LEED™ Supplement for California State Facilities (Supplement)

Purpose

This document is designed to be used in conjunction with the Leadership in Energy and Environmental Design (LEED) Green Building Rating System™, version 2.0. It provides information on California codes, policies and practices and it raises the minimum performance standards for various sustainable building elements to levels higher than those established in 2.0. The Supplement is designed to inform the design community about State law and required and recommended sustainable building practices, set clear performance goals, while providing flexibility in how those goals are achieved; and assist the State in achieving its sustainable building goal for state facilities.

State’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.

The objectives are to implement the sustainable building goal in a cost effective manner, while considering externalities; identify economic and environmental performance measures; determine cost savings; use extended life cycle costing; and adopt an integrated systems approach.

Governor’s Executive Order D-16-00

Created by:

The Sustainable Building Technical Group, a subcommittee of the State's Sustainable Building Task Force, developed this document. A list of Task Force participants is available at: //www.ciwmb.ca.gov/GreenBuilding/TaskForce/WhoDoesWhat/Members.htm

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Buildings covered under the Supplement

This supplement applies to state government construction projects, including new construction, renovations, and appropriate leased space.

New and renovated “significant” building construction projects. “Significant” projects include those over 50,000 square feet, or prototype buildings that can be replicated and impact over 50,000 square feet, or highly visible buildings that serve an educational purpose.

“Appropriate” and “significant” leased space is also covered. “Appropriate” refers to leases where the state has the ability to influence the design and construction such as build-to-suit leases.
This document is not intended to be used on infrastructure projects such as roads, bridges, sewers; buildings that are not occupied, and small structures under 5000 square feet that do not meet the criteria of a “significant” project. For these projects and to advance the state’s sustainable building goal, project managers and design teams are encouraged to apply the portions of the rating system and Supplement that make sense for their projects or are required by law or in contract documents.

**Using this Supplement to LEED 2.0**

No part of this document allows LEED™ 2.0 to supersede California codes.

LEED 2.0 prerequisites are required and LEED 2.0 credits are optional.

For each LEED category, meeting the LEED 2.0 prerequisite or credit DOES NOT mean you have met the California requirement.

*California Requirements* are not optional, but required. Many of these requirements are already in state law, but may not be fully implemented on state projects. *California Recommendations* are not required.

Several of the California requirements are also found in *Exhibit C, Energy Efficient and Sustainability Requirements*, which is attached to Architecture and Engineering Contracts administered by DGS.

This Supplement provides additional resources for informational purposes only.

**Proposed adoption schedule**

The Supplement will be incorporated into “significant” projects that are in the Capital Outlay Budget Change Proposal (COBCP) Budget Packet Phase, starting in September 2001. These projects may or may not be required to go through the full certification process, but at least three projects will go through the formal LEED certification process. The Sustainable Building Task Force will evaluate this process for its value and cost to the State and it will recommend an adoption schedule, for approval by the Department of Finance.

**Self-certified Compliance**

This Supplement is self-certifying, however it may be enforced by contract, other agreements, or through existing processes used to enforce local and state codes.

The *Green Building Rating System* is the basis of the Supplement and to be recognized as a State of California LEED Building, the project must go through the formal LEED certification process AND self-certify for the additional prerequisites and other supplemental elements contained in the *LEED Supplement for California State Facilities*. 
### Overview of LEED 2.0 and Supplemental California Requirements

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<td>Site Credit 8</td>
<td>Light Pollution Reduction</td>
</tr>
<tr>
<td><strong>Water</strong></td>
<td></td>
</tr>
</tbody>
</table>
| Water Credit 1 | Water Efficient Landscaping | Must achieve 1 point in this category  
Comply with water efficient landscaping ordinance |
| Water Credit 2 | Innovative Wastewater Technologies | No additional requirement |
| Water Credit 3 | Water Use Reduction | Install separate meters of indoor and outdoor water use |
| **Energy** | |
| Prerequisite 1 | Fundamental Building Systems and Commissioning | No additional requirement |
| Prerequisite 2 | Minimum Energy Performance | Meet Title 24, Part 6 instead of ASHRAE standard |
| Prerequisite 3 | CFC Reduction to HVAC&R Equipment | No additional requirement |
| Energy Credit 1 | Optimize Energy Performance | Must achieve a minimum of 2 points in this category  
(see full text for chart with Title 24). |
| Energy Credit 2 | Renewable Energy Credits | No additional requirement |
Overview of LEED 2.0 and Supplemental California Requirements

<table>
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<tr>
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<tr>
<td>Energy Credit 3</td>
<td>Additional Commissioning</td>
</tr>
<tr>
<td></td>
<td>• Must achieve 1 point</td>
</tr>
<tr>
<td></td>
<td>• IAQ management plan must be part of facility maintenance and commissioning plans</td>
</tr>
<tr>
<td>Energy Credit 4</td>
<td>Elimination of HCFC's and Halons</td>
</tr>
<tr>
<td></td>
<td>No additional requirement</td>
</tr>
<tr>
<td>Energy Credit 5</td>
<td>Measurement and Verification</td>
</tr>
<tr>
<td></td>
<td>No additional requirement</td>
</tr>
<tr>
<td>Energy Credit 6</td>
<td>Green Power</td>
</tr>
<tr>
<td></td>
<td>No additional requirement</td>
</tr>
</tbody>
</table>

**Materials**

- **Prerequisite 1**
  - Storage and Collection of Recyclables
  - Comply with local ordinance.

- **Materials Credit 1**
  - Building Reuse
  - No additional requirement

- **Materials Credit 2**
  - Construction Waste Management
  - Must achieve 1 point in this category
  - Comply with local ordinance, if applicable

- **Materials Credit 3**
  - Resource Reuse
  - No additional requirement

- **Materials Credit 4**
  - Recycled Content
  - Must achieve 1 point in this category
  - Comply with State Agency Buy Recycled Campaign

- **Materials Credit 5**
  - Local/Regional Materials
  - No additional requirement

- **Materials Credit 6**
  - Rapidly Renewable Materials
  - No additional requirement

- **Materials Credit 7**
  - Certified Wood
  - No additional requirement

**Indoor Environmental Quality**

- **Prerequisite 1**
  - Minimum IAQ Performance
  - Meet operational, maintenance, and record-keeping requirements of Cal/OSHA
  - Outside air intakes at least 25 feet from sources of contamination
  - Exterior wrap for duct insulation
  - Proper drainage for the HVAC condensate pans
  - High efficiency filters at main HVAC intakes
  - Irrigation systems must not spray on buildings
  - Design to prevent the accumulation of water under, in, or near buildings

- **Prerequisite 2**
  - Environmental Tobacco Smoke Control
  - No additional requirement

- **IEQ Credit 1**
  - Carbon Dioxide Monitoring
  - Must achieve 1 point in this category
  - Specify controlled ventilation ONLY for those areas with variable occupancy exceeding one person per 50
  - Separate minimum outdoor airflow measuring station for each HVAC system
## Overview of LEED 2.0 and Supplemental California Requirements

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<td>IEQ Credit 2</td>
<td>Increase Ventilation Effectiveness</td>
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<tr>
<td>IEQ Credit 3</td>
<td>Construction IAQ Management Plan</td>
</tr>
<tr>
<td>IEQ Credit 4</td>
<td>Low-Emitting Materials</td>
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</table>

### IEQ Credit 2
- Increase Ventilation Effectiveness
- No additional requirement

### IEQ Credit 3
- Must have a minimum of one point in this category.
- The flush-out is required.
  - Prior to substantial completion and occupancy a flush out must be conducted continuously (i.e. 24 hours per day, seven (7) days a week) using tempered outside air (or maximum amount of outside air while achieving reasonable indoor temperature) for at least 30 calendar days or as many days possible before occupancy. New filtration media must be installed at the end of the flush-out.
  - After occupancy continue the flush out using tempered air for 30 days. This time period may be adjusted if an IAQ sampling plan has been prepared and is used to monitor air quality.
  - Return ventilation system to normal operation following flush-out period to minimize energy consumption.
- Specify the sequence of installation of finishing materials according to the Reference Specifications for Energy and Resource Efficiency, section 1350.

### IEQ Credit 4
- All 4 points must be achieved in this category.
- Materials with significant effects on indoor air quality to meet the Chronic Reference Exposure Levels as adopted by OEHHA for organic compounds.
- The following building materials shall emit zero formaldehyde:
  - Interior paints
  - Suspended ceiling panels
  - Acoustical and thermal insulation
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<tr>
<td>IEQ Credit 5</td>
<td>Indoor Chemical and Pollutant Source Control</td>
</tr>
<tr>
<td></td>
<td>(see pages 8-38 for full text)</td>
</tr>
<tr>
<td>IEQ Credit 6</td>
<td>Controllability of Systems</td>
</tr>
<tr>
<td></td>
<td>Recommendation (not required). When operable windows are installed:</td>
</tr>
<tr>
<td></td>
<td>• Provide sensors at each window so that maintenance staff gets notified when windows</td>
</tr>
<tr>
<td></td>
<td>are left open after hours</td>
</tr>
<tr>
<td></td>
<td>• Provide local temperature and/or airflow control</td>
</tr>
<tr>
<td>IEQ Credit 7</td>
<td>Thermal Comfort</td>
</tr>
<tr>
<td>IEQ Credit 8</td>
<td>Daylight and Views</td>
</tr>
<tr>
<td>Innovation and Design/Building Process</td>
<td>No additional requirements. The Sustainable Building Task Force is attempting to seek pre-approval for fuel cells that operate using non-renewable fuel (fuel cell operating with renewable fuel are already included under Energy Credit 2).</td>
</tr>
<tr>
<td>Innovation Credits</td>
<td>No additional requirements.</td>
</tr>
<tr>
<td>LEED Accredited Professional</td>
<td>No additional requirements.</td>
</tr>
</tbody>
</table>
Sustainable Sites:  2.0 and the California Supplement

Site Prerequisite 1:  Erosion and Sedimentation Control

2.0 Requirement
Design to a site sediment and erosion control plan that conforms to best management practices in the EPA's Storm Water Management for Construction Activities, EPA Document No. EPA-833-R-92-001, Chapter 3, OR local Erosion and Sedimentation Control standards and codes, whichever is more stringent. The plan shall meet the following objectives:

- Prevent loss of soil during construction by storm water runoff and/or wind erosion, including protecting topsoil by stockpiling for reuse.
- Prevent sedimentation of storm sewer or receiving streams and/or air pollution with dust and particulate matter.

California Requirement
No additional requirement.

Documentation
See Reference Guide.

Additional Resources and Comments
- California Reference: State Water Resources Control Board, Construction Storm Water Program, Construction activity resulting in a land disturbance of five acres or more, or less than five acres but part of a larger common plan of development or sale must obtain the Construction Activities Storm Water General Permit (General Permit). Storm water discharges in the Lake Tahoe Hydrologic Unit and the San Jacinto Watershed are regulated by a separate construction permit(s). http://www.swrcb.ca.gov/stormwr/constfaq.html
- Individual County zoning ordinances may further limit development in wetlands (e.g., sec. 35.97.9 of Santa Barbara County's Coastal Zoning Ordinance). At the same time, projects “which result in discharge of water into a wetland require a permit from the California Regional Water Quality Control Board.” Note that each local zoning ordinance may give exception to that requirement for a particular waterway.
- Recommend separation from power-line easements, railroad tracks, hazardous pipelines, adverse levels of noise
- Recommend no construction on active earthquake faults or fault traces
- Identify if asbestos is present in soil and rocks AND if present, comply with regulations and guidance for monitoring and controlling asbestos. www.arb.ca.gov/toxics/asbestos.htm
Site Credit 1: Site Selection
1 point

**LEED 2.0 Requirement**
Do not develop buildings on portions of sites that meet any one of the following criteria:
- Prime agricultural land as defined by the Farmland Trust
- Land whose elevation is lower than 5 feet above the elevation of the 100-year flood as defined by FEMA
- Land that provides habitat for any species on the Federal or State threatened or endangered list
- Within 100 feet of any wetland as defined by 40 CFR, Parts 230-233 and Part 22, OR as defined by local or state rule or law, whichever is more stringent.
- Land which prior to acquisition for the project was public parkland, unless land of equal or greater value as parkland is accepted in trade by the public land owner. (Park Authority projects are exempt.)

**California Requirement**
No additional requirement.

**Documentation**
See Reference Guide.

**Additional Resources and Comments and Comments**
- Research the Farmland Trust and find out what types of land qualify
- Check local soil surveys to identify “important farmland.” County offices of the US Dept. of Agriculture, Natural Resources Conservation Districts can be identified at this web site: http://offices.usda.gov/scripts/ndlSAPI.dll/oip_public/USA_map
- The California Coastal Commission regulates coastal development in parallel with the U.S. Army Corps of Engineers and the California Regional Water Quality Control Board. In addition, joint consultation is called for that includes the California Dept of Fish and Game, for any projects in or adjacent to any waterway, tidal creek, wetland, or seasonal stream.
- Comply with DGS policy on location of facilities http://www.osp.dgs.ca.gov/Publications/samy/mmemos/mm01_18.pdf
- Locate buildings upwind and with as much setback as possible from neighborhood pollutant sources such as heavy traffic roadways, intersections, bus/car/truck loading areas, parking garages and lots, railroad depots, and commercial and industrial sources of air pollution. (See IEQ Prerequisite 1 for siting of HVAC intakes)
- Consult the local Air Pollution Control Officer to locate nearby emission sources; review the list of Toxic Hot Spot facilities http://www.arb.ca.gov/emisinv/disclaim.htm, commercial and industrial emission sources, and Superfund sites for the area. Consult the local and regional planning agencies to estimate the peak traffic flows nearby, both current and projected flows. Note: these considerations may also impact decisions to use natural ventilation and improved air filtration.
Site Credit 2: Urban Redevelopment  
1 point  

**LEED 2.0 Requirement**  
Increase localized density to conform to existing or desired density goals by utilizing sites that are located within an existing minimum development density of 60,000 square feet per acre (2 story downtown development).

**California Requirement**  
No additional requirement.

**Documentation**  
See Reference Guide.

Site Credit 3: Brownfield Redevelopment  
1 point  

**LEED 2.0 Requirement**  
Develop on a site classified as a brownfield and provide remediation as required by EPA’s Brownfield Redevelopment program requirements.

**California Requirement**  
No additional requirement.

**Documentation**  
See Reference Guide.

Site Credit 4: Alternative Transportation  
1-4 points  

**LEED 2.0 Requirement**  
- Locate building within ½ mile of a commuter rail, light rail or subway station or ¼ mile of 2 or more bus lines. (1 point)  
- Provide suitable means for securing bicycles, with convenient changing/shower facilities for use by cyclists, for 5% or more of building occupants. (1 point)  
- Install alternative-fuel refueling station(s) for 3% of the total vehicle parking capacity of the site. Liquid or gaseous fueling facilities must be separately ventilated or located outdoors. (1 point)  
- Size parking capacity not to exceed minimum local zoning requirements AND provide preferred parking for carpools or van pools capable of serving 5% of the building occupants, OR, add no new parking for rehabilitation projects AND provide preferred parking for carpools or van pools capable of serving 5% of the building occupants. (1 point)

**California Requirement**  
No additional requirement.

**Documentation**  
See Reference Guide.
Additional Resources and Comments

Alternative Transportation. Such vehicles will be used increasingly by employees, vendors, and customers. Short- and long-term loans are available for organizations to obtain alternative vehicles.

- Electric Vehicle (EV) Loan Program for Public Agencies can be found at: http://www.arb.ca.gov/msprog/zevprog/loanprog/loanprog.htm
- Grants for EV purchase can be found at: http://www.arb.ca.gov/msprog/zevprog/zevprog.htm
- Funding for Alternative Fueled Vehicles can be found here:
  - http://www.afdc.doe.gov/afv/funding.shtml
  - http://www.energy.ca.gov/afvs/index.html
  - http://www.consumerenergycenter.org/transportation/afv/incentives.html

- Provide compressed natural gas and electrical hook-ups to locations near parking areas for natural gas and electric vehicles, respectively. This cost is relatively minor, especially compared to a retrofit later on. Low-pressure gas lines are now available for slow filling of compressed natural gas vehicles, so tanks and compressors are not necessary, except at central facilities.

- Preferential parking near the front of the facility for alternative fuel vehicles.

Site Credit 5:
Reduced Site Disturbance
1-2 points

LEED 2.0 Requirement

- On greenfield sites, limit site disturbance including earthwork and clearing of vegetation to 40 feet beyond the building perimeter, 5 feet beyond primary roadway curbs, walkways, and main utility branch trenches, and 25 feet beyond pervious paving areas that require additional staging areas in order to limit compaction in the paved area; OR, on previously developed sites, restore a minimum of 50% of the remaining open area by planting native or adapted vegetation. (1 point)

- Reduce the development footprint (including building, access roads and parking) to exceed the local zoning’s open space requirement for the site by 25%. (1 point)

California Requirement
No additional requirement.

Documentation
See Reference Guide.

Additional Resources and Comments
Site Credit 6:
Stormwater management
1-2 points

LEED 2.0 Requirement
Implement a stormwater management plan that results in:
- No net increase in the rate or quantity of stormwater runoff from existing to developed conditions; OR, if existing imperviousness is greater than 50%, implement a stormwater management plan that results in a 25% decrease in the rate and quantity of stormwater runoff. (1 point)
- Treatment systems designed to remove 80% of the average annual post development total suspended solids (TSS), and 40% of the average annual post development total phosphorous (TP), by implementing Best Management Practices (BMPs) outlined in EPA’s Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters (EPA 840-B-92-002 1/93). (1 point)

California Requirement
Comply with Stormwater Construction Activities General Permit, or other permit as required by state law.

The General Permit requires all dischargers where construction activity disturbs five acres or more to:

1. Develop and implement a Storm Water Pollution Prevention Plan (SWPPP) which specifies Best Management Practices (BMPs) that will prevent all construction pollutants from contacting storm water and with the intent of keeping all products of erosion from moving off site into receiving waters.

2. Eliminate or reduce nonstorm water discharges to storm sewer systems and other waters of the nation.

3. Perform inspections of all BMPs.

The General Permit is implemented and enforced by the nine California Regional Water Quality Control Boards (RWQCBs).

Intent
Protect water resources from pollution.

Submittals
Written verification from local RWQCB or enforcement agency, or project architect, engineer, or commissioning agent that indicates compliance with requirements.

Documentation
See Reference Guide.
Storm Water Pollution Prevention Plan
Additional Resources and Comments

- The State Water Resources Control Board (SWRCB) adopted one statewide General Permit that applies to all storm water discharges associated with construction activity, except from those on Tribal Lands, in the Lake Tahoe Hydrologic Unit, and those performed by the California Department of Transportation (Caltrans). Construction on Tribal Lands is regulated by a USEPA permit, the Lahontan Regional Water Control Board adopted a separate NPDES permit for the Lake Tahoe Hydrologic Unit, and the SWRCB adopted a separate NPDES permit for Caltrans projects. [http://www.swrcb.ca.gov/stormwtr/construction.html](http://www.swrcb.ca.gov/stormwtr/construction.html)

- Caltrans Storm Water Management Program

- LACDPW: Chapter 12.80 STORMWATER AND RUNOFF POLLUTION CONTROL

- County of San Diego Storm Water Management Program

- Alameda Countywide Clean Water Program (ACCWP)

Site Credit 7:
Landscape and Exterior Design to Reduce Heat Islands
1-2 points

LEED 2.0 Requirement

- Provide shade (within 5 years) on at least 30% of non-roof impervious surface on the site, including parking lots, walkways, plazas, etc., OR, use light-colored/ high-albedo materials (reflectance of at least 0.3) for 30% of the site’s non-roof impervious surfaces, OR place a minimum of 50% of parking space underground OR use open-grid pavement system (net impervious area of LESS than 50%) for a minimum of 50% of the parking lot area. (1 point)

- Use ENERGY STAR Roof compliant, high-reflectance AND high emissivity roofing (initial reflectance of at least .65 and three-year-aged reflectance of at least .5 when tested in accordance with ASTM E408) for a minimum of 75% of the roof surface; OR, install a “green” (vegetated) roof for at least 50% of the roof area. (1 point)

California Requirement
No additional requirement.

Documentation
See Reference Guide.

Additional Resources and Comments

- It is likely that California energy efficiency standards will offer a credit for cool roofs and peak load reductions. [www.energy.ca.gov/peakload](http://www.energy.ca.gov/peakload)

- Explore eliminating or reducing black top and consider new coatings and integral colorants for asphalt to achieve light colored surfaces.

- EPA’s EnergyStar program includes a database of high reflectance roofing materials. [http://yosemite1.epa.gov/estar/consumers.nsf/content/roofbus.htm](http://yosemite1.epa.gov/estar/consumers.nsf/content/roofbus.htm)
Site Credit 8:  
Light Pollution Reduction  
1 point  

**LEED 2.0 Requirement**  
Do not exceed Illuminating Engineering Society of North America (IESNA) footcandle level requirements as stated in the Recommended Practice Manual: Lighting for Exterior Environments, AND design interior and exterior lighting such that zero direct-beam illumination leaves the building site.  

**California Requirement**  
No additional requirement.  

**Documentation**  
See Reference Guide.  

**Additional Resources and Comments**  
- California Outdoor Lighting Regulations: a list of the cities and counties with linked references to specific sections of ordinances relating to outdoor lighting [http://www.skykeepers.org/califord.htm](http://www.skykeepers.org/califord.htm)  
- Refer to: IESNA RP-33 Recommended Practice for Exterior Environmental Lighting or applicable section of the IESNA Lighting Handbook, Ninth Edition. [http://www.iesna.org](http://www.iesna.org)
### Water Efficiency: 2.0 and the California Supplement

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<tr>
<th><strong>Water Credit 1:</strong></th>
<th><strong>LEED 2.0 Requirement</strong></th>
</tr>
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<tbody>
<tr>
<td>Water Efficient Landscaping</td>
<td>Use high efficiency irrigation technology, OR, use captured rain or recycled site water to reduce potable water consumption for irrigation by 50% over conventional means. (1 point)</td>
</tr>
<tr>
<td>1-2 points</td>
<td>Use only captured rain or recycled site water for an additional 50% reduction (100% total reduction) of potable water for site irrigation needs, OR, do not install permanent landscape irrigation systems. (1 point)</td>
</tr>
<tr>
<td><strong>Required</strong></td>
<td>1 Point minimum</td>
</tr>
<tr>
<td><strong>California Requirement</strong></td>
<td></td>
</tr>
<tr>
<td>• Must have at least 1 point in this category.</td>
<td><strong>Intent</strong>: Comply with local ordinances and use water resources efficiently.</td>
</tr>
<tr>
<td>• Establish landscape water budget to conform to local Water Efficient Landscape Ordinance. If no local ordinance is applicable, then use the landscape water budget in the <em>Model Water Efficient Landscape Ordinance</em> developed by the California Department of Water Resources.</td>
<td><strong>Submittals</strong>: Stamped plans by landscape architect indicating that local ordinance was met.</td>
</tr>
<tr>
<td><strong>Documentation</strong></td>
<td><strong>See Reference Guide and local Water Efficient Landscape Ordinance or Model Water Efficient Landscape Ordinance, whichever applicable.</strong></td>
</tr>
<tr>
<td>• Assembly Bill 325, the Water Conservation in Landscaping Act of 1990, required that the Department of Water Resources develop a Model Water Efficient Landscape Ordinance. This Model Ordinance was adopted and went into effect January 1, 1993. Cities and counties could adopt the Model Ordinance, adopt their own ordinance, or issue findings that no ordinance was necessary. If no action was taken, the Model Ordinance automatically went into effect. As of 1993, 257 agencies adopted a different type of ordinance, 59 agencies issued findings that an ordinance was not necessary, and the rest either have the Model Ordinance or a similar ordinance in place. <a href="http://www.dpla.water.ca.gov/cgi-bin/urban/conservation/landscape/ordinance/index">http://www.dpla.water.ca.gov/cgi-bin/urban/conservation/landscape/ordinance/index</a></td>
<td></td>
</tr>
<tr>
<td><strong>Additional Resources and Comments</strong></td>
<td></td>
</tr>
<tr>
<td>• Install separate meters or submeters for indoor and outdoor water use (see <em>Water Credit 3</em>).</td>
<td></td>
</tr>
<tr>
<td>• Recommend use of mulch to cut down evaporation</td>
<td><strong><a href="http://www.dpla.water.ca.gov/urban/conservation/landscape/wucols/index.html">http://www.dpla.water.ca.gov/urban/conservation/landscape/wucols/index.html</a></strong></td>
</tr>
<tr>
<td>• Recommend installation a gray water system where applicable.</td>
<td>**Assembly Bill 325, the Water Conservation in Landscaping Act of 1990, required that the Department of Water Resources develop a Model Water Efficient Landscape Ordinance. This Model Ordinance was adopted and went into effect January 1, 1993. Cities and counties could adopt the Model Ordinance, adopt their own ordinance, or issue findings that no ordinance was necessary. If no action was taken, the Model Ordinance automatically went into effect. As of 1993, 257 agencies adopted a different type of ordinance, 59 agencies issued findings that an ordinance was not necessary, and the rest either have the Model Ordinance or a similar ordinance in place. <a href="http://www.dpla.water.ca.gov/cgi-bin/urban/conservation/landscape/ordinance/index">http://www.dpla.water.ca.gov/cgi-bin/urban/conservation/landscape/ordinance/index</a></td>
</tr>
<tr>
<td>• Landscape Auditors certified by the Irrigation Association (703) 536-7080:</td>
<td><strong><a href="http://www.dpla.water.ca.gov/urban/conservation/landscape/wucols/index.html">http://www.dpla.water.ca.gov/urban/conservation/landscape/wucols/index.html</a></strong></td>
</tr>
</tbody>
</table>
Water Credit 2:  
Innovative Wastewater Technologies  
1 point

**LEED 2.0 Requirement**  
Reduce the use of municipally provided potable water for building sewage conveyance by a minimum of 50%, OR, treat 100% of wastewater on site to tertiary standards.

**California Requirement**  
No additional requirement.

**Documentation**  
See Reference Guide.

**Additional Resources and Comments**  

Water Credit 3:  
Water Use Reduction  
1 point

**LEED 2.0 Requirement**  
Employ strategies that in aggregate use 20% less water than the water use baseline calculated for the building (not including irrigation) after meeting Energy Policy Act of 1992 fixture performance requirements. (1 point)  
Exceed the potable water use reduction by an additional 10% (30% total efficiency increase). (1 point)

**California Requirement**  
Install separate meters or submeters for indoor and outdoor water use.

**Intent**  
Monitor and manage water use and detect leaks.

**Submittals**  
Written verification by project architect, engineer, or commissioning agent that submeters were installed and are operational.

**Documentation**  
See Reference Guide.

**Additional Resources and Comments**  
- Recommendations for Cooling Towers:  
  - Install variable frequency drives instead of single speed fans regulated
by louver controls for better air flow modulation to lower evaporative losses.
• Control cooling tower bleed off water with conductivity meters or other water quality measurement.
• Install submeters for make-up and bleed-off water.
• Use recycled water for make-up water in noncontact cooling systems.
• http://www.dpla.water.ca.gov/urban/ici/we_guide/weg_directory.html

• Recommend the use of municipally supplied reclaimed water systems, where available, to reduce the use of potable water for building sewage conveyance.
• Recycling Water for Irrigation: www.srcsd.com/recyclwat.html
• Energy Policy Act (EPACT) requirements are show below. Fixtures that just meet the EPA requirements are the industry standard. Carefully select fixtures for performance to discourage their removal and replacement.

<table>
<thead>
<tr>
<th>Fixture</th>
<th>EPA Requirements</th>
<th>20% reduction</th>
<th>30% reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toilets</td>
<td>1.6 gal/flush</td>
<td>1.3 gal/flush</td>
<td>1.1 gal/flush</td>
</tr>
<tr>
<td>Urinals</td>
<td>1.0 gal/flush</td>
<td>.8 gal/flush</td>
<td>.7 gal/flush</td>
</tr>
<tr>
<td>Showerheads</td>
<td>2.5 gal/min</td>
<td>2.0 gal/min</td>
<td>1.8 gal/min</td>
</tr>
<tr>
<td>Faucets</td>
<td>2.5 gal/min</td>
<td>2.0 gal/min</td>
<td>1.8 gal/min</td>
</tr>
<tr>
<td>Replacement</td>
<td>2.5 gal/min</td>
<td>2.0 gal/min</td>
<td>1.8 gal/min</td>
</tr>
<tr>
<td>Aerators</td>
<td>2.5 gal/min</td>
<td>2.0 gal/min</td>
<td>1.8 gal/min</td>
</tr>
<tr>
<td>Metering</td>
<td>.25 gal/cy</td>
<td>.2 gal/cy</td>
<td>.18 gal/cy</td>
</tr>
<tr>
<td>Faucets</td>
<td>.25 gal/cy</td>
<td>.2 gal/cy</td>
<td>.18 gal/cy</td>
</tr>
</tbody>
</table>
Energy: 2.0 and the California Supplement

**Energy Prerequisite 1:**
Fundamental Building Systems Commissioning

**LEED 2.0 Requirement**
Implement all of the following fundamental best practice commissioning procedures.
- Engage a commissioning authority.
- Develop design intent and basis of design documentation.
- Include commissioning requirements in the construction documents.
- Develop and utilize a commissioning plan.
- Verify installation, functional performance, training and documentation
- Complete a commissioning report.

**California Requirement**
No additional requirement.

**Documentation**
See Reference Guide.

**Additional Resources and Comments**
- Maintenance and record keeping must meet the requirements of Cal/OSHA Minimum building Ventilation Standard, Title 8, Section 5142. [http://www.dir.ca.gov/title8/5142.html](http://www.dir.ca.gov/title8/5142.html)

**Energy Prerequisite 2:**
Minimum Energy Performance

**LEED 2.0 Requirement**
Design to meet building energy efficiency and performance as required by ASHRAE/IESNA 90.1-1999 or the local energy code, which ever is the more stringent. Analyze expected baseline building performance using the System/Component Method.

**California Requirement**

**Documentation**
See Reference Guide and Title 24.

**Additional Resources and Comments**
Title 24: [http://www.energy.ca.gov/title24/](http://www.energy.ca.gov/title24/)

**Energy Prerequisite 3:**
CFC Reduction to HVAC&R Equipment

**LEED 2.0 Requirement**
Zero use of CFC-based refrigerants in new base building HVAC&R systems. When reusing existing base building HVAC equipment, complete a comprehensive CFC phaseout conversion.
California Requirement
No additional requirement.

Documentation
See Reference Guide and Title 24: http://www.energy.ca.gov/title24/

Additional Resources and Comments

Energy Credit 1: LEED 2.0 Requirement
Optimize Energy Performance
2-10 points

Reduce design energy cost compared to the energy cost budget for regulated energy components described in the requirements of ASHRAE/IESNA Standard 90.1-1999, as demonstrated by a whole building simulation using the Energy Cost Budget Method described in Section 11.

<table>
<thead>
<tr>
<th>Required</th>
<th>New Bldgs</th>
<th>Existing Bldgs</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>20%</td>
<td>10%</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>30%</td>
<td>20%</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>40%</td>
<td>30%</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>50%</td>
<td>40%</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>60%</td>
<td>50%</td>
<td>10</td>
</tr>
</tbody>
</table>

Regulated energy components include HVAC systems, building envelope, service hot water systems, lighting and other regulated systems as defined by ASHRAE.

California Requirement
- Must have at least 2 points in this category.
- Design to exceed building energy efficiency and performance as required by Title 24, Part 6 California's Energy Efficiency Standards for Residential and Nonresidential Buildings (Title 24) instead of ASHRAE/IESNA 90.1-1999. Use the version of Title 24 that is current at the time of bid documents.

<table>
<thead>
<tr>
<th>Title 24</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>10%</td>
<td>2</td>
</tr>
<tr>
<td>20%</td>
<td>4</td>
</tr>
<tr>
<td>30%</td>
<td>6</td>
</tr>
<tr>
<td>40%</td>
<td>8</td>
</tr>
<tr>
<td>50%</td>
<td>10</td>
</tr>
</tbody>
</table>

Regulated energy components include HVAC systems, building envelope, service hot water systems, lighting and other regulated systems as defined by Title 24, Part 6 California's Energy Efficiency Standards for Residential and Nonresidential Buildings (Title 24).
Energy Credit 2: Renewable Energy
1-3 points

LEED 2.0 Requirement
Supply a net fraction of the building’s total energy use (as expressed as a fraction of annual energy cost) through the use of on-site renewable energy systems.

<table>
<thead>
<tr>
<th>% of Total Energy Cost in Renewables</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>5%</td>
<td>1</td>
</tr>
<tr>
<td>10%</td>
<td>2</td>
</tr>
<tr>
<td>20%</td>
<td>3</td>
</tr>
</tbody>
</table>

California Requirement
No additional requirement.

Documentation
See Reference Guide.

Additional Resources and Comments
- Recommendation: 5% where technically feasible or purchase green power for at least 10% of building load unless unavailable. If unavailable purchase “green tags” with party verification. http://www.eren.doe.gov/greenpower/home.shtml http://www.eren.doe.gov/greenpower/GreenTags_ws1.html
- The USGBC defines Renewable Energy as on-site non-polluting energy generation; Green Power is grid-source, renewable energy technologies on a net zero pollution basis.
- Although not renewable, diesel generated energy is common and proper controls must be used. Follow current California Air Resource Board guidance for reducing diesel emissions: http://www.arb.ca.gov/diesel/documents/rmpfinal.pdf
- Regulation for the Statewide Portable Equipment Registration Program (diesel engines), California Code of Regulations, Title 13, § 2450 - 2466
**Energy Credit 3:**
Additional Commissioning
1 point

**Required**
1 point minimum

**LEED 2.0 Requirement**
In addition to the Fundamental Building Commissioning prerequisite, implement the following additional commissioning tasks:
1. Conduct a focused review of the design prior to the construction documents phase.
2. Conduct a focused review of the construction documents when close to completion.
3. Conduct a selective review of contractor submittals of commissioned equipment.
4. Develop a system and energy management manual.
5. Have a contract in place for a near-warranty end or post occupancy review.

Someone other than the designer must perform items 1, 2, and 3.

**California Requirement**
- Must achieve 1 point in this category.
- Include an IAQ management plan as part of the Facility Maintenance and Commissioning Plans.

**Intent**
Provide adequate indoor air quality.

**Submittals**
Written verification by project architect, engineer, or commissioning agent that the CA requirement has been met.

**Documentation**
See Reference Guide.

**Additional Resources and Comments**
- Check for more favorable terms of professional liability insurance.
- Consider including an ongoing training component to strengthen the training beyond the commissioning prerequisite. This should be integrated in the IAQ Management Plan.
- Include an IAQ Management Plan as part of the Facility Maintenance and Commissioning Plans. Designate a trained staff person with clear responsibility to implement and update the plan. Development of an IAQ Management Plan will be part of the Building Commissioning Plan. Implementation of these plans will be made during design, construction, and start-up as well as after the building is occupied. The user agency will be responsible for implementing the part of the plan after occupancy.

**Energy Credit 4:**
Elimination of HCFCs and Halons
1 point

**LEED 2.0 Requirement**
Install base building level HVAC and refrigeration equipment and fire suppression systems that do not contain HCFC’s or Halon.

**California Requirement**
No additional requirement.
Energy Credit 5: Measurement and Verification
1 point

**LEED 2.0 Requirement**
Comply with the installed equipment requirements for continuous metering as stated in Option B: Methods by Technology of the US DOE's International Performance Measurement and Verification Protocol (IPMVP) for the following:
- Lighting systems and controls.
- Constant and variable motor loads.
- Variable frequency drive (VFD) operation.
- Chiller efficiency at variable loads (kW/ton).
- Cooling load.
- Air and water economizer and heat recovery cycles.
- Air distribution static pressures and ventilation air volumes.
- Boiler efficiencies.
- Building specific process energy efficiency systems and equipment.
- Indoor water risers and outdoor irrigation systems.

**California Requirement**
No additional requirement.

**Documentation**
See Reference Guide.

**Additional Resources and Comments**

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Energy Credit 6: Green Power
1 point

**LEED 2.0 Requirement**
Engage in a two year contract to purchase power generated from renewable sources that meet the Center for Resource Solutions (CRS) Green-E requirements.

**California Requirement**
No additional requirement.

**Documentation**
See Reference Guide.

**Additional Resources and Comments**
- California certifies green power providers. Reference these certifications instead of Green-E. [http://www.energy.ca.gov/greenpower/index.html](http://www.energy.ca.gov/greenpower/index.html)
- According to the USGBC, Renewable Energy is on-site non-polluting energy generation; Green Power is grid-source, renewable energy technologies on a net zero pollution basis.
Materials:  2.0 and the California Supplement

<table>
<thead>
<tr>
<th>Materials</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prerequisite 1:</strong></td>
<td></td>
</tr>
<tr>
<td>Storage and Collection of Recyclables</td>
<td></td>
</tr>
</tbody>
</table>

**LEED 2.0 Requirement**
Provide an easily accessible area that serves the entire building that is dedicated to the separation, collection and storage of materials for recycling including (at a minimum) paper, glass, plastics, and metals.

**California Requirement**
Also meet local ordinance for recycling space.

**Intent**
Comply with local ordinances and use materials efficiently.

**Submittals**
- Copy of local ordinance or a direct web link to the local ordinance.
- A project architect, engineer or commissioning agent to provide written verification that the local ordinance or model ordinance adopted by the CIWMB, whichever applicable, has been included in the specifications, collection containers are in place and a recycling collection program is operational.

**Documentation**
See Reference Guide.
Additional Resources and Comments

- Assembly Bill No. 1327, Farr, (Stats. 1991, Ch. 842) added Chapter 18 (commencing with Section 42900) to Part 3 of Division 30 of the Public Resources Code. Chapter 18 requires the California Integrated Waste Management Board to develop, by March 1, 1993, a model ordinance for adoption by any local agency relating to adequate areas for collection and loading of recyclable materials in development projects. Local agencies are required to adopt the model, or an ordinance of their own, governing adequate areas for collection and loading of recyclable materials in development projects by September 1, 1993. If, by that date, a local agency has not adopted its own ordinance, the model ordinance adopted by the CIWMB will take effect and shall be enforced by the local agency.


- For assistance in developing waste prevention and recycling programs contact your local solid waste management agency. A collection of educational materials to assist organizations setting up programs is available at this site:


- Show building occupants spaces dedicated for the collection of recyclables. Bin designs need to allow for easy cleaning to avoid health issues. Ensure that spaces are compatible with policies of local waste handling companies.

Materials Credit 1: Building Reuse
1-3 points

LEED 2.0 Requirement

- Reuse large portions of existing structures during renovation or redevelopment projects. Maintain at least 75% of existing building structure and shell (exterior skin and framing excluding window assemblies). (1 point)

- Maintain an additional 25% (100% total) of existing building structure and shell (exterior skin and framing excluding window assemblies). (1 point)

- Maintain 100% of existing building structure and shell AND 50% non-shell (walls, floor coverings, and ceiling systems). (1 point)

California Requirement
No additional requirement.

Documentation
See Reference Guide.

Additional Resources and Comments
Materials Credit 2:
Construction Waste Management
1-2 points

Required
1 point minimum

LEED 2.0 Requirement
- Develop and implement a waste management plan, quantifying material diversion by weight.
- Recycle and/or salvage at least 50% (by weight) of construction, demolition, and land clearing waste. (1 point)
- Recycle and/or salvage an additional 25% (75% total by weight) of the construction, demolition, and land clearing debris. (1 point)

California Requirement
- Must obtain at least 1 point in this category.
- Also meet local construction and demolition waste management ordinance, if applicable.

Intent
- Comply with local ordinances and use materials efficiently.

Submittals
- Copy of local ordinance or a direct web link to the local ordinance.
- A project architect, engineer or commissioning agent to provide written verification that the local ordinance, if applicable, has been included in the specifications, collection containers are in place, a recycling collection program was operational during demolition and construction phases, and that reported diversion rates are accurate.

Documentation
See Reference Guide and local ordinance, if applicable.

Additional Resources and Comments
- This web site shows several, but not all, local government ordinances concerning construction and demolition materials. http://www.ciwmmb.ca.gov/ConDemo/sampledocs/default.htm
- A list of publications with information on keeping construction and demolition wastes out of landfills: http://www.ciwmmb.ca.gov/publications/default.asp?cat=3
- Check with local solid waste agencies regarding any applicable construction and demolition policies and ordinances.

Materials Credit 3:
Resource Reuse
1-2 points

LEED 2.0 Requirement
- Specify salvaged or refurbished materials for 5% of building materials. (1 point)
- Specify salvaged or refurbished materials for 10% of building materials. (1 point)

California Requirement
No additional requirement.

Documentation
See Reference Guide.
Additional Resources and Comments

- The State of California has a materials exchange database. CalMAX is a free service designed to help businesses find markets for materials they have traditionally discarded. It is a place to look for or request materials. http://www.ciwmb.ca.gov/CalMAX/

Materials Credit 4: Recycled Content
1-2 points

Required
1 point minimum

LEED 2.0 Requirement

- Specify a minimum of 25% of building materials that contain in aggregate a minimum weighted average of 20% post-consumer recycled content material, OR, a minimum weighted average of 40% post-industrial recycled content material. (1 point)

- Specify an additional 25% (50% total) of building materials that contain in aggregate, a minimum weighted average of 20% post-consumer recycled content material, OR, a minimum weighted average of 40% post-industrial recycled content material. (1 point)

California Requirement

- Must obtain a minimum of 1 point in this category.
- Also products must be compliant to the State Agency Buy Recycled Campaign (SABRC), which states that half of all products purchased in 11 product categories, must meet specific minimum recycled-content requirements. For example, carpet, a plastic product, must contain 50 percent recycled content, 10 of which must be post-consumer, to qualify.

Intent

Comply with State Law and use materials efficiently.

Submittals

- Completed and signed certification forms. Note that the SABRC certification forms may be customized and used to collect data for the LEED requirement simultaneously.
- A project architect, engineer or commissioning agent must provide written verification that the CA requirement has been met.

Documentation


Additional Resources and Comments

- General information on SABRC program: http://www.ciwmb.ca.gov/BuyRecycled/StateAgency/Default.htm
- For information about the 11 product categories, go to this page: http://www.ciwmb.ca.gov/BuyRecycled/StateAgency/Buying.htm
- The certification form, which can be customized to collect all recycled content information to facilitate data collection for the LEED application, is available at: http://www.ciwmb.ca.gov/BuyRecycled/StateAgency/Manual/CertForm.htm
• Reference Specifications for Energy and Resource Efficiency is a set of specifications for commercial buildings that allows users to select from and insert language into their construction documents. The specifications cover components, systems, and controls with strong emphasis on performance monitoring and commissioning of those systems; and building materials issues such as embodied energy, indoor air quality, recycled content, recyclability and visible light reflectance. http://www.eley.com.hosting.pacbell.net/specs/index.htm

• Access a database of recycled content products: http://www.ciwmb.ca.gov/RCP/ (Viewable by CSI section number)

**Materials Credit 5:**
Local / Regional Materials
1-2 points

**LEED 2.0 Requirement**
Specify a minimum of 20% of building materials that are manufactured regionally within a radius of 500 miles. (1 point)
Of these regionally manufactured materials, specify a minimum of 50% that are extracted, harvested, or recovered within 500 miles. (1 point)

**California Requirement**
No additional requirement.

**Documentation**
See Reference Guide.

**Additional Resources and Comments**

**Materials Credit 6:**
Rapidly Renewable Materials
1 point

**LEED 2.0 Requirement**
Specify rapidly renewable building materials for 5% of total building materials.

**California Requirement**
No additional requirement.

**Documentation**
See Reference Guide.

**Additional Resources and Comments**

**Materials Credit 7:**
Certified Wood
1 point

**LEED 2.0 Requirement**
Use a minimum of 50% of wood-based materials certified in accordance with the Forest Stewardship Council guidelines for wood building components including but not limited to framing, flooring, finishes, furnishings, and non-rented temporary construction applications such as bracing, concrete form work and pedestrian barriers.

**California Requirement**
No additional requirement.
Sustainable Building Technical Group

**Documentation**
See Reference Guide.

**Additional Resources and Comments**
- Refer to the Forest Stewardship Council guidelines for wood building components. [http://fscus.org](http://fscus.org);
- Database of certified wood products: [http://www.certifiedwood.org](http://www.certifiedwood.org)
Indoor Environmental Quality (IEQ): 2.0 and the California Supplement

<table>
<thead>
<tr>
<th>IEQ Prerequisite 1</th>
<th>LEED 2.0 Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum IAQ</td>
<td>Meet the minimum requirements of voluntary consensus standard ASHRAE 62-1999, Ventilation for Acceptable Indoor Air Quality and approved Addenda.</td>
</tr>
<tr>
<td>Performance</td>
<td></td>
</tr>
</tbody>
</table>

**California Requirement**

- Meet operational, maintenance, and record-keeping requirements of Cal/OSHA Workplace Regulation for Operation and Maintenance of HVAC Systems, Title 8, Sec. 5142.
- Locate building’s OA intakes at least 25 feet from potential and existing sources of contamination as recommended by the California Department of Health Services in Minimizing the Risk of Legionnaires’ Disease in Public Buildings (see Site Prerequisite 2 for building siting in relation to pollutant sources).
- To the extent possible, use exterior wrap for duct insulation taking into consideration sound attenuation requirements.
- Provide proper drainage for the HVAC condensate pans.
- Install high efficiency filters at main HVAC intakes (at least 85% according to ASHRAE Standard 52.1-1992). This only applies to occupied buildings.
- Irrigation systems must not spray on buildings.
- All surface grades, drainage systems, HVAC condensate, must be designed to prevent the accumulation of water under, in, or near buildings.

**Intent** Provide adequate indoor air quality.

**Submittals**

- A project architect, engineer, or commissioning agent must provide written verification that the CA requirement has been included in the specifications, installed and is operational.

**Documentation**

- See Reference Guide.
Additional Resources and Comments

- Sources of contamination could include bacteria-containing droplets released from cooling towers; contaminants in building HVAC exhausts; exhausts from vehicles idling at loading docks; and roadway traffic.
- Interior insulation may become friable over time and could add to indoor air contamination. Also, if insulation gets wet it could promote microbial growth. Standing water in condensate pans facilitates mold and bacterial growth and can result in occupant health problems.
- The efficiency rating of filters is based on the amount of particulate matter removed from the air stream. Typical efficiencies of primary filters are about 30%.
- Cal/OSHA Workplace Regulation for Operation and Maintenance of HVAC Systems, Title 8, Section 5142. [http://www.dir.ca.gov/title8/5142.html](http://www.dir.ca.gov/title8/5142.html)
- *Minimizing the Risk of Legionnaires' Disease in Public Buildings*, California Department of Health Services, 1995
- ASHRAE Standard 62-1999, approved addenda 62j, 62l, 62m, 62q, 62s, and 62w. ASHRAE 62-1999 is a design standard. The Cal-OSHA regulation requires that the design ventilation rate be supplied when the building is occupied and HVAC maintenance records be kept.

IEQ Prerequisite 2: Environmental Tobacco Smoke Control

LEED 2.0 Requirement

Zero exposure of nonsmokers to ETS by prohibition of smoking in the building, OR, by providing a designated smoking room designed to effectively contain, capture and remove ETS from the building. At a minimum, the smoking room shall be directly exhausted to the outdoors with no recirculation of ETS-containing air to the non-smoking area of the building, enclosed with impermeable structural deck-to-deck partitions and operated at a negative pressure compared with the surrounding spaces of at least 7 Pa (0.03 inches of water gauge). Performance of smoking rooms shall be verified using tracer gas testing methods as described in ASHRAE Standard 129-1997. Acceptable exposure in non-smoking areas is defined as less than 1% of the tracer gas concentration in the smoking room detectable in the adjoining non-smoking areas. Smoking room testing as described in the ASHRAE Standard 129-1997 is required in the contract documents and critical smoking facility systems testing results must be included in the building commissioning plan and report or as a separate document.

California Requirement

No additional requirement.

Documentation

See Reference Guide.
Additional Resources and Comments
Smoking is not allowed in California public buildings except in designated enclosed smoking rooms with exhaust to outside and no air recirculation to other parts of the building as per AB 13. A number of local governments prohibit the operation of smoking rooms in their jurisdictions.
http://www.leginfo.ca.gov/cgi-bin/displaycode?section=lab&group=06001-07000&file=6400-6413.5

IEQ Credit 1:
Carbon Dioxide Monitoring
1 point
Required
1 point minimum

LEED 2.0 Requirement
Install a permanent carbon dioxide (CO₂) monitoring system that provides feedback on space ventilation performance in a form that affords operational adjustments, AND specify initial operational set point parameters that maintain indoor carbon dioxide levels no higher than outdoor levels by more than 530 parts per million at any time.

California Requirement
- Must obtain 1 point in the category.
- Specify controlled ventilation ONLY for those areas with variable occupancy exceeding one person per 50 (in these areas, concentrations must be maintained either at 800 ppm or below or no higher than 530 ppm above ambient concentrations as per Title 24.
- Provide a separate minimum outdoor airflow measuring station for each HVAC system.

Intent
Provide adequate indoor air quality.

Submittals
- A project architect, engineer, or commissioning agent must provide written verification that the CA requirement was included in the specifications, was installed and is operational.

Documentation
- See Reference Guide.
- California Title 24, Chapter 4, Section 4.2.1.G

Additional Resources and Comments
- Monitoring technology has been shown to be cost-effective in some case studies of energy efficiency, and it can serve as a warning system for HVAC failures or malfunctions. There is some concern that such systems could encourage excess reduction of outdoor air supply rates, or provide a false sense of security about IEQ. Under the California Requirement, -controlled ventilation of low-occupancy areas (less than one person per 50 ) are not permitted.
- According to 1998 Energy Efficiency Standards, Chapter 4, suitable applications for -controlled ventilation systems include restaurants, hotel ballrooms, meeting rooms, and lecture halls.
• Outdoor airflow measuring stations require the installation of air velocity sensors and, in larger HVAC systems, secondary outdoor air dampers so that the minimum required amount of outdoor air can be supplied to an occupied building under all operating conditions.

• California Title 24, Chapter 4, Section 4.2.1.G

**IEQ Credit 2:**
Increase Ventilation Effectiveness
1 point

**LEED 2.0 Requirement**
For mechanically ventilated buildings, design ventilation systems that result in an air change effectiveness (E) greater than or equal to 0.9 as determined by ASHRAE 129-1997. For naturally ventilated spaces demonstrate a distribution and laminar flow pattern that involves not less than 90% of the room or zone area in the direction of air flow for at least 95% of hours of occupancy.

**California Requirement**
No additional requirement.

**Documentation**
See Reference Guide.

**Additional Resources and Comments**
• T-24 does not address ventilation effectiveness.

**IEQ Credit 3:**
Construction IAQ Management Plan
1-2 points

**LEED 2.0 Requirement**
Develop and implement an Indoor Air Quality (IAQ) Management Plan for the construction and pre-occupancy phases of the building as follows:

• During construction, meet or exceed the minimum requirements of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guideline for Occupied Buildings under Construction, 1995, AND protect stored on-site or installed absorptive materials from moisture damage, AND replace all filtration media immediately prior to occupancy (Filtration media shall have a Minimum Efficiency Reporting Value (MERV) of 13 as determined by ASHRAE 52.2-1999). (1 point)

• Conduct a minimum two-week building flush-out with new filtration media at 100% outside air after construction ends and prior to occupancy, OR, conduct a baseline indoor air quality testing procedure consistent with current EPA protocol for Environmental Requirements, Baseline IAQ and Materials, for the Research Triangle Park Campus, Section 01445. (1 point)
Required
1 point minimum and additional California requirements

California Requirements
- Must have a minimum of one point in this category.
- The flush-out is required.
  - Prior to substantial completion and occupancy a flush out must be conducted continuously (i.e. 24 hours per day, seven (7) days a week) using tempered outside air (or maximum amount of outside air while achieving reasonable indoor temperature) for at least 30 calendar days or as many days possible before occupancy. New filtration media must be installed at the end of the flush-out.
  - After occupancy continue the flush out using tempered air for 30 days. This time period may be adjusted if an IAQ sampling plan has been prepared and is used to monitor air quality.
  - Return ventilation system to normal operation following flush-out period to minimize energy consumption.
  - Also, must specify the sequence of installation of finishing materials according to the Reference Specifications for Energy and Resource Efficiency, section 1350, http://www.eley.com.

Intent
Provide adequate indoor air quality to protect occupant health.

Submittals
Verification that specifications include required elements and a signed statement by the commissioning agent confirming the specifications were met.

Documentation
- See Reference Guide

Additional Resources and Comments
- Reference Specifications for Energy and Resource Efficiency, Section 1350, does not dictate means and methods, but there must be a written plan for addressing these issues. A copy can be downloaded at no charge. http://www.eley.com
- Construction IAQ Management Plan. Any mandatory worker health and safety procedures should be followed. For workers exposed to fumes, dust, and fibers while using paints, sealants, solvents, grinders, etc., the use of local ventilation and respirators with the appropriate cartridges and fit-testing is recommended, if not required, by Cal/OSHA.
- Flush-outs before occupancy ensures that the initial high concentrations of air contaminants emitted from new building materials are exhausted to the outside.
• Air monitoring is expensive and may not measure every air contaminant so flush-outs after occupancy are a cost-effective method to minimize employee complaints and the associated health and productivity costs.

• The flush-out can be conducted at less than 100% outdoor air if outdoor air conditions do not allow it (i.e., temperatures or humidities beyond the capacity of the HVAC system). In such cases, the maximum % of outdoor air must be brought into the building that allows adequate control of the building’s temperature.

• The maximum amount of outdoor air provided by an HVAC system is limited by: (a) the systems’ overall airflow capacity; and (b) the system’s heating/cooling capacity to condition the supply air in order to maintain a minimum indoor temperature. Maximum possible outdoor airflow may not be achieved during outdoor conditions close to the design temperature/humidity values.

• Install porous finish materials such as carpets, window coverings, suspended ceiling panels, and furniture last. Apply wet finishing products such as paints, adhesives, and sealants before installing porous materials. Frequently inspect and replace filters as needed during construction. Turn off HVAC system during activities generating high quantities of dust such as drywall sanding. If HVAC is not operational during installation of building materials with high VOC emissions, provide temporary ventilation to construction areas as needed.

• This credit is intended to apply to occupied building under construction and new buildings as well.

• ASHRAE Standard 62-1999, Addendum L

IEQ Credit 4: Low-Emitting Materials
1-4 points

Required
4 point minimum

LEED 2.0 Requirement
Meet or exceed VOC limits for adhesives, sealants, paints, composite wood products, and carpet systems as follows:

• Adhesives must meet or exceed the VOC limits of South Coast Air Quality Management District Rule #1168 by, AND all sealants used as a filler must meet or exceed Bay Area Air Resources Board Reg. 8, Rule 51 (1 point)

• Paints and coatings must meet or exceed the VOC and chemical component limits of Green Seal requirements. (1 point)

• Carpet systems must meet or exceed the Carpet and Rug Institute Green Label Indoor Air Quality Test Program. (1 point)

• Composite wood or agrifiber products must contain no added urea-formaldehyde resins. (1 point)
California Requirement
- All 4 points must be achieved in this category.
- For the building materials listed above, as well as, ceiling tiles and other materials with significant effects on indoor air quality; meet the most recently-published Chronic Reference Exposure Levels as adopted by OEHHA for organic compounds: http://www.oehha.ca.gov/air/chronic_rels/AllChrels.html. Laboratories shall conduct testing using procedures described in the Reference Specifications for Energy and Resource Efficiency, Section 1350, http://www.eley.com to determine compliance with OEHHA's Chronic reference Exposure Levels.
- The following building materials shall emit zero formaldehyde:
  - Interior paints
  - Suspended ceiling panels
  - Acoustical and thermal insulation

Intent  Provide adequate indoor air quality to protect occupant health.

Submittals
A project architect, engineer or commissioning agent must provide written verification that the CA requirement was met, this includes verification of language in specifications and installation procedures.

Documentation
See Reference Guide.

Additional Resources and Comments
- All new office furniture must meet the Environmental Specifications for Office Furniture Systems: http://www.ciwmb.ca.gov/GreenBuilding/Specs/Furniture/default.htm

IEQ Credit 5
Indoor Chemical and Pollutant Source Control
1 point

LEED 2.0 Requirement
Design to minimize cross-contamination of regularly occupied areas by chemical pollutants:
- Employ permanent entryway systems (grills, grates, etc.) to capture dirt, particulates, etc. from entering the building at all high volume entryways, AND provide areas with structural deck to deck partitions with separate outside exhausting, no air recirculation and negative pressure where chemical use occurs (including housekeeping areas and copying/print rooms), AND provide drains plumbed for appropriate disposal of liquid waste in spaces where water and chemical concentrate mixing occurs.

California Requirement
No additional requirement.

Documentation
See Reference Guide
Additional Resources and Comments

- Indoor Chemical and Pollutant Source Control.
  Surface Dust Control. Minimize transfer of dust and soil into buildings. Cover all exposed dirt. Provide walk-off mats at all entrances, and clean and replace them regularly. Avoid any deep-pile carpets, and consider using only area rugs, especially in rooms used by persons with respiratory or immune diseases.
- Retain requirements for chemical use areas, i.e., no recirculation and negative pressure, and add a requirement for inspection and maintenance. This topic is covered by current building standards and Cal/OSHA and should be a prerequisite.
- Diesel Generator Test Scheduling. Diesel generators are used for emergency electrical supply and fire suppression pumping. The routine maintenance and testing of these generators should be scheduled for nights or weekends.

IEQ Credit 6
Controllability of Systems
1-2 points

**LEED 2.0 Requirement**

- Provide a minimum of one operable window and one lighting control zone per 200 s.f. for all occupied areas within 15 feet of the perimeter wall. (1 point)
- Provide controls for each individual for airflow, temperature, and lighting for 50% of the non perimeter, regularly occupied areas. (1 point)

**California Recommendation**

When operable windows are installed:
- Provide sensors at each window so that maintenance staff gets notified when windows are left open after hours
- Provide local temperature and/or airflow control

**Intent**

Provide comfort and improved indoor air quality.

**Submittals** A project architect, engineer or commissioning must provide written verification that the CA requirement was included in the specifications, installed and is operational.

**Documentation**

See Reference Guide.
Additional Resources and Comments

Do not recommend sole reliance on natural ventilation. Natural ventilation can greatly increase exposures to pollutants from outdoor sources, such as ozone, particles, pollen, and mold spores. This can occur even at moderate temperatures and pollutant levels. Limit the use of natural ventilation to periods when the Air Quality Index is below warning levels for sensitive groups, when no odors or other local pollutant sources are present, or when the occupants do not have asthma, allergies, or other respiratory disorders.

To use natural ventilation as a back-up strategy, design the building orientation and air convection pathways to optimize air movement and minimize noise transmission. See the International Energy Agency natural ventilation programs (www.caddet.org) and the Florida Solar Energy Center for design guidelines and demonstration projects.

IEQ Credit 7
Thermal Comfort
1-2 points

LEED 2.0 Requirement
- Addenda 1995 for thermal comfort standards including humidity control within established ranges per climate zone. (1 point)
- Install a permanent temperature and humidity monitoring system configured to provide operators control over thermal comfort performance and effectiveness of humidification and/or dehumidification systems in the building. (1 point)

California Requirement
No additional requirement.

Documentation
See Reference Guide
Title 24: www.energy.ca.gov/title24

Additional Resources and Comments
- Refer to the ANSI/ASHRAE 55-1992 or chapter 8 of the ASHRAE handbook, 1993 for indoor design temperature and humidity conditions.
- Refer to Title 24: www.energy.ca.gov/title24
IEQ Credit 8
Daylight and Views
1-2 points

LEED 2.0 Requirement
- Achieve a minimum Daylight Factor of 2% (excluding all direct sunlight penetration) in 75% of all space occupied for critical visual tasks, not including copy rooms, storage areas, mechanical, laundry, and other low occupancy support areas. Exceptions include those spaces where tasks would be hindered by the use of daylight or where accomplishing the specific tasks within a space would be enhanced by the direct penetration of sunlight. (1 point)
- Direct line of sight to vision glazing from 90% of all regularly occupied spaces, not including copy rooms, storage areas, mechanical, laundry, and other low occupancy support areas. (1 point)

California Requirement
No additional requirement.

Documentation
See Reference Guide.

Additional Resources and Comments
Innovation Credits and Design/Build Process: 2.0 and the California Supplement

<table>
<thead>
<tr>
<th>Innovation Credits</th>
<th>LEED 2.0 Requirement</th>
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<tbody>
<tr>
<td></td>
<td>In writing, using the LEED Credit Equivalence process, identify the INTENT of the proposed innovation credit, the proposed REQUIREMENT for compliance, the proposed DOCUMENTATION to demonstrate compliance, and the TECHNOLOGIES/STRATEGIES used to meet the requirement elements.</td>
</tr>
<tr>
<td></td>
<td><strong>California Requirement</strong></td>
</tr>
<tr>
<td></td>
<td>No additional requirement.</td>
</tr>
<tr>
<td>Documentation</td>
<td>See Reference Guide.</td>
</tr>
</tbody>
</table>

**Additional Resources and Comments**

The Sustainable Building Task Force will seek pre-approval of the innovation credit below. If the USGBC approves this credit, designers will know in advance that it can be counted as a credit in applications for LEED certification.

<table>
<thead>
<tr>
<th>Innovation Credit for Fuel Cells (Tentative)</th>
<th>LEED 2.0 Requirement</th>
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<tbody>
<tr>
<td></td>
<td>Not applicable</td>
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**California Innovation Credit**

Supply a net fraction of the building's total energy use (expressed as a fraction of annual energy cost) through the use of on-site energy systems which utilize fuel cells operating on non-renewable fuel AND utilize waste heat recovery.

**Intent**

Provide efficient energy, reduce or eliminate air pollutants and greenhouse gas emissions, promote energy independence.

**Submittals**

Written verification from the project architect, engineer or commissioning agent of installed fuel cells and heat recovery systems, and estimates of the total energy that will be generated by the fuel cell.
**Documentation**
To be added.

**Technologies and Strategies**
To be added.

**Additional Resources and Comments**
Fuel cells operating on non-renewable fuel and utilize waste heat recovery provide significant air pollution emission reductions and for this reason are eligible for credit. Fuel cells operating off renewable energy are covered under the credit for renewable energy (see *Energy Credit 2*).

<table>
<thead>
<tr>
<th>% of Total Energy Cost</th>
<th>Points</th>
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<tbody>
<tr>
<td>10</td>
<td>1</td>
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<tr>
<td>20</td>
<td>2</td>
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<tr>
<td>40 or greater</td>
<td>3</td>
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</table>

**LEED Accredited Professional**

**LEED 2.0 Requirement**
At least one principal participant of the project team that has successfully complete the LEED Accredited Professional exam.

**California Requirement**
No additional requirement.

**Documentation**
See Reference Guide.

**Additional Resources and Comments**