

Greening California State Buildings – What's happening?

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Background

- Non-State Construction:
 - Residential
 - 2004-07: 200,000+ new permits/year
 - Non residential
 - 2004-2007: >\$60 Billion/year

Background

- State financed infrastructure 2002-2007: \$56 Billion
 - State owned building construction: \$2 Billion/yr
 - Historic drivers for State buildings: lowest cost and quickest delivery

Background

- **Energy:** uncertainty future supply
- **Water:** "California faces big water supply challenges in the future,.." (DWR, 2005)
- **Land use:** 19% + new urbanization is happening on Prime farmland (Dept. Of Conservation, 2002)
- **Waste:** 47% diversion rate, but still 2,300/lbs/person/year going to landfill (CIWMB, 2004)
- **Air quality:** 4 of the 10 worst cities for air quality in the U.S. (EPA, 2004)

Background

Environmental Impact of Buildings

- >65% of total U.S. electricity consumption
- > 36% of total U.S. primary energy use
- >30% of total U.S. greenhouse gas emissions
- 136 million tons of construction and demolition waste in the U.S., 21% of California's waste stream
- 12% of potable water in the U.S.
- 40% (3 billion tons annually) of raw materials use globally

Background

Benefits of Green Building

- Environmental benefits
 - Reduce the impacts of natural resource consumption
- Economic benefits
 - Improve the bottom line
- Health and safety benefits
 - Enhance occupant comfort and health
- Community benefits
 - Minimize strain on local infrastructures and improve quality of life

Background

What is Green Building?

Many definitions:

- Sustainable Building
- Ecologically Designed Building
- High Performance Building

Background

What is Green Building?

- A Careful Balance Of Human Needs And Social and Environmental Realities:
 - Resource Efficient
 - Socially Responsible
 - Safe and Healthy
 - Commissioned and Measured
 - Well Maintained and Operated
 - A Learning Tool

Background

- Life Cycle Cost of New Buildings
 - 5-10% Design and construction “first costs”
 - 60-80% Operations and maintenance including staffing
 - 5-35% Land acquisition, conceptual planning, renewal or revitalization, and disposal

Background

- A recent economic analysis by the California Sustainable Building Taskforce found that
“..minimal increases in upfront costs of 0-2% to support green design will result in life cycle savings of 20% of total construction costs -- more than ten times the initial investment.”

www.ciwmb.ca.gov/greenbuilding/Design/CostIssues.htm#Cost&Benefit

Background

Building Certification by the
U.S. Green Building Council (USGBC)



www.usgbc.org

Background

USGBC's Leadership in Energy And Environmental Design (LEED)

- Most Recognized and Adopted Measurement Tool
- Flexible and Performance Based
- Acts as Independent Third Party Certification Tool
- Tiered certification: Platinum, Gold, Silver and Certified



LEED
LEADERSHIP IN ENERGY & ENVIRONMENTAL DESIGN

CAEEC Block 225, LEED Project # 0090
LEED Version 2.0 Certification Level: GOLD
January 10, 2003

43 Points Achieved

Possible Points: 69

Certified 26 to 32 points Silver 33 to 38 points Gold 39 to 51 points Platinum 52 or more points

9 Sustainable Sites Possible Points: 14

Y			
Y	Prereq 1	Erosion & Sedimentation Control	
1	Credit 1	Site Selection	1
1	Credit 2	Urban Redevelopment	1
	Credit 3	Brownfield Redevelopment	1
1	Credit 4.1	Alternative Transportation, Public Transportation Access	1
1	Credit 4.2	Alternative Transportation, Bicycle Storage & Changing Rooms	1
1	Credit 4.3	Alternative Transportation, Alternative Fuel Refueling Stations	1
1	Credit 4.4	Alternative Transportation, Parking Capacity	1
	Credit 5.1	Reduced Site Disturbance, Protect or Restore Open Space	1
	Credit 5.2	Reduced Site Disturbance, Development Footprint	1
	Credit 6.1	Stormwater Management, Rate and Quantity	1
	Credit 6.2	Stormwater Management, Treatment	1
1	Credit 7.1	Landscape & Exterior Design to Reduce Heat Islands, Non-Roof	1
1	Credit 7.2	Landscape & Exterior Design to Reduce Heat Islands, Roof	1
1	Credit 8	Light Pollution Reduction	1

3 Water Efficiency Possible Points: 5

Y			
1	Credit 1.1	Water Efficient Landscaping, Reduce by 50%	1
	Credit 1.2	Water Efficient Landscaping, No Potable Use or No Irrigation	1
	Credit 2	Innovative Wastewater Technologies	1
1	Credit 3.1	Water Use Reduction, 20% Reduction	1
1	Credit 3.2	Water Use Reduction, 30% Reduction	1

9 Energy & Atmosphere Possible Points: 17

Y			
Y	Prereq 1	Fundamental Building Systems Commissioning	
Y	Prereq 2	Minimum Energy Performance	
Y	Prereq 3	CFC Reduction in HVAC&R Equipment	
2	Credit 1.1	Optimize Energy Performance, 20% New / 10% Existing	2
2	Credit 1.2	Optimize Energy Performance, 30% New / 20% Existing	2
2	Credit 1.3	Optimize Energy Performance, 40% New / 30% Existing	2
1	Credit 1.4	Optimize Energy Performance, 50% New / 40% Existing	2
	Credit 1.5	Optimize Energy Performance, 60% New / 50% Existing	2
	Credit 2.1	Renewable Energy, 5%	1
	Credit 2.2	Renewable Energy, 10%	1
	Credit 2.3	Renewable Energy, 20%	1
1	Credit 3	Additional Commissioning	1
	Credit 4	Ozone Depletion	1
1	Credit 5	Measurement & Verification	1
	Credit 6	Green Power	1

6 Materials & Resources Possible Points: 13

Y			
Y	Prereq 1	Storage & Collection of Recyclables	
	Credit 1.1	Building Reuse, Maintain 75% of Existing Shell	1
	Credit 1.2	Building Reuse, Maintain 100% of Existing Shell	1
	Credit 1.3	Building Reuse, Maintain 100% Shell & 50% Non-Shell	1
1	Credit 2.1	Construction Waste Management, Divert 50%	1
1	Credit 2.2	Construction Waste Management, Divert 75%	1
	Credit 3.1	Resource Reuse, Specify 5%	1
	Credit 3.2	Resource Reuse, Specify 10%	1
1	Credit 4.1	Recycled Content, Specify 25%	1
1	Credit 4.2	Recycled Content, Specify 50%	1
1	Credit 5.1	Local/Regional Materials, 20% Manufactured Locally	1
	Credit 5.2	Local/Regional Materials, of 20% Above, 50% Harvested Locally	1
	Credit 6	Rapidly Renewable Materials	1
	Credit 7	Certified Wood	1

13 Indoor Environmental Quality Possible Points: 15

Y			
Y	Prereq 1	Minimum IAQ Performance	
Y	Prereq 2	Environmental Tobacco Smoke (ETS) Control	
1	Credit 1	Carbon Dioxide (CO ₂) Monitoring	1
1	Credit 2	Increase Ventilation Effectiveness	1
1	Credit 3.1	Construction IAQ Management Plan, During Construction	1
1	Credit 3.2	Construction IAQ Management Plan, Before Occupancy	1
1	Credit 4.1	Low-Emitting Materials, Adhesives & Sealants	1
1	Credit 4.2	Low-Emitting Materials, Paints	1
1	Credit 4.3	Low-Emitting Materials, Carpet	1
1	Credit 4.4	Low-Emitting Materials, Composite Wood	1
1	Credit 5	Indoor Chemical & Pollutant Source Control	1
	Credit 6.1	Controllability of Systems, Perimeter	1
1	Credit 6.2	Controllability of Systems, Non-Perimeter	1
1	Credit 7.1	Thermal Comfort, Comply with ASHRAE 55-1992	1
1	Credit 7.2	Thermal Comfort, Permanent Monitoring System	1
	Credit 8.1	Daylight & Views, Daylight 75% of Spaces	1
1	Credit 8.2	Daylight & Views, Views for 90% of Spaces	1

4 Innovation & Design Process Possible Points: 5

Y			
1	Credit 1.1	Innovation in Design: Exemplary Recycled Content--Weighted 20%	1
1	Credit 1.2	Innovation in Design: Emissions Test of Materials & Furnishings	1
1	Credit 1.3	Innovation in Design: Interpretative Educational Pocket Park	1
	Credit 1.4	Innovation in Design:	1
1	Credit 2	LEED™ Accredited Professional	1

LEED in the U.S

State Government Use:

- California
- Maryland
- Massachusetts
- New Jersey
- New York
- Oregon
- Pennsylvania
- Washington

Local Government Use:

- Austin, TX
- Arlington, VA
- Boulder, CO
- Chicago and Cook County, IL
- Los Angeles, CA
- Portland, OR
- San Jose, CA
- San Francisco, CA
- Seattle, WA

State Green Building

Events

1. Capitol East End Project (1999)
2. Environmental Specifications for Office Furniture Systems (2000)
3. Executive Order D-16-00 (2000)
4. Executive Order D-46-01 (2001)
5. Executive Order EO S-20-04 (2004)
6. SB 1106 - Environmentally Preferable Purchasing (2005)

The Greening of State Buildings

1. The Capitol East End Project (1999 - 2003)

- \$392 million, five building , 1.5 million sq. ft complex
- The largest state government office project in California's history
- Formation of the Sustainable Building Task Force of over 40 state agencies
- "Greenest" buildings ever built by the California state government

Capitol East End Complex



Capitol East End Complex



Capitol East End Project

(completed in 2003)

Building Highlights

- Energy efficient measures - exceeds Title 24 standards by 30%, saving \$400,000+/year
- New environmental specs for modular furniture
- Under floor distribution system
- *Development of new indoor air guideline - Section 01350*
- Thorough building flushout
- High recycled content materials
- 5000 photovoltaic panels producing 160+kilowatts of electricity
- "Cool roofing" materials reflect sunlight, 40% less cooling cost

Building Highlights (continue)

- Reuse 30,000+ sq.ft of salvaged marble flooring
- 97% of construction waste (1/4 million tons) diverted from landfill
- Smart light controls, high efficiency fluorescent lamps, and window glazing
- Interior and exterior water efficient and saving systems
- Electric charging stations, carpool and alternative fuel vehicle parking, bicycle lockers, and shower facilities

Phase 1: LEED NC, Gold

Phase 2: LEED NC, Silver

Sustainable Building Task Force

Participants from over 40 State agencies, including:

- DGS
- Housing & Community Development
- Department of Finance
- Division of the State Architect
- CalTrans
- UC/CSU/CCC
- CARB
- DWR
- CIWMB
- CEC
- DTSC
- DHS
- OEHHA



2. Environmental Specifications for Office Furniture Systems (2000)

- Review specifications for office workstation (DGS's Procurement Division, 1999)
- \$60 million contract for three years
- By law state agencies are required to purchase from California Prison Industries (PIA)
- Part of contract can be filled by private vendors

2. Environmental Specifications for Office Furniture Systems (2000) continue

- Specifications:

- a. IAQ Testing & Selection Criteria

- ✓ Most important, specified that in emission testing formaldehyde should not exceeded 20 ppb (the first in the US for modular furniture)

- b. Recycled Contents

- c. Lighting

Special Environmental Requirements (California Section 01350)

California Section 01350 was developed based on the Environmental Specifications for Office Furniture by:

- **CIWMB**
- **DHS**
- **CARB**
- **OEHHA**
- **Anthony Bernheim FAIA, Simon Martin-Vergue Winkelstein Moris**
- **Hal Levin, Building Ecology Research Group**

Special Environmental Requirements (California Section 01350)

- **Specific IAQ Testing Requirements (Manufacturer)**
- **Identify specific materials for individual, adhesive, and assembly for emission chamber testing**
- **Chamber testing under ASTM Standard D5116-97**
- **Procedure for specimen collection, preparation, conditioning, sampling, etc.**
- **Identify all chemicals (a) listed as probable or known human carcinogen or reproductive toxicants (Prop 65/TAC list)) and (b) with Chronic RELs**

<http://www.ciwmb.ca.gov/GreenBuilding/Specs/Section01350/>

3. Executive Order D-16-00

Governor's sustainable building goal:

“to site, design, deconstruct, construct, renovate, operate, and maintain state buildings that are models of energy, water, and materials efficiency, while providing healthy, productive and comfortable indoor environments and long-term benefits to Californians”



Building Better Buildings:



A Blueprint for Sustainable State Facilities

D E C E M B E R 2 0 0 1

Prepared by the Sustainable Building Task Force
and the State and Consumer Services Agency

Governor's Executive Order D-16-00

Building Better Buildings:



An Update on State Sustainable Building Initiatives



October 2003

Prepared by the Sustainable Building Task Force and the State and Consumer Services Agency

<http://www.ciwmb.ca.gov/GreenBuilding/Blueprint/2003/FullReport.pdf>

4. Executive Order D-46-01



This order provides guidance on the process DGS will use to locate and lease space, including such considerations as proximity to public transit and affordable housing; preserving structures of historic, cultural, and architectural significance; opportunities for economic renewal; and sensitivity to neighborhood and community concerns.

5. Executive Order S-20-04



Green Building Action Plan

- Reduce Energy Use by 20%/sq.ft.
- Green Building
 - LEED NC, Silver Minimum for All State Buildings
 - Retro-Commission for Existing State Buildings (LEED EC)
 - Energy Benchmarking
- Life Cycle Cost Assessment Methodology
- Resource & Energy Efficient Schools Guidelines
- Energy Star equipment



6. Environmentally Preferable Purchasing (EPP) (SB 1106, 2005*)

California's EPP law directs the DGS to develop and implement a "strategy to increase environmentally preferable purchasing. This may include the development of statewide policies, guidelines, programs, and regulation," It also "ensures the procurement and use of recycled resources,"

***Public Contract Code Sections 12400-12404**

6. Environmentally Preferable Purchasing

EPP means “the procurement or acquisition of goods and services that have a lesser or reduced effect on human health and the environment when compared with competing goods or services that serve the same purpose. This comparison shall take into consideration, to the extent feasible, raw materials acquisition, production, manufacturing, packaging, distribution, reuse, operation, maintenance, disposal, energy efficiency, product performance, durability, safety, the needs of the purchaser, and cost.”

EPP cannot supersede recycled-content laws, require purchase of poorly performing goods, exclude adequate competition, or require unreasonable prices or lead times.

6. Environmentally Preferable Purchasing

- A multi-agency state EPP Task Force was formed to help DGS in its mandate**
- DGS will “green” all its statewide commodity contracts**
- 76 contracts expiring before 7/31/07, many will be reviewed by the groups within the EPP Task Force**

6. Environmentally Preferable Purchasing

Examples of some state contracts

Commodity	Awarded Amount	End date
Computer Equipment: Desktops & Workstation	\$1,800,000,000	6/29/2007
Computer Equipment: Notebooks	\$1,800,000,000	6/29/2007
Computer Equipment: Printers	\$900,000,000	6/29/2007
Computer Equipment: Monitors	\$900,000,000	6/29/2007
Computer Equipment: Peripherals	\$900,000,000	6/29/2007
Office Supplies	\$109,000,000	7/18/2008
Panel System, Open Office	\$60,000,000	Open
Monolithic panel systems furniture	\$20,000,000	Open

California Gold Sustainable Carpet Standard

An interagency EPP Carpet Working Group contributed to the development of a national consensus-based standard (NSF 140-2005). California Gold Sustainable Carpet Standard includes added criteria related to material emissions, post-consumer recycled content and end of life management

All carpet purchased by State agencies after August 31, 2006 shall meet CA Gold Standard.

<http://www.green.ca.gov/EPP/carpets.htm>

California Gold Sustainable Carpet Standard

Standard developed by California to ensure carpet purchased by State:

- Meets low emissions standards, (**Section 01350** and achieves LEED IEQ credit 4.3)
- Meets California's (10% post-consumer) recycled content requirements of SABRC (State Agency Buy Recycled Campaign)
- Manufacturer has carpet reclamation program in place meeting industry goals
- Manufacturer incorporates Life Cycle Assessment (LCA) program
- Manufacturer achieves a minimum of 52 sustainable credits in various categories

Cleaning Products

Adopts Green Seal (GS-37) Environmental Standard for general-purpose, bathroom, glass, and carpet cleaners for industrial & institutional purposes as the “base” standard.

The EPP Cleaning Products Work Group is:

- 1. Working on an addendum to GS-37 to include Section 01350 and other requirements**
- 2. Reviewing other guidelines such as EPA’s Design for the Environment Formulator Program “A More Discriminating and Protective Approach to Cleaning Products Review and Recognition”**
- 3. Supports PIA in their develop of “green” cleaners**

Section 01350 is now being integrated into:

- Scientific Certification Systems's "**Indoor Advantage**" IAQ Performance Environmental Certification Program and their EPP carpet specification and the Resilient Floor Covering "**FloorScore**" program (www.scscertified.com/iaq)
- Carpet Testing Program The Carpet & Rug Institute's new **Green Label Plus** (www.carpet-rug.com)
- The Green Guide for Health Care (www.gghc.org)
- Collaborative for High Performance Schools' Best Practice Manual (www.CHPS.net)
- Institute for Market Transformation to Sustainability (MTS) Textile and Flooring standards (<http://MTS.sustainableproducts.com>)

CHPS

- Best Practices Manual
 - Process, Design Guidelines, and Eligibility Criteria
- Training
 - Seminars to educate districts and designers
- Financial and Design Assistance Programs
 - Performance based grants and loans to help offset incremental costs.
- Demonstration Schools
 - New schools showcase the value and feasibility of innovative designs.
- Material Specifications
 - Testing, emissions, and resource efficiency standards for materials (Section 01350)

the
S
collaborative
P
for high
H
performance
C
schools



Cal/EPA Headquarters, Sacramento CA

- LEED Existing Building (LEED-EB) Platinum Certification
- 25 stories and 950,000 square feet
- Environmentally sensitive and resource efficient materials
- Dual pane "Low E" exterior glass
- Zero VOC paints
- Fan rooms on each floor to bring in fresh air
- Innovative Operations & Maintenance Initiatives
- Solar energy generation of up to 55,180 KWH (736 rooftop photovoltaic panels)

