



DAYLIGHTING *initiative*

Design tools and information from PG&E

Industrial Application

Retail Application

Museum Application

Restaurant Application

School Application

Office Application

Photo: John Stephens. © J. Paul Getty Trust



J. Paul Getty Museum

The Fine Art

The Getty captures the California sun

The electric lights are turned off in this daylit gallery.



Photo: Tom Bonner; © J. Paul Getty Trust

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.

The J. Paul Getty Museum seeks to delight, inspire, and educate the public with works of fine art within its fields of collecting. A building design employing high-quality lighting thus became a top priority for Museum Director John Walsh. He wanted lighting conditions in the museum galleries to be similar to those in which artists painted. "Daylight brings out subtleties of color and texture that artists would see in their studios," says Walsh.

The desire for daylight in the galleries had to be balanced with curatorial concerns. Careful solar control is needed to protect artwork from too much light and direct solar radiation. A lighting design team worked with museum staff to develop a system that met these requirements.

DAYLIGHTING FEATURES THE J. PAUL GETTY MUSEUM

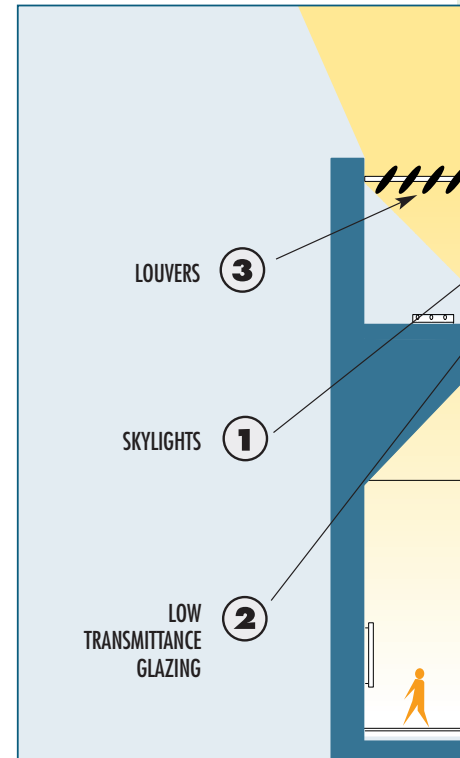
1 SKYLIGHTS

Most of the galleries are lit from above by skylights that can be as large as 17 feet wide by 35 feet long. Other galleries use sawtooth-shaped roof forms to bring daylight to the interior.

The upper half of each wall in the typical daylit gallery slopes to the skylight opening. This diffuses incoming light, creating even illumination levels across the room while improving visual quality by reducing glare.

2 LOW TRANSMITTANCE GLAZING

A large opening was needed to facilitate the lighting design. A neutral-colored glazing with a 35% visible transmittance was specified to reduce illumination to a level appropriate for best observing artwork.



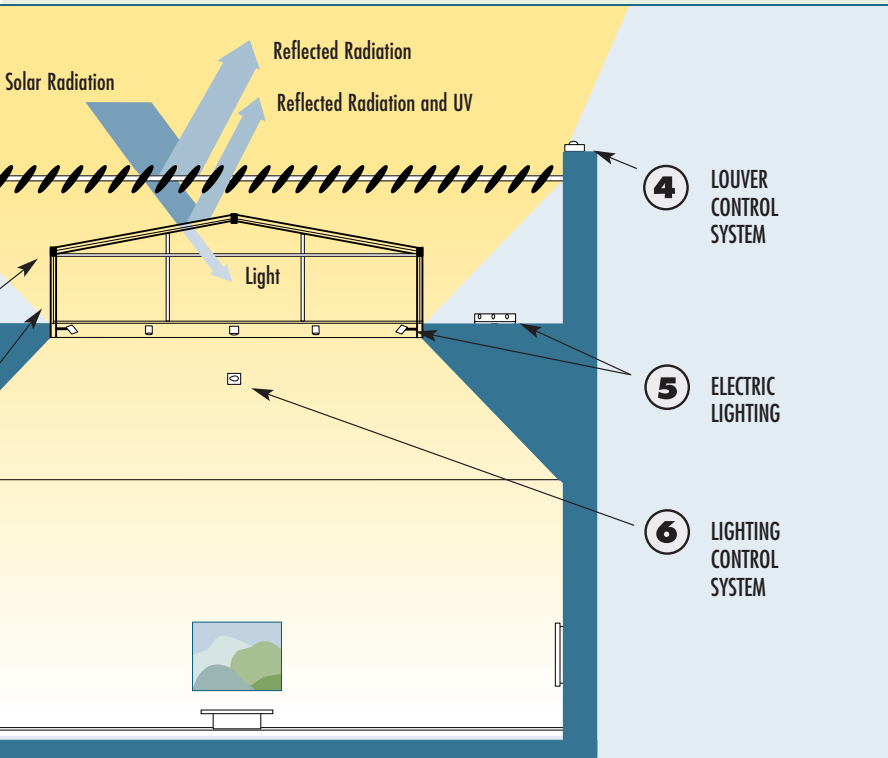
A balance needed to be achieved between the glazing visual transmittance characteristics and the use of external louvers to control solar gain and illumination levels. Using physical daylighting models, the final design achieved a proper balance and was able to use daylight as the primary light source throughout most of the year.

3 LOUVERS

To regulate daylight and protect the artwork from direct sun, exterior louvers were installed above each skylight. The louvers are oriented on an east-west axis so that they open in a north-south direction. Locating the louvers outside of the glass permits them to reduce solar heat gain as well as regulate daylighting levels in the galleries. Over 26,000 sq.ft. of computer-operated louvers are installed at the Getty Museum.

of Lighting

un to experience art at its finest.



4 LOUVER CONTROL SYSTEM

Louvers are operated by a timer that regulates their position depending upon the season and time of day. As the sun rises, an exterior photosensor looks at the sky and compares the reading to statistical data. The louvers are then moved to a preset position and remain there for 1–2 hours, allowing for some daylight variation in the space. The louvers are never positioned at an angle that permits direct sun to enter the galleries.

5 ELECTRIC LIGHTING

A series of special low-voltage 100W quartz halogen lights—filtered blue to match the color of daylight—are mounted in the skylight. At night, a second set of warmer lights comes on to provide

nighttime illumination. Fluorescent fixtures located above the gallery reflect light off the closed louvers, through the skylight and into the gallery providing diffused light at night.

6 LIGHTING CONTROL SYSTEM

Three photosensors in each gallery measure the illumination levels. They are connected to a computer system that can override the timer-controlled louvre position if more or less light is needed. At dusk, blue filtered lights are gradually turned up to maintain the desired quantity and quality of illumination. Both the lighting and louvre control systems are wired through the museum's central building management system so that both curatorial and operations staff can monitor the galleries.

Skylights provide even lighting conditions for viewing art.

Photo: Tom Banner. © J. Paul Getty Trust



“Daylight brings out subtleties of color and texture that artists would see in their studios.”

John Walsh
Museum Director

Use of direct sunlight can provide highlights without negative effects.

Photo: Scott Francis/Esto. © J. Paul Getty Trust





Photo: Scott Francis/Esto. © J. Paul Getty Trust

An impressive look-up into the entrance pavilion skylight of the Getty.

RESULTS

Museum directors value daylight and have managed to commission buildings that control the quality of light to the very strict demands set by curators. Most buildings we inhabit do not require this degree of control. The fact that daylighting can be successfully achieved in this environment is testament to our abilities to design daylighted buildings most anywhere.

The Getty project reminds us that daylighting is more than an energy conservation strategy. In addition to providing superb lighting, it is a means of creating space and expressing architecture. The galleries at the Getty Museum employ carefully controlled daylight to create a very high-quality visual environment, one that is excellent for viewing artwork. The Getty project demonstrates that daylight not only saves energy, but is preferable to exclusive reliance on electric light.

This program is funded by California utility customers and administered by Pacific Gas and Electric Company, under the auspices of the California Public Utilities Commission.

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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:

Architect:

Richard Meier & Partners, Los Angeles, California
www.richardmeier.com — 310-208-6464

Lighting Designers:

Fisher Marantz Stone, New York, New York
212-691-3020

Lighting Controls:

Lutron Electronic Co., Coopersburg, Pennsylvania
www.lutron.com — 1-800-523-9466

Photosensors:

PLC Multipoint Inc., Everett, Washington
425-353-7552

Automated Skylight Shutters & Louvers:

C/S Group, Lebanon, New Jersey
www.c-sgroup.com — 1-800-631-7379

ADDITIONAL CONTACT INFORMATION

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

The Getty Museum, Los Angeles, California
www.getty.edu — 310-440-7360