



DAYLIGHTING *initiative*

Design tools and information from PG&E

Retail Applications

Restaurant Application

Industrial Application

School Application

Museum Application

Office Application



Gymboree Corporation



Pacific Gas and
Electric Company.

WE DELIVER ENERGY.™

The Lighter Side

Making a difference that counts for a business

PG&E'S DAYLIGHTING INITIATIVE

PG&E's Daylighting Initiative has two goals: to raise awareness of good daylighting practice within the design community and to improve the practice of daylighting design. This case study is one of a dozen case studies undertaken within the initiative.

Together, they document a wide range of successful technical solutions demonstrated across a number of different commercial applications.

The Daylighting Initiative includes projects that will make better design tools available to the daylighting design community. The Desktop Radiance project, a collaborative effort of Lawrence Berkeley National Laboratory and PG&E, is bringing the powerful Radiance lighting simulation capabilities into the practical world of architectural CAD software. The Daylighting Initiative also includes a series of workshops and seminars at the Pacific Energy Center in San Francisco. For more information, visit the project's web site at www.pge.com/pec/daylight.

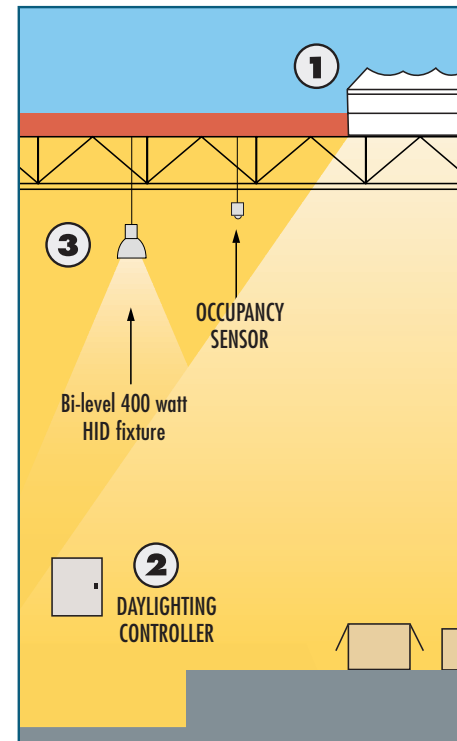
When designing its distribution center in Dixon, California, Gymboree Corporation wanted to make a difference. They wanted to offer an excellent working environment for employees. They also wanted to minimize energy use and its associated environmental impact and reduce operating costs for the company.

High efficiency prismatic skylights were installed to provide a quality daylit space for employees. Energy conservation and the associated reduction in operating costs was achieved by using daylighting and occupancy controls to manage the electric lights.

DAYLIGHTING FEATURES

1 PRISMATIC SKYLIGHTS

Three hundred sixty 4-ft. x 8-ft. prismatic skylights cover the nearly 270,000 sq.ft. of the single-story building (~4.3% coverage) used for distribution and storage. Thousands of tiny prisms—over 8,000 per sq.ft.—refract sunlight throughout the room. The result is a soft, yet bright natural light—over 40% more light than standard white bubble skylights. The prismatic design eliminates damaging direct sunlight by screening 98% of the ultraviolet radiation. The unique shape of the skylight helps to capture more sunlight at low sun angles.

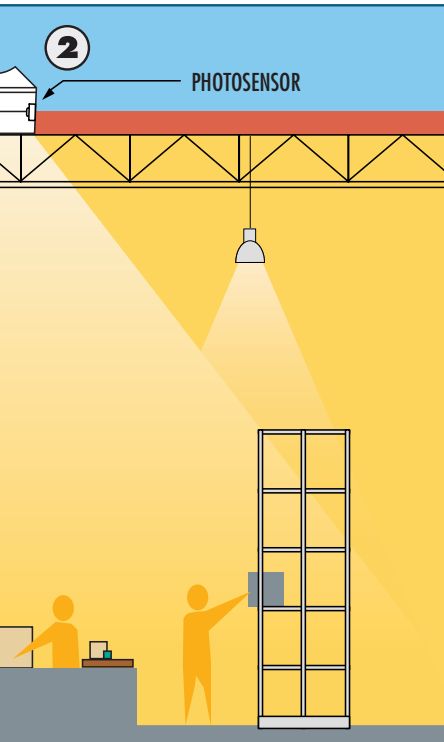


2 DAYLIGHTING CONTROL SYSTEM

A typical daylighting control system consists of a photosensor(s) sending a signal to a controller that then dims or turns off the electric lights. In this case, a single photosensor positioned in one of the skylights signals the dedicated daylighting controller to turn most of the electric lights off when there is adequate daylight in the space, with a few lights left on for security reasons. A minimum light level is maintained throughout the building. A special timer feature for managing HID (High Intensity Discharge) luminaires prevents rapid on/off cycling during the warm-up phase of the HID lamp, prolonging the life of the lamp

ade of Daylight

Business, its employees, and the environment.



and ballast. The timer is set for 10–15 minutes to prevent the lamps from cycling due to rapidly changing cloud cover.

Additional features programmed via the daylighting control panel include: a) an override sensor (adjustable from 1 to 120 minutes), b) sensor calibration, and c) a skylight-to-room scaling factor, which converts skylight illuminance to work level illuminance at the control panel. Occupancy sensors are also installed in the storage areas (~60% of total area) of the distribution center. At night, if an area is unoccupied, the bi-level HID lamps are switched to half power, further reducing energy use.

“The corporation had a strong desire to make a difference by reducing energy use and its associated environmental impacts. Daylighting was key to achieving this goal.”

— Alan Katz
Director of Corporate
Real Estate and Facilities

3 ELECTRIC LIGHTING

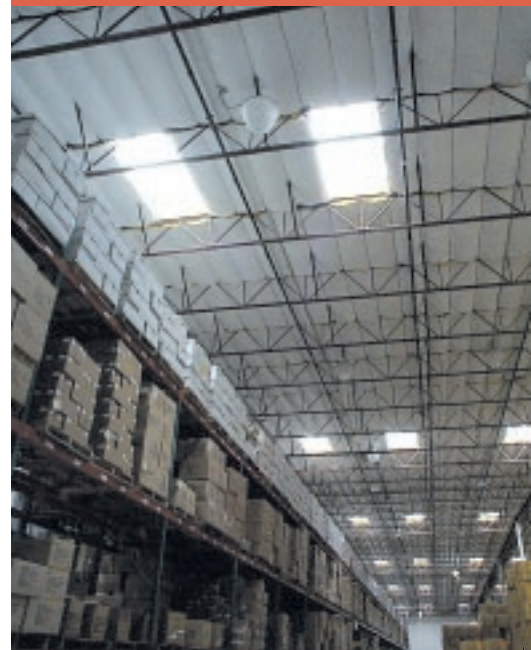
Bi-level metal halide luminaires—each 400 watts—provide a bright white light throughout the distribution center. Metal halides are of the HID lamp family and require an adequate warm-up time to achieve full brightness. This lamp feature requires special consideration when coupled with daylighting controls. On a typical day at Gymboree, approximately 80% of the lights are turned off during daytime hours due to daylight control. The remaining 20% are kept on for security reasons. The bi-level feature of the HID luminaires allows the operator to cut the light output and wattage in half. Though most fixtures are turned off during the day, the bi-level feature enables energy savings during the night when certain areas are unoccupied.



The unique shape of these prismatic skylights help to capture light at low sun angles, improving overall daylighting performance.



The electric lights are turned off in this daylight area of the distribution center.



RESULTS

Motivated to make a difference, Gymboree set out to make its new distribution center a great place to work and minimize its impact on the environment. Daylighting created a bright and airy working environment with illuminance levels ranging from 50 to 200 foot-candles during the day. Energy savings from daylighting controls alone are estimated at 1.2 kWh/sq.ft.-yr or \$28,000 per year. Occupancy sensors add additional savings. The dedicated daylighting control system described here is scheduled for installation.

Warehouses and distribution centers represent 15% of existing commercial floor space in Northern California buildings. An additional 48 million sq.ft. is projected for construction in the next 20 years. Significant energy savings are possible for existing and new warehouse-type buildings through the cost-effective application of skylights and daylighting controls.

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RESOURCES

PG&E does not endorse particular products or services from any specific manufacturer or service provider. High efficiency products and services similar to those used in this project are available from multiple suppliers. For informational purposes, PG&E notes that the following companies provided equipment or services to the project:

Skylights:

Sunoptics Prismatic Skylights, Sacramento, California
www.sunoptics.com — 1-800-289-4700

Daylighting Controls:

Day Light Controls, Moorpark, California
www.daylightcontrols.com — 805-529-0119

ADDITIONAL CONTACT INFORMATION

Pacific Energy Center, San Francisco, California
www.pge.com/pec/daylight — 415-973-7206

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