

# Aging Like a Fine Wine

THE CALIFORNIA DEPARTMENT OF EDUCATION BUILDING EARNS LEED GOLD AND PLATINUM



INFORMATION PROVIDED BY THE CALIFORNIA DEPARTMENT OF GENERAL SERVICES

Having been covered briefly in the January/February 2005 issue of *eco-structure* and more thoroughly in the Fall 2003 issue, the Capitol Area East End Complex, Sacramento, Calif., has been performing better than expected. In the interest of brevity, the 336,000-square-foot (31,214-m<sup>2</sup>), 6-story California Department of Education Building within the complex will be examined more closely in this article. (All metrics and base units provided by the California Department of General Services for this article were established by and verified through the Washington, D.C.-based U.S. Green Building Council's LEED for Existing Building's certification process.)

Marking a major milestone in California Gov. Arnold Schwarzenegger's Green Building Initiative ([www.green.ca.gov](http://www.green.ca.gov)), the California Department of Education Building has become the first pre-existing, state-owned U.S. office building to achieve USGBC's LEED Platinum rating for Existing Buildings after already having been certified LEED Gold for New Construction in 2003.

"Even before it achieved the latest honor, this building was designed and constructed to meet the LEED Gold standard of energy conservation and environmental design," says Rosario Marin, secretary of the State and Consumer Services Agency. "It was certified as LEED Gold shortly after it was built, but we wanted better than Gold. So we kept on fine tuning it with still more energy-saving and conservation techniques."

## SCHWARZENEGGER'S GREEN INITIATIVE

The governor's December 2004 executive order threw the full weight of his administration behind an aggressive plan to reduce California's energy purchases for thousands of state-owned buildings by 20 percent by 2015 while conserving other scarce natural resources. The executive order also urged local governments, K-12 schools, universities, community





colleges and business organizations to adopt the same ambitious goals.

The governor proposed to achieve the 20 percent energy reduction by designing, constructing, operating and renovating state-owned buildings to meet USGBC standards. His executive order directed that existing state buildings, like the California Department of Education Building, and all future state construction and renovation projects must meet a minimum of LEED Silver certification to ensure they save energy and water and divert waste from landfills. So far, seven state buildings have achieved various levels of LEED certification with 36 more projects (67 buildings) on the way.

Part of the governor's Green Building Initiative calls for fine tuning the operation of existing buildings. After the education building was opened in 2002, additional operations and maintenance practices were launched to make it more energy efficient and better at conserving scarce resources. For example, the building uses recycled paper products; microfiber cloths; and cleaning equipment that employs green cleaning products and less resources, including a carpet extractor that recycles/uses less water, floor scrubber with rechargeable gel batteries, floor burnisher with onboard disposable paper filtration system, dry carpet cleaning system that uses organic absorbents, vacuums with 99.97 percent filtration efficiency and a chemical proportioning system. All mixed paper, cardboard, glass, plastic and aluminum cans generated by the building's occupants are collected and recycled. In early 2006, those

improvements earned the education building a U.S. Environmental Protection Agency Energy Star rating of 95 out of 100 points.

## ENERGY

Expected to save \$200,000 per year compared with a traditionally built structure of comparable size, the education building's heat gain has been cut through the maintenance of a white roof and high-performance glazing. Its windows and open floor plans make maximum use of daylight and views while daylight and motion sensors ensure electric lights are dimmed or off when not needed. All electric replacement fluorescent lamps in state-owned buildings are required to be low-mercury bulbs.

In addition, an upper floor of the building houses solar panels for a 9-kilowatt photovoltaic system. The PVs provide clean, renewable electricity to help power elevators, lighting and other systems throughout the building.

An underfloor air-distribution system reduces overhead ductwork and improves airflow delivering cool air at a higher temperature and lower velocity cooling to the level around the workers, allowing the warmer air to rise to the ceiling by convection and be exhausted, saving energy. Employees have air diffusers to control the amount of air they receive. Additionally, night-time cooling using outside air and the thermal mass of the concrete floors below the UFAD, saves cooling energy during the day.

"The Education Building was designed, built and now is operated to be 40 percent more energy efficient than required by the California

## GREEN TEAM

**ARCHITECT / Johnson Fain Partners,** Los Angeles, [www.jfpartners.com](http://www.jfpartners.com)  
**CONSTRUCTION MANAGER / 3D/I,** Sacramento, Calif., [www.3di.com](http://www.3di.com)  
**DESIGN-BUILD / Hensel Phelps Construction Co.,** Greeley, Colo., [www.henselphelps.com](http://www.henselphelps.com); **Fentress Bradburn Architects,** Denver, [www.fentressbradburn.com](http://www.fentressbradburn.com); and **Dreyfuss & Blackford Architects,** Sacramento, [www.dreyfussblackford.com](http://www.dreyfussblackford.com)  
**GREEN CONSULTANTS / SMWM,** San Francisco, [www.smwm.com](http://www.smwm.com), and **Nolte Beyond Engineering,** Sacramento, [www.nolte.com](http://www.nolte.com)  
**MECHANICAL ENGINEER / Taylor Engineering LLC,** Alameda, Calif., [www.taylor-engineering.com](http://www.taylor-engineering.com)  
**GEOTECHNICAL CONSULTANT / Geolabs,** Oakland, Calif., [www.geolabs.net](http://www.geolabs.net)  
**COMMISSIONING AGENT / SMWM**



## MATERIALS AND SOURCES

**COOL ROOF / TPO** from **Firestone Building Products**, Indianapolis, [www.firestonebpco.com](http://www.firestonebpco.com)

**ROOF AND WALL INSULATION / Johns Manville**, Denver, [www.jm.com](http://www.jm.com)

**GLAZING / Wausau Window and Wall Systems**, Wausau, Wis., [www.wausauwindow.com](http://www.wausauwindow.com)  
**DAYLIGHTING AND MOTION SENSORS / Wattstopper Inc.**, Santa Clara, Calif., [www.wattstopper.com](http://www.wattstopper.com)

**LOW-MERCURY LIGHT BULBS / Phillips**, Somerset, N.J., [www.usa.philips.com](http://www.usa.philips.com), and **Sylvania**, Danvers, Mass., [www.sylvania.com](http://www.sylvania.com)

**PHOTOVOLTAICS / Model DS-40 modules** manufactured by Dunasolar Inc. under license from **Energy Photovoltaics Inc.**, Princeton, N.J., [www.epv.net](http://www.epv.net)

**HVAC / Two boilers with Alzeta burners** from **Cleaver-Brooks**, Milwaukee, [www.cleaver-brooks.com](http://www.cleaver-brooks.com); two Evergreen chillers and one chiller, model 19XR-02128BGS64, from **Carrier Corp.**, Farmington, Conn., [www.carrier.com](http://www.carrier.com); and four cooling towers from **Baltimore Aircoil**, Jessup, Md., [www.baltimoreaircoil.com](http://www.baltimoreaircoil.com)

**LOW-FLOW PLUMBING FIXTURES / Optima Sensor Operated CP Lav Faucet** from **Sloan Valve Co.**, Franklin Park, Ill., [www.sloanvalve.com](http://www.sloanvalve.com); Sunroc drinking faucets from **Tri Palm International**, Columbus, Ohio, [www.tripalmint.com](http://www.tripalmint.com); Lever Handle Sink Faucet from **Delta Faucet Co.**, Indianapolis, [www.deltafaucet.com](http://www.deltafaucet.com); and Pressure Balance Shower Valve and Hand Shower System from **Leonard Valve Co.**, Cranston, R.I., [www.leonardvalve.com](http://www.leonardvalve.com)

**LOW-FLOW TOILETS AND URINALS / Optima Sensor Operated CP Flush Valve water closet and urinal** from **Sloan Valve**



Building Code. If government can slash energy usage that dramatically, so can business," Marin says. "Commercial buildings use more than one-third of all the electricity consumed in California. Just think what we could achieve working together if every building in California aimed at these energy savings."

The building is a stand-alone structure using standard utility company (Sacramento Municipal Utility District) metering. During 2003, the first full year the building was occupied, 4.9 million kWh of energy were used. In 2004, the building consumed 4.1 million kWh. Another decrease occurred in 2005 when 4 million kWh were consumed. In 2006, 4.5 million kWh were used, which was attributed to one of the hottest years on record in California history. In fact, a "heat storm" during the summer in Sacramento caused temperatures to be 100 F (38 C) and higher for several weeks.

## INDOOR ENVIRONMENTAL QUALITY

In addition to energy savings, the building's indoor environmental quality for employees and visitors has been improved through the use of efficient ventilation and air distribution, including the following:

- Although the building does not have operable windows, a UFAD system brings fresh air into the building through plenum in the floor. Employees can regulate the amount of air coming into their workspaces by adjusting vents at their cubicles or in their offices.

- Use of a state-of-the-art air-filtration system clears the air of everything from dust to fumes.
- Use of carpet, paints and building finishes containing very low to nearly zero levels of harmful VOCs further improves IAQ.
- The use of green cleaning products reduces chemical exposure to the janitorial staff and emissions to building occupants.

Detailed information about California's sustainable building operations and maintenance polices is available at [www.green.ca.gov/greenbuildings/BBBTManual.htm](http://www.green.ca.gov/greenbuildings/BBBTManual.htm).

## WATER

Water efficiency has been increased by reducing the flow in plumbing fixtures and irrigation systems. In addition to reducing water flow, the building's water faucets and restroom facilities conserve water by using motion sensors, and unused water from drinking fountains throughout the building is recycled into an outdoor, decorative fountain.

The irrigation system's controller was set in 2003 by the building designer. In 2006, while applying for LEED-EB, the settings were reviewed by a California Department of General Services landscape architect, and, subsequently, the control settings were refined resulting in the irrigation system using 80 percent less water than a conventional system.

Overall, the building's water usage is 18 percent less than a comparably sized, conventionally designed building.

## OPERATIONS

The building's solid-waste stream (trash that would normally go to landfill) has been reduced through recycling measures. Policies have been implemented to purchase environmentally preferable products containing recycled content for the building and its occupants. State agencies are required, by law, to practice environmentally preferable purchasing, which means buying and using products with a reduced impact on health and the environment compared to competing products serving the same purpose.

Approximately, 55 percent of purchases are recycled materials using at least 10 percent post-consumer or 20 percent postindustrial material. One hundred percent of purchases are IAQ-compliant products, equivalent to Green Seal Standard GS-37. Environmentally preferable products used in state facilities include recycled-content carpeting with low or near-zero VOCs, low-mercury fluorescent lighting, low-VOC paint and recycled-content office supplies.

Department of General Services building operations and maintenance policy includes the use of Integrated Pest Management. IPM is a common-sense approach to pest management that uses a variety of nontoxic methods to control pests. Considerable effort is put toward preventing pest problems by controlling conditions that may attract and support pests. Outdoor organic fertilizers, hand weeding and introduction of landscaping that attracts beneficial insects, such as ladybugs, are part of the program to reduce or eliminate chemical usage.

For more information about California's EPP practices, refer to the *EPP Best Practices Manual* at [www.green.ca.gov/EPP/default.htm](http://www.green.ca.gov/EPP/default.htm).

## HUMAN RESPONSE

For those employees who worked in the previous California Department of Education building, the new building has provided them a much better working environment.

"Our new building is not only environmentally friendly but worker friendly, as well," says Pam Slater, a California Department of Education public-information officer. "We all feel a sense of pride working here knowing we are part of a growing movement toward 'green' buildings that use natural resources wisely. Because of the green innovations designed into our building, the air is cleaner, the water is filtered and there is plenty of natural light. I just feel healthier and even more productive. And, of course, we do our part like using only nontoxic cleaners in our work stations and recycling everything we possibly can. Our former building was seriously overdue for renovation, which it is still undergoing. It was dark and dank, and I always kept a cover on my coffee cup because I was never sure what was floating in the air." 🌱

The Education Building was designed, built and now is operated to be **40 PERCENT** more energy efficient than required by the California Building Code.

