LEED 2009 FOR COMMERCIAL INTERIORS

For Public Use and Display

LEED 2009 for Commercial Interiors Rating System

USGBC Member Approved November 2008 (Updated November 2011)

PREFACE FROM USGBC

The built environment has a profound impact on our natural environment, economy, health, and productivity. Breakthroughs in building science, technology, and operations are now available to designers, builders, operators, and owners who want to build green and maximize both economic and environmental performance.

Through the LEED® green building certification program, the U.S. Green Building Council (USGBC) is transforming the built environment. The green building movement offers an unprecedented opportunity to respond to the most important challenges of our time, including global climate change, dependence on non sustainable and expensive sources of energy, and threats to human health. The work of innovative building professionals is a fundamental driving force in the green building moment. Such leadership is a critical component to achieving USGBC's mission of a sustainable built environment for all within a generation.

USGBC MEMBERSHIP

USGBC's greatest strength is the diversity of our membership. USGBC is a balanced, consensus based nonprofit with more than 18,000 member companies and organizations representing the entire building industry. Since its inception in 1993, USGBC has played a vital role in providing a leadership forum and a unique, integrating force for the building industry. USGBC's programs have three distinguishing characteristics:

Committee-based

The heart of this effective coalition is our committee structure, in which volunteer members design strategies that are implemented by staff and expert consultants. Our committees provide a forum for members to resolve differences, build alliances, and forge cooperative solutions for influencing change in all sectors of the building industry.

Member-driven

Membership is open and balanced and provides a comprehensive platform for carrying out important programs and activities. We target the issues identified by our members as the highest priority. We conduct an annual review of achievements that allows us to set policy, revise strategies, and devise work plans based on members' needs.

Consensus-focused

We work together to promote green buildings, and in doing so, we help foster greater economic vitality and environmental health at lower costs. We work to bridge ideological gaps between industry segments and develop balanced policies that benefit the entire industry.

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The LEED 2009 for Commercial Interiors Rating System builds on the work of those who helped create previous versions:

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LEED 2009 FOR COMMERCIAL INTERIORS PROJECT CHECKLIST

Sustainable Sites		**21 Possible Points**
☐ Credit 1	Site Selection	1-5
☐ Credit 2	Development Density and Community Connectivity	6
☐ Credit 3.1	Alternative Transportation—Public Transportation Access	6
☐ Credit 3.2	Alternative Transportation—Bicycle Storage and Changing Rooms	2
☐ Credit 3.3	Alternative Transportation—Parking Availability	2
Water Efficiency		**11 Possible Points**
☑ Prerequisite 1	Water Use Reduction	Required
☐ Credit 1	Water Use Reduction	6-11
Energy and Atmosphere		**37 Possible Points**
☑ Prerequisite 1	Fundamental Commissioning of Building Energy Systems	Required
☑ Prerequisite 2	Minimum Energy Performance	Required
☑ Prerequisite 3	Fundamental Refrigerant Management	Required
☐ Credit 1.1	Optimize Energy Performance—Lighting Power	1–5
☐ Credit 1.2	Optimize Energy Performance—Lighting Controls	1–3
☐ Credit 1.3	Optimize Energy Performance—HVAC	5–10
☐ Credit 1.4	Optimize Energy Performance—Equipment and Appliances	1–4
☐ Credit 2	Enhanced Commissioning	5
☐ Credit 3	Measurement and Verification	2-5
☐ Credit 4	Green Power	5
Materials and Resources		**14 Possible Points**
☑ Prerequisite 1	Storage and Collection of Recyclables	Required
☐ Credit 1.1	Tenant Space—Long-Term Commitment	1
☐ Credit 1.2	Building Reuse—Maintain Interior Nonstructural Components	1-2
☐ Credit 2	Construction Waste Management	1-2
☐ Credit 3.1	Materials Reuse	1-2
☐ Credit 3.2	Materials Reuse—Furniture and Furnishings	1
☐ Credit 4	Recycled Content	1-2
☐ Credit 5	Regional Materials	1-2
☐ Credit 6	Rapidly Renewable Materials	1
☐ Credit 7	Certified Wood	1
Indoor Environmental Quality		**17 Possible Points**
☑ Prerequisite 1	Minimum Indoor Air Quality Performance	Required
☑ Prerequisite 2	Environmental Tobacco Smoke (ETS) Control	Required
☐ Credit 1	Outdoor Air Delivery Monitoring	1
☐ Credit 2	Increased Ventilation	1
☐ Credit 3.1	Construction Indoor Air Quality Management Plan—During Construction	1
☐ Credit 3.2	Construction Indoor Air Quality Management Plan—Before Occupancy	1

☐ Credit 4.1	Low-Emitting Materials—Adhesives and Sealants	1
☐ Credit 4.2	Low-Emitting Materials—Paints and Coatings	1
☐ Credit 4.3	Low-Emitting Materials—Flooring Systems	1
☐ Credit 4.4	Low-Emitting Materials—Composite Wood and Agrifiber Products	1
☐ Credit 4.5	Low-Emitting Materials—Systems Furniture and Seating	1
☐ Credit 5	Indoor Chemical and Pollutant Source Control	1
☐ Credit 6.1	Controllability of Systems—Lighting	1
☐ Credit 6.2	Controllability of Systems—Thermal Comfort	1
☐ Credit 7.1	Thermal Comfort—Design	1
☐ Credit 7.2	Thermal Comfort—Verification	1
☐ Credit 8.1	Daylight and Views—Daylight	1-2
☐ Credit 8.2	Daylight and Views—Views for Seated Spaces	1

Innovation in Design **6 Possible Points**

☐ Credit 1	Innovation in Design	1-5
☐ Credit 2	LEED Accredited Professional	1

Regional Priority **4 Possible Points**

☐ Credit 1	Regional Priority	1-4

LEED 2009 for Commercial Interiors

100 base points; 6 possible Innovation in Design and 4 Regional Priority points

Certified	40–49 points
Silver	50–59 points
Gold	60–79 points
Platinum	80 points and above

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INTRODUCTION

I. LEED® GREEN BUILDING RATING SYSTEM

Background on LEED®

Following the formation of the U.S. Green Building Council (USGBC) in 1993, the organization's members quickly realized that the sustainable building industry needed a system to define and measure "green buildings." USGBC began to research existing green building metrics and rating systems. Less than a year after formation, the members acted on the initial findings by establishing a committee to focus solely on this topic. The composition of the committee was diverse; it included architects, real estate agents, a building owner, a lawyer, an environmentalist, and industry representatives. This cross section of people and professions added a richness and depth both to the process and to the ultimate product.

The first LEED Pilot Project Program, also referred to as LEED Version 1.0, was launched at the USGBC Membership Summit in August 1998. After extensive modifications, LEED Green Building Rating System Version 2.0 was released in March 2000, with LEED Version 2.1 following in 2002 and LEED Version 2.2 following in 2005.

As LEED has evolved and matured, the program has undertaken new initiatives. In addition to a rating system specifically devoted to building operational and maintenance issues (LEED for Existing Buildings: Operations & Maintenance), LEED addresses the different project development and delivery processes that exist in the U.S. building design and construction market, through rating systems for specific building typologies, sectors, and project scopes: LEED for Core & Shell, LEED for New Construction, LEED for Schools, LEED for Neighborhood Development, LEED for Retail, LEED for Healthcare, LEED for Homes, and LEED for Commercial Interiors.

Project teams interact with the Green Building Certification Institute (GBCI) for project registration and certification. GBCI was established in 2008 as a separately incorporated entity with the support of the U.S. Green Building Council. GBCI administers credentialing and certification programs related to green building practice. These programs support the application of proven strategies for increasing and measuring the performance of buildings and communities as defined by industry systems such as LEED.

The green building field is growing and changing daily. New technologies and products are being introduced into the marketplace, and innovative designs and practices are proving their effectiveness. The LEED rating systems and reference guides will evolve as well. Project teams must comply with the version of the rating system that is current at the time of their registration.

USGBC will highlight new developments on its website on a continual basis at www.usgbc.org.

Features of LEED®

The LEED Green Building Rating Systems are voluntary, consensus-based, and market-driven. Based on existing and proven technology, they evaluate environmental performance from a whole building perspective over a building's life cycle, providing a definitive standard for what constitutes a green building in design, construction, and operation.

The LEED rating systems are designed for rating new and existing commercial, institutional, and residential buildings. They are based on accepted energy and environmental principles and strike a balance between known, established practices and emerging concepts. Each rating system is organized into 5 environmental categories: Sustainable Sites, Water Efficiency, Energy and Atmosphere, Materials and Resources, and Indoor Environmental

Quality. An additional category, Innovation in Design, addresses sustainable building expertise as well as design measures not covered under the 5 environmental categories. Regional bonus points are another feature of LEED and acknowledge the importance of local conditions in determining best environmental design and construction practices.

The LEED Credit Weightings

In LEED 2009, the allocation of points between credits is based on the potential environmental impacts and human benefits of each credit with respect to a set of impact categories. The impacts are defined as the environmental or human effect of the design, construction, operation, and maintenance of the building, such as greenhouse gas emissions, fossil fuel use, toxins and carcinogens, air and water pollutants, indoor environmental conditions. A combination of approaches, including energy modeling, life-cycle assessment, and transportation analysis, is used to quantify each type of impact. The resulting allocation of points among credits is called credit weighting.

LEED 2009 uses the U.S. Environmental Protection Agency's TRACI[1] environmental impact categories as the basis for weighting each credit. TRACI was developed to assist with impact evaluation for life-cycle assessment, industrial ecology, process design, and pollution prevention.

LEED 2009 also takes into consideration the weightings developed by the National Institute of Standards and Technology (NIST); these compare impact categories with one another and assign a relative weight to each. Together, the 2 approaches provide a solid foundation for determining the point value of each credit in LEED 2009.

The LEED 2009 credit weightings process is based on the following parameters, which maintain consistency and usability across rating systems:

All LEED credits are worth a minimum of 1 point.

All LEED credits are positive, whole numbers; there are no fractions or negative values.

All LEED credits receive a single, static weight in each rating system; there are no individualized scorecards based on project location.

All LEED rating systems have 100 base points; Innovation in Design (or Operations) and

Regional Priority credits provide opportunities for up to 10 bonus points.

Given the above criteria, the LEED 2009 credit weightings process involves 3 steps:

1. A reference building is used to estimate the environmental impacts in 13 categories associated with a typical building pursuing LEED certification.
2. The relative importance of building impacts in each category are set to reflect values based on the NIST weightings.[2]
3. Data that quantify building impacts on environmental and human health are used to assign points to individual credits.

Each credit is allocated points based on the relative importance of the building-related impacts that it addresses. The result is a weighted average that combines building impacts and the relative value of the impact categories. Credits that most directly address the most important impacts are given the greatest weight, subject to the system design parameters described above. Credit weights also reflect a decision by LEED to recognize the market implications of point allocation. The result is a significant change in allocation of points compared with previous LEED rating systems. Overall, the changes increase the relative emphasis on the reduction of energy consumption and greenhouse gas emissions associated with building systems, transportation, the embodied energy of water, the embodied energy of materials, and where applicable, solid waste.

The details of the weightings process vary slightly among individual rating systems. For example, LEED for Existing Buildings: O&M includes credits related to solid waste management but LEED for New Construction does not. This results in a difference in the portion of the environmental footprint addressed by each rating system and the relative allocation of points. The weightings process for each rating system is fully documented in a weightings workbook.

The credit weightings process will be reevaluated over time to incorporate changes in values ascribed to different building impacts and building types, based on both market reality and evolving scientific knowledge related to buildings. A complete explanation of the LEED credit weightings system is available on the USGBC website, at www.usgbc.org.

Regional Priority Credits

To provide incentive to address geographically specific environmental issues, USGBC regional councils and chapters have identified 6 credits per rating system that are of particular importance to specific areas. Each regional priority credit is worth an additional 1 point, and a total of 4 regional priority points may be earned. Upon project registration, LEED Online automatically determines a project's regional priority credits based on its zip code. If the project achieves more than 4 regional priority credits, the team can choose the credits for which these points will apply. The USGBC website also contains a searchable database of regional priority credits.

II. OVERVIEW AND PROCESS

The LEED 2009 Green Building Rating System for Commercial Interiors is a set of performance standards for certifying the design and construction of tenant spaces for office, restaurant, healthcare, hotel/resort and education buildings of all sizes, both public and private. The intent is to promote healthful, durable, affordable, and environmentally sound practices in tenant space design and construction.

Prerequisites and credits in the LEED 2009 for Commercial Interiors Rating System addresses 7 topics:

Sustainable Sites (SS)

Water Efficiency (WE)

Energy and Atmosphere (EA)

Materials and Resources (MR)

Indoor Environmental Quality (IEQ)

Innovation in Design (ID)

Regional Priority (RP)

LEED 2009 for Commercial Interiors certifications are awarded according to the following scale:

Certified	40–49 points
Silver	50–59 points
Gold	60–79 points
Platinum	80 points and above

GBCI will recognize buildings that achieve 1 of these rating levels with a formal letter of certification.

When to Use LEED 2009 for Commercial Interiors

LEED 2009 for Commercial Interiors addresses the specifics of tenant spaces primarily in office, retail, and institutional buildings. Tenants who lease their space or do not occupy the entire building are eligible.

LEED for Commercial Interiors was designed to work hand-in-hand with the LEED for Core & Shell certification system. LEED for Core & Shell is used by developers to certify the core and shell of a project; it prepares the building for environmentally conscious tenants.

Many projects clearly fit the defined scope of only 1 LEED rating system; others may be eligible for 2 or more. The project is a viable candidate for LEED certification if it can meet all prerequisites and achieve the minimum points required in a given rating system. If more than 1 rating system applies, the project team can decide which to pursue. For assistance in choosing the most appropriate LEED rating system, please e-mail leedinfo@usgbc.org.

Registration

Project teams interested in earning LEED certification for their buildings must first register the project with GBCI. Projects can be registered on the GBCI website (www.gbci.org). The website also has information on registration costs for USGBC national members as well as nonmembers. Registration is an important step that establishes contact with GBCI and provides access to software tools, errata, critical communications, and other essential information.

Certification

To earn LEED certification, the applicant project must satisfy all the prerequisites and qualify for a minimum number of points to attain the established project ratings as listed below. Having satisfied the basic prerequisites of the program, applicant projects are then rated according to their degree of compliance within the rating system.

LEED 2009 for Commercial Interiors provides the option of splitting a certification application into two phases, design and construction, in lieu of a combined design and construction review. Documentation for design phase credits, identified in LEED Online, can be submitted for review at the end of the design phase; the submittals for these credits can be fully evaluated based on documentation available during this phase of the project. For example, if a project site meets the requirements of LEED for Commercial Interiors SS Credit 3.1, Alternative Transportation—Public Transportation Access, the likelihood of credit achievement can be assessed prior to the completion of construction. The LEED credit itself, however, is not awarded at the design review stage.

For more information on the LEED certification process including LEED Online, Credit Interpretation Requests and Rulings, Appeals, and Fees please see the LEED Reference Guide for Green Building Design and Construction, 2009 Edition and visit www.usgbc.org or www.gbci.org.

III. MINIMUM PROGRAM REQUIREMENTS

The LEED 2009 Minimum Program Requirements (MPRs) define the minimum characteristics that a project must possess in order to be eligible for certification under LEED 2009. These requirements define the categories of buildings that the LEED rating systems were designed to evaluate, and taken together serve three goals: to give clear guidance to customers, to protect the integrity of the LEED program, and to reduce challenges that occur during the LEED certification process. To view the MPRs and the MPR Supplemental Guidance, visit the LEED Resources and Tools section of www.usgbc.org/projecttools.

IV. EXEMPLARY PERFORMANCE STRATEGIES

Exemplary performance strategies result in performance that greatly exceeds the performance level or expands the scope required by an existing LEED 2009 for Commercial Interiors credit. To earn exemplary performance credits, teams must meet the performance level defined by the next step in the threshold progression. For credits with more than 1 compliance path, an Innovation in Design point can be earned by satisfying more than 1 compliance path if their benefits are additive.

The credits for which exemplary performance points are available through expanded performance or scope are noted in the LEED Reference Guide for Green Interior Design and Construction, 2009 Edition and in LEED Online.

Endnotes

1 Tools for the Reduction and Assessment of Chemical and Other Environmental Impacts (TRACI). U.S. Environmental Protection Agency, Office of Research and Development. http://www.epa.gov/nrmrl/std/sab/traci/.

2 Relative impact category weights based on an exercise undertaken by NIST (National Institute of Standards and Technology) for the BEES program. http://www.bfrl.nist.gov/oae/software/bees/.

SUSTAINABLE SITES

SS Credit 1: Site Selection

1–5 Points

Intent

To encourage tenants to select buildings that employ best practices systems and green strategies.

Requirements

OPTION 1

Select a LEED certified building (5 points).

OR

OPTION 2

Locate the tenant space in a building that has in place 1 or more of the following characteristics at time of submittal (1 – 5 points). Each of the following options may also be met by satisfying the requirements of the corresponding LEED 2009 for New Construction credit.

PATH 1. Brownfield Redevelopment (1 point)

A building developed on a site documented as contaminated (by an ASTM E1903-97 Phase II Environmental Site Assessment or a local voluntary cleanup program) OR

A building on a site classified as a brownfield by a local, state or federal government agency.

Effective remediation of site contamination must have been completed.

PATH 2. Stormwater Design—Quantity Control (1 point)

A building that prior to its development had less than or equal to 50% imperviousness and has implemented a stormwater management plan that is equal to or is less than the predevelopment 1 1/2 year 24-hour rate and quantity discharge.

OR

A building that prior to its development had more than 50% imperviousness and has implemented a stormwater management plan that reduced predevelopment 1 1/2 year 24-hour rate and quantity discharge by 25% of the annual on-site stormwater load. This mitigation can be achieved through a variety of measures such as perviousness of site, stormwater retention ponds, and harvesting of rainwater for reuse.

Stormwater values are based on actual local rainfall unless the actual exceeds the 10-year annual average local rainfall, in which case the 10-year annual average should be used.

PATH 3. Stormwater Design—Quality Control (1 point)

A building that has in place site stormwater treatment systems designed to remove at least 80% of the average annual site area's total suspended solids (TSS) and 40% of the average annual site area's total phosphorus (TP).

These values are based on the average annual loadings from all storms less than or equal to the 2-year 24-hour storm. The building must implement and maintain best management practices (BMPs) outlined in Chapter 4, Part 2 Urban Runoff, of the EPA Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters, January 1993 (EPA 840B92002) or the local government's BMP document, whichever is more stringent.

PATH 4. Heat Island Effect—Nonroof (1 point)

A building that provides shade (or will provide shade within 5 years of landscape installation); and/ or uses light-colored or high-albedo materials with a solar reflectance index (SRI)[1] of at least 29; and/ or has open-grid pavement areas that individually or in total equals at least 30% of the site's nonroof impervious surfaces, such as parking areas, walkways, plazas, and fire lanes.

OR

A building that has placed a minimum of 50% of parking spaces underground or covered by structured parking.

OR

A building that has an open-grid pavement system (less than 50% impervious) for 50% of the parking lot area.

PATH 5. Heat Island Effect—Roof (1 point)

A building whose roofing has a solar reflectance index (SRI) of the following minimum values for at least 75% of the roof surface;

Roof Type	Slope	SRI
Low-sloped roof	≤ 2:12	78
Steep-sloped roof	> 2:12	29

OR

A building that has installed a vegetated roof for at least 50% of the roof area.

OR

A building that has both high SRI roofs and vegetated roofs that satisfy the following area requirement:

$$\text{Total Roof Area} \leq \left[(\text{Area of SRI Roof} \times 1.33) + (\text{Area of Vegetated Roof} \times 2) \right]$$

PATH 6. Light Pollution Reduction (1 point)

A building whose nonemergency interior luminaires with a direct line of sight to any openings in the envelope (translucent or transparent) must have their input power reduced (by automatic device) by at least 50% between 11 p.m. and 5 a.m. After-hours override may be provided by a manual or occupant-sensing device provided the override lasts no more than 30 minutes.

1 The solar reflectance index (SRI) is a measure of the constructed surface's ability to reflect solar heat, as shown by a small temperature rise. It is defined so that a standard black surface (reflectance 0.05, emittance 0.90) is 0 and a standard white surface (reflectance 0.80, emittance 0.90) is 100. To calculate the SRI for a given material, obtain the reflectance value and emittance value for the material. SRI is calculated according to ASTM E 1980. Reflectance is measured according to ASTM E 903, ASTM E 1918 or ASTM C 1549. Emittance is measured according to ASTM E 408 or ASTM C 1371.

OR

A building whose openings in the envelope (translucent or transparent) with a direct line of sight to any nonemergency luminaires must have shielding (with transmittance of less than 10%) that is controlled or closed by automatic device between 11 p.m. and 5 a.m.

PATH 7. Water Efficient Landscaping—Reduce by 50% (2 points)

A building that employs high-efficiency irrigation technology OR uses harvested rainwater or recycled site water to reduce potable water consumption for irrigation by at least 50% over conventional means.

PATH 8. Water Efficient Landscaping—No Potable Water Use or Irrigation (2 points in addition to Path 7)

A building that uses only harvested rainwater or recycled site water to eliminate all potable water use for site irrigation (except for initial watering to establish plants), OR does not have permanent landscaping irrigation systems.

PATH 9. Innovative Wastewater Technologies (2 points)

A building that reduces the use of municipally provided potable water for building sewage conveyance by at least50%, OR treats 100% of wastewater on-site to tertiary standards.

PATH 10. Water Use Reduction—30% Reduction (1 point)

A building that meets the 30% reduction in water use requirement for the entire building and has an ongoing plan to require future occupants to comply.

PATH 11. On-site Renewable Energy (1-2 points)

A building that supplies at least 2.5% (1 point) or 5% (2 points) of the building's total energy use (expressed as a fraction of annual energy cost) from on-site renewable energy systems.

PATH 12. Other Quantifiable Environmental Performance (1 point)

A building that has in place at the time of selection other quantifiable environmental benefits.

Potential Technologies & Strategies

During the building selection process, give preference to those properties which exhibit green building strategies and technologies.

SS Credit 2: Development Density and Community Connectivity

6 points

Intent

To channel development to urban areas with existing infrastructure, protect greenfields and preserve habitat and natural resources.

Requirements

OPTION 1. Development Density

Select space in a building that is located in an established, walkable community with a minimum density of 60,000 square feet per acre net. The density calculation is based on a typical two-story downtown development and must include the area of the project being built.

OR

OPTION 2. Community Connectivity

Select space in a building on a site that meets the following criteria:

- Is located within 1/2-mile of a residential area or neighborhood with an average density of 10 units per acre net
- Is within 1/2-mile of at least 10 basic services
- Has pedestrian access between the building and the services.

For mixed-use projects, no more than 1 service within the project boundary may be counted as 1 of the 10 basic services, provided it is open to the public. No more than 2 of the 10 services required may be anticipated (i.e. at least 8 must be existing and operational). In addition, the anticipated services must be documented appropriately to demonstrate that they will be operational in the locations indicated within 1 year of occupation of the applicant project.

Examples of basic services include the following:

Bank	Laundry	School
Place of Worship	Library	Supermarket
Convenience Grocery	Medical or Dental Office	Theater
Day Care Center	Senior Care Facility	Community Center
Cleaners	Park	Fitness Center
Fire Station	Pharmacy	Museum
Beauty Salon	Post Office	
Hardware	Restaurant	

Proximity is determined by drawing a 1/2-mile radius around a main building entrance on a site map and counting the services within that radius.

Greenfield developments and projects that do not use existing infrastructure are not eligible.

Potential Technologies & Strategies

During the site selection process, give preference to urban sites with pedestrian access to a variety of services.

SS Credit 3.1: Alternative Transportation—Public Transportation Access

6 points

Intent

To reduce pollution and land development impacts from automobile use.

Requirements

OPTION 1. Rail Station Proximity

Locate the project in a building within 1/2-mile walking distance (measured from a main building entrance) of an existing (or planned and funded) commuter rail, light rail or subway station.

OR

OPTION 2. Bus Stop Proximity

Locate the project within 1/4-mile walking distance (measured from a main building entrance) of 1 or more stops for 2 or more public campus or private bus lines usable by tenant occupants.

Potential Technologies & Strategies

Perform a transportation survey of potential tenant occupants to identify transportation needs. Locate the building near mass transit.

SS Credit 3.2: Alternative Transportation—Bicycle Storage and Changing Rooms

2 points

Intent

To reduce pollution and land development impacts from automobile use.

Requirements

Provide secure bicycle racks and/or storage (within 200 yards of a main building entrance) for 5% or more of tenant occupants (measured at peak periods).

Provide shower and changing facilities in the building, or within 200 yards of a building entrance, for 0.5% of full-time equivalent (FTE) occupants.

Potential Technologies & Strategies

Select a building with transportation amenities such as bicycle racks and shower/changing facilities or add them as part of the tenant fit-out.

SS Credit 3.3: Alternative Transportation—Parking Availability

2 points

Intent

To reduce pollution and land development impacts from automobile use.

Requirements

CASE 1. Projects with an Area Less Than 75% of the Total Building Area

OPTION 1

Parking spaces provided to tenant must meet but not exceed minimum number required by local zoning regulations .

Preferred parking[1] must be provided for carpools or vanpools capable of serving 5% or more of tenant occupants.

OR

OPTION 2

No parking is provided or subsidized for tenant occupants.

CASE 2. Projects with an Area 75% or More of the Total Building Area

OPTION 1

Parking capacity must meet but not exceed minimum local zoning requirements.

Preferred parking[1] must be provided for carpools or vanpools, capable of serving 5% of the building occupants.

OR

OPTION 2

No new parking is added for rehabilitation projects.

Preferred parking[1] must be provided for carpools or vanpools, capable of serving 5% of the building occupants.

Potential Technologies & Strategies

Select a building with minimized car parking capacity and include limited parking inclusions in the lease.

1 For the purposes of this credit "preferred parking" refers to the parking spots that are closest to the main entrance of the project (exclusive of spaces designated for handicapped persons) or parking passes provided at a discounted price. To establish a meaningful incentive in all potential markets, the parking rate must be discounted at least 20%. The discounted rate must be available to all eligible customers (i.e. not limited to the number of customers equal to 5% of the vehicle parking capacity), publicly posted at the entrance of the parking area, and available for a minimum of 2 years.

WATER EFFICIENCY

WE Prerequisite 1: Water Use Reduction

Required

Intent

To increase water efficiency within the tenant space to reduce the burden on municipal water supply and wastewater systems.

Requirements

Employ strategies that in aggregate use 20% less water than the water use baseline calculated for the tenant space (not including irrigation).

Calculate the baseline according to the commercial and/or residential baselines outlined below.[1] Calculations are based on estimated occupant usage and must include only the following fixtures and fixture fittings located within the tenant space: water closets, urinals, lavatory faucets, showers, kitchen sink faucets and prerinse spray valves.[2]

Commercial Fixtures, Fittings, and Appliances	Current Baseline
Commercial toilets	1.6 gallons per flush (gpf)* Except blow-out fixtures: 3.5 (gpf)
Commercial urinals	1.0 (gpf)
Commercial lavatory (restroom) faucets	2.2 gallons per minute (gpm) at 60 pounds per square inch (psi), private applications only (hotel or motel guest rooms, hospital patient rooms) 0.5 (gpm) at 60 (psi)** all others except private applications 0.25 gallons per cycle for metering faucets
Commercial prerinse spray valves (for food service applications)	Flow rate ≤ 1.6 (gpm) (no pressure specified; no performance requirement)

Residential Fixtures, Fittings, and Appliances	Current Baseline
Residential toilets	1.6 (gpf)***
Residential lavatory (bathroom) faucets	2.2 (gpm) at 60 psi
Residential kitchen faucet	
Residential showerheads	2.5 (gpm) at 80 (psi) per shower stall****

* EPAct 1992 standard for toilets applies to both commercial and residential models.

** In addition to EPAct requirements, the American Society of Mechanical Engineers standard for public lavatory faucets is 0.5 gpm at 60 psi (ASME A112.18.1-2005). This maximum has been incorporated into the national Uniform Plumbing Code and the International Plumbing Code.

*** EPAct 1992 standard for toilets applies to both commercial and residential models.

**** Residential shower compartment (stall) in dwelling units: The total allowable flow rate from all flowing showerheads at any given time, including rain systems, waterfalls, bodysprays, bodyspas and jets, must be limited to the allowable showerhead flow rate as specified above (2.5 gpm) per shower compartment, where the floor area of the shower compartment is less than 2,500 square inches. For each increment of 2,500 square inches of floor area thereafter or part thereof, an additional showerhead with total allowable flow rate from all flowing devices equal to or less than the allowable flow rate as specified above must be allowed. Exception: Showers that emit recirculated nonpotable water originating from within the shower compartment while operating are allowed to exceed the maximum as long as the total potable water flow does not exceed the flow rate as specified above.

1 Tables adapted from information developed and summarized by the U.S. Environmental Protection Agency (EPA) Office of Water based on requirements of the Energy Policy Act (EPAct) of 1992 and subsequent rulings by the Department of Energy, requirements of the EPAct of 2005, and the plumbing code requirements as stated in the 2006 editions of the Uniform Plumbing Code or International Plumbing Code pertaining to fixture performance.

2 Projects where fixtures or fixture fittings are not within the tenant space are exempt from WE Prerequisite 1.

The following fixtures, fittings and appliances are outside the scope of the water use reduction calculation:

Commercial Steam Cookers

Commercial Dishwashers

Automatic Commercial Ice Makers

Commercial (family-sized) Clothes Washers

Residential Clothes Washers

Standard and Compact Residential Dishwashers

Potential Technologies & Strategies

WaterSense-certified fixtures and fixture fittings should be used where available. Use high-efficiency fixtures (e.g., water closets and urinals) and dry fixtures, such as toilets attached to composting systems, to reduce potable water demand. Consider using alternative on-site sources of water (e.g., rainwater, stormwater, and air conditioner condensate) and graywater for nonpotable applications such as custodial uses and toilet and urinal flushing. The quality of any alternative source of water used must be taken into consideration based on its application or use.

WE Credit 1: Water Use Reduction

6–11 Points

Intent

To further increase water efficiency within the tenant space to reduce the burden on municipal water supply and wastewater systems.

Requirements

Employ strategies that in aggregate use less water than the water use baseline calculated for the tenant space (not including irrigation). The minimum water savings percentage for each point threshold is as follows:

Percentage Reduction	Points
30%	6
35%	8
40%	11

Calculate the baseline according to the commercial and/or residential baselines outlined below.[1] Calculations are based on estimated occupant usage and must include only the following fixtures and fixture fittings necessary to meet the needs of the occupants including fixtures and fixture fittings that may be outside the tenant space: water closets, urinals, lavatory faucets, showers, kitchen sink faucets and pre-rinse spray valves.

Commercial Fixtures, Fittings, and Appliances	Current Baseline
Commercial toilets	1.6 gallons per flush (gpf)* Except blow-out fixtures: 3.5 (gpf)
Commercial urinals	1.0 (gpf)
Commercial lavatory (restroom) faucets	2.2 gallons per minute (gpm) at 60 pounds per square inch (psi), private applications only (hotel or motel guest rooms, hospital patient rooms) 0.5 (gpm) at 60 (psi)** all others except private applications 0.25 gallons per cycle for metering faucets
Commercial prerinse spray valves (for food service applications)	Flow rate ≤ 1.6 (gpm) (no pressure specified; no performance requirement)

Residential Fixtures, Fittings, and Appliances	Current Baseline
Residential toilets	1.6 (gpf)***
Residential lavatory (bathroom) faucets	2.2 (gpm) at 60 psi
Residential kitchen faucet	
Residential showerheads	2.5 (gpm) at 80 (psi) per shower stall****

* EPAct 1992 standard for toilets applies to both commercial and residential models.

** In addition to EPAct requirements, the American Society of Mechanical Engineers standard for public lavatory faucets is 0.5 gpm at 60 psi (ASME A112.18.1-2005). This maximum has been incorporated into the national Uniform Plumbing Code and the International Plumbing Code.

*** EPAct 1992 standard for toilets applies to both commercial and residential models.

**** Residential shower compartment (stall) in dwelling units: The total allowable flow rate from all flowing showerheads at any given time, including rain systems, waterfalls, bodysprays, bodyspas and jets, must be limited to the allowable showerhead flow rate as specified above (2.5 gpm) per shower compartment, where the floor area of the shower compartment is less than 2,500 square inches. For each increment of 2,500 square inches of floor area thereafter or part thereof, an additional showerhead with total allowable flow rate from all flowing devices equal to or less than the allowable flow rate as specified above must be allowed. Exception: Showers that emit recirculated nonpotable water originating from within the shower compartment while operating are allowed to exceed the maximum as long as the total potable water flow does not exceed the flow rate as specified above.

1 Tables adapted from information developed and summarized by the U.S. Environmental Protection Agency (EPA) Office of Water based on requirements of the Energy Policy Act (EPAct) of 1992 and subsequent rulings by the Department of Energy, requirements of the EPAct of 2005, and the plumbing code requirements as stated in the 2006 editions of the Uniform Plumbing Code or International Plumbing Code pertaining to fixture performance.

The following fixtures, fittings and appliances are outside the scope of the water use reduction calculation:

Commercial Steam Cookers

Commercial Dishwashers

Automatic Commercial Ice Makers

Commercial (family-sized) Clothes Washers

Residential Clothes Washers

Standard and Compact Residential Dishwashers

Potential Technologies & Strategies

Use WaterSense-certified fixtures and fixture fittings where available. Use high-efficiency fixtures (e.g., water closets and urinals) and dry fixtures, such as toilets attached to composting systems, to reduce the potable water demand. Consider using alternative on-site sources of water (e.g., rainwater, stormwater, and air conditioner condensate, graywater) for nonpotable applications (e.g., toilet and urinal flushing, custodial uses). The quality of any alternative source of water being used must be taken into consideration based on its application or use.

ENERGY & ATMOSPHERE

EA Prerequisite 1: Fundamental Commissioning of Building Energy Systems

Required

Intent

To verify that the project's energy-related systems are installed and calibrated to performing according to the owner's project requirements, basis of design and construction documents.

Benefits of commissioning include reduced energy use, lower operating costs, fewer contractor callbacks, better building documentation, improved occupant productivity, and verification that the systems perform in accordance with the owner's project requirements.

Requirements

The following commissioning process activities must be completed by the project team:

- Designate an individual as the commissioning authority (CxA) to lead, review and oversee the completion of the commissioning process activities.
  - The CxA must have documented commissioning authority experience in at least 2 building projects.
  - The individual serving as the CxA must be independent of the project's design and construction management, though the CxA may be an employee of any firms providing those services. The CxA may be a qualified employee or consultant of the owner.
  - The CxA must report results, findings and recommendations directly to the owner.
  - For projects smaller than 50,000 gross square feet, the CxA may be a qualified person on the design or construction teams who has the required experience.
- The owner must document the owner's project requirements. The design team must develop the basis of design. The CxA must review these documents for clarity and completeness. The owner and design team must be responsible for updates to their respective documents.
- Develop and incorporate commissioning requirements into the construction documents.
- Develop and implement a commissioning plan.
- Verify the installation and performance of the systems to be commissioned.
- Complete a summary commissioning report.

Commissioned Systems

Commissioning process activities must be completed for the following energy-related systems at a minimum:

- Heating, ventilating, air conditioning and refrigeration (HVAC&R) systems (mechanical and passive) and associated controls.
- Lighting and daylighting controls.
- Domestic hot water systems.
- Renewable energy systems (e.g. PV, wind, solar).

Potential Technologies & Strategies

Engage a CxA as early as possible in the design process. Determine the owner's project requirements, develop and maintain a commissioning plan for use during design and construction and incorporate commissioning requirements in bid documents. Assemble the commissioning team, and prior to occupancy verify the performance of energy consuming systems. Complete the commissioning reports with recommendations prior to accepting the commissioned systems.

Owners are encouraged to seek out qualified individuals to lead the commissioning process. Qualified individuals are identified as those who possess a high level of experience in the following areas:

- Energy systems design, installation and operation.
- Commissioning planning and process management.
- Hands-on field experience with energy systems performance, interaction, start-up, balancing, testing, troubleshooting, operation and maintenance procedures.
- Energy systems automation control knowledge.

Owners are encouraged to consider including water-using systems, building envelope systems, and other systems in the scope of the commissioning plan as appropriate. The building envelope is an important component of a facility which impacts energy consumption, occupant comfort and indoor air quality. While this prerequisite does not require building envelope commissioning, an owner can achieve significant financial savings and reduce risk of poor indoor air quality by including it in the commissioning process.

EA Prerequisite 2: Minimum Energy Performance

Required

Intent

To establish the minimum level of energy efficiency for the tenant space systems to reduce environmental and economic impacts associated with excessive energy use.

Requirements

Design portions of the building as covered by the tenant's scope of work to comply with ANSI/ASHRAE/IESNA Standard 90.1-2007 (with errata but without addenda[1]), and complete the following:

- Comply with the mandatory provisions (Sections 5.4, 6.4, 7.4, 8.4, 9.4 and 10.4) of ANSI/ASHRAE/IESNA Standard 90.1-2007 (with errata but without addenda[1]).
- Achieve the prescriptive requirements (Sections 5.5, 5.6, 6.5, 7.5 and 9.5 or 9.6) or performance requirements (Section 11) of ANSI/ASHRAE/IESNA Standard 90.1-2007 (with errata but without addenda[1]).
- Reduce connected lighting power density 10% below that allowed by ANSI/ASHRAE/IESNA Standard 90.1-2007 (with errata but without addenda[1]) using either the Space-by-Space Method or by applying the whole building lighting power allowance to the entire tenant space.
- Install ENERGY STAR® qualified equipment for 50% (by rated-power) of ENERGY STAR eligible equipment installed as part of the tenant's scope of work. This requirement includes appliances, office equipment, electronics, and commercial food service equipment. Excluded are heating, ventilating and air conditioning (HVAC), lighting, and building envelope products.

Projects in California may use Title 24-2005, Part 6 in place of ANSI/ASHRAE/IESNA Standard 90.1-2007.

Potential Technologies & Strategies

Design the systems impacted in the tenant's scope of work to maximize energy performance. Use a computer simulation model to assess the energy performance and identify the most cost-effective energy measures. Quantify energy performance compared with a baseline building.

If local code has demonstrated quantitative and textual equivalence following, at a minimum, the U.S. Department of Energy (DOE) standard process for commercial energy code determination, then the local code may be used to satisfy this prerequisite in lieu of ANSI/ASHRAE/IESNA Standard 90.1-2007. Details on the DOE process for commercial energy code determination can be found at http://www.energycodes.gov/implement/determinations_com.stm.

1 Project teams wishing to use ASHRAE approved addenda for the purposes of this credit may do so at their discretion. Addenda must be applied consistently across all LEED credits.

EA Prerequisite 3: Fundamental Refrigerant Management

Required

Intent
To reduce stratospheric ozone depletion.

Requirements
Zero use of chlorofluorocarbon (CFC)-based refrigerants in tenant heating, ventilating, air conditioning and refrigeration (HVAC&R) systems used within the LEED project scope of work.

Potential Technologies & Strategies
For new installations, specify new HVAC equipment that uses no CFC-based refrigerants. When reusing existing HVAC systems, conduct an inventory to identify equipment that uses CFC-based refrigerants and replace or retrofit these systems with non-CFC refrigerants.

Project teams are encouraged to either locate in buildings that have no CFC-based refrigerants or to influence the building owner to use such systems to reduce ozone depletion.

EA Credit 1.1: Optimize Energy Performance—Lighting Power

1–5 points

Intent

To achieve increasing levels of energy conservation beyond the referenced standard to reduce environmental and economic impacts associated with excessive energy use.

Requirements

Reduce connected lighting power density below that allowed by ANSI/ASHRAE/IESNA Standard 90.1-2007 (with errata but without addenda[1]) using either the space-by-space method or by applying the whole building lighting power allowance to the entire tenant space.

The points earned for reducing lighting power density below the standard are as follows:

Lighting Power Density Reduction below the Standard	Points
15%	1
20%	2
25%	3
30%	4
35%	5

Project teams in California may use Title 24-2005, Part 6 in place of ANSI/ASHRAE/IESNA Standard 90.1-2007.

Potential Technologies & Strategies

Design the connected lighting power to maximize energy performance. If the project warrants, consider a computer simulation model to assess the performance and identify the most cost-effective energy efficiency measures.

1 Project teams wishing to use ASHRAE approved addenda for the purposes of this prerequisite may do so at their discretion. Addenda must be applied consistently across all LEED credits..

EA Credit 1.2: Optimize Energy Performance—Lighting Controls

1–3 points

Intent

To achieve increasing levels of energy conservation beyond the prerequisite standard to reduce environmental and economic impacts associated with excessive energy use.

Requirements

Design the project to include 1 or more of the following independent strategies:

- Daylight controls for daylit areas: (1 point)

  Install daylight responsive controls in all regularly occupied daylit spaces within 15 feet of windows and under skylights. Daylight controls must switch or dim electric lights in response to the presence or absence of daylight illumination in the space.[1]

- Daylight controls for 50% of the lighting load: (1 point)

  Install daylight responsive controls for 50% or more of the connected lighting load and demonstrate that 50% of the connected lighting load is daylight responsive. Daylight controls must switch or dim electric lights in response to the presence or absence of daylight illumination in the space.[2]

- Occupancy sensors: (1 point)

  Install occupancy sensors for 75% of the connected lighting load.

Potential Technologies & Strategies

Design the lighting controls to maximize energy performance.

1 American Society of Heating, Refrigerating, and Air-Conditioning Engineers. ANSI/ASHRAE/IESNA Standard 90.1 – 2007 90.1 User's Manual. (Atlanta, 2008). P. 9-3

2 Ibid

EA Credit 1.3: Optimize Energy Performance—HVAC

5–10 points

Intent

To achieve increasing levels of energy conservation beyond the prerequisite standard to reduce environmental and economic impacts associated with excessive energy use.

Requirement

OPTION 1

Implement 1 or both of the following strategies:

- Equipment Efficiency—(5 points)

  Install heating, ventilation and air conditioning (HVAC) systems that comply with the efficiency requirements outlined in the New Building Institute's Advanced Buildings™ Core Performance™ Guide Sections 1.4: Mechanical System Design, 2.9: Mechanical Equipment Efficiency and 3.10: Variable Speed Control.

- Appropriate Zoning and Controls: (5 points)

  Zone tenant fit out of spaces to meet the following requirements:

  - Every solar exposure must have a separate control zone.
  - Interior spaces must be separately zoned.
  - Private offices and special occupancies (conference rooms, kitchens, etc.) must have active controls capable of sensing space use and modulating the HVAC system in response to space demand.

OR

OPTION 2

Reduce design energy cost compared with the energy cost budget for regulated energy components described in the requirements of ANSI/ASHRAE/IESNA Standard 90.1-2007 (with errata but without addenda[1])

AND

PATH 1 (5 points)

Demonstrate that HVAC system component performance criteria used for tenant space are 15% better than a system in minimum compliance with ANSI/ASHRAE/IESNA Standard 90.1-2007 (with errata but without addenda[1]).

OR

PATH 2 (10 points)

Demonstrate that HVAC system component performance criteria used for tenant space are 30% better than a system that is in minimum compliance with ANSI/ASHRAE/IESNA Standard 90.1-2007 (with errata but without addenda[1]).

1 Project teams wishing to use ASHRAE approved addenda for the purposes of this credit may do so at their discretion. Addenda must be applied consistently across all LEED credits.

Potential Technologies & Strategies

Design the HVAC system components to maximize energy performance. Review compliance options for EA Credit 1.3 and determine the most appropriate approach. Option 1 provides a more prescriptive approach to recognizing energy-efficient HVAC design, while Option 2 is performance based.

EA Credit 1.4: Optimize Energy Performance—Equipment and Appliances

1–4 points

Intent

To achieve increasing levels of energy conservation beyond the prerequisite standard to reduce environmental and economic impacts associated with excessive energy use.

Requirements

For all ENERGY STAR® eligible equipment and appliances installed as part of the tenant's scope of work, achieve one of the following percentages (by rated power):

Percent Installed ENERGY STAR Qualified Equipment of ENERGY STAR Eligible Equipment	Points
70%	1
77%	2
84%	3
90%	4

This requirement applies to appliances, office equipment, electronics, and commercial food service equipment. Excluded are HVAC, lighting, and building envelope products.

Potential Technologies & Strategies

Select energy-efficient equipment and appliances, as qualified by the EPA's ENERGY STAR Program (http://www.energystar.gov).

EA Credit 2: Enhanced Commissioning

5 points

Intent

To verify and ensure that the tenant space is designed, constructed and calibrated to operate as intended.

Requirements

Implement, or have a contract in place to implement, the following additional commissioning process activities in addition to the requirements of EA Prerequisite 1: Fundamental Commissioning of the Building Energy Systems:

- Prior to the start of the construction documents phase, designate an independent commissioning authority (CxA) to lead, review and oversee the completion of all commissioning process activities.
  - The CxA must have documented commissioning authority experience in at least 2 building projects.
  - The individual serving as the CxA:
    - Must be independent of the work of design and construction;
    - Must not be an employee of the design firm, though he or she may be contracted through them;
    - Must not be an employee of, or contracted through, a contractor or construction manager holding construction contracts;
    - May be a qualified employee or consultant of the owner.
  - The CxA must report results, findings and recommendations directly to the owner.
- The CxA must conduct, at a minimum, 1 commissioning design review of the owner's project requirements, basis of design and design documents prior to the mid-construction documents phase and must back-check the review comments in the subsequent design submission.
- The CxA must review contractor submittals applicable to systems being commissioned for compliance with the owner's project requirements and basis of design. This review must be concurrent with the reviews of the architect or engineer of record and submitted to the design team and the owner.
- The CxA or other project team members must develop a systems manual that gives future operating staff the information needed to understand and optimally operate the project's commissioned systems.
- The CxA or other project team members must verify that the requirements for training operating personnel and building occupants have been completed.
- The CxA must be involved in reviewing the operation of the tenant space with operations and maintenance (O&M) staff and occupants within 8 to 10 months after substantial completion. A plan for resolving outstanding commissioning-related issues must be included.

Potential Technologies & Strategies

Engage a CxA as early as possible in the design process. Determine the owner's project requirements, develop and maintain a commissioning plan for use during design and construction and incorporate commissioning requirements in bid documents. Assemble the commissioning team, and prior to occupancy verify the performance

of energy-consuming systems. Complete the commissioning reports with recommendations prior to acceptance of the commissioned systems.

Owners are encouraged to seek out qualified individuals to lead the commissioning process. Qualified individuals are identified as those who possess a high level of experience in the following areas:

- Energy systems design, installation and operation
- Commissioning planning and process management
- Hands-on field experience with energy systems performance, interaction, start-up, balancing, testing, troubleshooting, operation, and maintenance procedures
- Energy systems automation control knowledge

Owners are encouraged to consider including water-using systems, building envelope systems, and other systems in the scope of the commissioning plan as appropriate. The building envelope is an important component of a facility which impacts energy consumption, occupant comfort and indoor air quality. While this prerequisite does not require building envelope commissioning, an owner can receive significant financial savings and reduce risk of poor indoor air quality by including it in the commissioning process.

The LEED Reference Guide for Green Interior Design and Construction, 2009 Edition provides detailed guidance on the rigor expected for the following process activities:

- Owner's project requirements.
- Basis of design.
- Commissioning plan.
- Commissioning specification.
- Performance verification documentation.
- Commissioning report.

EA Credit 3: Measurement and Verification

2–5 points

Intent

To provide for the ongoing accountability and optimization of tenant energy and water consumption performance over time.

Requirements

CASE 1. Projects Less Than 75% of the Total Building Area

Complete 1 or more of the following:

- Install submetering equipment to measure and record energy use within the tenant space. (2 points)
- Negotiate a lease whereby energy costs are paid by the tenant and not included in the base rent. (3 points)

OR

CASE 2. Projects 75% or More of the Total Building Area

Install continuous metering equipment for the following end uses: (5 points)

- Lighting systems and controls.
- Constant and variable motor loads.
- Variable frequency drive 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-related process energy systems and equipment.
- Indoor water riser and outdoor irrigation systems.

Develop and implement a measurement and verification (M&V) plan that incorporates the monitoring information from the above end uses and is consistent with Option B, C or D of the 2001 International Performance Measurement & Verification Protocol (IPMVP) Volume I: Concepts and Options for Determining Energy and Water Savings.

Provide a process for corrective action if the results of the M&V plan indicate that energy savings are not being achieved.

Potential Technologies & Strategies

For projects with an area that constitutes less than 75% of the total building area, tenant space is submetered and has a direct pay clause in their lease for energy actually used instead of on a square foot basis. For projects with an area that constitutes 75% or more of the total building area, model the energy and water systems to predict savings. Design the project with equipment to measure energy and water performance. Draft a M&V plan to apply during building operations that compares predicted savings to those actually achieved in the field.

EA Credit 4: Green Power

5 points

Intent

To encourage the development and use of grid-source, renewable energy technologies on a net zero pollution basis.

Requirements

OPTION 1

Engage in at least a 2-year renewable energy contract to provide at least 50% of the tenant's electricity from renewable sources, as defined by the Center for Resource Solutions' Green-e energy product certification requirements.

All purchases of green power must be based on the quantity of energy consumed, not the cost, as determined by the annual electricity consumption results of EA Credit 1, Optimize Energy Performance.

OR

OPTION 2

Engage in at least a 2-year renewable energy contract to purchase at least 8 kilowatt hours per square foot per year from renewable electricity sources as defined by the Center for Resource Solutions (CRS) Green-e Energy's product certification requirements.

All purchases of green power must be based on the quantity of energy consumed, not the cost.

Potential Technologies & Strategies

Determine the energy needs of the tenant space and investigate opportunities to engage in a green power contract. Green power is derived from solar, wind, geothermal, biomass or low-impact hydro sources. Visit https://www.green-e.org/energy for details about the Green-e Energy program. The power product purchased to comply with credit requirements need not be Green-e Energy certified. Other sources of green power are eligible if they satisfy the Green-e Energy program's technical requirements. Renewable energy certificates (RECs), tradable renewable certificates (TRCs), green tags and other forms of green power that comply with the technical requirements of the Green-e Energy program may be used to document compliance with this credit.

MR Prerequisite 1: Storage and Collection of Recyclables

Required

Intent
To facilitate the reduction of waste generated by building occupants that is hauled to and disposed of in landfills.

Requirements
Provide an easily accessible dedicated area or areas for the collection and storage of materials for recycling for the tenant space. Materials must include at a minimum paper, corrugated cardboard, glass, plastics, and metals.

Potential Technologies & Strategies
Designate an area for recyclable collection and storage that is appropriately sized and located in a convenient area. Identify local waste handlers and buyers for glass, plastic, metals, office paper, newspaper, cardboard and organic wastes. Instruct occupants on recycling procedures. Instruct occupants on the recycling procedures. Consider employing cardboard balers, aluminum can crushers, recycling chutes and other waste management strategies to further enhance the recycling program.

MR Credit 1.1: Tenant Space—Long-Term Commitment

1 point

Intent

To encourage choices that will conserve resources, reduce waste and reduce the environmental impacts of tenancy as they relate to materials, manufacturing and transport.

Requirements

The occupant or tenant must commit to remain in the same location for a minimum of10 years.

Potential Technologies & Strategies

Suggest negotiations resulting in longer leases or ownership.

MR Credit 1.2: Building Reuse—Maintain Interior Nonstructural Components

1–2 Points

Intent

To extend the life cycle of existing building stock, conserve resources, retain cultural resources, reduce waste and reduce environmental impacts of new buildings as they relate to materials manufacturing and transport.

Requirements

Maintain at least 40% or 60% by area of the existing non-shell, nonstructural components (e.g., walls, flooring and ceiling systems). The minimum percentage interior component reuse for each point threshold is as follows:

Interior Reuse	Points
40%	1
60%	2

Potential Technologies & Strategies

Identify during the selection and design of the tenant space the potential to maintain as many of the existing interior elements as possible. Remove elements that pose a contamination risk to occupants, and update components that would improve energy and water efficiency, such as mechanical systems and plumbing fixtures. Quantify the extent of building reuse.

MR Credit 2: Construction Waste Management

1–2 Points

Intent

To divert construction and demolition debris from disposal in landfills and incineration facilities. Redirect recyclable recovered resources back to the manufacturing process and reusable materials to appropriate sites.

Requirements

Recycle and/or salvage nonhazardous construction and demolition debris. Develop and implement a construction waste management plan that, at a minimum, identifies the materials to be diverted from disposal and whether the materials will be sorted on-site or comingled. Excavated soil and land-clearing debris do not contribute to this credit. Calculations can be done by weight or volume, but must be consistent throughout. The minimum percentage debris to be recycled or salvaged for each point threshold is as follows:

Recycled or Salvaged	Points
50%	1
75%	2

Potential Technologies & Strategies

Establish goals for diversion from disposal in landfills and incineration facilities and adopt a construction waste management plan to achieve these goals. Consider recycling cardboard, metal, brick, concrete, plastic, clean wood, glass, gypsum wallboard, carpet and insulation. Construction debris processed into a recycled content commodity that has an open market value (e.g., wood derived fuel [WDF], alternative daily cover material, etc.) may be applied to the construction waste calculation. Designate a specific area(s) on the construction site for segregated or commingled collection of recyclable materials, and track recycling efforts throughout the construction process. Identify construction haulers and recyclers to handle the designated materials, and seek verification that the diverted materials are recycled or salvaged, as intended. Note that diversion may include donation of materials to charitable organizations and salvage of materials on site. For commercial interior projects the recycling rate for the landlord's demolition activity (before delivery to the tenant) can contribute to the project calculations for this credit if the team so chooses.

MR Credit 3.1: Materials Reuse

1–2 points

Intent

To reuse building materials and products to reduce demand for virgin materials and reduce waste, thereby lessening impacts associated with the extraction and processing of virgin resources.

Requirements

Use salvaged, refurbished or reused materials, the sum of which constitutes at least 5% or 10%, based on cost, of building (construction) materials, excluding furniture and furnishings The minimum percentage materials reused for each point threshold is as follows:

Reused Materials	Points
5%	1
10%	2

Potential Technologies & Strategies

Identify opportunities to incorporate salvaged materials into project design and research potential material suppliers. Consider salvaged materials such as beams and posts, flooring, paneling, doors and frames, cabinetry, brick, and decorative items.

MR Credit 3.2: Materials Reuse—Furniture and Furnishings

1 point

Intent

To reuse building materials and products to reduce demand for virgin materials and reduce waste, thereby reducing impacts associated with the extraction and processing of virgin resources.

Requirements

Use salvaged, refurbished or used furniture and furnishings for 30% of the total furniture and furnishings budget.

Potential Technologies & Strategies

Identify opportunities to incorporate salvaged and reuse furniture into project design and research potential material suppliers. Consider salvaging and reusing systems furniture and furnishings such as case pieces, seating, filing systems, decorative lighting and accessories.

MR Credit 4: Recycled Content

1–2 points

Intent

To increase demand for building products that incorporate recycled content materials, thereby reducing impacts resulting from extraction and processing of virgin materials.

Requirements

Use materials, including furniture and furnishings, with recycled content[1] such that the sum of postconsumer[2] recycled content plus 1/2 of the preconsumer[3] content constitutes at least 10% or 20% based on cost of the total value of the materials in the project. The minimum percentage materials recycled for each point threshold is as follows:

Recycled Content	Points
10%	1
20%	2

The recycled content value of a material or furnishing is determined by weight. The recycled fraction of the assembly is then multiplied by the cost of assembly to determine the recycled content value.

Mechanical, electrical and plumbing components cannot be included in this calculation.

Potential Technologies & Strategies

Establish a project goal for recycled content materials, and identify material suppliers that can achieve this goal. During construction, ensure that the specified recycled content materials are installed. Consider a range of environmental, economic and performance attributes when selecting products and materials.

1 Recycled content is defined in accordance with the International Organization of Standards document, ISO 14021 — Environmental labels and declarations — Self-declared environmental claims (Type II environmental labeling).

2 Postconsumer material is defined as waste material generated by households or by commercial, industrial and institutional facilities in their role as end-users of the product, which can no longer be used for its intended purpose.

3 Preconsumer material is defined as material diverted from the waste stream during the manufacturing process. Reutilization of materials (i.e., rework, regrind or scrap generated in a process and capable of being reclaimed within the same process that generated it) is excluded.

MR Credit 5: Regional Materials

1–2 Points

Intent

To increase demand for building materials and products that are extracted and manufactured within the region, thereby supporting the regional economy and reducing the environmental impacts resulting from transportation.

Requirements

OPTION 1 (1 point)

Use a minimum of 20% of the combined value of construction and Division 12 (Furniture) materials and products that are manufactured[1] regionally within a radius of 500 miles.

OR

OPTION 2 (2 points)

Meet the requirements for Option 1.

Use a minimum of 10% of the combined value of construction and Division 12 (furniture) materials and products extracted, harvested or recovered, as well as manufactured, within 500 miles of the project.

Potential Technologies & Strategies

Establish a project goal for locally sourced materials and identify materials and material suppliers that can achieve this goal. During construction, ensure that the specified local materials are installed and quantify the total percentage of local materials installed. Consider a range of environmental, economic and performance attributes when selecting products and materials.

1 Manufacturing refers to the final assembly of components into the building product that is furnished and installed by the tradesmen. For example, if the hardware comes from Dallas, Texas, the lumber from Vancouver, British Columbia, and the joist is assembled in Kent, Washington, then the location of the final assembly is Kent, Washington

MR Credit 6: Rapidly Renewable Materials

1 Point

Intent

To reduce the use and depletion of finite raw materials and long-cycle renewable materials by replacing them with rapidly renewable materials.

Requirements

Use rapidly renewable construction and Division 12 (Furniture and Furnishings) materials and products for 5% of the total value of all materials and products used in the project, based on cost. Rapidly renewable building materials and products are made from agricultural products that are typically harvested within a 10-year or shorter cycle.

Potential Technologies & Strategies

Establish a project goal for rapidly renewable materials and identify materials and suppliers that can achieve this goal. Consider materials such as bamboo flooring, wool carpets, straw board, cotton batt insulation, linoleum flooring, poplar OSB, sunflower seed board, wheatgrass cabinetry and others. During construction, ensure that the specified rapidly renewable materials are installed.

MR Credit 7: Certified Wood

1 Point

Intent
To encourage environmentally responsible forest management.

Requirements
When using new wood-based products and materials, use a minimum of 50% that are certified in accordance with the Forest Stewardship Council's principles and criteria. Division 12 (Furniture) material value is included in the determination of the certified wood content.

Potential Technologies & Strategies
Establish a project goal for FSC-certified wood products and identify suppliers that can achieve this goal. During construction, ensure that the FSC-certified wood products are installed and quantify the total percentage of FSC-certified wood products installed.

IEQ Prerequisite 1: Minimum Indoor Air Quality Performance

Required

Intent

To establish minimum indoor air quality (IAQ) performance to enhance indoor air quality in buildings, thus contributing to the comfort and well-being of the occupants.

Requirements

Meet the minimum requirements of Section 4 through 7 of ASHRAE Standard 62.1-2007, Ventilation for Acceptable Indoor Air Quality (with errata but without addenda[1]).

AND

CASE 1. Mechanically Ventilated Spaces

Mechanical ventilation systems must perform according to the ventilation rate procedure.

Modify or maintain existing building outside-air ventilation distribution system to supply at least the outdoor air ventilation rate required by ASHRAE Standard 62.1-2007 (with errata but without addenda[1]).

If the project team cannot meet the outside air requirements of ASHRAE Standard 62.1-2007 (with errata but without addenda[1]) document the space and system constraints that make it not possible, complete an engineering assessment of the system's maximum cubic feet per minute (cfm) capability toward meeting the requirements of ASHRAE Standard 62.1-2007 (with errata but without addenda[1]), and achieve those levels, with a minimum of 10 cfm per person. All other requirements must be met.

CASE 2. Naturally Ventilated Projects

Naturally ventilated buildings must comply with ASHRAE Standard 62.1-2007 Section 5.1 (with errata but without addenda[1]).

Potential Technologies & Strategies

Design ventilation systems to meet or exceed the minimum outdoor air ventilation rates as described in the ASHRAE standard. Balance the impacts of ventilation rates on energy use and indoor air quality to optimize for energy efficiency and occupant comfort. Use the ASHRAE Standard 62.1-2007 Users Manual (with errata but without addenda[1]) for detailed guidance on meeting the referenced requirements.

1 Project teams wishing to use ASHRAE approved addenda for the purposes of this prerequisite may do so at their discretion. Addenda must be applied consistently across all LEED credits

IEQ Prerequisite 2: Environmental Tobacco Smoke (ETS) Control

Required

Intent

To prevent or minimize exposure of building occupants, indoor surfaces and ventilation air distribution systems to environmental tobacco smoke (ETS).

Requirements

OPTION 1

Locate tenant space in a building that prohibits smoking by all occupants and users, within 25 feet of entries, outdoor air intakes and operable windows.

OR

OPTION 2

CASE 1. Non-Residential Projects

Confirm that smoking is prohibited in the portions of the tenant space not designated as a smoking space, all other building areas served by the same HVAC system, and the common areas used by occupants. Ensure that ETS cannot migrate by either mechanical or natural ventilation from other areas of the building.

If the occupants are permitted to smoke, provide one or more designated smoking rooms designed to contain, capture and remove ETS from the building. At a minimum, each smoking room must be directly exhausted to the outdoors, with no recirculation of ETS-containing air to nonsmoking areas, enclosed with impermeable deck-to-deck partitions, and operated at a negative pressure compared with surrounding spaces of at least an average of 5 Pa (0.02 inches of water gauge) and with a minimum of 1 Pa (0.004 inches of water gauge) when the doors to the smoking rooms are closed.

Verify performance of the smoking rooms differential air pressure by conducting 15 minutes of measurement, with a minimum of 1 measurement every 10 seconds, of the differential pressure in the smoking room with respect to each adjacent area and in each adjacent vertical chase with the doors to the smoking rooms closed. Conduct the testing with each space configured for worst case conditions of transport of air from the smoking rooms (with doors closed) to adjacent spaces.

CASE 2. Multi-Unit Residential Buildings

Minimize uncontrolled pathways for ETS transfer between individual residential units by sealing penetrations in walls, ceilings, and floors in the residential units and by sealing vertical chases adjacent to the units.

Weather-strip all doors in the residential units leading to common hallways to minimize air leakage into the hallway.[1]

1 If the common hallways are pressurized with respect to the residential units then doors in the residential units leading to the common hallways need not be weather-stripped provided that the positive differential pressure is demonstrated as in Option 2, Case 1 above, considering the residential unit as the smoking room.

Demonstrate acceptable sealing of residential units by conducting a blower door test in accordance with ANSI/ASTM-779-99, Standard Test Method for Determining Air Leakage Rate by Fan Pressurization.

Use the progressive sampling methodology defined in Chapter 7 (Home Energy Rating Systems (HERS) Required Verification and Diagnostic Testing) of the California Low Rise Residential Alternative Calculation Method Approval Manual. Residential units must demonstrate less than 1.25 square inches of leakage area per 100 square feet of enclosure area (i.e., sum of all wall, ceiling and floor areas).

Potential Technologies & Strategies

Prohibit smoking in the building or provide negative pressure smoking rooms. For residential buildings, a third option is to provide very tight construction to minimize ETS transfer among dwelling units.

IEQ Credit 1: Outdoor Air Delivery Monitoring

1 point

Intent

To provide capacity for ventilation system monitoring to promote occupant comfort and well-being.

Requirements

Install permanent monitoring systems to ensure that ventilation systems maintain design minimum requirements. Configure all monitoring equipment to generate an alarm when the airflow values or carbon dioxide(CO2) levels vary by 10% or more from the design values, via either a building automation system alarm to the building operator or a visual or audible alert to the building occupants

AND

CASE 1. Mechanically Ventilated Spaces

Monitor CO2 concentrations within all densely occupied spaces (those with a design occupant density of 25 people or more per 1,000 square feet). CO2 monitors must be between 3 and 6 feet above the floor.

Provide a direct outdoor airflow measurement device capable of measuring the minimum outdoor air intake flow with an accuracy of plus or minus 15% of the design minimum outdoor air rate, as defined by ASHRAE 62.1-2007 (with errata but without addenda[1]) for mechanical ventilation systems where 20% or more of the design supply airflow serves nondensely occupied spaces.

CASE 2. Naturally Ventilated Spaces

Monitor CO2 concentrations within all naturally ventilated spaces. CO2 monitors must be between 3 feet and 6 feet above the floor. One CO2 sensor may be used to monitor multiple nondensely occupied spaces if the natural ventilation design uses passive stack(s) or other means to induce airflow through those spaces equally and simultaneously without intervention by building occupants.

Potential Technologies & Strategies

Install CO2 and airflow measurement equipment and feed the information to the heating, ventilation and air conditioning (HVAC) system and/or Building Automation System (BAS) to trigger corrective action, if applicable. If such automatic controls are not feasible with the building systems, use the measurement equipment to trigger alarms that inform building operators or occupants of a possible deficiency in outdoor air delivery.

1 Project teams wishing to use ASHRAE approved addenda for the purposes of this credit may do so at their discretion. Addenda must be applied consistently across all LEED credits.

IEQ Credit 2: Increased Ventilation

1 point

Intent

To provide additional air ventilation to improve indoor air quality for improved occupant comfort, well-being and productivity.

Requirements

CASE 1. Mechanically Ventilated Spaces

Increase breathing zone outdoor air ventilation rates to all occupied spaces by at least 30% above the minimum rates required by ASHRAE 62.1-2007 (with errata but without addenda[1]) as determined by IEQ Prerequisite 1: Minimum Indoor Air Quality Performance.

CASE 2. Naturally Ventilated Spaces

Determine that natural ventilation is an effective strategy for the project by following the flow diagram process shown in Figure 2.8 of the Chartered Institution of Building Services Engineers (CIBSE) Applications Manual 10: 2005, Natural Ventilation in Non-domestic Buildings

AND

OPTION 1

Show that the natural ventilation systems design meets the recommendations set forth in the CIBSE manuals appropriate to the project space.

PATH 1. CIBSE Applications Manual 10: 2005, Natural Ventilation in Non-domestic Buildings

PATH 2. CIBSE AM 13:2000, Mixed Mode Ventilation

OR

OPTION 2

Use a macroscopic, multizone, analytic model to predict that room-by-room airflows will effectively naturally ventilate, defined as providing minimum ventilation rates required by ASHRAE 62.1-2007 Chapter 6 (with errata but without addenda[1]), for at least 90% of occupied spaces.

Potential Technologies & Strategies

For mechanically ventilated spaces: Design ventilation systems to provide breathing zone ventilation rates at least 30% larger than the minimum rates prescribed by the referenced standard.

1 Project teams wishing to use ASHRAE approved addenda for the purposes of this credit may do so at their discretion. Addenda must be applied consistently across all LEED credits

For naturally ventilated spaces, follow the 8 design steps described in Carbon Trust Good Practice Guide 237:

- Develop design requirements.
- Plan airflow paths.
- Identify building uses and features that might require special attention.
- Determine ventilation requirements.
- Estimate external driving pressures.
- Select types of ventilation devices.
- Size ventilation devices.
- Analyze the design.

Use public domain software such as NIST's CONTAM, Multizone Modeling Software, along with LoopDA, Natural Ventilation Sizing Tool, to analytically predict room-by-room airflows.

IEQ Credit 3.1: Construction Indoor Air Quality Management Plan—During Construction

1 point

Intent

To reduce indoor air quality (IAQ) problems resulting from construction or renovation and promote the comfort and well-being of construction workers and building occupants.

Requirements

Develop and implement an IAQ management plan for the construction and preoccupancy phases of the tenant space as follows:

- During construction, meet or exceed the recommended design approaches of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines for Occupied Buildings Under Construction, 2nd Edition 2007, ANSI/SMACNA 008-2008 (Chapter 3).
- Protect stored on-site and installed absorptive materials from moisture damage.
- If permanently installed air handlers are used during construction, filtration media with a minimum efficiency reporting value (MERV) of 8 must be used at each return air grille , as determined by ASHRAE 52.2-1999. (with errata but without addenda[1]).Replace all filtration media immediately prior to occupancy.

Potential Technologies & Strategies

Adopt an IAQ management plan to protect the heating, ventilating and air conditioning (HVAC) system during construction, control pollutant sources and interrupt contamination pathways. Sequence the installation of materials to avoid contamination of absorptive materials, such as insulation, carpeting, ceiling tile and gypsum wallboard. Coordinate with IEQ Credit 3.2: Construction IAQ Management Plan – Before Occupancy and IEQ Credit 5: Indoor Chemical & Pollutant Source Control to determine the appropriate specifications and schedules for filtration media.

If possible, avoid using permanently installed air handlers for temporary heating/cooling during construction. Consult the LEED Reference Guide for Green Interior Design and Construction, 2009 Edition for more detailed information on how to ensure the well-being of construction workers and building occupants if permanently installed air handlers must be used during construction.

1 Project teams wishing to use ASHRAE approved addenda for the purposes of this credit may do so at their discretion. Addenda must be applied consistently across all LEED credits.

IEQ Credit 3.2: Construction Indoor Air Quality Management Plan—Before Occupancy

1 point

Intent

To reduce indoor air quality (IAQ) problems resulting from construction or renovation and promote the comfort and well-being of workers and occupants.

Requirement

Develop an IAQ management plan and implement it after all finishes have been installed and the building has been completely cleaned before occupancy.

OPTION 1. Flush-Out[1]

PATH 1

After construction ends, prior to occupancy and with all interior finishes installed, install new filtration media and flush-out the building by supplying a total air volume of 14,000 cubic feet of outdoor air per square foot of floor area while maintaining an internal temperature of at least 60°F and, where mechanical cooling is operated, relative humidity no higher than 60%.

OR

PATH 2

If occupancy is desired prior to completion of the flush-out, the space may be occupied following delivery of a minimum of 3,500 cubic feet of outdoor air per square foot of floor area. Once the space is occupied, it must be ventilated at a minimum rate of 0.30 cubic feet per minute (cfm) per square foot of outside air or the design minimum outside air rate determined in EQ Prerequisite 1: Minimum IAQ Performance, whichever is greater. During each day of the flush-out period, ventilation must begin a minimum of 3 hours prior to occupancy and continue during occupancy. These conditions must be maintained until a total of 14,000 cubic feet per square foot of outside air has been delivered to the space.

OR

OPTION 2. Air Testing

Conduct baseline IAQ testing after construction ends and prior to occupancy using testing protocols consistent with the EPA Compendium of Methods for the Determination of Air Pollutants in Indoor Air or the ISO method listed in the table below. Testing must be done in accordance with one standard; project teams may not mix requirements from the EPA Compendium of Methods with ISO.

1 All finishes must be installed prior to flush-out

Demonstrate that the contaminant maximum concentration levels listed below are not exceeded:

Contaminant	Maximum Concentration	EPA Compendium method	ISO method
Formaldehyde	27 parts per billion	IP-6	ISO 16000-3
Particulates (PM10)	50 micrograms per cubic meter	IP-10	ISO 7708
Total volatile organic compounds (TVOCs)	500 micrograms per cubic meter	IP-1	ISO 16000-6
4-Phenylcyclohexene (4-PCH) *	6.5 micrograms per cubic meter	IP-1	ISO 16000-6
Carbon monoxide (CO)	9 parts per million and no greater than 2 parts per million above outdoor levels	IP-3	ISO 4224
*This test is required only if carpets and fabrics with styrene butadiene rubber (SBR) latex backing are installed as part of the base building systems.			

For each sampling point where the maximum concentration limits are exceeded, conduct an additional flush-out with outside air and retest the noncompliant concentrations. Repeat until all requirements have been met. When retesting noncompliant building areas, take samples from the same locations as in the first test.

Conduct the air sample testing as follows:

- All measurements must be conducted prior to occupancy, but during normal occupied hours, with the building ventilation system started at the normal daily start time and operated at the minimum outside air flow rate for the occupied mode throughout the test.
- All interior finishes must be installed, including but not limited to millwork, doors, paint, carpet and acoustic tiles. Movable furnishings such as workstations and partitions must be in place.
- The number of sampling locations will depend on the size of the building and number of ventilation systems. The number of sampling locations must include the entire building and all representative situations. Include areas with the least ventilation and greatest presumed source strength.
- Air samples must be collected between 3 and 6 feet from the floor to represent the breathing zone of occupants, and over a minimum 4-hour period.

Potential Technologies & Strategies

Prior to occupancy, perform a building flush-out or test the air contaminant levels in the building. The flush-out is often used where occupancy is not required immediately upon substantial completion of construction. IAQ testing can minimize schedule impacts but may be more costly. Coordinate with IEQ Credit 3.1: Construction IAQ Management Plan—During Construction and IEQ Credit 5: Indoor Chemical & Pollutant Source Control to determine the appropriate specifications and schedules for filtration media.

The intent of this credit is to eliminate IAQ problems that occur as a result of construction. Architectural finishes used in tenant build-outs constitute a significant source of air pollutants and must be addressed in order to qualify for this credit.

IEQ Credit 4.1: Low-Emitting Materials—Adhesives and Sealants

1 point

Intent

To reduce the quantity of indoor air contaminants that are odorous, potentially irritating and/or harmful to the comfort and well-being of installers and occupants.

Requirements

All adhesives and sealants used on the interior of the building (i.e. inside of the weatherproofing system and applied on-site) must comply with the requirements as applicable to the project scope:[1]

- Adhesives, sealants and sealant primers must comply with South Coast Air Quality Management District (SCAQMD) Rule 1168. Volatile organic compound (VOC) limits listed in the table below were effective July 1, 2005 with a rule amendment date of January 7, 2005.

Architectural Applications	VOC Limit (g/L less water)	Specialty Applications	VOC Limit (g/L less water)
Indoor carpet adhesives	50	PVC welding	510
Carpet pad adhesives	50	CPVC welding	490
Wood flooring adhesives	100	ABS welding	325
Rubber floor adhesives	60	Plastic cement welding	250
Subfloor adhesives	50	Adhesive primer for plastic	550
Ceramic tile adhesives	65	Contact adhesive	80
VCT and asphalt adhesives	50	Special purpose contact adhesive	250
Drywall and panel adhesives	50	Structural wood member adhesive	140
Cove base adhesives	50	Sheet applied rubber lining operations	850
Multipurpose construction adhesives	70	Top and trim adhesive	250
Structural glazing adhesives	100		
Substrate Specific Applications	**VOC Limit (g/L less water)**	**Sealants**	**VOC Limit (g/L less water)**
Metal to metal	30	Architectural	250
Plastic foams	50	Roadway	250
Porous material (except wood)	50	Other	420
Wood	30		
Fiberglass	80		
Sealant Primers	**VOC Limit (g/L less water)**		
Architectural, nonporous	250		
Architectural, porous	775		
Other	750		
This table excludes adhesives and sealants integral to the water-proofing system or that are not building related.			

1 The use of a VOC budget is permissible for compliance with this credit.

- Aerosol Adhesives must comply with Green Seal Standard for Commercial Adhesives GS-36 requirements in effect on October 19, 2000.

Aerosol Adhesives	VOC weight (g/L minus water)
General purpose mist spray	65% VOCs by weight
General purpose web spray	55% VOCs by weight
Special purpose aerosol adhesives (all types)	70% VOCs by weight

Potential Technologies & Strategies

Specify low-VOC materials in construction documents. Ensure that VOC limits are clearly stated in each section of the specifications where adhesives and sealants are addressed. Common products to evaluate include: general construction adhesives, flooring adhesives, fire-stopping sealants, caulking, duct sealants, plumbing adhesives, and cove base adhesives. Review product cut sheets, material safety data (MSD) sheets, signed attestations or other official literature from the manufacturer clearly identifying the VOC contents or compliance with referenced standards.

IEQ Credit 4.2: Low-Emitting Materials—Paints and Coatings

1 point

Intent

To reduce the quantity of indoor air contaminants that are odorous, irritating and/or harmful to the comfort and well-being of installers and occupants.

Requirements

Paints and coatings used on the interior of the building (i.e. inside the weatherproofing system and applied on-site) must comply with the following criteria as applicable to the project scope[1]:

- Architectural paints and coatings applied to interior walls and ceilings — must not exceed the volatile organic compound (VOC) content limits established in Green Seal Standard GS-11, Paints, 1st Edition, May 20, 1993.
- Anti-corrosive and anti-rust paints applied to interior ferrous metal substrates must not exceed the VOC content limit of 250 g/L established in Green Seal Standard GS-03, Anti-Corrosive Paints, 2nd Edition, January 7, 1997.
- Clear wood finishes, floor coatings, stains, primers, sealers, and shellacs applied to interior elements: must not exceed the VOC content limits established for those coating types in South Coast Air Quality Management District (SCAQMD) Rule 1113, Architectural Coatings, effective January 1, 2004.

Potential Technologies & Strategies

Specify low-VOC paints and coatings in construction documents. Ensure that VOC limits are clearly stated in each section where paints and coatings are addressed. Track the VOC content of all interior paints and coatings during construction.

1 The use of a VOC budget is permissible for compliance with this credit.

IEQ Credit 4.3: Low-Emitting Materials—Flooring Systems

1 point

Intent

To reduce the quantity of indoor air contaminants that are odorous, irritating and/or harmful to the comfort and well-being of installers and occupants.

Requirements

OPTION 1

All flooring must comply with the following as applicable to the project scope:

- All carpet installed in the building interior must meet the testing and product requirements of the Carpet and Rug Institute Green Label Plus[1] program.
- All carpet cushion installed in the building interior must meet the requirements of the Carpet and Rug Institute Green Label program.
- All carpet adhesive must have less than 50 g/L VOC.
- All hard surface flooring must meet the requirements of the FloorScore[2] standard (current as of the date of this rating system, or more stringent version) as shown with testing by an independent third-party. Mineral-based finish flooring products such as tile, masonry, terrazzo, and cut stone without integral organic-based coatings and sealants and unfinished/untreated solid wood flooring qualify for credit without any IAQ testing requirements. However, associated site-applied adhesives, grouts, finishes and sealers must be compliant for a mineral-based or unfinished/untreated solid wood flooring system to qualify for credit.
- Concrete, wood, bamboo, and cork floor finishes such as sealer, stain and finish must meet the requirements of South Coast Air Quality Management District (SCAQMD) Rule 1113, Architectural Coatings, effective January 1, 2004.
- Tile setting adhesives and grout must meet South Coast Air Quality Management District (SCAQMD) Rule 1168. VOC limits correspond to an effective date of July 1, 2005 and rule amendment date of January 7, 2005.

1 The Green Label Plus program for carpets and its associated VOC emission criteria in micrograms per square meter per hour, along with information on testing method and sample collection developed by the Carpet and Rug Institute (CRI) in coordination with California's Sustainable Building Task Force and the California Department of Public Health , are described in Section 9, Acceptable Emissions Testing for Carpet, DHS Standard Practice CA/DHS/EHLB/R-174, dated 07/15/04.

2 FloorScore is a voluntary, independent certification program that tests and certifies hard surface flooring and associated products for compliance with criteria adopted in California for indoor air emissions of Volatile Organic Compounds (VOCs) with potential health effects. The program uses a small-scale chamber test protocol and incorporates VOC emissions criteria, developed by the California Department of Public Health.

OR

OPTION 2

All flooring products must meet the testing and product requirements of the California Department of Public Health Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda. Mineral-based finish flooring products such as tile, masonry, terrazzo, and cut stone without integral organic-based coatings and sealants and unfinished/untreated solid wood flooring qualify for credit without any IAQ testing requirements. However, associated site-applied adhesives, grouts, finishes and sealers must be compliant for a mineral-based or unfinished/untreated solid wood flooring system to qualify for credit.

Potential Technologies & Strategies

Clearly specify requirements for product testing and/or certification in the construction documents. Select products that are either certified under the Green Label Plus program or for which testing has been done by qualified independent laboratories in accordance with the appropriate requirements.

IEQ Credit 4.4: Low-Emitting Materials—Composite Wood and Agrifiber Products

1 point

Intent

To reduce the quantity of indoor air contaminants that are odorous, irritating and/or harmful to the comfort and well-being of installers and occupants.

Requirements

Composite wood and agrifiber products used on the interior of the building (i.e. inside the weatherproofing system) must contain no added urea-formaldehyde resins. Laminate adhesives used to fabricate on-site and shop-applied composite wood and agrifiber assemblies must not contain added urea-formaldehyde resins.

Composite wood and agrifiber products are defined as: particleboard, medium density fiberboard (MDF), plywood, wheatboard, strawboard, panel substrates and door cores. Materials considered fixtures, furniture, and equipment (FF&E) are not considered base building elements and are not included.

Products covered by IEQ Credit 4.5, Low-Emitting Materials, System Furniture and Seating are excluded from these requirements.

Potential Technologies & Strategies

Specify wood and agrifiber products that contain no added urea-formaldehyde resins. Specify laminating adhesives for field and shop applied assemblies, including adhesives and veneers that contain no urea-formaldehyde. Review product cut sheets, material safety data (MSD) sheets, signed attestations or other official literature from the manufacturer.

IEQ Credit 4.5: Low-Emitting Materials—Systems Furniture and Seating

1 point

Intent

To reduce the quantity of indoor air contaminants that are odorous, irritating and/or harmful to the comfort and well-being of installers and occupants.

Requirements

All systems furniture[1] and seating[2] that was manufactured, refurbished or refinished within 1 year prior[3] to occupancy must meet 1 of the options below.

OPTION 1

Furniture and seating are Greenguard Indoor Air Quality Certified.

OR

OPTION 2

Calculated indoor air concentrations that are less than or equal to those listed in Table 1 for furniture systems and seating determined by a procedure based on ANSI/BIFMA M7.1-2007and ANSI/BIFMA X7.1-2007 testing protocol conducted in an independent third-party air quality testing laboratory.

The requirement in Section 5 of ANSI/BIFMA X7.1-2007 is waived for LEED purposes. Section 5 requires that laboratories used to perform the emissions testing and/or provide analytical results must be independently accredited to ISO/IEC 17025, "General requirements for the competence of testing and calibration laboratories."

Table 1. Maximum Indoor Air Concentrations

Chemical Contaminant	Emission Limits Systems Furniture	Emission Limits Seating
TVOC	0.5 mg/m^3	0.25 mg/m^3
Formaldehyde	50 parts per billion	25 parts per billion
Total Aldehydes	100 parts per billion	50 parts per billion
4 – Phenylcyclohexene (4-PCH)	0.0065 mg/m^3	0.00325 mg/m^3

Potential Technologies & Strategies

Specify low-VOC materials in construction documents. Ensure that VOC limits are clearly stated in each section where furniture assemblies are addressed.

1 Systems furniture is defined as either a panel-based workstation comprised of modular interconnecting panels, hang-on components and drawer/filing components, or a freestanding grouping of furniture items and their components that have been designed to work in concert. Furniture other than systems furniture and task and guest chairs used with systems furniture is defined as occasional furniture and is excluded from the credit requirements.

2 Seating is defined as task and guest chairs used with systems furniture

3 Salvaged and used furniture that is more than 1-year-old at time of occupancy is excluded from the credit requirements.

IEQ Credit 5: Indoor Chemical and Pollutant Source Control

1 point

Intent

To minimize building occupant exposure to potentially hazardous particulates, biological contaminants and chemical pollutants that degrade air and water quality.

Requirements

Design to minimize and control the entry of pollutants into the tenant space and later cross-contamination of regularly occupied areas through the following strategies:

- Employ permanent entryway systems at least 10 feet long in the primary direction of travel to capture dirt and particulates entering the building at regularly used exterior entryways. Acceptable entryway systems include permanently installed grates, grills and slotted systems that allow for cleaning underneath. Roll-out mats are acceptable only when maintained on a weekly basis by a contracted service organization.
- Sufficiently exhaust each space where hazardous gases or chemicals may be present or used (e.g. garages, housekeeping and laundry areas copying and printing rooms) to create negative pressure with respect to adjacent spaces when the doors to the room are closed. For each of these spaces, provide self-closing doors and deck-to-deck partitions or a hard-lid ceiling. The exhaust rate must be at least 0.50 cubic feet per minute (cfm) per square foot, with no air recirculation. The pressure differential with the surrounding spaces must be at least 5 Pascals (Pa) (0.02 inches of water gauge) on average and 1 Pa (0.004 inches of water) at a minimum when the doors to the rooms are closed.
- In mechanically ventilated buildings, each ventilations system that supplies outdoor air shall comply with the following:
  - Particle filters or air cleaning devices shall be provided to clean the outdoor air at any location prior to its introduction to occupied spaces.
  - These filters or devices shall be rated a minimum efficiency reporting value (MERV) of 13 or better in accordance with ASHRAE Standard 52.2.
  - Clean air filtration media shall be installed in all air systems after completion of construction and prior to occupancy.

Potential Technologies & Strategies

Design separate exhaust and plumbing systems for rooms with contaminants to achieve physical isolation from the rest of the building. Where appropriate, install permanent architectural entryway systems such as grills or grates to prevent occupant-borne contaminants from entering the space.

IEQ Credit 6.1: Controllability of Systems—Lighting

1 point

Intent

To provide a high level of lighting system control for individual occupants or groups in multi-occupant spaces (e.g., classrooms and conference areas) and promote their productivity, comfort and well-being.

Requirements

Provide individual lighting controls for: 90% (minimum) of the tenant space occupants to enable adjustments to suit individual task needs and preferences.

Provide lighting system controls for all shared multi-occupant spaces to enable adjustments that meet group needs and preferences.

Potential Technologies & Strategies

Design the tenant space with occupant controls for lighting. Strategies to consider include lighting controls and task lighting. Integrate lighting systems controllability into the overall lighting design, providing ambient and task lighting while managing the overall energy use of the building.

IEQ Credit 6.2: Controllability of Systems—Thermal Comfort

1 point

Intent

To provide a high level of thermal comfort system control[1] for individual occupants or groups in multi-occupant spaces (e.g., classrooms and conference areas) and promote their productivity, comfort and well-being.

Requirements

Provide individual controls for 50% (minimum) of the tenant occupants to enable adjustment to suit individual needs and preferences, Operable windows may be used in lieu of individual controls for occupants located 20 feet inside and 10 feet to either side of the operable part of the window. The areas of operable window must meet the requirements of ASHRAE Standard 62.1-2007 paragraph 5.1 Natural Ventilation (with errata but without addenda[2]).

Provide comfort system controls for all shared multi-occupant spaces to enable adjustments that meet group needs and preferences.

Conditions for thermal comfort are described in ASHRAE Standard 55-2004 (with errata but without addenda) and include air temperature, radiant temperature, air speed and humidity.

Potential Technologies & Strategies

Design the building and systems with comfort controls to allow adjustments to suit individual needs or those of groups in shared spaces. ASHRAE Standard 55-2004 (with errata but without addenda identifies the factors of thermal comfort and a process for developing comfort criteria for building spaces that suit the needs of the occupants involved in their daily activities. Control strategies can be developed to expand on the comfort criteria and enable individuals to make adjustments to suit individual needs and preferences. These strategies may involve system designs incorporating operable windows, hybrid systems integrating operable windows and mechanical systems, or mechanical systems alone. Individual adjustments may involve individual thermostat controls, local diffusers at floor, desk or overhead levels, control of individual radiant panels, or other means integrated into the overall building, thermal comfort systems, and energy systems design. Designers should evaluate the closely tied interactions between thermal comfort as required by ASHRAE Standard 55-2004 (with errata but without addenda) and acceptable indoor air quality (as required by ASHRAE Standard 62.1-2007 (with errata but without addenda) whether natural or mechanical ventilation.

1 For the purposes of this credit comfort system control is defined as control over at least 1 of these primary factors in the occupant's local environment: air temperature, radiant temperature, air speed and humidity.

2 Project teams wishing to use ASHRAE approved addenda for the purposes of this credit may do so at their discretion. Addenda must be applied consistently across all LEED credits.

IEQ Credit 7.1: Thermal Comfort—Design

1 point

Intent

To provide a comfortable thermal environment that promotes occupant productivity and well-being.

Requirements

Design heating, ventilating and air-conditioning (HVAC) systems to meet the requirements of ASHRAE Standard 55-2004, Thermal Comfort Conditions for Human Occupancy (with errata but without addenda[1]). Demonstrate design compliance in accordance with the Section 6.1.1 documentation.

Potential Technologies & Strategies

Establish comfort criteria according to ASHRAE Standard 55-2004 (with errata but without addenda) that support the desired quality and occupant satisfaction with building performance. Design building envelope (if in project scope) and systems with the capability to meet the comfort criteria under expected environmental and use conditions. Evaluate air temperature, radiant temperature, air speed, and relative humidity in an integrated fashion and coordinate these criteria with IEQ Prerequisite 1: Minimum IAQ Performance, IEQ Credit 1: Outdoor Air Delivery Monitoring, and IEQ Credit 2: Increased Ventilation.

1 Project teams wishing to use ASHRAE approved addenda for the purposes of this credit may do so at their discretion. Addenda must be applied consistently across all LEED credits.

IEQ Credit 7.2: Thermal Comfort—Verification

1 point in addition to IEQ credit 7.1

Intent

To provide for the assessment of occupant thermal comfort over time.

Requirements

Achieve IEQ Credit 7.1: Thermal Comfort – Design

Provide a permanent monitoring system and process for corrective action to ensure that building performance meets the desired comfort criteria as determined by IEQ Credit 7.1: Thermal Comfort—Design.

Agree to conduct a thermal comfort survey of tenant space occupants within 6 to 18 months after occupancy. This survey should collect anonymous responses about thermal comfort in the tenant space including an assessment of overall satisfaction with thermal performance and identification of thermal comfort problems. Agree to develop a plan for corrective action if the survey results indicate that more than 20% of occupants are dissatisfied with thermal comfort in the tenant space This plan should include measurement of relevant environmental variables in problem areas in accordance with ASHRAE Standard 55-2004 (with errata but without addenda[1]).

Potential Technologies & Strategies

ASHRAE Standard 55-2004 provides guidance for establishing thermal comfort criteria and documenting and validating building performance to the criteria. While the standard is not intended for purposes of continuous monitoring and maintenance of the thermal environment, the principles expressed in the standard provide a basis for the design of monitoring and corrective action systems.

1 Project teams wishing to use ASHRAE approved addenda for the purposes of this credit may to do so at their discretion. Addenda must be applied consistently across all LEED credits.

IEQ Credit 8.1: Daylight and Views—Daylight

1–2 points

Intent

To provide occupants with a connection between indoor spaces and the outdoors through the introduction of daylight and views into the regularly occupied areas of the tenant space.

Requirements

Through 1 of the 4 options, achieve daylighting in at least the following spaces[1]:

Regularly Occupied Spaces	Points
75%	1
90%	2

OPTION 1. Simulation

Demonstrate through computer simulations that the applicable spaces achieve daylight illuminance levels of a minimum of 10 footcandles (fc) and a maximum of 500 fc in a clear sky condition on September 21 at 9 a.m. and 3 p.m.

Provide glare control devices to avoid high-contrast situations that could impede visual tasks. However, designs that incorporate view-preserving automated shades for glare control may demonstrate compliance for only the minimum 10 fc illuminance level.

OR

OPTION 2. Prescriptive

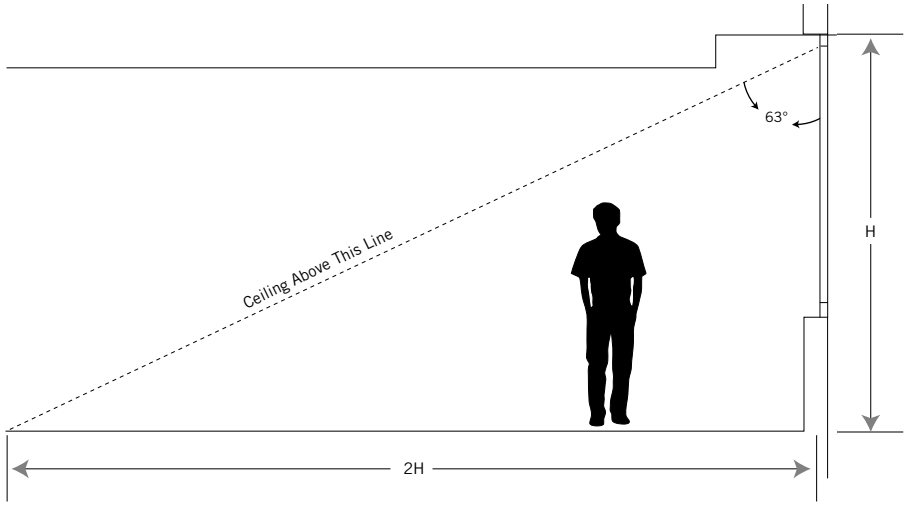
For side-lighting zones:

- Achieve a value, calculated as the product of the visible light transmittance (VLT) and window-to-floor area ratio (WFR) between 0.150 and 0.180.

$$0.150 < VLT \times WFR < 0.180$$

- The window area included in the calculation must be at least 30 inches above the floor.
- In section, the ceiling must not obstruct a line that extends from the window-head to a point on the floor that is located twice the height of the window-head from the exterior wall as measured perpendicular to the glass (see diagram on next page).

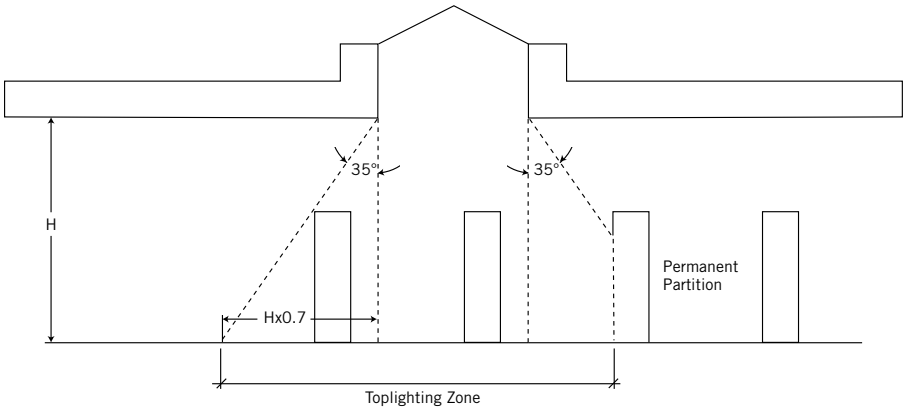
1 Exceptions for areas where tasks would be hindered by the use of daylight will be considered on their merits.



- Provide glare control devices to avoid high-contrast situations that could impede visual tasks. However, designs that incorporate view-preserving automated shades for glare control may demonstrate compliance for only the minimum 0.150 value.

For top-lighting zones:

- The top-lighting zone under a skylight is the outline of the opening beneath the skylight, plus in each direction the lesser of (see diagram below):
  - 70% of the ceiling height
  - 1/2 the distance to the edge of the nearest skylight
  - The distance to any permanent partition that is closer than 70% of the distance between the top of the partition and the ceiling.



- Achieve a skylight coverage for the applicable space (containing the top-lighting zone) between 3% and 6% of the total floor area.
- The skylights must have a with a minimum 0.5 VLT.
- A skylight diffuser, if used, must have a measured haze value of greater than 90% when tested according to ASTM D1003.

OR

OPTION 3. Measurement

Demonstrate, through records of indoor light measurements that a minimum daylight illumination level of 10 fc and a maximum of 500 fc has been achieved in the applicable spaces. Measurements must be taken on a 10-foot grid for all occupied spaces and recorded on building floor plans.

Provide glare control devices to avoid high contrast situations that could impede visual tasks. However, designs that incorporate view-preserving automated shades for glare control may demonstrate compliance for only the minimum 10 fc illuminance level.

OR

OPTION 4. Combination

Any of the above calculation methods may be combined to document the minimum daylight illumination in the applicable spaces.

Potential Technologies & Strategies

Design the tenant space to maximize interior daylighting. Strategies to consider include lower partition heights, interior shading devices, interior glazing and high ceiling reflectance values; additionally, automatic photocell-based controls can help reduce energy use. Predict daylight factors via manual calculations or model daylighting strategies with a physical or computer model to assess foot-candle levels and daylight factors achieved.

IEQ Credit 8.2: Daylight and Views—Views for Seated Spaces

1 point

Intent

To provide the building occupants a connection to the outdoors through the introduction of daylight and views into the regularly occupied areas of the tenant space.

Requirements

Achieve a direct line of sight to the outdoor environment via vision glazing between 30 inches and 90 inches above the finish floor for building occupants in 90% of all regularly occupied areas. Determine the area with a direct line of sight by totaling the regularly occupied square footage that meets the following criteria:

- In plan view, the area is within sight lines drawn from perimeter vision glazing.
- In section view, a direct sight line can be drawn from a point 42 inches above the floor (typical seated eye height) to perimeter vision glazing.

The line of sight may be drawn through interior glazing. For private offices, the entire square footage of the office may be counted if 75% or more of the area has a direct line of sight to perimeter vision glazing. If less than 75% of the area has a direct line of sight, only the area with the direct line of sight count toward meeting the credit requirement. For multi-occupant spaces, the actual square footage with a direct line of sight to perimeter vision glazing is counted.

Potential Technologies & Strategies

Design the tenant space to maximize daylighting and view opportunities. Strategies to consider include lower partitions, interior shading devices, interior glazing and automatic photocell-based controls.

INNOVATION IN DESIGN

ID Credit 1: Innovation in Design

1–5 points

Intent

To provide design teams and projects the opportunity to achieve exceptional performance above the requirements set by the LEED Green Building Rating System and/or innovative performance in Green Building categories not specifically addressed by the LEED Green Building Rating System.

Requirements

Credit can be achieved through any combination of the Innovation in Design and Exemplary Performance paths as described below:

PATH 1. Innovation in Design (1-5 points)

Achieve significant, measurable environmental performance using a strategy not addressed in the LEED 2009 for Commercial Interiors Rating System.

One point is awarded for each innovation achieved. No more than 5 points under IDc1 may be earned through PATH 1—Innovation in Design.

Identify the following in writing:

- The intent of the proposed innovation credit
- The proposed requirements for compliance
- The proposed submittals to demonstrate compliance
- The design approach (strategies) used to meet the requirements.

PATH 2. Exemplary Performance (1-3 points)

Achieve exemplary performance in an existing LEED 2009 for Commercial Interiors prerequisite or credit that allows exemplary performance as specified in the LEED Reference Guide for Green Building Interior Design, 2009 Edition. An exemplary performance point may be earned for achieving double the credit requirements and/or achieving the next incremental percentage threshold of an existing credit in LEED.

One point is awarded for each exemplary performance achieved. No more than 3 points under IDc1 may be earned through PATH 2— Exemplary Performance.

PATH 3. Pilot Credit (1 -5 points)

Attempt a pilot credit available in the Pilot Credit Library at www.usgbc.org/pilotcreditlibrary. Register as a pilot credit participant and complete the required documentation. Projects may pursue up to 5 Pilot Credits total.

Potential Technologies & Strategies

Substantially exceed a LEED 2009 for Commercial Interiors performance credit such as energy performance or water efficiency. Apply strategies or measures that demonstrate a comprehensive approach and quantifiable environment and/or health benefits.

ID Credit 2: LEED Accredited Professional

1 Point

Intent

To support and encourage the design integration required by LEED to streamline the application and certification process.

Requirements

At least 1 principal participant of the project team shall be a LEED Accredited Professional (AP).

Potential Technologies & Strategies

Educate the project team members about green building design and construction, the LEED requirements and application process early in the life of the project. Consider assigning integrated design and construction process facilitation to the LEED AP.

REGIONAL PRIORITY

RP Credit 1: Regional Priority

1–4 Points

Intent
To provide an incentive for the achievement of credits that address geographically specific environmental priorities.

Requirements
Earn 1-4 of the 6 Regional Priority credits identified by the USGBC regional councils and chapters as having environmental importance for a project's region. A database of Regional Priority Credits and their geographic applicability is available on the USGBC website, http://www.usgbc.org/.

One point is awarded for each Regional Priority Credit achieved; no more than 4 credits identified as Regional Priority credits may be earned. The USGBC has prioritized credits for projects located in the U.S., Puerto Rico, the U.S. Virgin Islands, and Guam. All other international projects should check the database for eligible Regional Priority credits.

Potential Technologies & Strategies
Determine and pursue the prioritized credits for the project location.