GREEN
BUILDING
OPERATIONS AND
MAINTENANCE

LEED Reference Guide for Green Building Operations and Maintenance
For the Operations and Maintenance of Commercial and
Institutional Buildings
2009 Edition

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

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

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.[1] 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[2]; 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.

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 abound. Energy efficiency measures have reduced operating expenses of the Denver Dry Goods building by approximately $75,000 per year. Students in day-lit schools in North Carolina consistently score higher on tests than students in schools using conventional lighting fixtures. Studies of workers in green buildings reported productivity gains of up to 16%, including less absenteeism and higher work quality, based on "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. The largest high-rise real estate project in Sacramento, the Joe Serna Jr. Environmental Protection Agency Headquarters Building (Cal/EPA), was able to save $610,000 a year by implementing energy efficiency measures that made it 34% more energy efficient than required by California's 1998 energy code. 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.

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

As LEED has evolved and matured, the program has undertaken new initiatives. In addition to a rating system specifically devoted to building operations 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 typologies, sectors, and project scopes: LEED for Core & Shell, LEED for New Construction, LEED for Schools, LEED for Neighborhood Development, LEED for Retail, LEED for Healthcare, LEED for Homes, and LEED for Commercial Interiors.

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

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

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

Features of LEED®

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

The LEED rating systems are designed for rating new and existing commercial, institutional, and residential buildings. They are based on accepted energy and environmental principles and strike a balance between known, established practices and emerging concepts. Each rating system is organized into 5 environmental categories: Sustainable Sites, Water Efficiency, Energy and Atmosphere, Materials and Resources, and Indoor Environmental Quality. An additional category, Innovation in Design (or Operations), addresses sustainable building expertise as well as measures not covered under the 5 environmental categories. Regional bonus points are another feature of LEED and acknowledge the importance of local conditions in determining best environmental design and construction practices.

The LEED Credit Weightings

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

LEED 2009 uses the U.S. Environmental Protection Agency's TRACI[1] environmental impact categories as the basis for weighting each credit. TRACI[3] was developed to assist with impact evaluation for life-cycle assessment, industrial ecology, process design, and pollution prevention. LEED 2009 also takes into consideration the weightings developed by the National Institute of

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

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

- All LEED credits are worth a minimum of 1 point.

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

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

- All LEED rating systems have 100 base points; Innovation in Design (or Operations) and Regional Priority credits provide opportunities for up to 10 bonus points.

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

1. A reference building is used to estimate the environmental impacts in 13 categories associated with a typical building pursuing LEED certification.

2. The relative importance of building impacts in each category are set to reflect values based on the NIST weightings.[4]

3. Data that quantify building impacts on environmental and human health are used to assign points to individual credits.

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

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

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

III. OVERVIEW AND PROCESS

The LEED Green Building Rating System for Existing Buildings: Operations & Maintenance is a set of performance standards for certifying the operations and maintenance of existing commercial or institutional buildings and high-rise residential buildings of all sizes, both public and private. The intent is to promote high-performance, healthful, durable, affordable, and environmentally sound practices in existing buildings.

Prerequisites and credits in the LEED for Existing Buildings: Operations & Maintenance Rating System address 7 topics:

- Sustainable Sites (SS)

- Water Efficiency (WE)

- Energy and Atmosphere (EA)

- Materials and Resources (MR)

- Indoor Environmental Quality (IEQ)

- Innovation in Operations (IO)

- Regional Priority (RP)

LEED prerequisites and credits have identical structures; see Section XV of this Introduction.

When to Use LEED for Existing Buildings: Operations & Maintenance

LEED for Existing Buildings: Operations & Maintenance was designed to certify the sustainability of ongoing operations of existing commercial and institutional buildings. All such buildings, as defined by standard building codes, are eligible for certification under LEED for Existing Buildings: Operations & Maintenance and include offices, retail and service establishments, institutional buildings (libraries, schools, museums, churches, etc.), hotels, and residential buildings of 4 or more habitable stories.

LEED for Existing Buildings: Operations & Maintenance provides owners and operators of existing buildings an entry point into the LEED certification process and is applicable to the following:

- building operations, processes, systems upgrades, minor space-use changes, and minor facility alterations or additions; and

- buildings new to LEED certification as well as buildings previously certified under LEED for New Construction, LEED for Schools, or LEED for Core & Shell; these may be either ground-up new construction or existing buildings that have undergone major renovations.

LEED for Existing Buildings: Operations & Maintenance encourages owners and operators of existing buildings to implement sustainable practices and reduce the environmental impacts of their buildings over their functional life cycles. Specifically, the rating system addresses exterior building site maintenance programs, water and energy use, environmentally preferred products and practices for cleaning and alterations, sustainable purchasing policies, waste stream management, and ongoing indoor environmental quality. LEED for Existing Buildings: Operations & Maintenance is targeted at single buildings, whether owner occupied, multitenanted, or multiple-building campus projects. It is a whole-building rating system; individual tenant spaces are ineligible.

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

Minimum Program Requirements

A project must adhere to LEED's Minimum Program Requirements (MPRs), or possess minimum characteristics in order to be eligible for certification under LEED 2009. These requirements define the categories of buildings that the LEED rating systems were designed to evaluate, and taken together serve three goals: (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. In order 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 non-compliance with any applicable MPRs. If such a circumstance occurs, no registration or certification fees paid to GBCI will be refunded.

NOTE: Exceptions to all the MPRs will be considered on a case-by-case basis for special circumstances. Direction on the nature of allowable exceptions is given in the Supplemental Guidance document.

Registration

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

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 accurate and complete.

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 will 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 LEED for Existing Buildings: Operations & Maintenance. 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, refer to the prerequisite or credit information found in the rating system and reference guide, and emphasize the intent of the prerequisite or credit. If possible, the project team

should offer potential solutions to the problem or a proposed interpretation. Follow the detailed instructions in LEED-Online.

Communications related to credit interpretation requests will be in electronic format.

Review and Certification
To earn certification under LEED for Existing Buildings: Operations & Maintenance, the applicant project must satisfy all the prerequisites plus credits worth the minimum number of points to warrant the desired project rating. 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 final application review. Please 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 Reference Guide for Green Building Operations & Maintenance, 2009. As building operation strategies and systems 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.. Updates and addenda will be accumulated between revisions and will be formally incorporated in major revisions. In the interim, between major revisions, USGBC may issue updates or addenda to clarify criteria.

The prerequisites, credits, amendments and addenda current at the time of project registration will continue to guide the project throughout its certification process.

Information Privacy and Policy Guidelines
For more information on the privacy policy of the U.S. Green Building Counil, Inc. (USGBC), 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.

Green Building Certification Institute, Inc. (GBCI) 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. CERTIFICATION STRATEGY

The project team can determine the most efficient approach to organizing the LEED for Existing Buildings: Operations & Maintenance credits. As an alternative to using the credit categories,

project teams and facility managers may find it helpful to regroup credits according to functional characteristics. This alternative organization may offer a more intuitive division of responsibilities among the team members. Below is a possible alternative regrouping that may help facilitate the planning process.

Materials in credits are associated with planning and executing a sustainable purchasing policy (MR Prerequisite 1). This group of credits includes purchase of sustainable items, such as ongoing consumables, durable goods including furniture and electric-powered equipment, facility alterations and additions, light bulbs, and food.

Materials out credits drive the implementation of a solid waste management policy (MR Prerequisite 2). These credits involve conducting waste stream audits and implementing alternative methods of disposal for ongoing consumables, durable goods, and debris from facility alterations and additions.

Administration credits assist in planning and logistics support in running a high-performance building. These credits involve conducting surveys to ensure occupants' comfort, providing alternative transportation, optimizing daylight and views, documenting sustainable building cost impacts, involving LEED Accredited Professionals, and exploring innovations in upgrades.

Green cleaning credits support a low environmental impact cleaning policy (EQ Prerequisite 3). These credits involve purchase of sustainable cleaning products and equipment, and assessment of custodial effectiveness.

Site management credits encompass site-specific standards to ensure sustainable maintenance and operations by groundskeeping staff. These credits cover management of building exterior and hardscape, pest management methods, water-efficient landscaping measures, light pollution reduction, effective stormwater management, nonroof heat reduction, and protection and restoration of open spaces.

Occupant health and productivity credits address improvements to indoor air quality and best practices. These include thermal comfort monitoring, increased ventilation, occupant-controlled lighting, and reduced particulates in air distribution.

Energy metrics credits focus on measurement of the building's energy performance and ozone protection. These credits include methods of refrigerator management, emissions reduction reporting, and optimized energy performance.

Operational effectiveness credits support best management practices (EA Prerequisite 1) for energy and water consumption. These include implementation of building commissioning, use of the building automation system, metering of energy usage and water consumption, cooling tower water management, indoor plumbing fixture efficiency, and nonpotable water use.

V. INITIAL CERTIFICATION VS. RECERTIFICATION

Any first-time certification application to the LEED for Existing Buildings: Operations & Maintenance program is considered an initial LEED for Existing Buildings: Operations & Maintenance certification. This includes applications for both buildings never certified under LEED and buildings previously certified under LEED for New Construction, LEED for Schools, or LEED for Core & Shell. Any LEED for Existing Buildings: Operations & Maintenance application for a building previously certified using LEED for Existing Buildings: Operations & Maintenance is considered a LEED for Existing Buildings: Operations & Maintenance recertification. These buildings can apply for recertification as frequently as each year but must file for recertification at least once every 5 years to maintain their LEED for Existing Buildings: Operations & Maintenance status; if projects do not recertify at the 5 year mark, their next application will be considered an initial certification

application. The project must recertify all prerequisites but may drop previously earned credits or add new credits as desired.

When registering for recertification, register as a separate project from the original existing building project but use the original project title and include the word "recertification" in the project name. There is no registration fee for registering a recertification project, but recertification project teams must contact GBCI to ensure that the registration fee is waived. The recertification fee is 50% of the fee for the project's LEED for Existing Buildings: Operations & Maintenance initial certification. This fee is due when the application for recertification review is submitted. For more information on how to begin recertification, contact LEED Customer Service. All LEED for Existing Buildings: Operations & Maintenance recertification projects must use LEED-Online.

All LEED for Existing Buildings recertification projects are required to register under the version of the rating system that is current in LEED-Online at the time of the recertification registration. Nevertheless, recertification project teams may opt to use a newer version if 1 becomes available during the recertification application process (i.e., if a project registered for recertification before LEED for Existing Buildings: Operations & Maintenance was required, it can upgrade to the new rating system version).

LEED for Existing Buildings: Operations & Maintenance offers 2 sets of LEED-Online documentation guidance for each credit: 1 for initial certification and another for recertification. The project team must use the proper guidance language for the credits as follows.

- Use initial certification language if the project is recertifying under a later version than its previous certification (i.e., LEED for Existing Buildings: Operations & Maintenance instead of Version 2.0).

- Use initial certification language for any credit that was not earned in the previous certification application, even if the versions are the same.

- Use recertification language if the project is recertifying under the same version as its previous certification, but only for the credits that were earned in the previous certification application.

The required performance period for credits earned in the initial certification is different from that for newly pursued credits. See additional explanation on the performance period in Section VII.

Recertification allows projects to maintain certified high-performance operations. When embarking on the LEED for Existing Buildings: Operations & Maintenance certification process for the first time, teams are encouraged to plan ahead for recertification. Realizing that changes in mechanics and staff will occur is the first step to maintaining LEED for Existing Buildings: Operations & Maintenance certification. For example, critical operating components will wear out and, if left in worn condition, cause indoor environmental quality, building performance, and the environment to suffer. Similarly, as changes are made in staff, responsibility for policies, programs, and plans will shift.

The project team should therefore set goals to help maintain efficient and clean performance. Such goals may include continued data collection, ongoing commissioning, and documentation of operational changes, records from purchases, and new product specs. Setting and maintaining such goals will make the recertification process easier. If management requires periodic reports on the building's operational status, keep these documents as reference for future LEED for Existing Buildings: Operations & Maintenance certification applications.

Because recertification is streamlined, projects already certified under LEED for Existing Buildings: Operations & Maintenance will have minimal documentation burden. Any project that seeks to add or change credits to improve its LEED rating must submit the initial certification documents for

those credits. In either scenario, a project seeking recertification must prove, using data appropriate to its goals, that it has maintained a level of LEED for Existing Buildings: Operations & Maintenance certification. For more information on recertification, please e-mail LEED Customer Service.

The following typical best practices will make a project's recertification process easier:

- For LEED-related policies and procedures that were in place at the time of initial certification and did not change before recertification under the same version of the rating system, record adherence to those policies and procedures through progress reports and other reporting methods. For example, record maintenance and repair activities throughout the building and site, and track occupants' purchasing and waste streams to verify performance goals.

- Update policies and procedures as changes occur on-site. Catalogue these changes and track implementation. For example, update building energy consumption in the ENERGY STAR Portfolio Manager tool on a regular basis.

- Maintain the minimum level of tenant occupancy.

- Track lease rates and occupants' satisfaction with the building and site to identify areas for improvement.

- When vendor contracts are renewed or put out to bid, make sure that sustainability components are retained in the new contracts.

- Stay informed of LEED for Existing Buildings updates, and adjust the building's sustainability measures accordingly.

LEED for Existing Buildings: Operations & Maintenance certifications are awarded according to the following scale:

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

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

VI. PERFORMANCE PERIOD

LEED for Existing Buildings: Operations & Maintenance certification application includes performance data for the building and site over the performance period—the continuous, unbroken time during which sustainable operations performance is being measured. The performance period may not have any gaps, defined as any period of time longer than 1 full week.

Requirements for Initial Certification

Some prerequisites and credits in LEED for Existing Buildings: Operations & Maintenance require that operating data and other documentation be submitted for the performance period. For the initial LEED for Existing Buildings: Operations & Maintenance certification, the performance period is the most recent period of operations preceding certification application; it must be a minimum of 3 months for all prerequisites and credits except Energy and Atmosphere Prerequisite 2 and Credit 1, which have longer minimum durations of 1 year. At the project team's option, the performance period for any prerequisite or credit may be extended to a maximum of 24 months preceding certification application.

Consistent start times and durations of the performance periods for each prerequisite and credit are preferred but not strictly necessary. However, all performance periods must overlap and terminate

within 1 week of each other, as illustrated in Table 1. In this example, each performance period is at least 3 months, and the termination dates range from April 20 through April 26.

Table 1. Sample Performance Period

Credit	Start	End*	Duration**
WE 3, Water-Efficient Landscaping	February 22, 2007	April 20, 2008	14 months
SS 6, Stormwater Management	April 6, 2007	April 22, 2008	12.5 months
SS 2, Building Exterior and Hardscape Management Plan	August 25, 2007	April 25, 2008	8 months
WE 1, Minimum Indoor Plumbing Fixture and Fitting Efficiency	January 12, 2008	April 26, 2008	3.5 months
* All performance periods must end within the same 7-day interval. ** Minimum duration = 3 months; maximum duration = 24 months.			

Application Submittal upon Completion of the Performance Period

To ensure that certification is awarded based on current building performance data, LEED for Existing Buildings: Operations & Maintenance certification applications must be submitted to GBCI for review within 60 calendar days of the end of the performance periods. The 60-day period starts with the day following the last date of the performance period termination interval. In the example above, the termination interval ends on April 26, 2008. The certification application therefore must be submitted on or before May 28, 2008.

Performance Period Best Practices

USGBC encourages initial LEED for Existing Buildings: Operations & Maintenance applicants to use a longer performance period, which will provide a more robust picture of the building's operations. For example, a full year of data will reflect seasonal variations in resource consumption and occupants' behavior, such as commuting choices. Ideally, the performance period should be identical across all prerequisites and credits.

Requirements should be fully implemented before the start of the performance period so that the data collected to document compliance reflect any changes. If major changes to building operating procedures or equipment are made during the performance period, collect at least 3 months of data afterward to help identify any new trends in the performance results.

Performance Period for Recertification

The performance period for recertification depends on whether the credit is newly pursued. For prerequisites and all credits earned in the initial LEED for Existing Buildings: Operations & Maintenance certification, the performance period is the entire period between the previous certification and the current application. For all credits not earned in the initial LEED for Existing Buildings: Operations & Maintenance certification, the performance period is the same as for initial certification.

The performance period for recertification applications can be as short as 1 year and as long as 5 years.

Performance data for the entire performance period must be submitted with LEED for Existing Buildings: Operations & Maintenance recertification applications, as specified in the recertification submittal language. The required performance data must be provided for each year of the performance period so that ongoing annual performance is demonstrated. If data for a building do not reflect the entire performance period, submit an application for first-time LEED for Existing Buildings: Operations & Maintenance certification.

VII. LEED-ONLINE DOCUMENTATION REQUIREMENTS

All LEED for Existing Buildings: Operations & Maintenance certification applications must include the following:

- Required LEED-Online documentation (general project documentation, documentation for all prerequisites, and documentation for all pursued credits).

- Additional project narratives, as listed below.

Project Narrative

LEED for Existing Buildings: Operations & Maintenance requires the submission of an overall project narrative with the completed credit documentation. 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. Project teams must address all the required elements listed below, providing details and clarifications where appropriate, and they may include any optional elements that are helpful in describing the project.

1. Project Summary and Scope
   a. Briefly describe the factors that motivated the team to seek LEED for Existing Buildings: Operations & Maintenance certification for this building.

   b. Indicate whether the project is a single building, multiple buildings, campus, or neighborhood.

2. Building and Site
   a. Note the project location and describe the building context, setting, and surrounding area.

   b. Document the total site area and footprint of the vehicle parking area, if any.

   c. If the project is part of a multibuilding site or campus, briefly describe the surrounding buildings and setting.

3. Occupancy and Usage
   a. Document the percentage of total floor area currently occupied or being used.

   b. List the major space use types in the building and the percentage of total floor area for each.

   c. If the building is not 100% owner occupied, provide the percentage of total floor area occupied by the owner and tenants, and the total number of tenants.

Optional Project Summary Elements

1. Applicant Organization
   - Describe the mission and function of the ownership organization, institution, or firm.

   - Provide the total number of employees in the organization (all facilities).

   - Provide the total number and total floor area of the organization's buildings.

   - Provide the name, number, rating system, and certification levels for organization buildings previously certified under LEED.

2. Building History

- Provide previous construction and occupancy dates.

- Describe changing uses over the building's lifetime.

- Describe any major upgrades over the building's lifetime.

3. Applicant Project Team

- Describe how the certification process was led and managed.

- Describe how personnel involved in the ongoing management of the building, including internal staff and external contractors, were engaged in the LEED for Existing Buildings: Operations & Maintenance implementation and documentation process.

- Describe the level of management buy-in and how the buy-in was achieved.

4. Project Challenges

- Describe challenges that arose during preparation for LEED for Existing Buildings: Operations & Maintenance certification, the reasons these challenges arose, and the team's approach to overcoming them.

Credit Substitution

LEED for Existing Buildings: Operations & Maintenance does not allow credit substitution using other LEED rating systems. Because LEED for Existing Buildings: Operations & Maintenance differs significantly from LEED for Existing Buildings Version 2.0, currently registered LEED for Existing Buildings projects that want to use LEED for Existing Buildings: Operations & Maintenance credits need to switch to the new version in entirety. USGBC expects that most projects will find this switch feasible and advantageous.

The following example, which uses Energy and Atmosphere Prerequisite 2 and Credit 1, illustrates why USGBC does not accept credit substitution. LEED for Existing Buildings Version 2.0 requires all building projects registered before June 26, 2007, to achieve a minimum ENERGY STAR rating of 60 and all projects registered on or after that date to achieve 67 (2-point minimum). However, LEED for Existing Buildings: Operations & Maintenance requires all projects to achieve a minimum ENERGY STAR score of 65 (for projects registered before June 26, 2007) or 69 (for projects registered afterward). Thus, projects that choose to upgrade from Version 2.0 to Operations & Maintenance need to assess whether achieving the higher ENERGY STAR rating is feasible. A project able to achieve a 65 or 69 may decide to upgrade to Operations & Maintenance; projects that cannot will stay with Version 2.0.

USGBC strongly encourages project teams for existing buildings to weigh the operational savings benefits of the LEED for Existing Buildings: Operations & Maintenance Rating System. LEED for Existing Buildings: Operations & Maintenance is a better fit for most projects because it offers prerequisites targeted at ongoing operations, explicit guidance for multitenant buildings, reduced documentation burden, more specific and consistent instructions for the required documentation, more options to earn points toward certification, and reduced overlap with the new construction rating systems.

VIII. MULTITENANT BUILDINGS

LEED for Existing Buildings: Operations & Maintenance certification applies only to whole buildings. Multitenant buildings (single buildings that contain floor area under the ownership or tenancy of more than 1 entity) must meet the LEED for Existing Buildings: Operations & Maintenance minimum program requirements (see Section IV). That is, the project for a multitenant building

must involve at least 90% of the total gross floor space. Calculate project scope floor space by dividing the project's floor space by the total gross floor space.

Multitenant buildings may face particular challenges in earning LEED for Existing Buildings: Operations & Maintenance credits. Prerequisites should generally be possible for multitenant buildings, since they address base building systems or are limited to areas under management control. However, many credits require commitment and cooperation from tenants. Multitenant building project teams must determine which credits can be pursued based on the lease structure and management situation. They may either pursue credits that do not require tenant commitment or obtain commitments from enough tenants to achieve credit requirements. Projects that have a few large tenant spaces may be able to satisfy participation requirements more easily than buildings with many small tenant spaces.

 All prerequisites (except IEQ Prerequisite 2: Environmental Tobacco Smoke Control) and credits offer a 10% floor area exemption option for multitenant buildings. If it is not possible to gather the necessary tenant data for these credits, or the applicant does not have control over the required element, the project team can exempt up to 10% of the building's gross floor area. LEED-Online will indicate whether it is also necessary to submit a narrative listing the management, occupancy, and floor area of all exempted spaces and summarizing the attempts the team made to acquire the data from those tenants.

IX. FACILITY ALTERATIONS AND ADDITIONS

Although LEED for Existing Buildings: O&M focuses mainly on sustainable ongoing building operations, it also embraces sustainable alterations and new additions to existing buildings.

In general parlance, alterations and additions may range from a complete gutting, major renovation, or large new wing to the replacement of an old window, sheet of drywall, or section of carpet.

In LEED for Existing Buildings: O&M, however, alterations and additions has a specific meaning. It refers to changes that affect usable space in the building. Mechanical, electrical, or plumbing system upgrades that involve no disruption to usable space are excluded.

Only alterations and additions within the following limits are eligible for inclusion in LEED for Existing Buildings: O&M certification:

- Maximum. Alterations that affect no more than 50% of the total building floor area or cause relocation of no more than 50% of regular building occupants are eligible. Additions that increase the total building floor area by no more than 50% are eligible. Buildings with alterations or additions exceeding these limits should pursue certification under the LEED for New Construction program.

- Minimum. Alterations that include construction activity by more than 1 trade specialty, make substantial changes to at least 1 entire room in the building, and require isolation of the work site from regular building occupants for the duration of construction are eligible. Additions that increase the total building floor area by at least 5% are eligible. Alterations or additions below these limits are considered repairs, routine replacements, or minor upgrades and are ineligible to earn points under LEED for Existing Buildings: O&M. The minimum applies to Materials and Resources (MR) Credits 3 and 9, and Indoor Environmental Quality (IEQ) Credit 1.5.

X. 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 Existing Buildings: Operations &

Maintenance 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 Operations point can be earned by satisfying more than 1 compliance path if their benefits are additive. See the Innovation in Operations credit section for further details.

The credits for which exemplary performance points are available through expanded performance are noted throughout this reference guide and in LEED-Online by the logo shown below.

The list for exemplary performance points available is as follows:

Sustainable Sites

SS Credit 4	Alternative Commuting Transportation
SS Credit 5	Site Development—Protect or Restore Open Space
SS Credit 6	Stormwater Quantity Control
SS Credit 7.1	Heat Island Reduction—Nonroof
SS Credit 7.2	Heat Island Reduction—Roof

Water Efficiency

WE Credit 1, Option 2	Water Performance Measurement—Submetering
WE Credit 2	Additional Indoor Plumbing Fixture and Fitting Efficiency
WE Credit 4, Option 2	Cooling Tower Water Management—Nonpotable Water Source Use

Energy and Atmosphere

EA Credit 1	Optimize Energy Efficiency Performance
EA Credit 4	On-site and Off-site Renewable Energy

Materials and Resources

MR Credit 1	Sustainable Purchasing—Ongoing Consumables
MR Credit 2	Sustainable Purchasing—Durable Goods
MR Credit 3	Sustainable Purchasing—Facility Alterations and Additions
MR Credit 4	Sustainable Purchasing—Reduced Mercury in Lamps
MR Credit 5	Sustainable Purchasing—Food
MR Credit 7	Solid Waste Management—Ongoing Consumables
MR Credit 9	Solid Waste Management—Facility Alterations and Additions

Indoor Environmental Quality

IEQ Credit 2.2	Controllability of Systems—Lighting
IEQ Credit 2.4	Daylight and Views
IEQ Credit 3.2	Green Cleaning—Custodial Effectiveness Assessment
IEQ Credit 3.3	Green Cleaning—Purchase of Sustainable Cleaning Products and Materials

XI. REGIONAL PRIORITY CREDITS

To provide incentive to address geographically specific environmental issues, USGBC regional councils and chapters have identified 6 credits per rating system that are of particular importance to specific areas. Each regional priority credit is worth an additional 1 point, and a total of 4 regional priority points may be earned. Upon project registration, LEED-Online automatically determines a

project's regional priority credits based on its zip code. If the project achieves more than 4 regional priority credits, the team can choose the credits for which these points will apply. The USGBC website also contains a searchable database of regional priority credits.

XII. POLICY MODEL

Any policies required throughout the LEED for Existing Buildings: Operations & Maintenance Rating System must, at a minimum, contain the following components in the LEED for Existing Buildings: Operations & Maintenance Policy Model. Project teams are not required to develop separate policies in this format to achieve the prerequisites and credits, but they must highlight these components in their existing policies.

1. Scope
    a. Describe the facility management and operations processes to which the policy applies.

    b. Describe the building components, systems, and materials to which the policy applies.

2. Performance Metric
    a. Describe how performance will be measured or evaluated.

3. Goals
    a. Identify the goals that the project strives to meet by adhering to the policy.

    b. Note: Although project teams must set goals, documentation of actual achievements is not required to demonstrate compliant policies. Teams are encouraged to set high goals and work toward achieving them.

4. Procedures and Strategies
    a. Outline the procedures and strategies in place to meet the goals and intent of the policy.

5. Responsible Party
    a. Identify the teams and individuals involved in implementing the policy.

    b. Identify and outline the major tasks for the responsible parties.

6. Time Period
    a. Identify the time period over which the policy is applicable.

XIII. TOOLS FOR REGISTERED PROJECTS

LEED offers additional resources for LEED for Existing Buildings: Operations & Maintenance teams on the USGBC website, at http://www.usgbc.org/projecttools. The Registered Projects Tools website provides resources for starting the project, including rating system errata, rating system version comparisons, a scorecard, documentation requirements, and referenced industry standards. Also consult the website for the following:

Minimum narrative requirements. Most LEED for Existing Buildings: Operations & Maintenance submittal paths require 1 or more narrative descriptions of the features or strategies the project team used in pursuit of a LEED prerequisite or credit. This resource explains the narrative requirements, including format, length, language, and content, and it defines unique circumstances.

Policy, program, and plan models. This resource describes the requirements and structure of policy, program, or plan submittals. It defines the components of LEED for Existing Buildings: Operations &

Maintenance project policies, such as scope, performance metrics, goals, procedures and strategies, responsible party, and time period. It also gives guidance on resources and implementation, performance metrics, and quality assurance and quality control processes.

Declarant definitions and other definitions. This resource describes the team members who are required to sign off on certain documentation requirements and indicates the prerequisites and credits for which each team member is responsible. The required declarant is noted in the corresponding credit documentation section of LEED-Online.

Licensed Professional Exemption Form. The Licensed Professional Exemption Form 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.

XIV. HOW TO USE THIS REFERENCE GUIDE

The LEED Reference Guide is a supporting document to the LEED for Existing Buildings: Operations & Maintenance Rating System. The guide helps project teams understand the criteria, the reasons behind them, strategies for implementation, and documentation requirements. It includes examples of strategies that can be used in each category, case studies of buildings that have implemented these strategies successfully, and additional resources. It does not provide an exhaustive list of strategies for meeting the criteria or all the information that a project team needs to determine the applicability of a credit to the project.

Rating System Pages

The rating system, published in its entirety on the USGBC website, is imbedded in this reference guide. Each prerequisite and credit discussion begins with a gray page that mirrors the rating systems' Intent and Requirements. This Reference guide addresses the Intents and Requirements for the LEED 2009 Existing Buildings: Operations & Maintenance Rating System. The Potential Technologies and Strategies included in the rating systems are not explicitly called out in the reference guide, refer to the published rating systems as desired.

Prerequisite and Credit Format

Each prerequisite or credit is organized in a standardized format for simplicity and quick reference. The first section summarizes the main points regarding the green measure and includes the intent, requirements, required submittals for certification, and a summary of any referenced industry standard. Subsequent sections provide supporting information to help teams interpret the measure and link to various resources and examples. The sections for each credit are described in the following paragraphs.

Intent identifies the main sustainability goal or benefit of the prerequisite or credit.

Requirements specifies the criteria that satisfy the prerequisite or credit and the number of points available. The prerequisites must be achieved; the credits are optional, but each contributes to the overall project score. Some credits have 2 or more paths with cumulative points. Other credits have several options from which the project team must choose. For example, Energy and Atmosphere Credit 1, Optimize Energy Efficiency Performance, has 3 options, but a project can apply for only 1, depending on the type of building.

Benefits and Issues to Consider addresses the environmental benefits of the activity encouraged by the prerequisite or credit, and **econom**ic considerations related to first costs, life-cycle costs, and estimated savings.

Related Credits acknowledges the trade-offs and synergies within the LEED rating system credit categories. Achieving a particular credit may make it worthwhile and comparatively easy to pursue related credits; the converse is also possible.

The **Summary of Referenced Standards**, where applicable, introduces the required standards used to measure achievement of the credit intent. Teams are strongly encouraged to review the full standard and not rely on the summary.

Implementation discusses specific methods or assemblies that facilitate achievement of the requirements.

Timeline and Team guides the project team by identifying who should lead an effort and when the tasks should begin.

Calculations offers sample formulas or computations that determine achievement of a particular prerequisite or credit. Most calculations are available in LEED-Online.

The **Documentation Guidance** section lists the first steps in preparing to complete the LEED-Online documentation requirements.

Examples illustrates strategies for credit achievement.

Exemplary Performance, if applicable, details the level of performance needed for the award of points in addition to those for credit achievement.

Regional Variations outlines concerns specific to the geographic location of the building.

Resources offers suggestions for further research and provide examples or illustrations, detailed technical information, or other information relevant to the prerequisite or credit. The resources include websites, online materials, and printed books and articles that can be obtained directly from the organizations listed.

Definitions clarifies the meanings of certain terms relevant to the prerequisite or credit. These may be general terms or terms specific to LEED for Existing Buildings: Operation & Maintenance. A complete glossary is found at the end of this reference guide.

Endnotes

1. Energy Information Administration. "Emissions of Greenhouse Gas Report." Report #DOE/EIA-0573(2006). Released 28 November 2007. http://www.eia.doe.gov/oiaf/1605/ggrpt/carbon.html#commercial

2. Office of the Federal Environmental Executive. http://ofee.gov/wpr/wastestream.asp Last modified 24 April 2008.

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

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