

Bi-level HID Wall Packs

California State University, Chico



PIER Buildings Program

Research Powers the Future

www.energy.ca.gov/research

The Problem

Wall packs are exterior lights that often are used to bolster security and aid in wayfinding in evenings. While wall packs effectively provide lighting around buildings, in the past they have suffered from many setbacks. The problems include low fixture efficiency, minimal or nonexistent cutoff, and wasted energy because of low occupancy patterns. During unoccupied hours—most of the evening—energy is wasted fully illuminating a space that actually requires significantly reduced lighting.

The Solution

Philips Day-Brite and the California Lighting Technology Center (CLTC) partnered on this PIER-sponsored project to demonstrate a bi-level high intensity discharge (HID) wall pack from Philips Day-Brite's established NiteBrites product line. The product provides dynamic light levels to surrounding areas based on occupancy using a single high intensity (HID) lamp and fixture-integrated occupancy sensor.

This product delivers energy-savings results by combining dynamic light output with a familiar and reliable light source that many facilities already use. The fixture operates at 50% of full output during vacant night hours and 100% only when pedestrians are present in the area. The product highlighted in this case study is the NiteBrites bi-level Medium Cutoff Wall Pack with a 150 W metal halide light source.

Features and Benefits

- Bi-level light output is based on occupancy
- Familiar light source
- Heavy-duty, two-piece, die-cast aluminum housing
- Rugged, vandal resistant design
- Easy to install
- Shock and thermal resistant

FIGURE 1: BI-LEVEL HID WALL PACK

Shasta Hall, California State University, Chico



Technology Costs and Incentives

Savings are achieved by combining an HID light source with a fixture-integrated microwave occupancy sensor to increase light levels to maximum only when necessary. The use of a broad-spectrum, white light metal halide lamp may allow for reductions to the overall demand size (Watts) of the luminaire, in addition to the savings from the fixture-integrated controls.

Installation is identical to other wall pack luminaires, and replacement scenarios generally are one-to-one in retrofit applications. Equipment costs may be up to 20% higher than the same wall pack without bi-level controls, but this cost may be offset by utility rebates. Many California utilities offer one-time incentives ranging from 5–15 cents per kWh saved, plus up to \$100 per kW reduced as compared to incumbent technologies or state energy regulations. For more information on incentives and rebates, check with your local utility or visit www.fypower.org.

FIGURE 2: PRE-RETROFIT LIGHTING
Shasta Hall, California State University, Chico



FIGURE 3: POST-RETROFIT LIGHTING
Shasta Hall, California State University, Chico



Demonstration Results

California State University, Chico

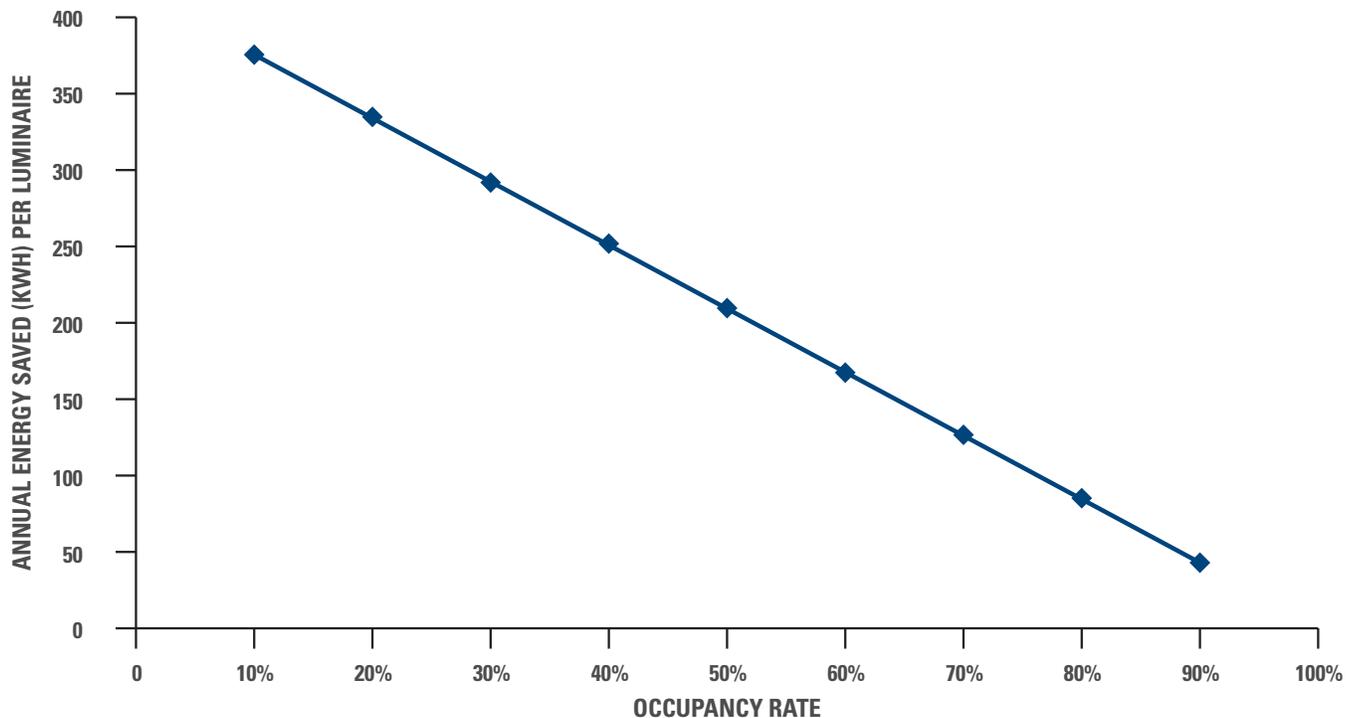
California State University, Chico (CSUC) installed 14 new bi-level NiteBrites HID fixtures at Shasta and Lassen halls, twin three-story dormitories. The pathways surrounding the dorms initially were lit by a combination of 150 W HPS wall packs and 70 W HPS tall wall packs operating magnetic ballasts. Fourteen fixtures were retrofitted—13 wall packs, and one tall wall pack at Shasta Hall—with Philips Day-Brite NiteBrites bi-level HID wall packs.

The retrofit increased illuminance levels of the pathways surrounding the dormitories, as well as provided a high color quality and color temperature (4000K). In addition, the retrofit resulted in 42% energy savings, which translates into 4,550 kWh saved annually.

Product Availability

The NiteBrites bi-level HID fixture is available through Philips Day-Brite as a special order. Although not always a standard option when ordering wall packs, most luminaires can be produced as a bi-level fixture. For more information, visit www.daybritelighting.com.

FIGURE 4: ENERGY SAVINGS BASED ON PERIMETER AREA OCCUPANCY RATE FOR ONE LUMINAIRE



What's next

CLTC continues demonstrations of energy-efficient bi-level HID, induction, and LED wall packs as part of the State Partnership in Energy Efficiency Demonstrations (SPEED) Program and is seeking new demonstration locations for these technologies. In addition to bi-level wall packs, the program includes other bi-level technologies such as bollards and area lights. Contact CLTC for more information.

Collaborators

The California State University, Chico Bi-level Wall Pack demonstration is a collaboration between California State University, Sacramento, CLTC, PIER, and Philips Day-Brite.

For More Information

Cori Jackson, Senior Development Engineer
California Lighting Technology Center, UC Davis
cmjackson@ucdavis.edu, www.cltc.ucdavis.edu

- To read more about Bi-level HID Wall Packs, visit cltc.ucdavis.edu/content/view/776/403
- More information on demonstrations is available at www.pierpartnershipdemonstrations.com

FIGURE 5: POST-RETROFIT LIGHTING
Shasta Hall, California State University, Chico

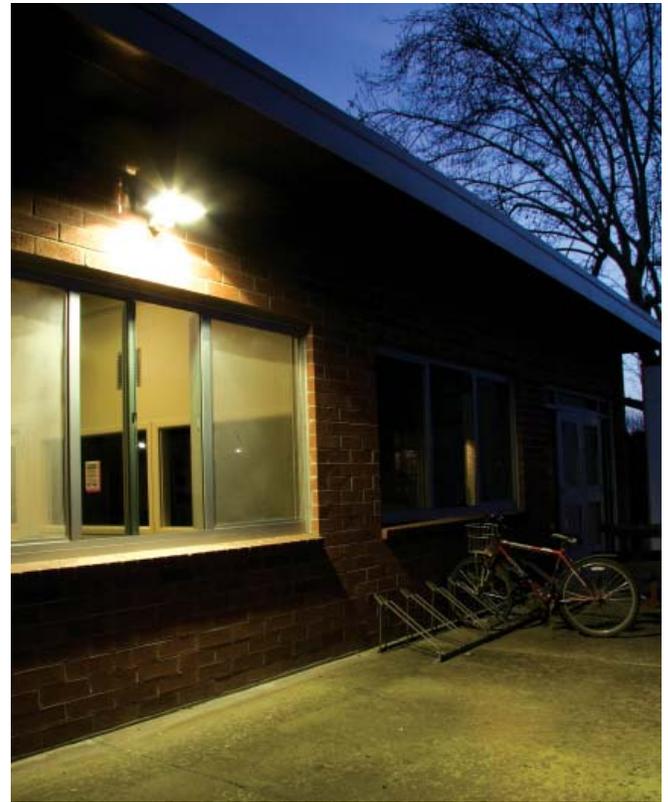


TABLE 1: ENERGY AND MAINTENANCE COST AND SAVINGS

| TECHNOLOGY | ANNUAL ENERGY CONSUMPTION (kWh) | ANNUAL ENERGY COST | TOTAL LIFECYCLE COST |
|----------------------|---------------------------------|--------------------|----------------------|
| HIGH PRESSURE SODIUM | 810.3 | \$103.72 | \$570.46 |
| BI-LEVEL HID | 451.1 | \$57.75 | \$317.63 |
| SAVINGS | 359.2 | \$45.97 | \$252.83 |

Maintenance costs assumed equal for all technologies
Cost of Labor: \$50/hour

Years of use: 5.5 years
Time to replace lamp: 0.15 hrs

Annual hours of use: 4,380
Cost of energy: \$0.128/kWh

Number of fixtures: 14
Occupancy: 9%

About PIER

This project was conducted by the California Energy Commission's Public Interest Energy Research (PIER) Program. PIER supports public interest energy research and development that helps improve the quality of life in California by bringing environmentally safe, affordable, and reliable energy services and products to the marketplace.

Arnold Schwarzenegger, Governor
California Energy Commission

For more information, see www.energy.ca.gov/research

Chair: Karen Douglas

Vice Chair: James D. Boyd

Commissioners: Jeffrey D. Byron, Anthony Eggert, Robert Weisenmiller

