applicable to all buildings.
Who: SCE, CLTC
Result: SCE tested three Advanced Lighting Control Systems (Convia, Lutron, and Universal). All three of the installed systems were able to respond successfully to the requirements of demand response operation and to provide energy savings. Cost barriers exist for these systems.

Retrofit Integrated Classroom Lighting System (R-ICLS)

What: Develop and demonstrate retrofit lighting solutions for classrooms to integrate luminaires, sensors, and controls, providing quality lighting for general and audio/visual settings together with white-board lighting.
Why: Give schools a "good", "better" or "best" way to combine state-of-the-art luminaires, lamps, ballasts, sensors, and controls into cost-effective, retrofit system solutions.
Who: Finelite, Inc., CLTC
Result: Four levels of R-ICLS systems were developed and demonstrated in 13 classrooms in three schools in California. Results have shown a range of equipment and installation costs and energy use impacts. Finelite has commercialized some components of the R-ICLS systems.

Wireless Integrated Photosensor and Motion Sensor (WIPAM) Lighting Control System

What: Develop and commercialize an easy-to-install lighting control system that combines photosensors and motion sensors with low power wireless communication, and eliminates the need to be wired into the switchbox or ceiling-mounted near the luminaire.
Why: Reduce the installed cost and improve the reliability of lighting controls by placing sensors in convenient and accessible locations.
Who: Adura Technologies, CLTC
Result: Adura has developed a prototype system for private offices, corridors, and parking garages. Demonstrations have been installed and monitored by the CLTC. Adura has commercialized the system.

Advanced LED Downlighting Systems

What: Develop and commercialize a component-based system specifically tailored to the unique characteristics of light emitting diodes (LED) indirect light sources, optimizing LED components while maintaining the features and functionality that have made downlights so popular.
Why: Provide more energy-efficient and cost-effective product than LED downlights based on components intended for CFL light sources.
Who: CLTC
Result: The CLTC worked with various manufacturers to develop several versions of an integrated prototype with an indirect LED source. The prototype has been demonstrated at the CLTC facility and at trade shows with high interest from potential users.

Novel LED Downlights

What: Develop and commercialize a novel recessed downlight fixture using LEDs that are dimmable.
Why: Achieve a cost-effective system that has a high overall lumen output while providing continuous dimming control at low output levels.
Who: CLTC, Cooper Lighting
Result: Working with the CLTC, Cooper Lighting developed, tested, and commercialized the HALO® Recessed LED Downlight. The product is the first ENERGY STAR®-approved solid state downlight product.

Smart LED Lighting in Residential Fans

What: Develop and commercialize LED-based lighting kits for ceiling and exhaust fans in residential applications, and explore the integration of controls.
Why: Determine the amount of energy savings that can be achieved in a cost-effective manner, providing an option to incandescent-based ceiling-fan light kits for consumers.
Who: CLTC, Hunter Fan Company
Result: The CLTC worked with Hunter Fan Company to design and develop prototypes for a Retrofit LED Lighting Fan Kit. Also, a prototype exhaust fan with LED lighting was developed. Hunter Fan Company has shown interest in commercializing a kit based on the prototype versions.

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

What: Develop a LED-based downlighting system for use in homes and commercial buildings based on the patented SPE™ (Scattered Photon Extraction) technology.
Why: The technology, developed by the Lighting Research Center, has been shown to improve significantly the efficacy and light output of current generation LED technology.
Who: Lighting Research Center
Result: The LRC developed and tested recessed downlight prototypes using the SPE technology. They are exploring commercialization opportunities.

Program-wide Market Connections

What: Provide project-specific information to various national and California stake holders, and evaluate codes and standards implications.
Why: Accelerate broad market adoption by various groups involved in lighting commercialization and energy-efficient strategies, and commercial and residential consumers.
Who: New Buildings Institute (NBI), CLTC, AEC
Result: Market connections efforts have included presentations and attendance at various conferences and industry trade shows along with electronic posting of information on the LCF participant web sites. Marketing collateral for commercialized products also has been developed.