



UC DAVIS SMART LIGHTING INITIATIVE: LIGHTING THE WAY TO A SUSTAINABLE 2ND CENTURY

The Initiative is a key part of the UC Davis Climate Action Plan. Released in June 2010, the plan documents current and future actions UC Davis is taking to reduce greenhouse gas emissions and combat global climate change.

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"UC Davis is uniquely able to serve as a model for other campuses and institutions. We are innovating lighting in campus residences, offices, classrooms, laboratories, medical centers, wineries and breweries, green spaces, and parking lots."

— Michael Siminovitch, CLTC, UC Davis

Lighting accounts for about a quarter of California's electricity use, and installing energy-efficient lighting can lead to significant energy, maintenance, carbon, and economic savings, according to the California Public Utilities Commission (CPUC). In September 2010, the CPUC adopted a plan to achieve a 60–80% reduction in statewide electrical lighting consumption by 2020.

The University of California, Davis, was the first large institution in California to respond to the CPUC's call to action. UC Davis instituted the Smart Lighting Initiative, a coordinated effort to reduce the campus's electricity use for lighting by 60%, based on 2007 lighting energy use levels.

UC Davis Smart Lighting projects are based on innovations developed or refined by designers and engineers at the California Lighting Technology Center (CLTC) and implemented by UC Davis Facilities Management and UC Davis Design and Construction Management. Many of these technologies were developed through the State Partnership for Energy Efficient Demonstrations (SPEED) program, which is coordinated by the California Institute for Energy & Environment (CIEE) in partnership with CLTC.

SPEED technology installations on the UC Davis campus include adaptive LED and induction lighting for parking lots and garages, adaptive corridor lighting, and a networked, adaptive exterior lighting system for campus roadways, paths and building perimeters. The first phase of the Initiative addressed outdoor lighting. The second phase will focus on adaptive lighting solutions for interior spaces. Five greenhouses will also undergo retrofit testing.

UC Davis hopes its Smart Lighting Initiative will serve as an example. Innovations demonstrated and installed on campus are transferable to other colleges and universities, K–12 schools, corporate campuses, hospitals, commercial buildings, federal and military facilities, and other spaces.

The UC Davis Smart Lighting Initiative is a campus-wide effort that includes participation by Facilities Management, Student Affairs, Design and Construction Management, UC Davis Energy Efficiency Center, and Capital Resource Management, in addition to the California Lighting Technology Center and Environmental Stewardship and Sustainability.

Through collaborative efforts across several departments, UC Davis has installed numerous energy-efficient lighting projects, including:

- Adaptive LED and induction luminaires with occupancy sensors in campus parking structures and lots
- Adaptive post-tops near Tercero Residence Halls
- Adaptive corridor luminaires and the Open Digital Communications Protocol for Lighting Systems in Bainer Hall
- Wireless lighting controls with occupancy sensors, daylight sensors, personal controls, and LED task lights in Mrak Hall offices
- Adaptive stairwell lighting, as well as daylighting and occupancy sensors in the book stacks at Shields Library
- Tubular daylighting devices and occupancy controls in the Food Science Laboratory at the Robert Mondavi Institute for Wine and Food Science
- Hybrid bathroom luminaires that combine LED night-lights with conventional lamps and occupancy sensors in Emerson and Webster Residence Halls
- Reflective surfaces and photosensitive controls that maximize daylight and reduce the need for electric light in Robbins Hall labs

The lighting initiative is expected to cost \$39 million. The California Statewide Energy Partnership Program will fund \$4 million of the total. The balance will be paid for by energy savings of \$3 million per year.

The University of California system has set a target for all 10 UC campuses to return to 2000 emission levels by 2014. UC Davis reached that goal in 2008, six years ahead of schedule, and hopes to reduce campus emissions by an additional 10% by 2014.

All of these efforts are part of the statewide objective to reduce California's emissions to 1990 levels by 2020, as required under Assembly Bill 32, the California Global Warming Solutions Act of 2006.



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In June of 2012 UC Davis launched its state-of-the-art adaptive outdoor lighting system. The campus-wide solution integrates LED light sources, photosensors, occupancy sensors, and an advanced wireless control network, to deliver unprecedented amenity, energy efficiency and control. It is one of many innovations that helped distinguish UC Davis as the nation's "Coolest School" in Sierra magazine's annual ranking of colleges and universities striving to implement best practices and create sustainable solutions to climate change.

UC DAVIS: LEADER IN SUSTAINABILITY

THE PLAN

In 2010 UC Davis became one of the **1st** large California institutions to commit to a substantial, sweeping cut in energy use for lighting.

The Smart Lighting Initiative aims to achieve a **60% reduction in electricity use for lighting** (based on 2007 electricity use levels).

The plan will improve campus lighting while reducing electricity use by roughly **30 million kilowatt-hours (kWh)** annually.

It will reduce UC Davis' carbon footprint by **over 10,000 metric tons of CO₂E** annually.

UC Davis will save an estimated **\$3 million** annually in electricity costs, in addition to savings from reduced cooling needs and maintenance costs.

Potential energy savings of **50–60%** for the various space types are achievable using currently available technologies.

CURRENT USAGE

UC Davis uses about **58.5 million kWh** per year for electric lighting.

An estimated **25%** of total campus electricity use is for lighting.

CAMPUS LIGHTING INITIATIVES

CLTC has installed over **15 demonstrations** of energy-efficient lighting and controls technologies on campus.

Lighting demonstrations have saved UC Davis more than **300,000 kWh** and more than **200 metric tons of CO₂E**.

Simply upgrading to adaptive induction parking garage luminaires in all three parking structures on campus has saved UC Davis at least **\$100,000** annually.