



### Award Category

Lighting and Controls

### Green Features

Daylight harvesting

Programmable dimming

No Polychlorinated Biphenyls (PCBs)

### Annual Energy Savings

Each ballast cuts fixture energy use by 50%

### Cost

\$16,000 ballast cost

\$15,000 labor cost

### Contacts

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### Completion Date

Winter 2006

# University of California, Davis Student Housing Lighting Retrofit

Retrofitting two residence halls with electronic Axis ballasts has achieved a 50 percent reduction in lamp energy consumption. The ballasts use daylight harvesting and programmable dimming to optimize the balance between electric and natural light in bathrooms, hallways, lounges, and laundry rooms.

The lighting retrofit in the Cuarto and Terzero Residence Hall complexes expands upon a previous retrofit completed by UC Davis in 1997. In that project, all T12 compact fluorescents with magnetic ballasts were replaced with T8 lamps with electronic ballasts. These ballasts function at a higher operating frequency, resulting in a more efficient conversion of power to light. According to ENERGYSTAR®, this type of retrofit improves the efficiency of a lighting system by about 30 percent.

With the T8 lamps already significantly cutting electricity use, UC Davis's Student Housing department took an extra step to collect further savings. Staff installed Axis ballasts on T8 lamps in bathrooms, study lounges, laundry rooms and hallways. These ballasts offer two innovative energy-saving features: daylight harvesting and programmable dimming.

The daylight harvesting feature makes Axis ballasts a useful application in spaces that receive high levels of natural light. A photosensor in the ballast reads the amount of daylight in a space and adjusts the level of electric light accordingly. Each fixture operates independent of other fixtures, so luminaries that are closer to windows will dim by a greater amount than ones in dark corners. The result is a consistent illumination level throughout the space, and a significant drop in energy consumption.

The fixed-level dimming feature allows staff to program each room to its optimal light level and power output. Fixtures with Axis ballasts can be programmed down to 40 percent of their maximum lumen output in increments

of 10 percent. This allows staff to reduce the wattage in overlit spaces without creating the dark areas that occur when individual fixtures or tubes are removed. Excessive lighting is a common problem in older buildings, which were often designed at up to twice the foot-candles currently recommended by the Illuminating Engineering Society of North America.



View of a retrofitted lounge. Photo: Trista Little.

While Axis ballasts are more expensive than typical T8 ballasts, utility rebates can help offset the additional cost. UC Davis saved approximately \$10 per ballast by participating in the Standard Performance Contract incentive program. This program is offered statewide through Southern California Edison, San Diego Gas & Electric, and Pacific Gas and Electric in their respective service areas.

The Student Housing department estimates a 50 percent reduction in energy used by retrofitted lamps. Unfortunately, without submetering in place at the residence halls the campus is unable to determine the exact savings achieved by this project.

*Best Practices* is written and produced by the Green Building Research Center, at the University of California, Berkeley.

The Best Practices Competition showcases successful projects on UC and CSU campuses to assist campuses in achieving energy efficiency and sustainability goals. Funding for *Best Practices* is provided by the UC/CSU/IOU Energy Efficiency Partnership.



Pacific Gas and Electric Comp

