# 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 percent of the total energy and more than 60 percent 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[i]. Each day 5 billion gallons of potable water is used solely to flush toilets. A typical North American commercial building generates about 1.6 pounds of solid waste per employee per day.[1] 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. For example, energy efficiency measures have the 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 percent, including reductions in absenteeism and improved work quality, based on "people-friendly" green design. Karges Faulconbridge, Inc. renovated a former grocery store for its new headquarters and diverted 88 percent of the construction waste from landfills through reuse or recycling. The largest high-rise real estate project in Sacramento, the Joe Serna Jr. Environmental Protection Agency Headquarters Building (Cal/EPA), was able to generate $610,000 in annual savings by implementing energy efficiency measures, making it 34 percent 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.

1 Office of the Federal Environmental Executive. <http://ofee.gov/wpr/wastestream.asp> Last mondified 24 April 2008.

## II. LEED® Green Building Rating System™

### History

Following the formation of the U.S. Green Building Council In 1993, 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, members established a committee comprising architects, real estate agents, a building owner, a lawyer, an environmentalist and industry representatives to focus on this challenge. This cross section of people and professions added a richness and depth both to the process and to the ultimate product—the Leadership in Energy and Environmental Design (LEED) green building certification program. The first LEED Pilot Project Program, known as LEED Version 1.0, was launched at the USGBC Membership Summit in August 1998. After extensive modifications, the LEED Green Building Rating System Version 2.0 was released in March 2000.

As LEED has evolved and matured, the program has undertaken new initiatives. LEED addresses the different project development and delivery processes that exist in the U.S. building design and construction market.

### LEED Today

The LEED Green Building Rating System is a voluntary, consensus-based, market-driven building rating system based on existing proven technology. It evaluates environmental performance from a whole-building perspective over a building's life-cycle, providing a definitive standard for what constitutes a green building. The development of the LEED Green Building Rating System was initiated by USGBC members, involves all segments of the building industry, and has been open to public scrutiny.

LEED has five environmental categories: Sustainable Sites, Water Efficiency, Energy & Atmosphere, Materials & Resources, and Indoor Environmental Quality. A sixth category, Innovation in Operations, addresses sustainable building expertise as well as design measures not covered under the five environmental categories.

The measurement system is designed for rating and certifying new and existing commercial, institutional, and residential buildings. It is based on accepted energy and environmental principles and strikes a balance between known, established practices and emerging concepts. It is a performance-oriented system in which points are earned for satisfying criteria that address specific environmental impacts inherent in the design, construction, and operations and maintenance of buildings.

Different levels of LEED green building certification are awarded based on the total points earned. The system is designed to be comprehensive in scope yet simple in operation.

The green design field is growing and changing daily. New technologies and products are coming into the marketplace, and innovative designs are proving their effectiveness. The rating systems and the reference guides are evolving as well. Teams wishing to certify their projects with LEED should use the version of the rating system that is current at the time of their registration.

USGBC highlights new developments on its website on a continual basis, at www.usgbc.org.

## III. Overview and Process

The LEED Green Building Rating System for Existing Buildings: 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: O&M Rating System address six topics:

- ❑ Sustainable Sites (SS)
- ❑ Water Efficiency (WE)
- ❑ Energy & Atmosphere (EA)
- ❑ Materials & Resources (MR)
- ❑ Indoor Environmental Quality (EQ)
- ❑ Innovation in Operations (IO)

LEED prerequisites and credits have identical structures.

- ❑ The Intent section describes the objective of each prerequisite or credit.
- ❑ The Requirements section describes what must be done to earn each prerequisite or credit.
- ❑ The Potential Strategies & Technologies section describes possible methods for achieving each prerequisite or credit. More detail on strategies, technologies, and resources is provided in the LEED for Existing Buildings: O&M Reference Guide.

### When to Use LEED for Existing Buildings: Operations & Maintenance

LEED for Existing Buildings: O&M 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: O&M. They include but are not limited to offices, retail and service establishments, institutional buildings (libraries, schools, museums, churches, etc.), hotels, and residential buildings of four or more habitable stories.

LEED for Existing Buildings: O&M 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 underwent major renovations.

LEED for Existing Buildings: O&M encourages owners and operators of existing buildings to implement sustainable operations and maintenance practices and to reduce the environmental impact 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: O&M 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 cleanly and clearly fit the defined scope of only one LEED rating system; others may be applicable to two or more. USGBC encourages the project team to tally a potential point total using the checklists for all applicable rating systems. 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 one rating system applies, the project team can decide which one to pursue. For assistance in choosing the most appropriate LEED rating system, please e-mail leedinfo@usgbc.org.



### Registration

Project teams interested in obtaining LEED for Existing Buildings: O&M Certification for their buildings must first register the project with USGBC. Projects can be registered on the USGBC website (www.usgbc.org) in the USGBC Store, under LEED. 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 the USGBC and provides access to software tools, errata, critical communications, and other essential information.

### LEED-Online

Once a project is registered, the project team begins to collect information and perform calculations to meet the requirements for the prerequisites and credits. It is helpful to designate a LEED team leader who will be responsible for managing the compilation of this information.

Project teams pursuing LEED certification are required to use LEED-Online and its submittal templates. These templates contain embedded calculators and are instrumental in documenting fulfillment of credit requirements and prompting for correct and complete supporting information. This enables teams to submit 100 percent of its documentation online in an easy-to-use format. LEED-Online stores all LEED information, resources, and support in one centralized location. LEED-Online enables team members to upload credit templates, view and submit credit interpretation requests (CIRs), manage important project details, contact customer service, and communicate with reviewers throughout the LEED review process.

### Credit Interpretation Requests and Rulings

In some cases, a LEED project team may encounter challenges in applying a LEED for Existing Buildings: O&M prerequisite or credit to its particular project. These difficulties may arise from instances where the Reference Guide does not sufficiently address a specific issue or a conflict requires resolution. To address such issues, USGBC has established the LEED for Existing Buildings: Operations & Maintenance Credit Interpretation Ruling (CIR) process. See the CIR section of the USGBC website for more information, at www.usgbc.org.

The credit interpretation process is summarized as follows:

1. Project teams should review previously posted credit interpretation requests and USGBC responses on the CIR webpage. Many questions can be resolved by reviewing existing CIRs. Note that CIRs for other rating systems and LEED for Existing Buildings v2.0 are not necessarily applicable.
2. If no existing CIRs are relevant to the project, the LEED project team should submit an online credit interpretation request. The description of the challenge encountered by the project team should be brief but explicit, be based on 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 and solicit approval or rejection of their proposed interpretation. Follow the detailed instructions in the CIR Guidelines document available on the CIR webpage in

the LEED section of the USGBC website.

3. USGBC will rule on your request electronically according to the posted schedule, either through a posting on the CIR page or via e-mail correspondence.

### Review and Certification

To earn LEED certification, the applicant project must satisfy all the prerequisites and credits worth the minimum number of points to attain the desired project rating under LEED for Existing Buildings: O&M. Projects will need to comply with the version that is current at the time of project registration.

### Appeals

Appeals may be filed after the final application review. Please see the Certification Process page of the USGBC website for more information on appeals.

### Fees

Information on certification fees can be found in the Register Your Project section of the USGBC website. USGBC will acknowledge receipt of your application and proceed with application review when all project documentation and payments have been submitted.

### Updates and Addenda

This is the first edition of the LEED for Existing Buildings: O&M Reference Guide, dated July 2008. As LEED for Existing Buildings: O&M continues 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 for Existing Buildings: O&M. Updates and addenda will be accumulated between revisions and will be formally incorporated in major revisions. In the interim, between major revisions, USGBC may use its consensus process to clarify criteria.

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

## IV. Minimum Program Requirements

The project building (or buildings) must meet the following minimum requirements to pursue certification:

- ❑ The buildings must be fully occupied (defined as average or typical occupancy expected during normal operations) for at least the 12 continuous months preceding certification application. Vacant tenant space measuring 25% or less of the building floor area is permitted, as time-averaged over the previous 12 months. For an apartment building, hotel, dormitory, convention center, classroom, sports facility, or similar structure, ordinary partial occupancy is permitted.
  - At least 75% of the floor area must be physically occupied at normal capacity and the corresponding building systems shall operate normally for a year.
  - If the space is leased but unoccupied, it does not meet the minimum requirement. However, USGBC will allow time weighting; full occupancy for a couple of months may counterbalance a 60% occupancy level during the other months of the certification period.
  - USGBC will not disqualify the project from achieving certification if occupancy unexpectedly falls below 75% provided this occurs after registration, late in the certification process, and under normal operations, and provided the certification application is submitted within two months of the decline.
- ❑ The project scope must include 100% of the total floor area of each building in the certification application, with the following exception: If operations are under separate management control for a portion of a building, up to 10% of its floor area may be excluded for that reason. Other exemptions are prohibited.
- ❑ The building must be in compliance with federal, state, and local environmental laws and regulations, including but not limited to those addressing asbestos, PCBs, water discharge, and water management. USGBC reserves the right to revoke LEED certification upon knowledge of noncompliance.

## V. Certification Strategy

Each project team can determine the most efficient approach to organizing the LEED for Existing Buildings: O&M credits. As an alternative to using the LEED for Existing Buildings: O&M 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 of LEED for Existing Buildings: O&M credits 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 support the development of a solid waste management policy (MR Prerequisite 2). These credits involve conducting waste-stream audits and implementing methods of disposal for ongoing consumables, durable goods, and 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 for tenants, 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 are a group of site-specific standards to ensure sustainable maintenance and operations by groundskeeping staff. These credits include 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 include 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 minimum 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.

## VI. Initial Certification vs. Recertification

Any first-time certification application to the LEED for Existing Buildings: O&M program is considered an initial LEED for Existing Buildings certification. This includes both applications for buildings that have never been 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: O&M application for a building previously certified using LEED for Existing Buildings: O&M is considered a LEED for Existing Buildings: O&M recertification. These buildings can apply for recertification as frequently as each year but must file for recertification at least once every five years to maintain their LEED for Existing Buildings: O&M status.

To register 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 LEED Customer Service at leedinfo@usgbc.org to ensure that the registration fee is waived. The recertification fees are 50% of the fee shown on our site for LEED for Existing Buildings: O&M initial certification. This fee is due when the the application for recertification review is submitted. For more information on how to begin recertification, contact LEED Customer Service at leedinfo@usgbc.org. All LEED for Existing Buildings: O&M recertification projects must use LEED-Online. The project must recertify all prerequisites but may drop previously earned credits or add new credits as desired.

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

LEED for Existing Buildings: O&M offers two sets of submittal template language for each credit: one for initial certification and another for recertification. The project team must use the proper submittal 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: O&M 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, below.

When embarking on the LEED for Existing Buildings: O&M certification process for the first time, USGBC encourages teams to keep future LEED for Existing Buildings: O&M certifications in mind. Critical operating components will wear out, and if left in worn condition, these components can have adverse consequences on indoor environmental quality, building performance, and the environment. Similarly, as changes are made in staff, responsibility for policies, programs, and plans will shift. Realizing that these changes in mechanics and staff will occur is the first step to maintaining and achieving LEED for Existing Buildings: O&M certification.

Recertification allows projects to maintain their certified high-performance operations. The project team should set goals to help maintain efficient and clean performance. Such goals may include continued data collection, ongoing commissioning, and documentation of operational changes, receipts 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: O&M certification applications.

Because recertification is streamlined with initial LEED for Existing Buildings: O&M certification, projects 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 LEED for Existing Buildings project seeking recertification must prove, using data appropriate to its goals, that it has maintained a level of LEED for Existing Buildings: O&M certification. For more information on recertification, please e-mail LEED Customer Service at leedinfo@usgbc.org.

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, 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, as energy inputs change, update building energy consumption in the ENERGY STAR Portfolio Manager Tool.
- 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.

## VII. Performance Period

Documentation required for LEED for Existing Buildings: O&M 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 one full-week.

### Requirements for Initial Certification

For the initial LEED for Existing Buildings: O&M certification, the performance period is the most recent period of operations preceding certification application and must be a minimum of three months for all prerequisites and credits except Energy & Atmosphere Prerequisite 2 and Credit 1, which have longer minimum durations. 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.

Some credits in LEED for Existing Buildings: O&M require that operating data and other documentation be submitted for the performance period. For the initial LEED for Existing Buildings: O&M certification, *performance period* is defined as the most recent period of operations and must be, at a minimum, three months. For LEED for Existing Buildings: O&M credits that were achieved in the initial certification and are being pursued for recertification, the performance period is the entire period between the previous certification and the current 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 one week of each other, as illustrated in Table 1. In this example, each performance period is at least three months, and the termination dates range from April 20 through April 26.

**Table 1.** Performance Period Example

| 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 seven-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: O&M certification applications must be submitted to the USGBC 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: O&M 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, such as irrigation rates and heating and cooling loads, and occupant behavior, such as commuting choices. Ideally, the performance period should be identical across all prerequisites and credits, policy, operations, and equipment changes undertaken to meet LEED for Existing Buildings: O&M.

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 three 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: O&M 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: O&M certification, the performance period is the same as for initial certification.

The performance period for these recertification applications can be as short as one year and as long as five years.

Performance data for the entire performance period must be provided with LEED for Existing Buildings: O&M 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: O&M certification.

## VIII. Submittals

All LEED for Existing Buildings: O&M certification applications must include the following:

- ❑ Completed LEED-Online submittal templates, including
  - general submittals template and all required document uploads;
  - templates for all prerequisites and all required document uploads; and
  - templates for all pursued credits and all required document uploads.
- ❑ Additional project narrative items, including all requirements listed below.

### General Submittals: Project Narrative

LEED for Existing Buildings: Operations & Maintenance requires the submission of an overall project narrative with the completed submittal templates. The project narrative, part of the general

submittals template, describes the applicant's organization, building, site, and team. It helps the LEED for Existing Buildings: O&M review team understand the major elements of the project and building performance, and it also aids USGBC 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 motivating LEED for Existing Buildings: O&M implementation and 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, basic 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. Provide the major space usage 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: O&M 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: O&M certification, the reasons these challenges arose, and the team's approach to overcoming them.



**Credit Substitution**

LEED for Existing Buildings: O&M does not allow credit substitution using other LEED rating systems. LEED for Existing Buildings: O&M differs significantly from LEED for Existing Buildings version 2.0 and is the leading rating system of operational sustainability. Currently registered LEED for Existing Buildings projects that want to use LEED for Existing Buildings: O&M 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 (two-point minimum). However, LEED for Existing Buildings: O&M 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 O&M 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 O&M; 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: O&M Rating System. LEED for Existing Buildings: O&M 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.

## IX. Multitenant Buildings

LEED for Existing Buildings: O&M certification applies only to whole buildings. Multitenant buildings (single buildings that contain floor area under the ownership or tenancy of more than one entity) must meet the LEED for Existing Buildings: Operations & Maintenance minimum program requirements (see page 11). 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: O&M credits. All prerequisites should 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.

Certain 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, the project team can exempt up to 10% of the building's gross floor area. The LEED-Online credit templates 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.

The exemption is optional for the following credits:

**Materials & Resources**

| | |
|---|---|
| MR Credit 1 | Sustainable Purchasing—Ongoing Consumables |
| MR Credit 2.1 | Sustainable Purchasing—Durable Goods, electric |
| MR Credit 2.2 | Sustainable Purchasing—Durable Goods, furniture |
| 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 8 | Solid Waste Management—Durable Goods |
| MR Credit 9 | Solid Waste Management—Facility Alterations and Additions |

**Indoor Environmental Quality**

| | |
|---|---|
| EQ Credit 1.2 | IAQ Best Management Practices—Outdoor Air Delivery Monitoring |
| EQ Credit 3.2 | Green Cleaning – Custodial Effectiveness Assessment, Score of ≤ 3 |
| EQ Credit 3.3 | Green Cleaning – Custodial Effectiveness Assessment, Score of ≤ 2 |
| EQ Credit 3.4 | Green Cleaning – Sustainable Cleaning Products and Materials, 30% |
| EQ Credit 3.5 | Green Cleaning – Sustainable Cleaning Products and Materials, 60% |
| EQ Credit 3.6 | Green Cleaning – Sustainable Cleaning Products and Materials, 90% |
| EQ Credit 3.7 | Green Cleaning – Sustainable Cleaning Equipment |

## X. 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. For alterations, those that affect no more than 50% of the total building floor area or cause relocation of no more than 50% of regular building occupants. For additions, those that increase the total building floor area by no more than 50%. Buildings with alterations or additions exceeding these limits should pursue certification under the LEED for New Construction program.
- Minimum. For alterations, projects that include construction activity by more than one trade specialty, make substantial changes to at least one entire room in the building and require isolation of the work site from regular building occupants for the duration of construction. For additions, those that increase the total building floor area by at least 5%. 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 & Resources (MR) Credits 3 and 9, and Indoor Environmental Quality (EQ) Credit 1.5.

## XI. 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: O&M 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 one compliance path, an Innovation in Operations point can be earned by satisfying more than one compliance path if their benefits are additive. See the Innovation in Operations chapter for further details.

The credits for which exemplary performance points are available through expanded performance or scope are noted throughout this reference guide and on the submittal templates, and they are listed below.

**Sustainable Sites**

| | |
|---|---|
| SS Credit 4 | Alternative Commuting Transportation |
| SS Credit 5 | Reduced Site Disturbance—Protect or Restore Open Space |
| SS Credit 6 | Stormwater Management |
| SS Credit 7.1 | Heat Island Reduction – Non-Roof |
| SS Credit 7.2 | Heat Island Reduction – Roof |

**Water Efficiency**

| | |
|---|---|
| WE Credit 1.2 | Water Performance Measurement – Submetering |
| WE Credit 2 | Additional Indoor Plumbing Fixture and Fitting Efficiency |
| WE Credit 4.2 | Cooling Tower Water Management – Nonpotable Water Source Use |

**Energy & Atmosphere**

| | |
|---|---|
| EA Credit 4 | Renewable Energy |

**Materials & Resources**

| | |
|---|---|
| MR Credit 1 | Sustainable Purchasing—Ongoing Consumables |
| MR Credit 2.1 | Sustainable Purchasing—Durable Goods, electric |
| MR Credit 2.2 | Sustainable Purchasing—Durable Goods, furniture |
| 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 8 | Solid Waste Management—Durable Goods |
| MR Credit 9 | Solid Waste Management—Facility Alterations and Additions |

**Indoor Environmental Quality**

| | |
|---|---|
| EQ Credit 2.2 | Occupant Comfort – Occupant Controlled Lighting |
| EQ Credit 2.4 | Occupant Comfort – Daylight and Views, 50% daylight/45% views |
| EQ Credit 2.5 | Occupant Comfort – Daylight and Views, 75% daylight/90% views |

## XII. Policy Model

Any policies required throughout the LEED for Existing Buildings: O&M Rating System must, at a minimum, contain the following components in the LEED for Existing Buildings: O&M 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 the how performance will be measured and/or evaluated.
3. Goals
    a. Identify the goals that the building 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 the achievement of these goals.
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: O&M teams on the USGBC website, at www.usgbc.org/projecttools. The Registered Projects Tools website provides resources for starting your project, including the LEED for Existing Buildings: O&M Rating System, errata, rating system version comparisons, a scorecard, and submittal referenced documents, as well as the following:

*Minimum narrative requirements.* Most LEED for Existing Buildings: O&M submittal paths require one 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, content, and description of 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: O&M 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 certain submittal templates and the prerequisites and credits for which each team member is responsible. The list is as follows:

**Property Manager**

| | |
|---|---|
| SS Credit 2 | Building Exterior and Hardscape Management Plan |
| SS Credit 3 | Integrated Pest Management, Erosion Control, and Landscape Management Plan |
| SS Credit 4 | Alternative Commuting Transportation |
| WE Prerequisite 1 | Minimum Indoor Plumbing Fixture and Fitting Efficiency |
| WE Credit 4.1 | Cooling Tower Water Management, Chemical Management |
| WE Credit 4.2 | Cooling Tower Water Management, Non-Potable Water Source Use |
| EA Prerequisite 1 | Energy Efficient Best Management Practices |
| EA Prerequisite 3 | Refrigerant Management—Ozone Protection |
| EA Credit 2.1 | Existing Building Commissioning – Investigation and Analysis |
| EA Credit 2.2 | Existing Building Commissioning – Implementation |
| EA Credit 2.3 | Existing Building Commissioning – Ongoing Commissioning |
| EA Credit 3.1 | Performance Measurement – Building Automation System |
| EA Credit 5 | Refrigerant Management |
| EQ Prerequisite 1 | Outdoor Air Introduction and Exhaust Systems |
| EQ Credit 1.1 | IAQ Best Management Practices – IAQ Management Program |
| EQ Credit 1.2 | IAQ Best Management Practices – Outdoor Air Delivery Monitoring |
| EQ Credit 1.3 | IAQ Best Management Practices – Increased Ventilation |
| EQ Credit 1.5 | IAQ Best Management Practices – IAQ Management for Facility Alterations and Additions |
| EQ Credit 2.1 | Occupant Comfort – Occupant Survey |
| EQ Credit 2.3 | Occupant Comfort, Thermal Comfort Monitoring |
| EQ Credit 3.2 | Green Cleaning – Custodial Effectiveness Assessment, Score of ≤ 3 |
| EQ Credit 3.3 | Green Cleaning – Custodial Effectiveness Assessment, Score of ≤ 2 |

| | |
|---|---|
| EQ Credit 3.7 | Green Cleaning, - Sustainable Cleaning Equipment |
| EQ Credit 3.8 | Green Cleaning, - Entryway Systems |
| EQ Credit 3.9 | Green Cleaning – Indoor Integrated Pest Management |
| IO Credit 3 | Documenting Sustainable Building Cost Impacts |

**Facility Manager**

| | |
|---|---|
| SS Credit 2 | Building Exterior and Hardscape Management Plan |
| SS Credit 3 | Integrated Pest Management, Erosion Control, and Landscape Management Plan |
| SS Credit 4 | Alternative Commuting Transportation |
| WE Prerequisite 1 | Minimum Indoor Plumbing Fixture and Fitting Efficiency |
| WE Credit 4.1 | Cooling Tower Water Management – Chemical Management |
| WE Credit 4.2 | Cooling Tower Water Management – Non-Potable Water Source Use |
| EA Prerequisite 1 | Energy Efficient Best Management Practices |
| EA Prerequisite 3 | Refrigerant Management—Ozone Protection |
| EA Credit 2.1 | Existing Building Commissioning – Investigation and Analysis |
| EA Credit 2.2 | Existing Building Commissioning – Implementation |
| EA Credit 2.3 | Existing Building Commissioning – Ongoing Commissioning |
| EA Credit 3.1 | Performance Measurement – Building Automation System |
| EA Credit 5 | Refrigerant Management |
| EQ Prerequisite 1 | Outdoor Air Introduction and Exhaust Systems |
| EQ Credit 1.1 | IAQ Best Management Practices – IAQ Management Program |
| EQ Credit 1.2 | IAQ Best Management Practices – Outdoor Air Delivery Monitoring |
| EQ Credit 1.3 | IAQ Best Management Practices – Increased Ventilation |
| EQ Credit 1.5 | IAQ Best Management Practices – IAQ Management for Facility Alterations and Additions |
| EQ Credit 2.1 | Occupant Comfort – Occupant Controlled Lighting |
| EQ Credit 2.3 | Occupant Comfort – Thermal Comfort Monitoring |
| EQ Credit 3.2 | Green Cleaning – Custodial Effectiveness Assessment, Score of ≤ 3 |
| EQ Credit 3.3 | Green Cleaning – Custodial Effectiveness Assessment, Score of ≤ 3 |
| EQ Credit 3.7 | Green Cleaning, - Sustainable Cleaning Equipment |
| EQ Credit 3.8 | Green Cleaning, - Entryway Systems |
| EQ Credit 3.9 | Green Cleaning – Indoor Integrated Pest Management |
| IO Credit 3 | Documenting Sustainable Building Cost Impacts |

**Building Engineer**

| | |
|---|---|
| WE Credit 4.1 | Cooling Tower Water Management – Chemical Management |
| WE Credit 4.2 | Cooling Tower Water Management – Non-Potable Water Source Use |
| EA Prerequisite 1 | Energy Efficient Best Management Practices |
| EA Prerequisite 3 | Refrigerant Management—Ozone Protection |
| EA Credit 2.2 | Existing Building Commissioning - Implementation |
| EA Credit 3.1 | Performance Measurement – Building Automation System |
| EA Credit 5 | Refrigerant Management |
| EQ Credit 1.2 | IAQ Best Management Practices – Outdoor Air Delivery Monitoring |

**Groundskeeper**

| | |
|---|---|
| SS Credit 2 | Building Exterior and Hardscape Management Plan |
| SS Credit 3 | Integrated Pest Management, Erosion Control, and Landscape Management Plan |

*Offline Credit Calculators.* Some of LEED for Existing Buildings: O&M prerequisites and credits include offline calculators to supplement the submittal templates for compliance. Calculators for EA Credit 1, EQ Prerequisite 1, and IO Credit 3 can be found on the LEED Registered Project Tools page.

*Design & Construction Streamlined Credits.* For some credits the Design & Construction streamlined path is available to registered projects that have previously been certified under a LEED design and construction rating system. The LEED for Existing Buildings: O&M submittal templates for these credits include streamlined paths as a submittal option. The relevant credits are listed here.

*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 to submit a streamlined path to certain credits, bypassing otherwise-required submittals. The licensed professional and project team may choose a streamlined path in lieu of the standard submittal documents, and this form is used in conjunction with the declarations on the LEED-Online submittal templates to document these 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

**Design & Construction Streamlined Credits**

| | |
|---|---|
| SS Credit 1 | LEED-Certified Design and Construction |
| SS Credit 5 | Reduced Site Disturbance—Protect or Restore Open Space |
| SS Credit 6 | Stormwater Management |
| SS Credit 7.1 | Heat Island Reduction - Nonroof |
| SS Credit 7.2 | Heat Island Reductio – Roof |
| SS Credit 8 | Light Pollution Reduction |
| WE Prerequisite 1 | Minimum Indoor Plumbing Fixture and Fitting Efficiency |
| WE Credit 2 | Additional Indoor Plumbing Fixture and Fitting Efficiency |
| WE Credit 3 | Water Efficient Landscaping |
| EA Prerequisite 3 | Refrigerant Management—Ozone Protection |
| EA Credit 5 | Refrigerant Management |
| EQ Prerequisite 2 | Environmental Tobacco Smoke (ETS) Control |
| EQ Credit 2.2 | Occupant Comfort – Occupant-Controlled Lighting |
| EQ Credit 2.4 | Occupant Comfort – Daylight and Views, 50% daylight/45% views |
| EQ Credit 2.5 | Occupant Comfort – Daylight and Views, 75% daylight/90% views |
| EQ Credit 3.8 | Green Cleaning: Entryway Systems |

Professional Exemption Form. Table 3 lists the submittals eligible for the licensed professional exemption.

**Table 3.** Submittals Eligible for Licensed Professional Exemption

| Credit | Title | Submittal |
|---|---|---|
| SS Credit 5 | Reduced Site Disturbance—Protect or Restore Open Space | Option 2, narrative |
| SS Credit 5 | Reduced Site Disturbance—Protect or Restore Open Space | Option 3, narrative |
| SS Credit 6 | Stormwater Management | Option 2, assessment report, stormwater calculator |
| SS Credit 7.1 | Heat Island Reduction, Nonroof | Option 2, third column of Option 2 table |
| SS Credit 7.2 | Heat Island Reduction, Roof | Option 2, documents provided |
| EA Credit 3.1 | Performance Measurement, Building Automation System | Summary report, maintenance plan |
| EA Credit 5 | Refrigerant Management | Option 2, narrative |
| EQ Credit 1.2 | IAQ Best Management Practices, Outdoor Air Delivery Monitoring | Option 1, outdoor air AHU table, airflow measurement devices, trend graph |
| EQ Credit 1.2 | IAQ Best Management Practices, Outdoor Air Delivery Monitoring | Option 2, floor plan submittals, airflow measurement devices, CO2 data sensor table, trend graph |
| EQ Credit 1.2 | IAQ Best Management Practices, Outdoor Air Delivery Monitoring | Option 3, floor plan submittals, airflow Measurement devices, CO2 sensor data table, trend graph |
| EQ Credit 2.3 | Occupant Comfort, Thermal Comfort Monitoring | Supporting submittals |

## XIV. Reference Guide

The LEED Reference Guide is a supporting document to the LEED for Existing Buildings: O&M Rating System. The guide helps project teams understand the criteria and their benefits, 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.

### 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 interpret the measure and offer links 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** specify 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 one contributes to the overall project score. Some credits have two or more paths with cumulative points. For example, Materials & Resources Credit 7, Solid Waste Management: Ongoing Consumables, is divided into Credit 7.1 for achieving a 50% reduction in solid waste (worth one point), and Credit 7.2 for achieving a 70% reduction(for an additional point). Other credits have several options from which the project team must choose. For example, Energy & Atmosphere Credit 1, Optimize Energy Efficiency Performance, has three options, but a project can apply for only one, depending on the type of building.

**Summary of referenced standards,** where applicable, briefly 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.

**Approach and implementation** are specific methods or assemblies that facilitate achievement of the requirements.

The submittal **documentation** section contains additional information for documenting prerequisite and credit achievements and developing the required submittals.

**Calculations** are sample formulas or computations that determine achievement of a particular prerequisite or credit. Some calculations are facilitated by the LEED letter templates, which are available to registered projects on the USGBC website.

**Considerations** related to the prerequisite or credit may include environmental, economic, and regional issues. **Environmental issues** address the environmental impacts of the prerequisite or credit and attempt to relate specific goals or concerns with the influence on our natural environment. **Economic issues** address considerations related to first costs, life-cycle costs, and estimated savings. Regional issues are specific to the geographic location of the building.

**Other resources** are suggested for further research and provide examples or illustrations, detailed technical information, or other information relevant to the prerequisite or credit. **Websites** list resources available on the Internet. **Print media** are books and articles related to the prerequisite or credit and may be obtained directly from the organizations listed.

**Definitions** clarify the meaning of certain terms relevant to the prerequisite or credit. These may be general terms or terms specific to LEED for Existing Buildings: O&M.

**Case studies** present examples of the successful implementation of the goals for the prerequisites or credits. A case study may illustrate one method to achieve the intent of the measure, but there may be other methods.

## XV. Definitions

Building engineer is a qualified engineering professional with relevant and sufficient expertise who oversees and is responsible for the operation and maintenance of mechanical, electrical, and plumbing systems in the project building.

**Building operating plan** is a general document summarizing the intended operation of each base building system described in the systems narrative; it may also be known as "owner's operating requirements" or something similar. The operating plan includes the time-of-day schedules for each system for each of the eight day types (Monday to Sunday plus holidays), the mode of operation for each system when it is running (occupied vs. unoccupied; day vs. night, etc.), and the desired indoor conditions or setpoints for each schedule or mode. The operating plan accounts for any differences in needs or desired conditions for different portions of the project building, as well as any seasonal variations in operations patterns. The plan accounts for all the monitored space conditions used to control the base systems: air temperature, relative humidity, occupancy, light level, $CO_2$ level, room pressurization, duct static pressure, etc.

**Declarant** is a LEED project team member who is technically qualified to verify the content of a credit submittal template, and is authorized by the project administrator to sign the template and upload it to LEED-Online. The declarant must have a significant degree of responsibility for the credit, such as participation in or oversight of its implementation or verification. The declarant for credits may be restricted or nonrestricted. For example, for Sustainable Sites Credit 4, only the property manager or facility manager may submit verification; for others, any team member, including contractors or consultants, can prepare the submittal documentation. See Table 2 in Section XII, above.

The **facility manager** is belongs to "a profession that encompasses multiple disciplines to ensure functionality of the built environment by integrating people, place, process, and technology" (International Facility Management Association).

A **full-time equivalent (FTE)** is a regular building occupant who spends 40 hours per week in the project building. Part-time or overtime occupants have FTE values based on their hours per week divided by 40. Multiple shifts are included or excluded depending on the intent and requirements of the credit.

A **groundskeeper** is a qualified professional with relevant and sufficient expertise who oversees and is responsible for the establishment and maintenance of landscaping, vegetation, and pest control on the project building's grounds.

The **owner** is a person directly employed by the organization holding title to the project building and recognized by law as having rights, responsibilities, and ultimate control over the project building.

The **project building** is the real property, including an occupied and operational building(s) and the associated grounds, that is registered for and actively pursuing LEED certification.

The **property manager** is a person directly employed by the organization who oversees operations, maintenance, and upkeep of the project building on behalf of the owner or serves as the primary liaison between the owner and project building tenants.

A **regular building occupant** is a worker who either has a permanent office or workstation in the project building or typically spends 10 hours per week or more in the project building. For a residential building, this includes all persons who live in the building.

**Sequence of operations** is a detailed system-level documentation for each base building system that defines which operational states are desired under which conditions: running vs. idle systems; full-load or part-load operation; staging or cycling of compressors, fans, or pumps; proper valve positions; desired system water temperatures; target duct static air pressures depending on other variables (e.g., outside air temperatures, room air temperatures, and/or relative humidity); and any reset schedules or occupancy schedules.

**Systems narrative** is a general description of each of the following types of base building systems installed in the project building: space heating, space cooling, ventilation, domestic water heating, humidification and/or dehumidification, and lighting. The narrative includes summaries of the central plant, distribution, and terminal units, as applicable. It also includes all the controls associated with these systems—central automatic, local automatic, or occupant control. It accounts for any differences in system types for different portions of the project building—for different floors, for interior vs. perimeter zones, etc. The systems narrative does not need to list each base building system individually (i.e., not each and every chiller) but does describe the distinct types of systems as listed above (i.e., all chillers having the same basic design and specifications). Other types of systems than those listed above— process equipment, office equipment, plumbing systems, fire protection systems—may be included in the narrative if desired but are not required.

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[i] 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>