LEED 2009 FOR RETAIL:

NEW CONSTRUCTION AND MAJOR RENOVATIONS

For Public Use and Display

LEED 2009 for Retail: New Construction and Major Renovations Rating System

USGBC Member Approved March 2010 (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.

Contact The U.S. Green Building Council
2101 L Street, NW
Suite 500
Washington, DC 20037
(800) 795-1747 Office
(202) 828-5110 Fax
www.usgbc.org

COPYRIGHT

Copyright © 2009 by the U.S. Green Building Council, Inc. All rights reserved.

The U.S. Green Building Council, Inc. (USGBC®) devoted significant time and resources to create this LEED® Rating System. USGBC authorizes individual use of the LEED Rating System. In exchange for this authorization, the user agrees:

(1) to retain all copyright and other proprietary notices contained in the LEED Rating System,

(2) not to sell or modify the LEED Rating System, and

(3) not to reproduce, display, or distribute the LEED Rating System in any way for any public or commercial purpose.

Unauthorized use of the LEED Rating System violates copyright, trademark, and other laws and is prohibited.

DISCLAIMER

None of the parties involved in the funding or creation of the LEED Rating System, including the USGBC, its members, its members, volunteers, or contractors, assume any liability or responsibility to the user or any third parties for the accuracy, completeness, or use of or reliance on any information contained in the LEED Rating System, or for any injuries, losses, or damages (including, without limitation, equitable relief) arising from such use or reliance. Although the information contained in the LEED Rating System is believed to be reliable and accurate, all materials set forth within are provided without warranties of any kind, either express or implied, including but not limited to warranties of the accuracy or completeness of information or the suitability of the information for any particular purpose.

As a condition of use, the user covenants not to sue and agrees to waive and release the U.S. Green Building Council, its members, volunteers, and contractors from any and all claims, demands, and causes of action for any injuries, losses, or damages (including, without limitation, equitable relief) that the user may now or hereafter have a right to assert against such parties as a result of the use of, or reliance on, the LEED Rating System.

U.S. Green Building Council
2101 L Street, NW
Suite 500
Washington, DC 20037

TRADEMARKS

USGBC®, U.S. Green Building Council®, GBCI, and LEED® are registered trademarks of the U.S. Green Building Council.

ISBN #978-1-932444-36-0

ACKNOWLEDGMENTS

The LEED for Retail Reference Guides have been made possible only through the efforts of many dedicated volunteers, staff members, and others in the USGBC community. The Reference Guide improvement work was managed and implemented by USGBC staff and included review and input by many Technical Advisory Group (TAG) members with oversight by the LEED Steering Committee. We espcially extend our deepest gratitude to all of our LEED committee members who participated in the development of this reference guide, for their tireless volunteer efforts and constant support of USGBC's mission:

LEED Steering Committee

Scot Horst, Chair, LSC	Horst, Inc
Joel Ann Todd, Vice-Chair, LSC	Joel Ann Todd
Neal Billetdeaux	JJR
John Boecker	7Group
Stuart Carron	JohnsonDiversey, Inc.
Bryna Dunn	Moseley Architects
Holley Henderson	H2 Ecodesign, LLC
Greg Kats	Managing Good Energies
Malcolm Lewis	Constructive Technologies Group, Inc.
Christine Magar	Greenform
Muscoe Martin	M2 Architecture
Jessica Millman	Agora DC
Sara O'Mara	Choate Construction Company
Kristin Shewfelt	Architectural Energy Corporation
Ian Theaker	Rep Canada Green Building Council
Bob Thompson	EPA Indoor Environment Management Branch
Mark Webster	Simpson Gumpertz & Heger
Alex Zimmerman	Rep Canada Green Building Council

Sustainable Sites TAG

Bryna Dunn, Chair	Moseley Architects
Stewart Comstock, Vice-Chair	Maryland Department of the Environment
Michele Adams	Cahill Associates
Gina Baker	Burt Hill
Ted Bardacke	Global Green USA
Stephen Benz	Sasaki
Mark Brumbaugh	Brumbaugh & Associates
Laura Case	Emory University Campus Services
Zach Christeson	the HOK Planning Group
Jay Enck	Commissioning & Green Building Services
Ron Hand	E/FECT. Sustainable Design Solutions
Richard Heinisch	Acuity Lighting Group
Michael Lane	Lighting Design Lab
Marita Roos	HNTB
Zolna Russell	Hord Coplan Macht, Inc.
Alfred Vick	Ecos Environmental Design, Inc.

Water Efficiency TAG

Neal Billetdeaux, Chair	JJR
John Koeller, Vice-Chair	Alliance for Water Efficiency
Gunnar Baldwin	TOTO USA, INC
Robert Benazzi	Jaros Baum & Bolles
David Bracciano	Tampa Bay Water
David Carlson	Columbia University
Bill Hoffman	H.W. Hoffman and Associates, LLC
Winston Huff	SSR Engineers
Heather Kinkade	Forgotten Rain, LLC
Geoff Nara	Civil & Environmental Consultants
Shabbir Rawalpindiwala	Kohler Company
Robert Rubin	NCSU-BAE and McKim & Creed
Stephanie Tanner	U.S. Environmental Protection Agency
Bill Wall	Clivus New England, Inc.
Daniel Yeh	University of South Florida

Energy & Atmosphere TAG

Greg Kats, Chair	GoodEnergies
Marcus Sheffer, Vice-Chair	7group
Drury Crawley	US Department of Energy
Jay Enck	Commissioning & Green Building Solutions, Inc.
Ellen Franconi	IPMVP and AEC
Mark Frankel	New Buildings Institute
Nathan Gauthier	Harvard Green Campus Initiative
Rusty Hodapp	Dallas/Fort Worth, Energy & Transportation Management
John Hogan	City of Seattle Department of Planning & Development
Bion Howard	Building Environmental Science and Technology
Dan Katzenberger	Engineering, Energy, and the Environment
Bob Maddox	Sterling Planet
Brenda Morawa	BVM Engineering, Inc.
Erik Ring	LPA, Inc.
Michael Rosenberg	Oregon Department of Energy
Mick Schwedler	Trane
Gord Shymko	IPMVP and G.F. Shymko & Associates
Gail Stranske	CTG Energetics
Michael Zimmer	Thompson Hine LLP

Materials & Resources TAG

Mark Webster, Chair	Simpson Gumpertz & Heger
Steven Baer, Vice Chair	Five Winds International
Paul Bertram	NAIMA
Chris Dixon	NBBJ
Ann Edminster	Design AVEnues
Lee Gros	Lee Gros Architect and Artisan, Inc
Theresa Hogerheide-Reusch	Reusch Design Services
Nadav Malin	BuildingGreen, LLC.

Nancy Malone	Siegel & Strain Architects
Kirsten Ritchie	Gensler
Wayne Trusty	Athena Sustainable Materials Institute
Denise Van Valkenburg	MASCO Retail Cabinet Group
Gabe Wing	Herman Miller, Inc.

Indoor Environmental Quality TAG

Bob Thompson, Chair	EPA Indoor Environment Management Branch
Steve Taylor, Vice-Chair	Taylor Engineering
Jude Anders	Shoreline Concepts, LLC
Daniel Bruck	BRC Acoustics & Tech.
Nancy Clanton	Clanton and Associates
Brian Cloward	Mithun Architects+Designers+Planners
Larry Dykhuis	Herman Miller, Inc
Alexis Kurtz	Ove Arup &Partners
David Lubman	David Lubman & Associates
Francis (Bud) Offerman	Indoor Environmental Engineering
Charles Salter	Salter Associates
Christopher Schaffner	The Green Engineer
Dennis Stanke	Trane Company
Prasad Vaidya	The Weidt Group

LEED for Retail Core Committee

Ben Packard, Chair	Starbucks
David Luick, Vice Chair	Target Corporation
Ralph DiNola	Green Building Services, Inc
Theresa Hogerheide-Reusch	Reusch Design Services
Liana Kallivoka	Austin Energy Green Building Program
Mark Peternell	Regency Centers
Leo Roy	Vanasse Hangen Brustlin, Inc.
Lisa Russell	Interior Systems, Inc.
Alec Strongin	Horizon Engineering Associates
Jorge Torres Coto	McParlene & Associates

A special thanks to the following people without whom this rating system and reference guide would not be possible: our consultants at Green Building Services Inc., especially Nina Tallering, Glen Phillips, and Caitlin Francis, and the following past and present USGBC staff, Brendan Owens, Maury Zimring, Justin Doak, Miranda Gardiner, and Nick Shaffer.

INTRODUCTION

I. WHY MAKE YOUR BUILDING GREEN?

The environmental impact of the building design, construction, and operations industry is enormous. Buildings annually consume more than 30% of the total energy and more than 60% of the electricity used in the United States. In 2006, the commercial building sector produced more than 1 billion metric tons of carbon dioxide, an increase of more than 30% over 1990 levels. Each day 5 billion gallons of potable water are used solely to flush toilets. A typical North American commercial building generates about 1.6 pounds of solid waste per employee per day; in a building with 1,500 employees, that can amount to 300 tons of waste per year. Development alters land from natural, biologically diverse habitats to hardscape that is impervious and devoid of biodiversity. The far-reaching influence of the built environment necessitates action to reduce its impact.

Of the commercial buildings in the United States, retail buildings account for the largest energy costs, totaling nearly $20 billion each year. More than 21,000 new retail facilities are built in the United States every year, including malls, supermarkets, home-supply centers, department stores, big-box stores, apparel boutiques, banks, and beauty salons. Together, they constitute 23% of all new commercial building projects, making retail the single biggest sector of the construction economy in terms of numbers of units.[1] The retail sector also generates airborne pollutants from shoppers' vehicular trips, stormwater runoff from parking facilities, and noise and light pollution.

Green building practices can substantially reduce or eliminate negative environmental impacts through high-performance, market-leading design, construction, and operations practices. As an added benefit, green operations and management reduce operating costs, enhance building marketability, increase workers' productivity, and reduce potential liability resulting from indoor air quality problems.

Examples of the benefits abound. Energy efficiency measures have reduced operating expenses of the Denver Dry Goods building by approximately $75,000 per year. Studies of workers in green buildings reported productivity gains of up to 16%, including less absenteeism and higher work quality, attributable to "people-friendly" green design. Karges Faulconbridge, Inc., renovated a former grocery store for its new headquarters and diverted 88% of the construction waste from landfills through reuse and recycling. In short, green design, construction, and operations have environmental, economic, and social elements that benefit all building stakeholders, including owners, occupants, and the general public.

II. 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.

1 http://www.capitalmarketspartnership.com/UserFiles/Admin%20Building%20Design%20Construction%202006%20White%20Paper.pdf

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 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 of the U.S. building design and construction market through rating systems for specific building types, 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.

In 2008, USGBC set up the Green Building Certification Institute (GBCI) as a separately incorporated entity to administer 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. Project teams interact with GBCI for project registration and certification.

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 are evolving as well, and USGBC will highlight new developments on its website, www.usgbc.org. Project teams must comply with the version of the rating system that is current at the time of their registration.

LEED® for Retail

LEED for Retail recognizes the unique nature of the retail environment and addresses the different types of spaces retailers need for their product lines. Compared with other commercial building types, retail has different occupancy characteristics and hours of operation, different parking and transportation considerations, different process water and energy consumption, and in some cases, prototype designs. Retail projects also may be part of a larger multitenant retail complex, in which certain issues are addressed at the site level rather than by the project itself.

In 2001, at the USGBC conference in Tucson, Arizona, a committee was formed to address the unique aspects of retail buildings. The initial group comprised national retailers who were interested in using LEED in as a platform for new construction projects. The committee soon grew to include engineers, consultants, developers, and architects, all working on retail projects. The LEED for Retail Committee and USGBC collaborated to create two application guides to work with the LEED for New Construction (NC) and LEED for Commercial Interiors (CI) rating systems.

In July 2005, the LEED-NC Application Guide for Retail Pilot opened. In February 2007, the scope of this work changed from application guides to the creation of two new rating systems, LEED for Retail: New Construction and LEED for Retail: Commercial Interiors. In April 2007, the LEED for Retail: CI pilot opened. More than 80 pilot project teams provided feedback on applying LEED for New Construction v2.2 and LEED for Commercial Interiors v2.0 to retail spaces to help the development of the retail rating systems. An Energy and Atmosphere Credit 1 working group was formed to develop baselines and a modeling protocol for commercial kitchen equipment, for which there was no established methodology. The Food Service Technology Center in San Ramon, California, and many grocery and restaurant pilot teams were active participants in this group, providing feedback and real project equipment considerations. Pilot teams contributed to discussions about how to apply green building principles in shopping centers and how developers and retailers can work together toward LEED certification.

LEED for Retail: NC went through three rounds of public comment and LEED for Retail: CI went through two rounds of public comment, before going out for member ballot. The current versions of LEED for Retail have been aligned with LEED 2009, where applicable, to maintain consistency across rating systems.

Features of LEED®

The LEED Green Building Rating Systems are voluntary, consensus-based, and market-driven. Based on existing, 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, as well as entire neighborhood developments. 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 among 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, and 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 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 7 categories associated with a typical building pursuing LEED certification.
2. The relative importance of building impacts in each category is set to reflect values based on the NIST weightings.
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 reducing 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: Operations & Maintenance 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 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. The weightings process for each rating system is fully documented in a weightings workbook, and a complete explanation of the LEED credit weightings system is available on the USGBC website, at www.usgbc.org.

III. OVERVIEW AND PROCESS

The LEED Green Building Rating System for Retail is a set of performance standards for certifying the design and construction of retail buildings all sizes. The intent is to promote healthful, durable, affordable, and environmentally sound practices in building (Retail for New Construction) and tenant space (Retail for Commercial Interiors) design and construction.

Prerequisites and credits in the LEED Green Building Rating Systems address 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 prerequisites and credits have identical structures; see Section XI of this Introduction.

When to Use LEED for Retail: New Construction

LEED for Retail: New Construction is designed for new retail buildings. All retail buildings, as defined by standard building codes, are eligible for certification as LEED for Retail: New Construction buildings. Examples of retail occupancies include grocery, restaurant, apparel, specialty, and banks, whether national or local chains or independent enterprises.

This rating system addresses design and construction activities for both new buildings and major renovations of existing buildings. If the project scope does not involve significant design and construction activities and focuses more on operations and maintenance activities, LEED for Existing Buildings: Operations & Maintenance is more appropriate because it addresses operational and maintenance issues of working buildings. Please see the Rating System Selection Policy, located in the LEED resources section of www.usgbc.org, for more information about choosing a rating system.

If a project is designed and constructed to be partially occupied by the owner or developer, then the owner or developer has direct influence over that portion of the interior build-out work. For these projects, LEED for New Construction may be more appropriate. Please see the Rating System Selection Policy, located in the LEED resources section of usgbc.org, for more information about choosing a rating system.

When to Use LEED for Retail: Commercial Interiors

LEED for Retail: Commercial Interiors addresses tenant spaces in retail buildings. Tenants who lease their space or do not occupy the entire building are eligible.

This rating system is 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 one LEED rating system; others may be eligible for two 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.

Minimum Program Requirements

A project must adhere to LEED's minimum program requirements (MPRs), or have certain minimum characteristics 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: (1) give clear guidance to customers, (2) protect the integrity of the LEED program, and (3) reduce challenges that occur during the LEED certification process. The MPRs will evolve over time in tandem with the LEED rating systems. To be eligible for certification under any LEED 2009 rating system, projects must comply with each associated MPR. The MPRs can be found in the LEED 2009 rating systems. In addition, definitions and more extensive guidance on certain issues are provided in a separate document, titled Supplemental Guidance, available on the USGBC website.

The Green Building Certification Institute (GBCI) reserves the right to revoke LEED certification from any LEED 2009 project upon gaining knowledge of noncompliance with any applicable MPRs. In such a circumstance, no registration or certification fees paid to GBCI will be refunded.

Exceptions to all the MPRs will be considered on a case-by-case basis. Direction on the nature of allowable exceptions is given in the Supplemental Guidance Document.

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 establishes contact with GBCI and provides access to software tools, errata, critical communications, and other essential information.

LEED Online

LEED Online is the primary resource for managing the LEED documentation process. From LEED Online, project teams can manage project details, complete documentation requirements for LEED credits and prerequisites, upload supporting files, submit applications for review, receive reviewer feedback, and ultimately earn LEED certification. LEED Online provides a common space where members of a project team can work together to document compliance with the LEED rating system.

All project teams pursuing LEED certification are required to use LEED Online and its submittal documentation paths. LEED submittals are instrumental in demonstrating credit compliance because they contain all the documentation requirements for each LEED credit. Additionally, LEED Online contains embedded calculators and tables to ensure that the submittal package delivered to GBCI is complete and accurate.

LEED Online also features several support capabilities. It enables team members to view and submit credit interpretation requests, contact customer service, generate project-specific reports, and consult supplementary LEED resources, such as FAQs, tutorials, offline calculators, and sample documentation. Applicants with multiple projects have access to reporting tools that use data from projects across their entire LEED portfolio. LEED certificates for successful projects are also issued through LEED Online.

Credit Interpretation Requests and Rulings

In some cases, a LEED project team may encounter challenges when interpreting the requirements of a prerequisite or credit for their project, perhaps because the reference guide does not sufficiently address a specific issue or a conflict requires resolution. To address such issues, a credit interpretation ruling process has been established for each LEED rating system. See the GBCI website for more information, at www.gbci.org.

Credit interpretation requests must be submitted online. Provide a brief but clear description of the challenge encountered, referring to the prerequisite or credit information found in the rating system and reference guide. If possible, the project team should offer potential solutions to the problem or a proposed interpretation, with emphasis on the intent of the requirement. Follow the detailed instructions in LEED Online.

Communications related to credit interpretation requests are in electronic format.

Review and Certification

To earn LEED certification, the applicant project must satisfy all the prerequisites and credits worth the minimum number of points to warrant the desired project rating under LEED for Retail. Projects must comply with the version of the rating system that is current in LEED Online at the time of project registration.

Appeals

Appeals may be filed after the design phase review, the construction phase review, or the full application review. Please see Section V, below, on design phase applications, and see the GBCI website for more information on appeals.

Fees

Information on certification fees can be found on the GBCI website. GBCI will acknowledge receipt of the application and proceed with application review when all project documentation and payments have been received and processed. Registration fees, appeal review fees, and any additional fees required to expedite LEED certification are not refundable.

Updates and Addenda

This is the first edition of the LEED Retail Reference Guide Supplement, 2009. As building science and technology continue to improve and evolve, updates and addenda will be made available. USGBC cannot be held liable for any criteria set forth herein that may not be applicable to later versions of LEED rating systems, and GBCI reserves the right to modify its policies from time to time.

Project teams are subject to Rating System addenda requirements based on registration date. It is strongly recommended that project teams adhere to the Reference Guide and Reference Guide addenda based on registration date. Rating System and Reference Guide addenda can be found on the USGBC's LEED Resources & Tools website, www.usgbc.org/projecttools.

Information Privacy and Policy Guidelines

For more information on the privacy policy of the U.S. Green Building Council, Inc., refer to the Policies and Guidelines section of the USGBC website, at www.usgbc.org. With the support of its members, volunteers, and other stakeholders, USGBC is the developer of the LEED rating systems.

The Green Building Certification Institute, Inc., implements the LEED rating systems and carries out credentialing programs relating to LEED. For more information on the privacy policy of GBCI, including the privacy policy on documentation submitted through LEED Online, refer to the Policies and Guidelines section of the GBCI website, at www.gbci.org. Projects whose information should be treated as confidential may select this option during registration; project confidentiality status may be changed at any time through LEED Online. Please review the GBCI privacy policy for further details.

IV. LEED ONLINE DOCUMENTATION REQUIREMENTS

All LEED for Retail, New Construction, Core & Shell, and Schools certification applications must include the required LEED Online documentation: general documentation requirements, documentation requirements for all prerequisites, and documentation requirements for all pursued credits.

General Requirements

LEED certification application requires the submission of an overall project narrative with the completed LEED Online documentation requirements. The project narrative describes the applicant's organization, building, site, and team. This narrative helps the LEED review team understand the major elements of the project and building performance, and it also aids in highlighting projects in future communications efforts. General documentation also requires the basic details pertaining to project site conditions, construction scope and timeline, occupant and usage data, and project team identification. Project teams must address all the elements in the general documentation requirements, providing details and clarifications where appropriate, and they may include any optional elements that are helpful in describing the project.

Credit Substitution

The LEED 2009 rating systems do not allow credit substitution using another version. Currently registered LEED projects that want to use LEED 2009 credits need to switch to the new version in its entirety. USGBC expects that most projects will find this switch feasible and advantageous.

V. CERTIFICATION APPLICATION

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.

After registration, the project design team should begin to collect information and perform calculations to satisfy the prerequisite and credit documentation requirements. Because documentation should be gathered throughout design and construction, it is helpful to designate a LEED team leader who will be responsible for managing its compilation.

LEED for Retail provides the option of splitting a certification application into two phases: design and construction. 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 New Construction SS Credit 3, Brownfield Redevelopment, the likelihood of credit achievement can be assessed before construction is complete. The LEED credit itself, however, is not awarded at the design review stage.

Design Phase Review

Each project is allotted a design phase review that consists of a preliminary design phase review and a final design phase review. GBCI formally rules on the design phase application by designating each attempted credit as either anticipated or denied. Participating in a design phase review does not guarantee award of any credit and will not result in LEED certification. This process enables project teams to assess the likelihood of credit achievement and requires follow-through to ensure the design is executed in the construction phase according to design specifications.

Construction Phase Review

At the completion of construction, the project team submits all attempted credits for review, including any newly attempted design credits. If the project team has had a design phase review and any of the design phase anticipated credits have since changed, additional documentation must be submitted to substantiate continued compliance with credit requirements. Upon receipt of the full certification application and fee, a final review will be conducted. All applicant-verified design phase credits that were designated as anticipated and have not changed since the design phase review will be declared as awarded. All other credits will be designated as either awarded or denied.

Project teams should refer to LEED Online and the rating system scorecards to get information on credits that can be submitted for design phase review and credits that must be submitted for construction phase review.

LEED for Retail 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 recognizes a building that achieves certification at any rating level with a formal letter of certification.

VI. CERTIFICATION STRATEGY

Timeline and Project Design Phases

Project teams should study the principles and objectives of LEED as early in the site selection and design process as possible. The project design phases mentioned throughout this reference guide correspond to the architectural design and planning steps commonly used in the construction industry:

1. **Predesign** entails gathering information, recognizing stakeholder needs, and establishing project goals.
2. **Schematic design** explores several design options and alternatives, with the intent to establish an agreed-upon project layout and scope of work.
3. **Design development** begins the process of spatial refinement and usually involves the first design of a project's energy systems.
4. **Construction documents** carry the design into the level of details for all spaces and systems and materials so that construction can take place.
5. **Construction**.
6. **Substantial completion** is a contractual benchmark that usually corresponds to the point at which a client could occupy a nearly completed space.
7. **Final completion**.
8. **Certificate of occupancy** is the official recognition by a local building department that a building conforms to applicable building and safety codes.

Related Credits

When pursuing LEED certification, it is important to consider how credits are interconnected and how their synergies and trade-offs will ultimately affect both the project and the other credits the team may consider pursuing. Consult the Related Credits section of each prerequisite and credit to help inform design and construction decisions leading to certification.

Consistent Documentation across Credits

Several kinds of project information are required for consistent LEED documentation across various credits. Pay special attention to overlapping project data; doing so will help the application and review process go smoothly.

Operations and Maintenance in LEED for Retail, New Construction, Core & Shell, and Schools Certified Buildings

The LEED Reference Guide for Green Building Design and Construction contains information on operations and maintenance to help project teams streamline green O&M practices once the LEED design and construction project has been completed. Although not required as part of the LEED certification process, upfront planning for green operations and maintenance can help building owners, operators, and maintenance staff ensure that the building continues to operate in a sustainable manner.

VII. EXEMPLARY PERFORMANCE STRATEGIES

Exemplary performance strategies result in performance that greatly exceeds the performance level or expands the scope required by an existing LEED for New Construction, Core & Shell, or Schools 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. See the Innovation in Design credit section for further details.

The credits for which exemplary performance points are available through expanded performance are noted in LEED Online.

VIII. REGIONAL PRIORITY

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. Upon project registration, LEED Online automatically determines a project's Regional Priority credits based on its zip code. Each Regional Priority credit is worth an additional 1 point, and a total of 4 additional points may be earned by achieving Regional Priority credits. 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 contains a searchable database of Regional Priority credits.

IX. TOOLS FOR REGISTERED PROJECTS

LEED offers additional resources for LEED project teams on the USGBC website, at www.usgbc.org/projecttools. The Registered Project Tools website provides resources for starting the project, including rating system errata, documentation requirements, and referenced industry standards. Also consult the website for definitions of declarants—that is, the team members who are required to sign off on certain documentation requirements—and a list of the prerequisites and credits for which each team member is responsible. The required declarant is also noted in the corresponding credit documentation section of LEED Online. Definitions of other terms are also available on the Registered Project Tools website.

The Licensed professional exemption form, on the Registered Project Tools website, can be used by a project team's registered professional engineer, registered architect, or registered landscape architect as a streamlined path to certain credits, bypassing otherwise-required submittals. This form is used in conjunction with the declarations in LEED Online to document any exemptions. The form is required for any eligible submittal requirements the project team wishes to waive; the exemption is invalid without a properly executed licensed professional exemption form. Licensed professional exemptions are noted in the corresponding credit documentation section of LEED Online.

SUSTAINABLE SITES

SS Prerequisite 1: Construction Activity Pollution Prevention

Required

Intent

To reduce pollution from construction activities by controlling soil erosion, waterway sedimentation, and airborne dust generation.

Requirements

Create and implement an erosion and sedimentation control plan for all construction activities associated with the project. The plan must conform to the erosion and sedimentation requirements of the 2003 EPA Construction General Permit OR local standards and codes, whichever are more stringent. The plan must describe the measures implemented to accomplish the following objectives:

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

The EPA construction general permit outlines the provisions necessary to comply with Phase I and Phase II of the National Pollutant Discharge Elimination System (NPDES) program. Although the permit applies only to construction sites larger than 1 acre, the requirements are applied to all projects for the purposes of this prerequisite. Information on the EPA construction general permit is available at http://cfpub.epa.gov/npdes/stormwater/cgp.cfm.

SS Credit 1: Site Selection

1 point

Intent

To avoid the development of inappropriate sites and reduce the environmental impact from the location of a building on a site.

Requirements

Do not develop buildings, hardscape, roads, or parking areas on portions of sites that meet any of the following criteria:

- Prime farmland as defined by the U.S. Department of Agriculture in the United States Code of Federal Regulations, Title 7, Volume 6, Parts 400 to 699, Section 657.5 (citation 7CFR657.5).
- Previously undeveloped land whose elevation is lower than 5 feet above the elevation of the 100-year flood as defined by the Federal Emergency Management Agency (FEMA).
- Land specifically identified as habitat for any species on federal or state threatened or endangered lists.
- Land within 100 feet of any wetlands as defined by the U.S. Code of Federal Regulations 40 CFR, Parts 230–233 and Part 22, and isolated wetlands or areas of special concern identified by state or local rule, OR within setback distances from wetlands prescribed in state or local regulations, as defined by local or state rule or law, whichever are more stringent.
- Previously undeveloped land that is within 50 feet of a water body, defined as seas, lakes, rivers, streams, and tributaries that support or could support fish, recreation, or industrial use, consistent with the terminology of the Clean Water Act.
- Land that prior to acquisition for the project was public parkland, unless land of equal or greater value as parkland is accepted in trade by the public landowner (park authority projects are exempt).

SS Credit 2: Development Density and Community Connectivity

5 points

Intent

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

Requirements

OPTION 1. Development Density

Construct or renovate a building on a previously developed site AND in a 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

Construct or renovate a building on a previously developed site that meets the following criteria:

- Is located on a previously developed site.
- Is 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 demonstrate that they will be operational in the locations indicated within 1 year of occupation of the applicant's project.

Examples of basic services include the following:

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

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.

SS Credit 3: Brownfield Redevelopment

1 point

Intent

To rehabilitate damaged sites where development is complicated by environmental contamination, to reduce pressure on undeveloped land.

Requirements

OPTION 1

Develop on a site documented as contaminated (by means of an ASTM E1903–97 Phase II Environmental Site Assessment or a local voluntary cleanup program).

OR

OPTION 2

Develop on a site defined as a brownfield by a local, state, or federal government agency.

SS Credit 4: Alternative Transportation

1-10 points

Intent

To reduce pollution and land development impacts from automobile use.

Requirements

OPTION 1. Public Transportation Access (6 points)

PATH 1. Rail Station Proximity

Locate the project 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

PATH 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 space occupants.

OPTION 2. Bicycle Commuting (1 point)

Provide secure bicycle racks and/or storage within 200 yards of a building entrance according to the following guidelines based on project square footage:

- Up to 5,000 sf, 2 or more
- 5,001–20,000 sf, 3 or more
- 20,001–50,000 sf, 6 or more
- More than 50,000 sf, 10 or more

AND

Institute 1 of the following: lockable changing areas, showers, bicycle maintenance program, or bicycle route assistance.

FOR PROJECTS THAT ARE PART OF A MULTITENANT COMPLEX

A multitenant complex is a master-planned development of stores, restaurants, and other businesses; retailers may share one or more services and/or common areas.

If bicycle racks have been provided by the development in which the project is located, the number that may be attributed to the project is determined by taking the square footage of the retail project and dividing by the total square footage of the development (buildings only). Multiply the resulting percentage by the total number of bicycle racks. If this number does not meet the credit requirement, the project should add additional spaces.

OPTION 3. Low-Emitting and Fuel-Efficient Vehicles[1] (1 point)

PATH 1

Provide low-emitting and fuel-efficient vehicles[1] for 3% of the full-time equivalent (FTE) occupants.

Provide preferred parking[2] for these vehicles.

OR

PATH 2

Provide preferred parking[2] for low-emitting and fuel-efficient vehicles[1] for 5% of the total employee parking and 5% of customer parking provided for the project.

OR

PATH 3

Install alternative-fuel refueling stations for 3% of the total vehicle parking capacity of the site. Liquid or gaseous fueling facilities must be separately ventilated or located outdoors.

OR

PATH 4

Provide building occupants access to a low-emitting or fuel-efficient vehicle-sharing program. The following requirements must be met:

- One low-emitting or fuel-efficient vehicle must be provided for a minimum 3% of employee FTE occupants. Assuming that 1 shared vehicle can carry 8 persons, 1 vehicle per 267 employee FTE occupants is required. For buildings with fewer than 267 employee FTE occupants, at least 1 low-emitting or fuel-efficient vehicle must be provided.
- A vehicle-sharing contract must be provided that has an agreement of at least 2 years.
- The estimated number of riders served per vehicle must be supported by documentation.
- A narrative explaining the vehicle-sharing program and its administration must be submitted.
- Parking for low-emitting and fuel-efficient vehicles[1] must be located in the nearest available spaces in the nearest available parking area. Provide a site plan or area map clearly highlighting the walking path from the parking area to the project site and noting the distance.

1 For the purposes of this credit, low-emitting vehicles are defined as vehicles that are classified as Zero Emission Vehicles (ZEV) by the California Air Resources Board. Fuel-efficient vehicles are defined as vehicles that have achieved a minimum green score of 40 on the American Council for an Energy Efficient Economy (ACEEE) annual vehicle rating guide.

2 For customer parking, preferred parking refers to the parking spots that are closest to the main entrance of the project (exclusive of spaces designated for handicapped) or parking passes provided at a discounted price. For employee parking, preferred parking refers to the spots that are closest to the entrance used by employees 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.
For projects that are part of a development for which there is no "assigned" parking, the number of parking spaces to be used in calculations under SS Credit 4 is determined by dividing the square footage of the retail project by the total square footage of the development (buildings only, excluding common areas). This percentage is the percentage of total parking spaces to be used in calculations.

OPTION 4. Parking Capacity (3 points)

PATH 1

Size parking capacity must meet but not exceed minimum local zoning requirements.

Provide preferred parking[2] for carpools or vanpools for 5% of the total parking spaces.

OR

PATH 2

For projects that provide parking for less than 5% of full-time equivalent (FTE) building occupants:

Provide preferred parking[2] for carpools or vanpools, marked as such, equal to for 5% of the total employee parking and 5% of customer parking provided for the project.

OR

PATH 3

Provide no new parking.

OPTION 5. Delivery Service (1 point)

Provide a delivery service for purchases made from the retail project seeking LEED certification.

It is not required that the delivery service be free of charge, but the cost should not be prohibitive.

OPTION 6. Incentives (1 point)

Provide a comprehensive incentives program for employees who carpool or use alternative transportation to get to work. Three incentives must be provided for all staff upon hire. Potential incentives may include but are not limited to the following:

- Transit pass subsidies.
- Purchase of public transportation passes on a pretax basis.
- Preferred scheduling for carpoolers. While shifts cannot be guaranteed, a reasonable effort will be made to accommodate carpooling employees' schedules.
- An "emergency ride home" program for carpoolers and vanpoolers who must leave work unexpectedly.
- Preferred parking[2] for carpools or vanpools.
- Discounts on bicycle accessories and maintenance at local shops.

OPTION 7. Alternative Transportation Education (1 point)

Provide a board or computer display in the retail project, accessible to both employees and customers, that provides the following information:

- Information on carpooling programs.
- Transit trip planning assistance.
- Transit maps.

- Maps of bicycle routes and the locations of secure bicycle parking, lockers, and showers, if provided.
- Summary of the company transportation management plan.
- Contacts for more information.

SS Credit 5.1: Site Development—Protect or Restore Habitat

1 point

Intent

To conserve existing natural areas and restore damaged areas to provide habitat and promote biodiversity.

Requirements

CASE 1. Greenfield Sites[1]

Limit all site disturbance to the following parameters:

- 40 feet beyond the building perimeter and parking garages;
- 10 feet beyond surface walkways, patios, surface parking, and utilities less than 12 inches in diameter;
- 15 feet beyond primary roadway curbs and main utility branch trenches;
- 25 feet beyond constructed areas with permeable surfaces (such as pervious paving areas, stormwater detention facilities, and playing fields) that require additional staging areas in order to limit compaction in the constructed area.

CASE 2. Previously Developed[2] Areas or Graded Sites

OPTION 1

Restore or protect a minimum of 50% of the site area (excluding the building footprint) or 20% of the total site area (including building footprint), whichever is greater, with native or adapted vegetation.[3] Projects earning SS Credit 2, Development Density and Community Connectivity, and using vegetated roof surfaces may apply the vegetated roof surface to this calculation if the plants are native or adapted, provide habitat, and promote biodiversity.

OR

OPTION 2

Donate land equivalent to a minimum of 50% of the site area (excluding building footprint) or 20% of the total site area (including building footprint), whichever is greater, to a land trust with the following provisions:

The project team donates the land within its own watershed as determined by EPA at http://cfpub.epa.gov/surf/locate/index.cfm.

AND

The land trust must adhere to the Land Trust Standards and Practices guide, available at http://www.landtrustalliance.org/learning/sp/lt-standards-practices07.pdf or http://www.lta.org.

1 Greenfield sites are those that are not previously developed or graded and remain in a natural state.
2 Previously developed areas are those that had buildings, roadways, parking lots or were graded or altered by direct human activities.
3 Native or adapted plants are plants indigenous to a locality or cultivars of native plants that are adapted to the local climate and are not considered invasive species or noxious weeds.

SS Credit 5.2: Site Development—Maximize Open Space

1 point

Intent

To promote biodiversity, by providing a high ratio of open space to development footprint.

Requirements

CASE 1. Sites with Local Zoning Open Space Requirements

Reduce the development footprint[1] and/or provide vegetated open space within the project boundary such that the amount of open space exceeds local zoning requirements by 25%.

CASE 2. Sites with No Local Zoning Requirements (e.g., some university campuses, military bases)

Provide a vegetated open space area adjacent to the building that is equal to the building footprint.

CASE 3. Sites with Zoning Ordinances but No Open Space Requirements (e.g., zero lot line)

Provide vegetated open space equal to 20% of the project's site area.

ALL CASES

For projects in urban areas that earn SS Credit 2: Development Density and Community Connectivity, vegetated roof areas can contribute to credit compliance.

For projects in urban areas that earn SS Credit 2: Development Density and Community Connectivity, pedestrian-oriented hardscape areas can contribute to credit compliance. For such projects, a minimum of 25% of the open space counted must be vegetated.

Wetlands or naturally designed ponds may count as open space if the side slope gradients average 1:4 (vertical: horizontal) or less and are vegetated.

FOR PROJECTS THAT ARE PART OF A MULTITENANT RETAIL COMPLEX[2]

A multitenant complex is a master-planned development of stores, restaurants, and other businesses; retailers may share one or more services and/or common areas.

Open space can be either adjacent to the building or at another location in the complex. It must be aggregated and contiguous, not divided and dispersed. The open space may be at another site as long as it is placed in a permanent reserve status. If the open space is not adjacent to the project building, provide documentation showing that the requirements have been met and the land is in a natural state or has been returned to a natural state and conserved for the life of the building.

1 Development footprint is the total area of the building footprint, hardscape, access roads, and parking.
2 A multitenant complex is a site that was master-planned for the development of stores, restaurants, and other businesses. Retailers may share one or more services and/or common areas.

SS Credit 6.1: Stormwater Design—Quantity Control

1 point

Intent

To limit disruption of natural water hydrology by reducing impervious cover, increasing onsite infiltration, reducing or eliminating pollution from stormwater runoff, and eliminating contaminants.

Requirements

CASE 1. SITES WITH EXISTING IMPERVIOUSNESS 50% OR LESS

OPTION 1

Implement a stormwater management plan that prevents the postdevelopment peak discharge rate and quantity from exceeding the predevelopment peak discharge rate and quantity for the 1- and 2-year 24-hour design storms.

OR

OPTION 2

Implement a stormwater management plan that protects receiving stream channels from excessive erosion. The stormwater management plan must include stream channel protection and quantity control strategies.

CASE 2. SITES WITH EXISTING IMPERVIOUSNESS GREATER THAN 50%

Implement a stormwater management plan that results in a 25% decrease in the volume of stormwater runoff from the 2-year 24-hour design storm.

FOR PROJECTS THAT ARE PART OF A MULTITENANT COMPLEX[1]

A multitenant complex is a master-planned development of stores, restaurants, and other businesses; retailers may share one or more services and/or common areas.

Projects may earn the credit if the complex as a whole meets the requirements.

1 A multitenant complex is a site that was master-planned for the development of stores, restaurants, and other businesses. Retailers may share one or more services and/or common areas.

SS Credit 6.2: Stormwater Design—Quality Control

1 point

Intent
To limit disruption and pollution of natural water flows by managing stormwater runoff.

Requirements
Implement a stormwater management plan that reduces impervious cover, promotes infiltration, and captures and treats the stormwater runoff from 90% of the average annual rainfall using acceptable best management practices (BMPs).

BMPs used to treat runoff must be capable of removing 80% of the average annual postdevelopment total suspended solids (TSS) load based on existing monitoring reports. BMPs are considered to meet the criterion if

- They are designed in accordance with standards and specifications from a state or local program that has adopted these performance standards.

OR

- There exists infield performance monitoring data demonstrating compliance with the criterion. Data must conform to accepted protocols (e.g., Technology Acceptance Reciprocity Partnership [TARP], Washington State Department of Ecology) for BMP monitoring.

FOR PROJECTS THAT ARE PART OF A MULTITENANT COMPLEX[1]

A multitenant complex is a master-planned development of stores, restaurants, and other businesses; retailers may share one or more services and/or common areas.

The credit requirements may be met using a centralized approach affecting the defined project site and that is within the complex's boundary. Distributed techniques based on a watershed approach are then required.

1 A multitenant complex is a site that was master-planned for the development of stores, restaurants, and other businesses. Retailers may share one or more services and/or common areas.

SS Credit 7.1: Heat Island Effect—Nonroof

1-2 points

Intent

To reduce heat islands[1] to minimize impacts on microclimates and human and wildlife habitats.

Requirements

OPTION 1

Use any combination of the following strategies for 25% or 50% of the site hardscape (including roads, sidewalks, courtyards, and parking lots):

- Provide shade from the existing tree canopy or within 5 years of landscape installation. Landscaping (trees) must be in place at the time of occupancy.
- Provide shade from structures covered by solar panels that produce energy used to offset some nonrenewable resource use.
- Provide shade from architectural devices or structures that have a solar reflectance index (SRI)2 of at least 29.
- Use hardscape materials with an SRI of at least 29.
- Use an open-grid pavement system (at least 50% pervious).

OR

OPTION 2

Place a minimum of 25% or 50% of parking spaces under cover.[2] Any roof used to shade or cover parking must have an SRI of at least 29, be a vegetated green roof, or be covered by solar panels that produce energy used to offset some nonrenewable resource use.

Project teams earn points by achieving the following percentages of site hardscape or parking under cover:

Percentage	Points
25%	1
50%	2

1 Heat islands are thermal gradient differences between developed and undeveloped areas.
2 For the purpose of this credit, under-cover parking is parking underground, under deck, under roof, or under a building.

SS Credit 7.2: Heat Island Effect—Roof

1 points

Intent

To reduce heat islands[1] to minimize impacts on microclimates and human and wildlife habitats.

Requirements

OPTION 1

Use roofing materials with a solar reflectance index (SRI)[2] equal to or greater than the values in the table below for a minimum of 75% of the roof surface.

Roofing materials having a lower SRI value than those listed below may be used if the weighted rooftop SRI average meets the following criterion:

$$\frac{\text{Area Roof Meeting Minimum SRI}}{\text{Total Roof Area}} \times \frac{\text{SRI of Installed Roof}}{\text{Required SRI}} \geq 75\%$$

Alternatively, the following equation may be used to calculate compliance:

$$\frac{\left[\text{Area of Roof A} \times \frac{\text{SRI of Roof A}}{\text{Required SRI}}\right] + \left[\text{Area of Roof B} \times \frac{\text{SRI of Roof B}}{\text{Required SRI}}\right] + \ldots}{0.75} \geq \text{Total Roof Area}$$

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

OR

OPTION 2

Install a vegetated roof that covers at least 50% of the roof area.

1 Heat islands are thermal gradient differences between developed and undeveloped areas.
2 Under-cover parking is parking underground, under deck, under roof, or under a building.

OR

OPTION 3

Install high-albedo and vegetated roof surfaces that, in combination, meet the following criterion:

$$\frac{\text{Area Roof Meeting Minimum SRI}}{0.75} + \frac{\text{Area of Vegetated Roof}}{0.5} \geq \text{Total Roof Area}$$

Alternatively, a weighted average approach may be used to calculate compliance for multiple materials:

$$\frac{\left[\text{Area of Roof A} \times \frac{\text{SRI of Roof A}}{\text{Required SRI}}\right] + \left[\text{Area of Roof B} \times \frac{\text{SRI of Roof B}}{\text{Required SRI}}\right]}{0.75} + \frac{\text{Area of Vegetated Roof}}{0.5} \geqq \text{Total Roof Area}$$

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

SS Credit 8: Light Pollution Reduction

2 points

Intent

To minimize light trespass from the building and site, reduce sky glow to increase night sky access, improve nighttime visibility through glare reduction, and reduce development impact on nocturnal environments.

Requirements

Project teams must comply with 1 of the 2 options for interior lighting AND the requirement for exterior lighting.

For Interior Lighting

OPTION 1

Reduce the input power (by automatic device) of all nonemergency interior luminaires with a direct line of sight to any openings in the envelope (translucent or transparent) 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 60 minutes.

OR

OPTION 2

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

For Exterior Lighting

Light areas only as required for safety and comfort. Exterior lighting power densities shall not exceed those specified in ANSI/ASHRAE/IESNA Standard 90.1-2007 with Addenda 1 for the documented lighting zone. Justification shall be provided for the selected lighting zone. Lighting controls for all exterior lighting shall comply with section 9.4.1.3 of ANSI/ASHRAE/IESNA Standard 90.1- 2007, without amendments[1].

Internally illuminated exterior retail[2] signage may be excluded from consideration under this credit.

Classify the project under 1 of the following zones, as defined in IESNA RP-33, and follow all the requirements for that zone:

LZ1: Dark (**developed areas within national parks, state parks, forestland, and rural areas**)

Design exterior lighting so that all site and building-mounted luminaires produce a maximum initial illuminance value no greater than 0.01 horizontal and vertical footcandles at the LEED project boundary and beyond. Document that 0% of the total initial designed fixture lumens (sum total of all fixtures on site) are emitted at an angle of 90 degrees or higher from nadir (straight down).

1 The requirement to use ASHRAE Addenda I is unique to this credit and does not obligate Project teams to use ASHRAE approved addenda for other credits.

2 To be LZ4, the area must be so designated by an organization with local jurisdiction, such as the local zoning authority.

LZ2: Low (**primarily residential zones, neighborhood business districts, light industrial areas with limited nighttime use, and residential mixed-use areas**)

Design exterior lighting so that all site and building-mounted luminaires produce a maximum initial illuminance value no greater than 0.10 horizontal and vertical footcandles at the LEED project boundary and no greater than 0.01 horizontal footcandles 10 feet beyond the LEED project boundary. Document that no more than 2% of the total initial designed fixture lumens (sum total of all fixtures on site) are emitted at an angle of 90 degrees or higher from nadir (straight down).

LZ3: Medium (**all other areas not included in LZ1, LZ2, or LZ4, such as commercial/ industrial, and high-density residential**)

Design exterior lighting so that all site and building-mounted luminaires produce a maximum initial illuminance value no greater than 0.20 horizontal and vertical footcandles at the LEED project boundary and no greater than 0.01 horizontal footcandles 15 feet beyond the site. Document that no more than 5% of the total initial designed fixture lumens (sum total of all fixtures on site) are emitted at an angle of 90 degrees or higher from nadir (straight down).

LZ4: High (**high-activity commercial districts in major metropolitan areas**)

Design exterior lighting so that all site and building-mounted luminaires produce a maximum initial illuminance value no greater than 0.60 horizontal and vertical footcandles at the LEED project boundary and no greater than 0.01 horizontal footcandles 15 feet beyond the site. Document that no more than 10% of the total initial designed fixture lumens (sum total of all fixtures on site) are emitted at an angle of 90 degrees or higher from nadir (straight down).

For LZ2, LZ3, and LZ4

For LEED project boundaries that abut public rights-of-way, light trespass requirements may be met relative to the curb line instead of the LEED project boundary.

For All Zones

Illuminance generated from a single luminaire placed at the intersection of a vehicular driveway and public roadway accessing the site is allowed to use the centerline of the public roadway as the LEED project boundary for a length of 2 times the driveway width (centered at the centerline of the driveway).

FOR PROJECTS THAT ARE PART OF A MULTITENANT COMPLEX[3]

A multitenant complex is a master-planned development of stores, restaurants, and other businesses; retailers may share one or more services and/or common areas.

Develop a master lighting plan that includes the project site and the surrounding buildings in a comprehensive manner addressing the safety and security issues of the entire project environment by sharing exterior lighting amenities while minimizing light pollution and energy consumption. The master lighting plan must show that it incorporates the credit requirements for interior and exterior lighting as well as the following:

- How this plan will reduce light trespass and sky glow and how specific projects fit into the overall design.
- How safety, security, comfort, and economic activity will be enhanced by the use of a master plan.

3 A multitenant complex is a site that was master-planned for the development of stores, restaurants and other businesses. Retailers may share one or more services and/or common areas.

WATER EFFICIENCY

WE Prerequisite 1: Water Use Reduction

Required

Intent

To increase water efficiency within buildings 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 building (not including irrigation).

BUILDING WATER USE

Calculate the baseline according to the commercial baselines outlined below.[1] Calculations are based on estimated occupant usage. Include only the following fixtures and fixture fittings (as applicable to the project scope): water closets, urinals, lavatory faucets, showers, kitchen sink faucets and pre-rinse spray valves.

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
Shower	2.5 (gpm) at 80 (psi) per shower stall
Kitchen Faucet	2.2 (gpm) at 60 (psi)
Commercial Pre-rinse Spray Valves (for food service applications)	Flow rate ≤ 1.6 (gpm) (no pressure specified; no performance requirement)

* 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.

AND

COMMERCIAL PROCESS WATER USE

Employ strategies that in aggregate use 20% less water than the water use baseline calculated performance requirements for commercial equipment as listed in Table 2. Base the calculations on estimated occupant usage. Include only the following fixtures (as applicable): clothes washers, dishwashers, ice machines, food steamers, and combination ovens.

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.

Exemptions from calculations:

- Appliances and equipment that use water for human consumption may be excluded. Examples: bread misters, produce misters, soda machines, coffee-making machines, and fixtures used to fill sinks for washing produce.
- Equipment, appliances, fixtures, and fittings that are not covered by the Energy Policy Act of 1992 (EPAct 1992), do not contribute toward the retail process, and are not commercially rated may be excluded. Example: a residential dishwasher in an employee break room.
- Fixtures whose flow rates are regulated by health codes may be excluded. Example: fixtures used for filling dishwashing sinks in which water must be maintained at a certain temperature.

Commercial Equipment	Baseline
Commercial clothes washer, less than 80 lbs	9 gallons/cf/cycle
Commercial dishwasher	
Under counter, high temperature	1.98 gallons/rack
Under counter, low temperature	1.95 gallons/rack
Door type, high temperature	1.44 gallons/rack
Door type, low temperature	1.85 gallons/rack
Single tank rack conveyor, high temperature	1.13 gallons/rack
Single tank rack conveyor, low temperature	1.23 gallons/rack
Multi- tank rack conveyor, high temperature	1.1 gallons/rack
Multi- tank rack conveyor, low temperature	0.99 gallon/rack
Flight type	180 gph
Commercial ice machines	
Ice machine, IMH (ice-making head) H < 450 lbs/day	< 25 gal/100 lbs ice
Ice machine, IMH (ice-making head) H > 450 lbs/day	< 25 gal/100 lbs ice
Ice machine, RCU (no remote compressor) H < 1,000 lbs/day	< 25 gal/100 lbs ice
Ice machine, RCU (no remote compressor) H > 1,000 lbs/day	< 25 gal/100 lbs ice
Ice machine, RCU (remote compressor) H < 934 lbs/day	< 25 gal/100 lbs ice
Ice machine, RCU (remote compressor) H > 934 lbs/day	< 25 gal/100 lbs ice
Ice machine, SCU (self-contained unit)	< 35 gal/100 lbs ice
Ice machine, water-cooled	Must be on chilled loop
Ice machine, once-through water-cooled	Banned
Food steamer	
Steam cooker, batch cooking	815 gph/pan
Steam cooker, high production or cook to order	84 gph/pan
Combination oven	
Countertop or stand mounted	40 gph
Roll-in	60 gph
Other equipment	Based on industry standards
Notes: gph = gallons per hour; cf = cubic feet; H = ice production.	

For equipment not listed in in the above tables, the project team may propose performance baseline requirements, with documentation supporting the proposed benchmark.

WE Credit 1: Water-Efficient Landscaping

2-4 points

Intent

To limit or eliminate the use of potable water, or other natural surface or subsurface water resources available on or near the project site, for landscape irrigation.

Requirements

OPTION 1. Reduce by 50% (2 points)

Reduce potable water consumption for irrigation by 50% from a calculated midsummer baseline case.

Reductions must be attributed to any combination of the following items:

- Plant species density and microclimate factor.
- Irrigation efficiency.
- Use of captured rainwater.
- Use of recycled wastewater.
- Use of water treated and conveyed by a public agency specifically for nonpotable uses.

Groundwater seepage that is pumped away from the immediate vicinity of building slabs and foundations can be used for landscape irrigation to meet the intent of this credit. However, the developer or owner must demonstrate that doing so does not affect site stormwater management systems.

OR

OPTION 2. No Potable Water Use or Irrigation[1] (4 points)

Meet the requirements for Option 1.

AND

PATH 1

Use only captured rainwater, recycled wastewater, recycled graywater, or water treated and conveyed by a public agency specifically for nonpotable uses for irrigation.

OR

PATH 2

Install landscaping that does not require permanent irrigation systems. Temporary irrigation systems used for establishing plants are allowed only if removed within 1 year of installation.

1 If the percent reduction of potable water is 100% AND the percent reduction of total water is equal to or greater than 50%, then Option 2 is earned, for a total of 4 points.

FOR PROJECTS THAT ARE PART OF A MULTITENANT COMPLEX[2]

A multitenant complex is a master-planned development of stores, restaurants, and other businesses; retailers may share one or more services and/or common areas.

If landscape irrigation for the project is part of a master plan, enter aggregate data in the submittal template. Submit documentation for the design of the rainwater collection system, the landscape design, and the extent of the supplemental temporary irrigation system.

Landscaping on the large scale of a multitenant complex provides abundant opportunity to implement solutions that require less water and use captured rainwater or recycled water. Large developments may find it cost-effective to treat buildings' wastewater to standards for nonpotable uses.

2 A multitenant complex is a site that was master-planned for the development of stores, restaurants and other businesses. Retailersmay share one or more services and/or common areas.

WE Credit 2: Innovative Wastewater Technologies

2 points

Intent

To reduce generation of wastewater and potable water demand while increasing the local aquifer recharge.

Requirements

OPTION 1

Reduce potable water use for building sewage conveyance by 50% through the use of water-conserving fixtures (e.g., efficient water closets and urinals) or nonpotable water (e.g., captured rainwater, recycled graywater, and on-site or municipally treated wastewater).

OR

OPTION 2

Treat 50% of wastewater on-site to tertiary standards. Treated water must be infiltrated or used on-site.

FOR PROJECTS THAT ARE PART OF A MULTITENANT COMPLEX[1]

A multitenant complex is a site that was master-planned for the development of stores, restaurants, and other businesses; retailers may share one or more services and/or common areas.

In multitenant complex, a weighted average of the site buildings, based on square footage, can be used to meet the requirements of the credit. This method ensures that each building generally meets the performance requirements.

Economies of scale may also allow more effective use of rainwater harvesting or innovative and economical waste treatment technologies on the site. Options include packaged biological nutrient removal systems, constructed wetlands, and high-efficiency filtration systems.

1 A multitenant complex is a site that was master-planned for the development of stores, restaurants and other businesses. Retailersmay share one or more services and/or common areas.

WE Credit 3: Water Use Reduction

2-4 points

Intent

To further increase water efficiency within buildings 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 building (not including irrigation). The minimum water savings percentage for each point threshold is as follows:

Building Use Reduction		Process Use Reduction	Points
30%	AND	30%	2
35%	AND	35%	3
40%	AND	40%	4

BUILDING WATER USE

Calculate the baseline according to the commercial baselines outlined below.[1] Calculations are based on estimated occupant usage. Include only the following fixtures and fixture fittings (as applicable): water closets, urinals, lavatory faucets, showers, kitchen sink faucets, and prerinse spray valves.

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
Shower	2.5 (gpm) at 80 (psi) per shower stall
Kitchen Faucet	2.2 (gpm) at 60 (psi)
Commercial Pre-rinse Spray Valves (for food service applications)	Flow rate ≤ 1.6 (gpm) (no pressure specified; no performance requirement)

* 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.

AND

COMMERCIAL PROCESS WATER USE

Employ strategies that in aggregate use less water than the water use baseline calculated for commercial equipment performance requirements as listed in the following table. Base the calculations on estimated occupant usage. Include only the following fixtures (as applicable): clothes washers, dishwashers, ice machines, food steamers, and combination ovens.

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.

Exemptions from calculations:

- Appliances and equipment that use water for human consumption may be excluded. Examples: bread misters, produce misters, soda machines, coffee-making machines, and fixtures used to fill sinks for washing produce.
- Equipment, appliances, fixtures, and fittings that are not covered by the Energy Policy Act of 1992 (EPAct 1992), do not contribute toward the retail process, and are not commercially rated may be excluded. Example: a residential dishwasher in an employee break room.
- Fixtures whose flow rates are regulated by health codes may be excluded. Example: fixtures used for filling dishwashing sinks in which water must be maintained at a certain temperature.

Commercial Equipment	Baseline
Commercial clothes washer, less than 80 lbs	9 gallons/cf/cycle
Commercial dishwasher	
Under counter, high temperature	1.98 gallons/rack
Under counter, low temperature	1.95 gallons/rack
Door type, high temperature	1.44 gallons/rack
Door type, low temperature	1.85 gallons/rack
Single tank rack conveyor, high temperature	1.13 gallons/rack
Single tank rack conveyor, low temperature	1.23 gallons/rack
Multi- tank rack conveyor, high temperature	1.1 gallons/rack
Multi- tank rack conveyor, low temperature	0.99 gallon/rack
Flight type	180 gph
Commercial ice machines	
Ice machine, IMH (ice-making head) H < 450 lbs/day	< 25 gal/100 lbs ice
Ice machine, IMH (ice-making head) H > 450 lbs/day	< 25 gal/100 lbs ice
Ice machine, RCU (no remote compressor) H < 1,000 lbs/day	< 25 gal/100 lbs ice
Ice machine, RCU (no remote compressor) H > 1,000 lbs/day	< 25 gal/100 lbs ice
Ice machine, RCU (remote compressor) H < 934 lbs/day	< 25 gal/100 lbs ice
Ice machine, RCU (remote compressor) H > 934 lbs/day	< 25 gal/100 lbs ice
Ice machine, SCU (self-contained unit)	< 35 gal/100 lbs ice
Ice machine, water-cooled	Must be on chilled loop
Ice machine, once-through water-cooled	Banned
Food steamer	
Steam cooker, batch cooking	815 gph/pan
Steam cooker, high production or cook to order	84 gph/pan
Combination oven	
Countertop or stand mounted	40 gph
Roll-in	60 gph
Other equipment	Based on industry standards
Notes: gph = gallons per hour; cf = cubic feet; H = ice production.	

For equipment not listed in the above tables, the project team may propose performance baseline requirements, with documentation supporting the proposed benchmark.

ENERGY AND 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 perform 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 firm 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 team 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., photovoltaic, wind, solar).

EA Prerequisite 2: Minimum Energy Performance

Required

Intent

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

Requirements

OPTION 1. Whole Building Energy Simulation

Demonstrate a 10% improvement in the proposed building performance rating for new buildings, or a 5% improvement in the proposed building performance rating for renovations to existing buildings, compared with the baseline building performance rating. Calculate the baseline building performance rating according to the building performance rating method in Appendix G of ANSI/ASHRAE/IESNA Standard 90.1–2007 (with errata but without addenda[1]) using a computer simulation model for the whole building project.

Appendix G of Standard 90.1–2007 requires that the energy analysis done for the building performance rating method include all energy costs associated with the building project. To achieve points using this credit, the proposed design must meet the following criteria:

- Compliance with the mandatory provisions (Sections 5.4, 6.4, 7.4, 8.4, 9.4, and 10.4) in Standard 90.1–2007 (with errata but without addenda[1]).
- Inclusion of all the energy costs associated with the building project.
- Comparison against a baseline building that complies with Appendix G of Standard 90.1–2007 (with errata but without addenda[1]). There is no default process energy cost.

For the purpose of this analysis, process energy is considered to include, but is not limited to, office and general miscellaneous equipment, computers, elevators and escalators, kitchen cooking and refrigeration, laundry washing and drying, lighting exempt from the lighting power allowance (e.g., lighting integral to medical equipment), and other (e.g., waterfall pumps).

Regulated (nonprocess) energy includes lighting (for the interior, parking garage, surface parking, façade, building grounds, etc., except as noted above); heating, ventilation, and air-conditioning (HVAC) (for space heating, space cooling, fans, pumps, toilet exhaust, parking garage ventilation, kitchen hood exhaust, etc.); and service water heating (for domestic or space heating purposes).

Process loads shall be identical for both the baseline building performance rating and for the proposed building performance rating. However, project teams may follow the exceptional calculation method (ANSI/ASHRAE/IESNA Standard 90.1–2007, G2.5) to document measures that reduce process loads. Documentation of process load energy savings must include a list of the assumptions made for both the base and the proposed design, and theoretical or empirical information supporting these assumptions.

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

Many of the industry standard baseline conditions for commercial kitchen equipment and refrigeration have been defined in Tables 1–4 in the Requirements section of EA Credit 1. No additional documentation is necessary to substantiate these predefined baseline systems as industry standard.

Projects in California may use Title 24–2005, Part 6, in place of ANSI/ASHRAE/IESNA Standard 90.1–2007 for Option 1.

OR

OPTION 2. Prescriptive Compliance Path: ASHRAE Advanced Energy Design Guide

Comply with the prescriptive measures of the ASHRAE Advanced Energy Design Guide for Small Retail Buildings 2006. Project teams must fully comply with all applicable criteria as established in the Advanced Energy Design Guide for the climate zone in which the building is located.

The building must meet the following requirements:

- Less than 20,000 square feet.
- Retail occupancy.

OR

OPTION 3. Prescriptive Compliance Path: Advanced Buildings™ Core Performance™ Guide

Comply with the prescriptive measures identified in the Advanced Buildings™ Core Performance™ Guide developed by the New Buildings Institute. The building must meet the following requirements:

- Less than 100,000 square feet.
- Comply with Section 1, Design Process Strategies, and Section 2, Core Performance Requirements.
- Projects less than 100,000 square feet must comply with Section 1 and Section 2 of the Core Performance Guide.
- Health care, warehouse, and laboratory projects are ineligible for this option.

EA Prerequisite 3: Fundamental Refrigerant Management

Required

Intent
To reduce stratospheric ozone depletion.

Requirements
Zero use of chlorofluorocarbon (CFC)-based refrigerants in new base building heating, ventilating, air-conditioning, and refrigeration (HVAC&R) systems. When reusing existing base building HVAC equipment, complete a comprehensive CFC phase-out conversion prior to project completion. Phase-out plans extending beyond the project completion date will be considered on their merits.

EA Credit 1: Optimize Energy Performance

1-19 points

Intent

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

Requirements

Select 1 of the 3 compliance path options described below. Project teams documenting achievement using any of the 3 options are assumed to be in compliance with EA Prerequisite 2, Minimum Energy Performance.

OPTION 1. Whole Building Energy Simulation (1–19 points)

Demonstrate a percentage improvement in the proposed building performance rating compared with the baseline building performance rating. Calculate the baseline building performance according to Appendix G of ANSI/ASHRAE/IESNA Standard 90.1–2007 (with errata but without addenda[1]) using a computer simulation model for the whole building project. The minimum energy cost savings percentage for each point threshold is as follows:

New Buildings	Existing Building Renovations	Points
12%	8%	1
14%	10%	2
16%	12%	3
18%	14%	4
20%	16%	5
22%	18%	6
24%	20%	7
26%	22%	8
28%	24%	9
30%	26%	10
32%	28%	11
34%	30%	12
36%	32%	13
38%	34%	14
40%	36%	15
42%	38%	16
44%	40%	17
46%	42%	18
48%	44%	19

All building energy uses associated with the project must be included in the energy simulation model. Improvements to process loads must be documented as described below. Nonprocess energy systems include HVAC (heating, cooling, fans, and pumps), service water heating, and lighting. Process loads for retail may include refrigeration equipment, cooking and food preparation, clothes washing, and other major support appliances. Merchandise for sale that is plugged in and small movable appliances are not candidates for improved energy performance.

Appendix G of Standard 90.1–2007 requires that the energy analysis done for the building performance rating method include all of the energy costs associated with the building project. To achieve points under this credit, the proposed design must meet the following criteria:

- Compliance with the mandatory provisions (Sections 5.4, 6.4, 7.4, 8.4, 9.4, and 10.4) in Standard 90.1–2007 (with errata but without addenda[1]).
- Inclusion of all the energy costs within and associated with the building project.
- Comparison against a baseline building that complies with Appendix G of Standard 90.1–2007 (with errata but without addenda[1]). There is no default process energy cost.

For the purpose of this analysis, process energy is considered to include, but is not limited to, office and general miscellaneous equipment, computers, elevators and escalators, kitchen cooking and refrigeration, laundry washing and drying, lighting exempt from the lighting power allowance (e.g., lighting integral to medical equipment), and other (e.g., waterfall pumps).

Regulated (nonprocess) energy includes lighting (for the interior, parking garage, surface parking, façade, building grounds, etc., except as noted above), heating, ventilating, and air-conditioning (HVAC) (for space heating, space cooling, fans, pumps, toilet exhaust, parking garage ventilation, etc.), and service water heating (for domestic or space heating purposes).

For this credit, process loads must be identical both for the baseline building performance rating and for the proposed building performance rating. However, project teams may follow the exceptional calculation method (ANSI/ASHRAE/IESNA Standard 90.1–2007, G2.5) to document measures that reduce process loads. Documentation of process load energy savings must include a list of the assumptions made for both the base and the proposed design, and theoretical or empirical information supporting these assumptions.

Projects in California may use Title 24–2005, Part 6, in place of ANSI/ASHRAE/IESNA Standard 90.1–2007 for Option 1.

Many of the industry standard baseline conditions for commercial kitchen equipment and refrigeration have been defined in Tables 1–4. No additional documentation is necessary to substantiate these predefined baseline systems as industry standard.

For process loads, provide cutsheets or other documentation demonstrating proposed equipment and budget equipment not covered in Tables 1–4. A clear baseline must be described and documented to compare proposed improvements in process load categories. The baseline and design must be documented in the following ways:

- For appliances and equipment, provide cutsheets of proposed equipment and budget equipment not covered in Tables 1–4 that indicate hourly energy use. Provide a spreadsheet calculation estimating the daily use hours for each piece of equipment listed. Use the total estimated energy use in the energy simulation model as a plug load. Reduced use time (schedule change) is not a category of energy improvement in this credit. ENERGY STAR ratings and evaluations are a valid basis for performing this calculation.
- Spreadsheet calculation may also be utilized for calculation of commercial appliances energy consumption, and input into the Energy Cost Budget (ECB), in lieu of energy simulation modeling as a plug load.
- For display lighting, the space-by-space method of determining allowed lighting power under ANSI/ASHRAE/IESNA Standard 90.1–2007 must be used to determine the appropriate baseline for both the

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

general building space and the display lighting. Installed lighting in the proposed building, including display lighting, is compared with this baseline in the simulation.

- For hard-wired refrigeration loads, the impact of energy performance improvements must be modeled with a simulation program specifically designed to account for refrigeration equipment. For example, eQUEST has a refrigeration module that can be used to simulate performance improvements in refrigeration equipment.

To establish the baseline and design conditions for the energy cost budget, use Tables 1 and 2.

OR

OPTION 2. Prescriptive Compliance Path: ASHRAE Advanced Energy Design Guide (1 point)

Comply with the prescriptive measures of the ASHRAE Advanced Energy Design Guide for Retail Buildings 2006.

Project teams must fully comply with all applicable criteria as established in the Advanced Energy Design Guide for the climate zone in which the building is located.

The building must meet the following requirements:

- Less than 20,000 square feet.
- Retail occupancy.

AND

Projects must comply with the prescriptive measures on Tables 1–4 for 90% of total energy consumption for all process equipment.

OR

OPTION 3. Prescriptive Compliance Path: Advanced Buildings™ Core Performance™ Guide (1–3 points)

Comply with the prescriptive measures identified in the Advanced Buildings™ Core Performance™ Guide developed by the New Buildings Institute. The building must meet the following requirements:

- Less than 100,000 square feet.
- Comply with Section 1, Design Process Strategies, and Section 2, Core Performance Requirements.
- Health care, warehouse, or laboratory projects are ineligible for this path.
- Points achieved under Option 3 (1 point):
- 1 point is available for all office, school, public assembly, and retail projects less than 100,000 square feet that comply with Sections 1 and 2 of the Core Performance Guide.
- Up to 2 additional points are available to projects that implement performance strategies listed in Section 3, Enhanced Performance. For every 3 strategies implemented from this section, 1 point is available.
- The following strategies are addressed by other aspects of LEED and are not eligible for additional points under EA Credit 1:
  - 3.1—Cool Roofs
  - 3.8—Night Venting
  - 3.13—Additional Commissioning

AND

Projects must comply with the prescriptive measures in Tables 1–4 for 90% of total energy consumption for all process equipment.

Table 1. Commercial Kitchen Appliance Prescriptive Measures and Baseline for Energy Cost Budget

	abbreviations:			
	ES = EPA Energy Star			
	CEC = California Energy Commision			
	Pre-EEM Energy Usage for Energy Modeling Path			
appliance type	**fuel source**	**Pre-EEM efficiency**	**Pre-EEM idle rate**	**Pre-EEM water use**
commercial fryers	elec	75%	1050 W (1)	na
large vat fryers	elec	75%	1350 W	na
steam cooker - batch cooking	elec	26%	200 W/pan	30 gph per compartment
steam cooker - high production/cook to order	elec	26%	330 W/pan	40 gph per compartment
hot food holding cabinets (excluding drawer warmers and heated display)	elec		125w/ft^3	na
solid door reach-in refrigerators	elec	.1V + 2.04 kWh/day	na	na
solid door reach-in freezers	elec	0.4V + 1.38 kWh/day	na	na
solid door reach-in refrigerator / freezer	elec	0.32AV - 0.8165 kW/day	na	na
glass door reach-in refrigerators	elec	.12V + 3.34 kWh/day	na	na
ice cream freezer	elec	0.45V + 0.943 kW/day	na	na
undercounter dish machines - high temp	elec	na	0.9 kW	1.98 gpr
undercounter dish machines - low temp	elec	na	0.5 kW	1.95 gpr
door type dishmachine - high temp	elec	na	1.0 kW	1.44 gpr
door type dishmachine - low temp	elec	na	0.6 kW	1.85 gpr
single tank rack conveyor dishmachine - high temp	elec	na	2.0 kW	1.13 gpr
single tank rack conveyor dishmachine - low temp	elec	na	1.6 kW	1.23 gpr
multi-tank rack conveyor dishmachine - high temp	elec	na	2.6 kW	1.1 gpr
multi-tank rack conveyor dishmachine - low temp	elec	na	2.0 kW	0.99 gpr
ice machine (ice making head) IMH H < 450 lb/day	elec	10.26 – 0.0086H kWh/100 lb ice	na	< 030 gal/100 lb ice
ice machine (ice making head) IMH H > 450 lb/day	elec	6.89 - 0.0011H kWh/100 lb ice	na	< 030 gal/100 lb ice
ice machine RCU (w/o remote compressor) H < 1000 lb/day	elec	8.85 - .0038H kWh/100lb ice	na	< 030 gal/100 lb ice
ice machine RCU (w/o remote compressor) H > 1000 lb/day	elec	5.10 kWh/100lb ice	na	< 030 gal/100 lb ice
ice machine RCU (with remote compressor) H < 934 lb/day	elec	8.85 - 0.0038H kWh/100 lb ice	na	< 030 gal/100 lb ice
ice machine RCU (with remote compressor) H > 934 lb/day	elec	5.30 kWh/100 lb ice	na	< 030 gal/100 lb ice
ice machine self contained unit (SCU) H < 175 lb/day	elec	18.0 - 0.0469H kWh/100lb ice	na	< 040 gal/100 lb ice
ice machine self contained unit (SCU) H > 175 lb/day	elec	9.80 kWh/100lb ice	na	< 040 gal/100 lb ice
ice machine water cooled IMH H <500 lb/day	elec	7.80 – 0.0055H kWh/100 lb ice	(3)	< 030 gal/100 lb ice
ice machine water cooled IMH 500 lb/day < H > 1436	elec	5.58 – 0.0011H kWh/100lb ice	(3)	< 030 gal/100 lb ice
ice machine water cooled IMH H > 1436 lb/day	elec	4.0 kWh/100lb ice	(3)	< 030 gal/100 lb ice
ice machine water cooled SCU H < 200 lb/day	elec	11.4 – 0.0190H kWh/100lb ice	(4)	< 040 gal/100 lb ice
ice machine water cooled SCU H > 200 lb/day	elec	7.6 kWh/100lb ice	(4)	< 040 gal/100 lb ice
ice machine once through water cooled	BANNED	BANNED	BANNED	BANNED
griddles (based on 3' model)	elec	65%	420 w/ft^2	na
range	elec	70% burner efficiency		
convection ovens (full size)	elec	65%	2.0 kW	na
combination ovens	elec	44%	1.25 kW/pan	< 4.0 gph per pan
toaster	elec		1.8 kW (100% duty cycle @ 4 slices per min.) = 1 conveyor	
pre-rinse spray valves (MANDATORY)	na	na	na	1.6 gpm
kitchen exhaust hood	na	IMC minimum req	na	na
fryers	gas	35%	14000 Btu/h (1)	na
large vat fryers	gas	35%	20000 Btu/h	
steam cooker - batch cooking	gas	15%	1800 BTUh/pan	30 gph per compartment
steam cooker - high production/cook to order	gas	15%	3000 BTUh/pan	40 gph per compartment
griddles	gas	32%	3200 BTUh/ft^2	na
convection ovens (full size)	gas	30%	18000 BTU/h	na
combination ovens	gas	35%	4700 BTU/h/pan	40 gph
rack ovens - single	gas	30%	43000 BTU/h	na
rack ovens - double	gas	30%	65000 BTU/h	na
broiler (underfired)	gas	30%	20,000 BTU/h/ft^2 peak input	na
range	gas	35% burner efficiency		
conveyor oven (small = < 25 inch belt)	gas	20%	45,000 BTU/h	na
conveyor oven (large = > 25 inch belt)	gas	20%	70000 BTU/h	na
high efficiency hot water heater	gas	82%		na
instantaneous water heater		82%		
clothes washer	gas	1.72 MEF		8.0 WF
(1)	Based on 15 inch fryer			
(2)	AV=Adjusted Volume = (1.63 x freezer volume) + refirgerator volume			
(3)	Condenser water use = 200 - 0.022H gal/100lb ice			
(4)	Condenser water use = 191 - 0.0315H gal/100lb ice			

FSTC = Food Service Technology Center

CEE = Consortium for Energy Efficiency

Levels for Prescriptive Path

CAIOU = California Investor Owned Utilities (CPUC approved CA incentive program)

LEED efficiency	LEED idle rate	LEED water use	Prescriptive criteria based on:	Energy Star Category	
80%	1000 W (1)	na	CEE, ES, CAIOU	yes	x
80%	1250 W	na	CAIOU	pending	x
50%	135 W/pan	10 gph per compartment	ES		x
50%	275 W/pan	15 gph per compartment	ES - modified		
	20 w/ft^3	na	CEE Tier II, CAIOU	yes	x
0.06V + 1.22 kWh/day	na	na	CEE Tier II, CAIOU	yes	x
0.28V + 0.97 kWh/day	na	na	CEE Tier II, CAIOU	yes	x
0.27AV - 0.71 kWh/day (2)	na	na	ES	yes	x
0.086V +2.39 kWh/day	na	na	CEE Tier II, CAIOU	pending	x
0.39V + 0.82 kWh/day	na	na	ES	yes	x
na	0.9 kW	1 gpr	ES	yes	x
na	0.5 kW	1.7 gpr	ES	yes	x
na	1.0 kW	0.95 gpr	ES	yes	x
na	0.6 kW	1.18 gpr	ES	yes	x
na	2.0 kW	0.7 gpr	ES	yes	x
na	1.6 kW	0.79 gpr	ES	yes	x
na	2.6 kW	0.54 gpr	ES	yes	x
na	2.0 kW	0.54 gpr	ES	yes	x
9.23 - 0.0077H kWh/100 lb ice	na	< 25 gal/100 lb ice	CEE Tier II, ES	yes	x
6.20 - 0.0010H kWh/100 lb ice	na	25 gal/100 lb ice	CEE Tier II, ES	yes	x
8.05 - 0.0035H kWh/100lb ice	na	< 25 gal/100 lb ice	CEE Tier II, ES	yes	x
4.64 kWh/100lb ice	na	< 25 gal/100 lb ice	CEE Tier II, ES	yes	x
8.05 - 0.0035H kWh/100 lb ice	na	< 25 gal/100 lb ice	CEE Tier II, ES	yes	x
4.82 kWh/100 lb ice	na	< 25 gal/100 lb ice	CEE Tier II, ES	yes	x
16.7 - 0.0436H kWh/100lb ice	na	< 35 gal/100 lb ice	CEE Tier II, ES	yes	x
9.11 kWh/100lb ice	na	< 35 gal/100 lb ice	CEE Tier II, ES	yes	x
7.02 - 0.005H kWh/100 lb ice	na	< 25 gal/100 lb ice	CEE Tier II		x
5.13 - 0.001H kWh/100lb ice	na	< 25 gal/100 lb ice	CEE Tier II		x
3.7 kWh/100lb ice	na	< 25 gal/100 lb ice	CEE Tier II		x
10.6 - 0.177H kWh/100lb ice	na	< 35 gal/100 lb ice	CEE Tier II		x
7.07 kWh/100lb ice	na	< 35 gal/100 lb ice	CEE Tier II		x
BANNED	BANNED	BANNED			BANNED
70%	350 w/ft^2	na	CAIOU	pending	x
80% burner efficiency					
70%	1.5 kW	na	CAIOU	pending	x
60%	0.80 kW/pan	< 15 gph per pan	CAIOU	pending	x
	3.6 kW (8% duty cycle) = 2 pop-ups				
na	na	< 1.2 gpm per pan	epact 2005	na	MANDATORY
35% reduction in design (full speed) ventilation rate (cfm) plus demand controlled ventilation	na	na	FSTC recommendation	no	x
50%	9000 BTU/h (1)	na	CEE, ES	yes	x
50%	12000 Btu/h		CAIOU	pending	x
38%	2100 BTU/h/pan	10 gph per compartment	CEE, ES, CAIOU	yes	x
38%	4300 BTU/h/pan	15 gph per compartment	ES - modified		
38%	3000 BTU/h/ft^2	na	CAIOU	pending	x
43%	13000 Btu/h	na	FSTC recommendation based on anticipated ES level	pending	x
40%	2850 BTU/h/pan	≤ 15 gph per pan	CAIOU	pending	x
50%	29000 BTU/h	na	CAIOU	pending	x
50%	35000 BTU/h	na	CAIOU	pending	x
35%	12500 BTU/h/ft^2 peak input	na	FSTC recommendation	no	x
40% burner efficiency			FSTC recommendation		x
42%	30000 BTU/h	na	FSTC recommendation	pending	x
42%	57000 BTU/h	na	FSTC recommendation	pending	
90%		na			x
90%					
2.00 MEF		6.0 WF	CAIOU	na	x

Table 2. Supermarket Refrigeration Prescriptive Measures and Baseline for Energy Cost Budget

Item	Attribute	Prescriptive Measures	Baseline
Evaporator	Evaporator fan speed control	Variable speed evaporator fan	Constant volume, constant operation
	Evaporator design approach temperature	10°F	10°F
Condenser	Air cooled condenser fan speed control	Variable Speed Condenser Fan (electronically commutated motors if single phase and less than 1 hp)	Cycling one speed fan
	Air cooled condenser design approach	Floating head pressure, min of 70°F, 5°F drybulb offset	10°F to 15°F depending on suction temperature
	Air cooled condenser fan power	80 Btu/Watt-hr at 10°F approach temperature	53 Btu/Watt-hr at 10°F approach temperature
	Evaporative condenser fan speed control	Variable speed condenser fan (electronically commutated motors if single phase and less than 1 hp)	Cycling one speed fan
	Evaporative condenser design approach temperature	Floating head pressure, min of 70°F, 9°F wetbulb offset	18°F to 25°F based on design wetbulb temperature
	Evaporative condenser fan and pump power	400 Btu/Watt-hr at 100°F saturated condensing temperature and 70°F wetbulb temperature	330 Btu/Watt-hr at 100°F saturated condensing temperature and 70°F wetbulb temperature
Refrigeration System	Suction pressure control	Not addressed	Not addressed
	Condensing temperature control	85°F minimum condensing temperature, fixed setpoint	85°F minimum condensing temperature, fixed setpoint
	Defrost control	No electrical defrost. Hot gas defrost only	Not addressed
Compressor	Compressor capacity modulation	Variable speed drive trim compressor	Slide valves on screw compressors, multiple compressor racks on reciprocating compressor plants

Table 3. Walk-in Coolers and Freezers Prescriptive Measures and Baseline for Energy Cost Budget

Item	Attribute	Prescriptive Measures	Baseline
Envelope	Freezer insulation	R-46	R-36
	Cooler insulation	R-36	R-20
	Automatic closer doors	Yes	No
	High efficiency low/no heat reach-in doors	40W/ft of door frame (low temperature) 17W/ft of door frame (medium temperature)	40W/ft of door frame (low temperature) 17W/ft of door frame (medium temperature)
Evaporator	Evaporator fan motor and control	Shaded pole and split phase motors are prohibited. Use PSC or EMC motors.	Constant speed fan
	Hot gas defrost	Yes, no electrical defrosting	Electric defrost
Condenser	Air cooled condenser fan motor and control	Shaded pole and split phase motors are prohibited. Use PSC or EMC motors. Add condenser fan controllers	Cycling one speed fan
	Air cooled condenser design approach	Floating head pressure controls or ambient sub-cooling	10°F to 15°F dependent on suction temperature
Lighting	Lighting power density (W/sq.ft.)	0.6 W/sq.ft.	0.6 W/sq.ft.

Chart based on *Final Report on Refrigerated Warehouses PG&E* (Pacific Gas & Electric) Codes and standards enhancement initiative, February 2007; *Analysis of Standards Options for Walk-In Coolers* (*Refrigerators*) *and Freezers PG&E* (Pacific Gas & Electric) Codes and standards enhancement initiative prepared by Davis Energy Group Energy Solutions, May 2004; and the *ASHRAE Refrigeration Handbook 2004*.

Table 4. Commercial Kitchen Ventilation Prescriptive Measures and Baseline for Energy Cost Budget

Strategies	Prescriptive Measures	Baseline
Make-up air strategies	Dedicated make-up air system	Transfer air through dining area
Exhaust rate control	Demand control package	Constant volume

EA Credit 2: On-Site Renewable Energy

1-7 points

Intent

To encourage and recognize increasing levels of on-site renewable energy self-supply to reduce environmental and economic impacts associated with fossil fuel energy use.

Requirements

Use on-site renewable energy systems to offset building energy cost. Calculate project performance by expressing the energy produced by the renewable systems as a percentage of the building's annual energy cost and use the table below to determine the number of points achieved.

Use the building annual energy cost calculated in EA Credit 1, Optimize Energy Performance, or the U.S. Department of Energy's Commercial Buildings Energy Consumption Survey (CBECS) database to determine the estimated electricity use.

The table below describes the minimum percentage of renewable energy for each point threshold:

Percentage Renewable Energy	Points
1%	1
3%	2
5%	3
7%	4
9%	5
11%	6
13%	7

EA Credit 3: Enhanced Commissioning

2 points

Intent

To begin commissioning early, in the design process and execute additional activities after systems performance verification is completed.

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 Building Energy Systems, and in accordance with the LEED Reference Guide for Green Building Design and Construction, 2009 Edition:

- 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 it;
    - 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 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 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 building with operations and maintenance (O&M) staff and occupants within 10 months after substantial completion. A plan for resolving outstanding commissioning-related issues must be included.

EA Credit 4: Enhanced Refrigerant Management

2 points

Intent

Reduce ozone depletion and support early compliance with the Montreal Protocol while minimizing direct contributions to global climate change.

Requirements

OPTION 1

Do not use refrigerants.

OR

OPTION 2

Select refrigerants and heating, ventilation, air-conditioning, and refrigeration (HVAC&R) equipment that minimize or eliminate the emission of compounds that contribute to ozone depletion and climate change. The base building HVAC&R equipment must comply with the following formula, which sets a maximum threshold for the combined contributions to ozone depletion and global warming potential:

$$LCGWP + LCODP \times 10^5 \leq 100$$

Calculation definitions for $LCGWP + LCODP \times 10^5 \leq 100$
LCODP = [ODPr x (Lr x Life + Mr) x Rc]/Life
LCGWP = [GWPr x (Lr x Life + Mr) x Rc]/Life
LCODP: Lifecycle Ozone Depletion Potential (lb CFC 11/Ton-Year)
LCGWP: Lifecycle Direct Global Warming Potential (lb CO_2/Ton-Year)
GWPr: Global Warming Potential of Refrigerant (0 to 12,000 lb CO_2/lbr)
ODPr: Ozone Depletion Potential of Refrigerant (0 to 0.2 lb CFC 11/lbr)
Lr: Refrigerant Leakage Rate (0.5% to 2.0%; default of 2% unless otherwise demonstrated)
Mr: End-of-life Refrigerant Loss (2% to 10%; default of 10% unless otherwise demonstrated)
Rc: Refrigerant Charge (0.5 to 5.0 lbs of refrigerant per ton of gross ARI rated cooling capacity)
Life: Equipment Life (10 years; default based on equipment type, unless otherwise demonstrated)

For multiple types of equipment, a weighted average of all base building HVAC&R equipment must be calculated using the following formula:

$$\frac{\sum \left(LCGWP + LCODP \times 10^5 \right) \times Qunit}{Qtotal} \leq 100$$

Calculation definitions for $[\sum (LCGWP + LCODP \times 10^5) \times Qunit] / Qtotal \leq 100$
Qunit = Gross ARI rated cooling capacity of an individual HVAC or refrigeration unit (Tons)
Qtotal = Total gross ARI rated cooling capacity of all HVAC or refrigeration

Small HVAC units (defined as containing less than 0.5 pounds of refrigerant) and other equipment, such as standard refrigerators, small water coolers, and any other cooling equipment that contains less than 0.5 pounds of refrigerant, are not considered part of the base building system and are not subject to the requirements of this credit.

Do not operate or install fire suppression systems that contain ozone-depleting substances such as chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs), or halons.

EA Credit 5: Measurement and Verification

3 points

Intent

To provide for the ongoing accountability of building energy consumption over time.

Requirements

OPTION 1

Develop and implement a measurement and verification (M&V) plan consistent with Option D: Calibrated Simulation (Savings Estimation Method 2), as specified in the International Performance Measurement & Verification Protocol (IPMVP), Volume III: Concepts and Options for Determining Energy Savings in New Construction, April 2003.

The M&V period must cover at least 1 year of postconstruction occupancy.

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

OR

OPTION 2

Develop and implement a measurement and verification (M&V) plan consistent with Option B: Energy Conservation Measure Isolation, as specified in the International Performance Measurement & Verification Protocol (IPMVP) Volume III: Concepts and Options for Determining Energy Savings in New Construction, April 2003.

The M&V period must cover at least 1 year of postconstruction occupancy.

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

EA Credit 6: Green Power

2 points

Intent

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

Requirements

Engage in at least a 2-year renewable energy contract to provide at least 35% of the building's electricity from renewable sources, as defined by the Center for Resource Solutions' Green-e Energy product certification requirements.

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

OPTION 1. Determine Baseline Electricity Use

Use the annual electricity consumption from the results of EA Credit 1: Optimize Energy Performance.

OR

OPTION 2. Estimate Baseline Electricity Use

Use the U.S. Department of Energy's Commercial Buildings Energy Consumption Survey database to determine the estimated electricity use.

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

Conduct a waste stream study to identify the top 5 recyclable waste streams by either weight or volume. The waste study shall categorize all waste streams consistently by either weight or volume, identify which waste streams are recyclable, and list the top 3 waste streams for which collection and storage space will be provided. If no information is available on typical waste streams for the project, projects should make projections based on the types of waste their operations will produce and similar operations. For those retailers with existing stores of similar size and function, historical information from these locations can be used.

Provide an easily accessible dedicated area or areas that serve the retail project and are dedicated to the separation, collection, and storage of materials for a minimum of the top 3 recyclable waste streams as identified by the waste study. The location of the collection and storage bins should be located in convenient proximity to the source of recyclable waste in the front or back of house. Examples of potential recyclable waste streams include plastic film, plastics, hanger metals, paper, cardboard, food waste, glass, or special waste as defined by local code.

MR Credit 1.1: Building Reuse—Maintain Existing Walls, Floors, and Roof

1-3 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 the existing building structure (including structural floor and roof decking) and envelope (the exterior skin and framing, excluding window assemblies and nonstructural roofing material).

The minimum percentage building reuse for each point threshold is as follows:

Building Reuse	Points
55%	1
75%	2
95%	3

Hazardous materials that are remediated as a part of the project must be excluded from the calculation of the percentage maintained. If the project includes an addition that is more than twice the square footage of the existing building, this credit is not applicable.

MR Credit 1.2: Building Reuse—Maintain Interior Nonstructural Elements

1 point

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

Use existing interior nonstructural elements (e.g., interior walls, doors, floor coverings, and ceiling systems) in at least 50% (by area) of the completed building, including additions. If the project includes an addition that is more than twice the square footage of the existing building, this credit is not applicable.

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 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 onsite 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

MR Credit 3: Materials Reuse

1-2 points

Intent

To reuse building materials and products to reduce demand for virgin materials and to 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 the total value of materials on the project.

Reused Materials	Points
5%	1
10%	2

Mechanical, electrical, and plumbing components and specialty items, such as elevators and equipment, cannot be included in this calculation. Include only materials permanently installed in the project. Furniture may be included if it is included consistently in MR Credit 3: Materials Reuse through MR Credit 7: Certified Wood.

Please note that casework and built-in millwork items must be included in the base building calculations.

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 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 of materials recycled for each point threshold is as follows:

Recycled Content	Points
10%	1
20%	2

The recycled content value of a material assembly 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 and specialty items, such as elevators, cannot be included in this calculation. Include only materials permanently installed in the project. Furniture may be included if it is included consistently in MR Credit 3: Materials Reuse through MR Credit 7: Certified Wood.

Please note that casework and built-in millwork items must be included in the base building calculations.

1 Recycled content is defined in accordance with International Organization of Standards (ISO) 14021, Environmental labels and declarations, Self-declared environmental claims (Type II environmental labeling).
2 Postconsumer material is 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 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 use of indigenous resources and reducing the environmental impacts resulting from transportation.

Requirements

Use building materials or products that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles of the project site for a minimum of 10% or 20%, based on cost, of the total materials value. If only a fraction of a product or material is extracted, harvested, or recovered and manufactured locally, then only that percentage (by weight) can contribute to the regional value. The minimum percentage of regional materials for each point threshold is as follows:

Regional Materials	Points
10%	1
20%	2

Mechanical, electrical, and plumbing components and specialty items, such as elevators and equipment, cannot be included in this calculation. Include only materials permanently installed in the project. Furniture may be included if it is included consistently in MR Credit 3: Materials Reuse through MR Credit 7: Certified Wood.

Please note that casework and built-in millwork items must be included in the base building calculations.

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 building materials and products for 2.5% of the total value of all building 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.

Please note that casework and built-in millwork items must be included in the base building calculations.

MR Credit 7: Certified Wood

1 point

Intent

To encourage environmentally responsible forest management.

Requirements

Use a minimum of 50% (based on cost) of wood-based materials and products that are certified in accordance with the Forest Stewardship Council's principles and criteria for wood building components. These components include, at a minimum, structural framing and general dimensional framing, flooring, subflooring, wood doors, and finishes.

Include only materials permanently installed in the project. Wood products purchased for temporary use on the project (e.g., formwork, bracing, scaffolding, sidewalk protection, and guardrails) may be included in the calculation at the project team's discretion. If any such materials are included, all such materials must be included in the calculation. If such materials are purchased for use on multiple projects, the applicant may include these materials for only one project, at its discretion. Furniture may be included if it is included consistently in MR Credit 3, Materials Reuse, through MR Credit 7, Certified Wood.

Please note that casework and built-in millwork items must be included in the base building calculations.

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 Sections 4 through 7 of ASHRAE 62.1–2007, Ventilation for Acceptable Indoor Air Quality (with errata but without addenda[1]).

AND

CASE 1. Mechanically Ventilated Spaces

Meet the minimum requirements of Sections 4 through 7 of ASHRAE 62.1–2007, Ventilation for Acceptable Indoor Air Quality (with errata but without addenda). Mechanical ventilation systems must be designed using the ventilation rate procedure or the applicable local code, whichever is more stringent.

OR

CASE 2. Naturally Ventilated Spaces

Naturally ventilated buildings must comply with ASHRAE 62.1–2007, paragraph 5.1 (with errata but without addenda[1]).

1 Project teams wishing to use addenda approved by ASHRAE 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

Prohibit smoking in the building.

Prohibit on-property smoking within 25 feet of entries, outdoor air intakes, and operable windows. Provide signage to allow smoking in designated areas, prohibit smoking in designated areas, or prohibit smoking on the entire property.

If the 25-foot requirement cannot be followed due to code or landlord rules, verification is required to prove such regulations are in place.

If outdoor space, public or private, is used for business purposes, regardless of zero lot line, this space needs to follow the no-smoking regulation outlined in this credit. Examples of such spaces include sidewalk seating, patios or decks, and/or stands for purchasing goods whereas smoking must be prohibited within 25 feet of such spaces.

OR

OPTION 2

Prohibit smoking in the building except in designated smoking areas.

Prohibit on-property smoking within 25 feet of entries, outdoor air intakes, and operable windows. Provide signage to allow smoking in designated areas, prohibit smoking in designated areas, or prohibit smoking on the entire property.

Provide designated smoking rooms designed to contain, capture, and remove ETS from the building. At a minimum, the smoking room must be directly exhausted to the outdoors, away from air intakes and building entry paths, with no recirculation of ETS-containing air to nonsmoking areas, and enclosed with impermeable deck-to-deck partitions. Operate exhaust sufficient to create a negative pressure differential with surrounding spaces of at least an average of 5 Pascals (Pa) (0.02 inches of water gauge) and 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 pressures 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 room closed. Conduct the testing with each space configured for worst-case conditions of transport of air from the smoking rooms (with closed doors) to adjacent spaces.

If outdoor space, public or private, is used for business purposes, regardless of a zero lot line condition, this area needs to follow the no-smoking regulation outlined in this credit. Examples of such spaces include sidewalk seating, patios or decks, and/or stands for purchasing goods whereas a designated smoking area must be at least 25 feet away from entries, outdoor air intakes, and operable windows.

IEQ Credit 1: Outdoor Air Delivery Monitoring

1 point

Intent

To provide capacity for ventilation system monitoring to help promote occupants' 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 airflow values or carbon dioxide (CO_2) levels vary by 10% or more from the design values either via a building automation system alarm to the building operator or via a visual or audible alert to the building occupants.

AND

CASE 1. Mechanically Ventilated Spaces

Monitor CO_2 concentrations within all densely occupied spaces (those with a design occupant density of 25 people or more per 1,000 square feet). CO_2 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 CO_2 concentrations within all naturally ventilated spaces. CO_2 monitors must be located between 3 and 6 feet above the floor. One CO_2 sensor may be used to monitor multiple nondensely occupied spaces if the natural ventilation design uses passive stacks or other means to induce airflow through those spaces equally and simultaneously without intervention by building occupants.

1 Project teams wishing to use addenda approved by ASHRAE 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 outdoor air ventilation to improve indoor air quality (IAQ) 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 Standard 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 Nondomestic 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 the minimum ventilation rates required by ASHRAE 62.1–2007, Chapter 6 (with errata but without addenda[1]), for at least 90% of occupied spaces.

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

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

1 point

Intent

To reduce indoor air quality (IAQ) problems resulting from the 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 building as follows:

- During construction, meet or exceed the recommended control measures 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 onsite 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.

1 Project teams wishing to use addenda approved by ASHRAE 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 the construction or renovation to promote the comfort and well-being of construction workers and building occupants.

Requirements

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 perform a building flush-out 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 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 IEQ Prerequisite 1: Minimum Indoor Air Quality 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 are met. When retesting noncompliant building areas, take samples from the same locations as in the first test, although it is not required.

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 should be in place for the testing, although it is not required.
- 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.

IEQ Credit 4: Low-Emitting Materials

1-5 points

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. Adhesives and Sealants (1 point)

All adhesives and sealants used on the interior of the building (i.e., inside the weatherproofing system and applied onsite) must comply with the following 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 correspond to an effective date of July 1, 2005, and 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	Nonmembrane roof	300
Porous material (except wood)	50	Roadway	250
Wood	30	Single-ply roof membrane	450
Fiberglass	80	Other	420
Sealant Primers	**VOC Limit [g/L less water]**		
Architectural nonporous	250		
Architectural porous	775		
Other	750		

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

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

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

OPTION 2. Paints and Coatings (1 point)

Paints and coatings used on the interior of the building (i.e., weatherproofing system and applied onsite) must comply with the following criteria as applicable to the project scope[2]:

- Architectural paints, coatings, and primers 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.
- Anticorrosive and antirust paints applied to interior ferrous metal substrates must not exceed the VOC content limit of 250 g/L established in Green Seal Standard GC-03, Anti-Corrosive Paints, 2nd Edition, January 7, 1997.
- Clear wood finishes, floor coatings, stains, and shellacs applied to interior elements must not exceed the VOC content limits established in South Coast Air Quality Management District (SCAQMD) Rule 1113, Architectural Coatings, rules in effect on January 1, 2004.

OPTION 3. Flooring (1 point)

PATH 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's Green Label Plus[3] 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 meet the requirements of IEQ Credit 4: Low-Emitting Materials, Option A, which lists a volatile organic compound (VOC) limit of 50 g/L.
- All hard surface flooring must meet the requirements of the FloorScore 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.

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

3 The Green Label Plus program for carpets and its associated VOC emissions criteria in micrograms per square meter per hour, along with information on testing method and sample collection developed by the Carpet & 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. This document is available at http://www.dhs.ca.gov/ps/deodc/ehlb/iaq/VOCS/Section01350_7_15_2004_FINAL_PLUS_ADDENDUM-2004-01.pdf (also published as Section 01350 Section 9 [dated 2004] by the Collaborative for High Performance Schools [http://www.chps.net]).

- 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, rules in effect on January 1, 2004.
- 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.
- 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.

OR

PATH 2

All flooring products must meet the testing and product requirements of the California Department of Health Services 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.

OPTION 4. Composite Wood and Agrifiber Products (1 point)

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. Laminating adhesives used to fabricate onsite and shop-applied composite wood and agrifiber assemblies must not contain added urea-formaldehyde resins.

Please note that built-in casework and built-in millwork items must be included in the base building calculations.

Products covered by IEQ Credit 4, Option E—Furniture shall be excluded from these requirements.

OPTION 5. Furniture and Furnishings (1 point)

For manufactured and custom furniture, components of furniture and their assembly must meet the requirements of IEQ Credit 4, Option A: Adhesives and Sealants, IEQ Credit 4 Option B—Paints and Coatings, and IEQ Credit 4, Option D: Composite Wood and Agrifiber Products.

Please note that built-in casework and built-in millwork items are to be considered part of the base building.

4 Systems furniture includes panel-based workstations comprising modular interconnecting panels, hang-on components, and drawer and filing components or a freestanding grouping of furniture items 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.

5 Seating consists of task and guest chairs used with systems furniture.

AND

All systems furniture[4] and seating[5] introduced into the project space that have been manufactured, refurbished, or refinished within 1 year prior[6] to occupancy must meet 1 of the requirements below.

PATH 1

Greenguard Indoor Air Quality Certified

OR

PATH 2

Calculated indoor air concentrations that are less than or equal to those established in Table 1 for furniture systems and seating determined by a procedure based on the EPA Environmental Technology Verification (ETV) Large Chamber Test Protocol for Measuring Emissions of VOCs and Aldehydes (September 1999) testing protocol conducted in an independent air quality testing laboratory.

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

OR

PATH 3

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

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

OPTION 6. Ceiling and Wall Systems (1 point)

All gypsum board, insulation, acoustical ceiling systems, and wall coverings installed in the building interior shall meet the testing and product requirements of the California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.

6 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 occupants' exposure to potentially hazardous particulates and chemical pollutants.

Requirements

Design to minimize and control the entry of pollutants into buildings 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 entrances. 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 shall be at least 0.50 cubic feet per minute (cfm) per square foot, with no air recirculation. The pressure differential with the surrounding spaces shall be at least 5 Pascals (Pa) (0.02 inches of water gauge) on average and a minimum of 1 Pa (0.004 inches of water gauge) when the doors to the rooms are closed.
- In mechanically ventilated buildings, install new air filtration media in regularly occupied areas prior to occupancy; these filters must provide a minimum efficiency reporting value (MERV) of 13 or higher. Filtration should be applied to process both return and outside air that is to be delivered as supply air.
- Provide containment (i.e., a closed container for storage for off-site disposal in a regulatory compliant storage area, preferably outside the building) for appropriate disposal of hazardous liquid wastes in places where water and chemical concentrate mixing occurs (e.g., housekeeping, janitorial laboratories).

IEQ Credit 6: Controllability of Systems—Lighting and Thermal Comfort

1 point

Intent

To provide a high level of lighting system and thermal comfort control[1] for individual workstations to promote the productivity, comfort, and well-being of building occupants.

Requirements

Provide individual lighting controls for 90% (minimum) of retail employees in office and administrative spaces, enabling adjustments to suit individual task needs and preferences.

AND

Provide individual thermal comfort controls for 50% (minimum) of retail employees in office and administrative spaces to enable adjustments to suit individual task needs and preferences. Operable windows can be used in lieu of comfort controls for occupants of areas that are 20 feet inside of and 10 feet to either side of the operable part of the window. The areas of operable window must meet the requirements of ASHRAE 62.1–2007, paragraph 5.1, Natural Ventilation (with errata but without addenda[2]).

1 Thermal comfort control is the ability to alter at least 1 of the following primary factors in the occupant's vicinity: air temperature, radiant temperature, air speed, and humidity.

2 Project teams wishing to use addenda approved by ASHRAE 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 and the building envelope 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.

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

IEQ Credit 7.2: Thermal Comfort—Employee Verification

1 point*

*1 point in addition to IEQ Credit 7.1

Intent

To provide for the assessment of building occupants' thermal comfort over time.

Requirements

Achieve IEQ Credit 7.1, Thermal Comfort—Design

AND

Provide a permanent monitoring system 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 building employees within a period of 6 to 18 months after occupancy. This survey should collect anonymous responses about thermal comfort in the building including an assessment of overall satisfaction with thermal performance and identification of thermal comfort-related 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 building. 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]).

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

IEQ Credit 8.1: Daylight and Views—Daylight

1 point

Intent

To provide for the building occupants with a connection between indoor spaces and the outdoors through the introduction of daylight and views into the regularly occupied areas[1] of the building.

Requirements

Through 1 of the 4 options, achieve daylighting in at least the following spaces[2]:

Regularly Occupied Spaces	Points
75%	1

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:

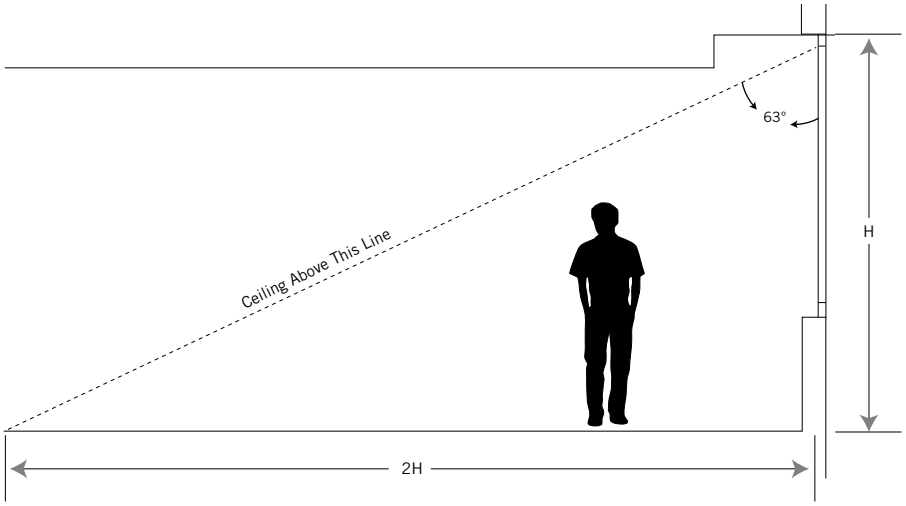
- Achieve a value, calculated as the product of the visible light transmittance (VLT) and window-to-floor area ratio (WFR) between 0.150 and 0.180.

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

- 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 Nonoccupied spaces include all rooms used by maintenance personnel that are not open for use by occupants. Examples are closets and janitorial, storage, and equipment rooms. Regularly occupied spaces are areas where workers are seated or standing as they work inside a building. In a retail operation, regularly occupied spaces include the sales floor, transaction counters, sales desks, workstations, offices, conference rooms, food-prep areas, cooking areas, and other areas of administrative support.

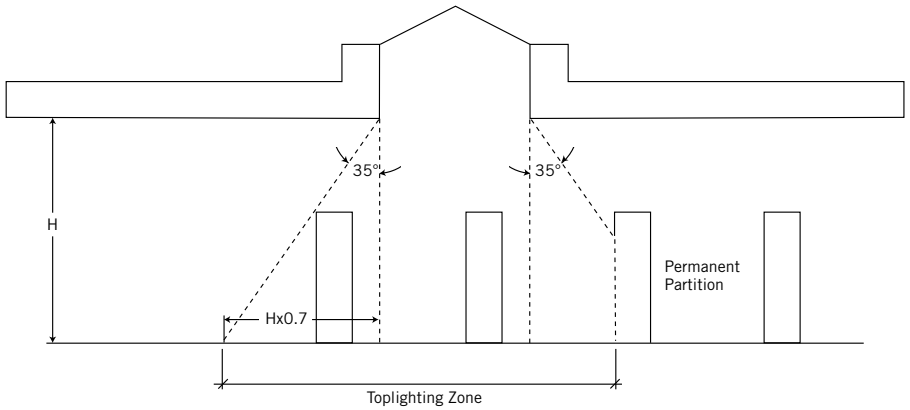
2 Exceptions for areas where tasks would be hindered by the use of daylight will be considered on their merits.



- 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 skylight coverage for the applicable space (containing the top-lighting zone) between 3% and 6% of the total floor area.
- The skylight must have 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 and shall be 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.

IEQ Credit 8.2: Daylight and Views—Views

1 point

Intent

To provide for the building occupants a connection to the outdoors through the introduction of daylight and views into the regularly occupied areas[1] of the building.

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 by stationary retail staff and/or customers. 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 the area 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. For multioccupant spaces, the actual square footage with a direct line of sight to perimeter vision glazing is counted.

1 Examples of regularly occupied retail stations and areas include restaurant seating, service desks, transaction counters, workstations, food-prep areas, cooking areas, individual staff offices, and shared offices.

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 New Construction and Major Renovations 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 requirement 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 New Construction and Major Renovations prerequisite or credit that allows exemplary performance as specified in the LEED Reference Guide for Green Building Design & Construction, 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.

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).

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. Projects outside of the U.S. are not eligible for Regional Priority credits.

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