



# High Hopes for Low-Glare Outdoor Luminaire

PIER Buildings Program

Research Powers the Future

www.energy.ca.gov/pier

## The Problem

Wall-pack luminaires with high-pressure sodium (HPS) lamps are commonly used to provide outdoor illumination for all types of buildings and many parking lots (**Table 1**), yet they are among the least-efficient fixtures made and provide poor glare control. The standard design approach makes a trade-off between good light distribution and glare/light pollution—designs that reduce glare also reduce the amount of light that reaches the ground. As a result, existing products use more energy than necessary to light up an area, and this contributes significantly to light pollution and light trespass.

## The Solution

Two new product prototypes were developed to reduce glare and improve the efficiency of outdoor luminaires. Prototypes of a low-glare wall sconce and a perimeter light use an advanced optical design, 100-watt (W) or 150-W ceramic metal-halide (CMH) lamps, and electronic ballasts to reduce energy use by up to 30 percent and minimize light pollution and glare. A manufacturer, Gardco Lighting, plans to introduce a commercial product based on these designs in 2006. The commercial product will feature a 70-W lamp as a replacement for a 175-W fixture (**Figure 1**).

## Features and Benefits

The CMH light source features a small arc-tube that helped designers produce a new optical system with more-precise

Figure 1: Low-glare product under development

Gardco plans to introduce a low-glare product, with a 70-watt ceramic metal-halide lamp, in 2006.



control of light output. The new optics provided the following benefits:

- *Better control of light distribution.* The Gardco wall-mounted unit provides illumination up to 45 feet (ft) from the building compared to 30 ft for a conventional luminaire.
- *Reduced power draw.* If the same luminaire spacing is used, a 100-W Gardco luminaire may replace a 150-W conventional luminaire.
- *Less glare and improved light dispersion.* There is a more even distribution of light over a greater surface area (**Figure 2**, next page).
- *Less wasted light.* The Gardco luminaire reduces light pollution in the night sky and light trespass in neighboring buildings and properties.
- *Fewer luminaires.* For a new installation, the wider distribution of light means 50 percent more coverage of surface area, so the number of luminaires required is reduced.
- *Increased security.* The combination of better light distribution, lower glare, and higher color definition will enhance the security of the lit environment.

Table 1: Outdoor lighting fixtures in California

Wall-mounted fixtures make up almost 15 percent of outdoor fixtures in California. Of those, less than 5 percent are glare-reducing cutoff fixtures, so wall-mounted units are a major source of glare and light pollution.

Fixture type	Amount as % of total outdoor fixtures	Amount as % of fixture type that uses cutoff designs
Post top mount	44.6	91.5
Wall or landscape	22.9	15.7
<b>Wall pack</b>	<b>14.6</b>	<b>4.4</b>
Pole mount	10.7	6.5
Canopy	6.6	37.9
Undefined	0.4	25.0
Landscape	0.1	100.0

The CMH lamps used in the luminaire produce white light with high color rendition, which most people prefer to the yellowish color and poor color-rendering qualities of HPS

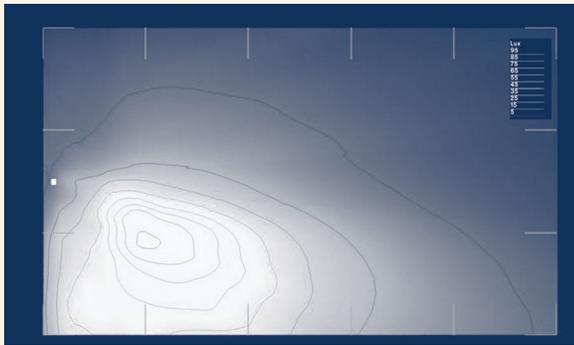
Figure 2: Better light distribution

Field tests showed that the Gardco prototype luminaire sends most light downward onto the surface it is illuminating, which reduces glare, light trespass, and light pollution compared to a conventional fixture with a high-pressure sodium (HPS) source.

Gardco wall sconce



HPS fixture



sources in common use. This improved color quality will result in a more pleasing environment and will enable users to identify their cars more easily in parking lots. In addition, Because the lamps use electronic ballasts, lamp life is estimated to be about 20,000 hours, which is close to the life expectancy of HPS lamps.

## Applications

The new products are applicable to building and parking lot illumination in new construction and in retrofit applications.

## California Codes and Standards

The new design features high cutoff characteristics that should enable the fixtures to meet local dark sky and light-trespass regulations.

## What's Next?

As a field demonstration to prove the effectiveness of the prototype design, 10 units were installed on the campus of Cal Poly Pomona. Those units continue to operate and serve to demonstrate the benefits of the design.

## Collaborators

The organizations involved in this project include Gardco Lighting and Lawrence Berkeley National Laboratory.

## For More Information

Reports documenting this project and providing more details may be downloaded from the web at [www.archenergy.com/lrp/products/wallpack.htm](http://www.archenergy.com/lrp/products/wallpack.htm). The final project report number is CEC-500-2005-141-A19.

To view Technical Briefs on other topics, visit [www.esource.com/public/products/cec\\_form.asp](http://www.esource.com/public/products/cec_form.asp).

## Contacts

Gardco Lighting, Dale Simpson,  
[dsimpson@gardcolighting.com](mailto:dsimpson@gardcolighting.com), 510-357-6900,  
[www.gardcolighting.com](http://www.gardcolighting.com)

California Energy Commission, Michael Seaman,  
[mseaman@energy.state.ca.us](mailto:mseaman@energy.state.ca.us), or visit  
[www.energy.ca.gov/pier/buildings](http://www.energy.ca.gov/pier/buildings)

## 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**

Chair Joseph Desmond, Vice Chair Jackalyne Pfannenstiel  
Commissioners: Arthur H. Rosenfeld, James D. Boyd, John L. Geesman

**For more information see** [www.energy.ca.gov/pier](http://www.energy.ca.gov/pier)



CEC-500-2006-014-FS  
031506