UC Davis Adaptive Controls for Exterior Lighting

UC Davis’s exterior adaptive controls project has broken new ground in lighting retrofits. The project integrates existing infrastructure with custom combined technology specifications, resulting in an energy cost savings of approximately $100,000 per year, and showcasing campus/industry collaboration.

The Smart Lighting Initiative (SLI), UC Davis’s energy efficiency program, is on track with a goal of meeting 60 percent lighting energy savings across the campus. The first phase of this project is the Institutional-Level Adaptive Controls (ILAC).

ILAC is a payback-focused lighting retrofit project funded by the University of California’s Strategic Energy Partnership Program and third-party incentives such as the CEC-administered Energy Technology Assistance Program, funded by the American Recovery and Reinvestment act of 2009. Since the SLI emphasizes projects that capitalize on street and area lights, 100 post-top luminaires and 100 wall packs were replaced during 2011 and 2012.

For the post top retrofits, the team selected the 45-watt EcoSwap Phillips Candela LED light engine with zero to ten-volt dimming. This product is rated with a 54,000-hour lifespan, which is 4.5 times the lifespan of the existing high-intensity discharge lamps. The use of dimmable LED luminaires result in both energy reductions and reduced maintenance costs. The project team also replaced the high-intensity discharge (HID) wall packs luminaires with more efficient LEDs by Philips, which use 14 watts in low mode and 45 watts in high mode, less than one-third of the electricity used by the original luminaires.

The lighting retrofit improved the visual acuity of the spaces and is responsive to environmental conditions and users’ travel patterns. The project also focused on meeting dark-sky requirements by designing the pathway and roadway fixtures to focus light downward, and distributing light following an efficient pattern described by the IES standard for “Type II” distribution. This approach most effectively illuminates the space, increases the distance between posts, and prevents light from spilling over property lines.

The project also changed the operation of all the retrofitted exterior lights from a dusk-to-daylight timer to a sensor-based network of occupancy sensors provided by WattStopper and wireless radio frequency controls by Lumewave. The post tops integrate two 180-degree WattStopper occupancy sensors, and the wall packs have one 270-degree sensor. The Lumewave module, installed at each light fixture, utilizes wireless radio frequency communication with a centralized real-time interface, which integrates roadway and pathway fixtures and allows for dynamic lighting along pedestrian and bike paths retrofitted with dimmable LEDs that respond to users’ direction of travel. Photo: Kathreen Fontecha, CLTC/UC Davis.
Contacts
Senior Project Manager
UC Davis Design and Construction Management:
Scott Arntzen
saarntzen@ucdavis.edu
530.754.1088

Associate Development Engineer, UC Davis California Lighting Technology Center:
Pedram Arani
pmarani@ucdavis.edu
530.747.3832

Project Team
UC Davis Design and Construction Management
UC Davis Utilities
UC Davis Facilities
UC Davis California Lighting Technology Center

More Information
http://cltc.ucdavis.edu
http://campus-care.ucdavis.edu/stories/energy-savings-program.shtml
http://police.ucdavis.edu/events/campus-safety-lighting-walk

Best Practices case studies are coordinated by the Green Building Research Center, at the University of California, Berkeley.

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