

**Green Cleaning and
LEED® for Existing Buildings:
Operations and Maintenance**

What's the Connection?

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I Introduction

The U.S. Green Building Council (USGBC) [LEED for Existing Buildings: Operations and Maintenance](#)¹ (LEED-EBOM) establishes a framework that maximizes operational efficiency while minimizing environmental impacts of buildings. In effect, LEED-EBOM provides a road map for property owners and service providers who wish to drive down operating costs while increasing occupants' productivity in an environmentally responsible manner

LEED-EBOM is based on a set of voluntary performance standards for the sustainable ongoing operations of existing buildings. LEED-EBOM certification is based on actual building operating performance as it relates to:

- Building exterior and site maintenance programs;
- Efficient and optimized use of energy and water;
- Purchase of environmentally preferred products and food;
- Waste stream management;
- Ongoing indoor environmental quality; and
- Green cleaning programs

The USGBC LEED-EBOM program confers certification upon buildings that garner a predetermined amount of credits based on specific performance measures and prerequisites. Of particular note, green cleaning and maintenance activities can contribute a significant portion of the total points needed to obtain LEED-EBOM certification at a relatively low cost.

Specifically, cleaning and maintenance activities (including green cleaning, hardscape and landscape maintenance, integrated pest management and waste management) can contribute up to 14 points toward the minimum 34 points needed for certification, over 40% of the minimum points needed for certification. Moreover, most of the cleaning related items in LEED-EBOM are relatively inexpensive and easy to implement.

Thus suppliers of cleaning products and services can play a critical supportive role in a building owner / operator's attempt to obtain and / or maintain LEED-EBOM certification. In addition, those sections of LEED-EB that address cleaning and maintenance activities set forth a framework for the development of a comprehensive green cleaning program.

This document identifies those LEED-EBOM prerequisites and credits that are related to cleaning and maintenance, and describes the actions necessary to achieve credit for those items. The discussion below identifies the specific cleaning and maintenance related LEED-EBOM credits available based on the April 2008 edition of LEED-EBOM. (Please note that as of the date of this writing, the USGBC has initiated the process of further revising LEED-EBOM.)

II Rating System

LEED-EBOM certification is based on a maximum of 92 points. To achieve certification, buildings must meet all prerequisites in the Rating System and earn a minimum of 34 points. The flexibility of the Rating System allows building owners, managers and others to determine which credits to pursue based on performance goals. LEED-EBOM ratings are awarded according to the following point thresholds:

- Certified: 34 – 42 points
- Silver: 43 – 50 points
- Gold: 51 – 67 points
- Platinum: 68 – 92 points

III Green Cleaning

The April 2008 LEED-EBOM consolidates the major components of a green cleaning program into one section, whereas previously it was incorporated into several separate sections of the standard. Up to a total of 9 points towards LEED-EBOM certification are attainable through the implementation of a comprehensive green cleaning program as outlined below.

A. Green Cleaning Policy (Required). A green cleaning policy is a prerequisite to certification under the LEED-EBOM Rating System, and must, at a minimum, contain the following components of the LEED-EBOM policy model:

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 and/or evaluated.
3. Goals
 - a. Identify the sustainability goals for the building.
 - b. Stating the goal is sufficient—Documentation of actual achievement is not required to demonstrate a compliant policy. Applicants for certification are encouraged to set high goals and work toward their achievement.
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 activities pertaining to the policy.
 - b. Identify and outline key tasks for the above teams and individuals.
6. Time Period
 - a. Identify the time period over which the policy is applicable.

In addition, the required green cleaning policy must address the green cleaning procedures and materials that are within the building and site management's control. Further the policy must address the following green cleaning credits and other requirements set forth in LEED-EBOM:

- Purchase of sustainable cleaning and hard floor and carpet care products meeting the sustainability criteria outline in Environmental Quality (EQ) Credits 3.4 – 3.6 of the LEED-EBOM.
- Purchase of cleaning equipment meeting the sustainability criteria outlined in EQ Credit 3.7.
- Establishment of standard operating procedures addressing how an effective cleaning and hard floor and carpet maintenance system will be consistently utilized, managed and audited. Specifically, it must address cleaning to protect vulnerable building occupants.
- Development of strategies for promoting and improving hand hygiene, including both hand washing and the use of alcohol-based waterless hand sanitizers.
- Development of guidelines addressing the safe handling and storage of cleaning chemicals used in the building, including a plan for managing hazardous spills or mishandling incidents.
- Development of requirements for staffing and training of maintenance personnel appropriate to the needs of the building. It must address the training of maintenance personnel in the hazards of use, disposal and recycling of cleaning chemicals, dispensing equipment and packaging.
- Provision for collecting occupant feedback and continuous improvement to evaluate new technologies, procedures and processes.

B. High Performance Cleaning Program (1 Point)—EQ Credit 3.1: Facilities must have in place a high-performance cleaning program that addresses the following components:

- Appropriate staffing plan.
- Implementation of training and maintenance personnel in the hazards, use, maintenance, disposal and recycling of cleaning chemicals, dispensing equipment and packaging.
- Use of chemical concentrates with appropriate dilution systems to minimize chemical use wherever possible.

- Use of sustainable cleaning materials, products, equipment, janitorial paper products and trash bags (including microfiber tools and wipes).
- Use of sustainable cleaning and hard floor and carpet care products that meet the sustainable criteria set forth in EQ Credits 3.3 – 3.5.
- Use of cleaning equipment that meets the sustainable criteria outlined in EQ Credit 3.6.

C. Custodial Effectiveness Assessment (1 to 2 Points)—EQ Credit 3.2 and 3.3: It is important to note that LEED-EBOM encourages greater levels of cleanliness and hygiene in facilities by rewarding points based on the APPA Guidelines. Specifically, facilities are encouraged to conduct an audit consistent with the APPA Leadership in Educational Facilities’ (APPA) Custodial Staffing Guidelines to determine the appearance level of the facility as set forth below.

- EQ Credit 3.2 (1 Point): The facility must be rated at level 3.
- EQ Credit 3.3 (2 Points): The facility must be rated at level 2 or less.

For information purposes, APPA appearance levels 1 through 3 are summarized below:

Level 1—Orderly Spotlessness

- Floor and base moldings shine and/or are bright and clean; colors are fresh. There is no build up in corners or along walls.
- All vertical and horizontal surfaces have a freshly cleaned or polished appearance and have no accumulation of dust, dirt, marks, streaks, smudges or fingerprints. Lights all work and fixtures are clean.
- Washroom and shower fixtures and tile gleam and are odor-free. Supplies are adequate.
- Trash containers and pencil sharpeners hold only daily waste, are clean and odor free.

Level 2—Ordinary Tidiness

- Floor and base moldings shine and/or are bright and clean. There is no build up in corners or along walls, but there can be up to two days worth of dust, dirt, stains or streaks.
- All vertical and horizontal surfaces are clean, but marks, dust, smudges and fingerprints are noticeable upon close observation. Lights all work and fixtures are clean.

- Washroom and shower fixtures and tile gleam and are odor-free. Supplies are adequate.
- Trash containers and pencil sharpeners hold only daily waste, are clean and odor free.

Level 3—Casual Inattention

- Floors are swept or vacuumed clean, but upon close observation there can be stains. A build up of dirt and/or floor finish in corners and along walls can be seen.
- There are dull spots and/or matted carpet in walking lanes. There are streaks or splashes on base molding.
- All vertical and horizontal surfaces have obvious dust, dirt, marks, smudges, and fingerprints. Lamps all work and fixtures are clean.
- Trash containers and pencil sharpeners hold only daily waste, are clean and odor free.

In conducting the audit, facilities should designate an individual or team to conduct a walk through inspection of a representative sample of rooms in the building to evaluate the effectiveness of the cleaning program. In so doing, they should identify areas that fall below the expected standard of cleanliness and make improvements to the cleaning program to improve levels of cleanliness accordingly.

D. Purchase of Sustainable Cleaning Products and Materials (1 to 3 Points)—EQ Credits 3.4-3.6: Facilities should implement sustainable purchasing for cleaning materials and products, disposable janitorial paper products and trash bags. Cleaning product and material purchases include items used by in-house staff or outsourced cleaning service providers.

One point is awarded for each 30% of the total annual purchases of these products (based on cost) that meet at least one of the following criteria:

- The cleaning products meet one or more of the following standards for the appropriate category:
 - Green Seal GS-37, for general purpose, bathroom, glass and carpet cleaners used for institutional and industrial purposes.
 - Environmental Choice CCD-110, for cleaning and degreasing compounds.
 - Environmental Choice CCD-146, for hard surface cleaners.

- Environmental Choice CCD-148, for carpet and upholstery care.
- Disinfectants, metal polish, floor finishes, strippers or other products not addressed by the above standards meet one or more of the following standards for the appropriate category:
 - Green Seal GS-40, for industrial and institutional floor finishes and strippers.
 - Environmental Choice CCD-112, for biological digestion additives for cleaning and odor control.
 - Environmental Choice CCD-113, for drain or grease trap additives.
 - Environmental Choice CCD-115, for odor control additives.
 - Environmental Choice CCD-147, for hard floor care.
 - Compliance with CARB VOC Limitations for the appropriate product category.
- Disposable janitorial paper products and trash bags meet the minimum requirements of one or more of the following programs for the applicable product category:
 - U.S. EPA Comprehensive Procurement Guidelines for Janitorial Paper and Plastic Trash Can Liners
 - Green Seal GS-9, for paper towels and napkins.
 - Green Seal GS-1, for tissue paper.
 - Environmental Choice CCD-82, for toilet tissue.
 - Environmental Choice CCD-86, for hand towels.
 - Janitorial paper products derived from rapidly renewable resources or made from tree-free fibers.
- Hand soaps meet one or more of the following standards/criteria:
 - No antimicrobial agents (other than as a preservative) except where required by health codes and other regulations (i.e., food service and health care requirements).

- Green Seal GS-41, for industrial and institutional hand cleaners.
- Environmental Choice CCD-104, for hand cleaners and hand soaps.

E. Sustainable Cleaning Equipment (1 Point)—EQ Credit 3.7: Facilities should implement a program for the use of powered cleaning equipment that will help reduce building contaminants and minimize any negative impact to the environment. LEED-EBOM calls for the purchase and use of cleaning equipment that meets the following criteria:

- Vacuum cleaners are certified by the Carpet and Rug Institute Green Label Testing Program and operate at a sound level of 70dBA.
- Carpet extraction equipment used for restorative deep cleaning is certified by the Carpet and Rug Institute’s Seal of Approval Testing Program for deep-cleaning extractors.
- Powered floor maintenance equipment, including electric and battery powered floor buffers and burnishers, is equipped with vacuums, guards and/or other devices for capturing fine particulates and operates with a sound level of less than 70dBA.
- Propane-powered floor equipment has high-efficiency, low-emissions engines with catalytic converters and mufflers that meet the California Air Resources Board (CARB) or U.S. EPA standards for the specific engine size and operate with a sound level of less than 90dBA.
- Automated scrubbing machines are equipped with variable-speed feed pumps and on-board chemical metering devices to optimize the use of cleaning fluids. Alternatively, the scrubbing machines use only tap water with no added cleaning products.
- Battery-powered equipment is equipped with environmentally preferable gel batteries.
- Powered equipment is ergonomically designed to minimize vibration, noise and user fatigue.
- Equipment is designed with safeguards, such as rollers or rubber bumpers, to reduce potential damage to building surfaces.

Facilities seeking LEED-EBOM certification should keep a log for all powered cleaning equipment to document the date of purchase and all repair and maintenance activities and include vendor specification sheets for each type of equipment in use.

F. Entryway Systems (1 Point)—EQ Credit 3.8: Facilities should use entryway systems (i.e., grills, grates, mats) to reduce the amount of dirt, dust, pollen and other particles entering the building at all public entryways. In addition, cleaning strategies should be developed to maintain those entryway systems as well as exterior walkways. At least 10 feet of mats must be in place immediately inside all public entryways. Public entryways that are not in use or serve only as emergency exits are excluded from the requirements as are private offices.

In addition, remember that the success of an entry way system is tied to exterior cleaning and maintenance as well. Keeping the exterior in proximity to the entryway clean and well maintained will contribute greatly to the performance of entryway systems.

Consider the following:

- Provide a water spigot and electrical outlet at each building entrance for cleaning and maintenance.
- At public building entrances, install low-maintenance vegetation within the landscape design. Avoid plants (including trees and shrubs) that produce fruit, flowers or leaves that are likely to be tracked into the building.
- Base plant selection on an integrated pest management approach to eliminate pesticide applications that could be tracked into the building as well as preventing pests from entering the building.

G. Indoor Integrated pest Management (1 Point)—EQ Credit 3.9: Facilities should develop, implement and maintain an indoor integrated pest management (IPM) plan. An IPM program or plan is generally defined as managing indoor pests in a way that protects human health and the surrounding environment, while improving economic returns through the most effective, least risk option. IPM programs call for using: the least toxic pesticides; minimum use of pesticides; use of pesticides only in targeted locations; and use only for targeted species.

In addition, IPM requires routine inspection and monitoring for indicators of the presence of pests or for pest attractants (such as sources of food and water for pests). An IPM plan must include at a minimum the following elements, integrated with any outdoor IPM plan that is also employed by the facility:

- Integrated methods, site or pest inspections, pest population monitoring, evaluation of the need for pest control and one or more pest control methods, including sanitation, structural repairs, mechanical and living biological controls, other nonchemical methods, and if nontoxic options are unreasonable and have been exhausted, the use of the least toxic pesticide appropriate for the task.
- Specification of the circumstances under which an emergency application of pesticides in a building or on surrounding grounds being maintained by building management can be conducted without complying with the earlier provisions.

- A communication strategy that provides for universal notification of building occupants at least 72 hours in advance of application of a pesticide under normal conditions; or 24 hours after application of a pesticide in emergency situations, other than a least toxic pesticide.

Put simply, IPM is a safer, and usually less costly option for effective pest management in the indoor environment. An IPM program uses common sense strategies to reduce sources of food, water and shelter for pests in buildings and grounds. An IPM program takes advantage of all pest management strategies, including the judicious and careful use of pesticides when necessary.

More information on IPM best practices can be found at:

<http://www.epa.gov/pesticides/factsheets/ipm.htm>

<http://www.epa.gov/pesticides/ipm/index.htm>

Note further that any cleaning products used in an IPM program must meet the requirements for EQ Credits 3.3 to 3.5.

IV Building Exterior and Hardscape Management Plan (1 Point)

Under LEED-EBOM's Sustainable Site (SS) Credit 2, facilities can earn one point toward certification by employing an environmentally sensitive, low impact building exterior and hardscape management plan that helps preserve surrounding ecological integrity. The plan must use best management practices that significantly reduce harmful chemical use, energy waste, water waste, air pollution, solid waste and/or chemical runoff (e.g., gasoline, oil, antifreeze, salts) compared with standard practices.

Such a plan must address all of the following operational elements that occur on the building and grounds, as applicable.

- **Maintenance Equipment**—Use maintenance equipment that minimizes noise and emissions. Replace gas-powered equipment with electric powered equivalents (battery or corded).
- **Snow and Ice Removal (where applicable)**—Use equipment and chemicals that reduce environmental impacts; plan snow plowing when exterior areas are least used.
- **Cleaning of Building Exterior**—Use green cleaning and maintenance practices and materials. Use the least harsh chemical products.
- **Paints and Sealants Used on Building Exterior**—Use low VOC paints and sealants, or products otherwise recognized as green.

- Cleaning of Sidewalks, Pavement and Other Hardscape—Use green cleaning and maintenance practices including the least harsh chemical products that minimize impacts to the environment. Plan cleaning and sweeping tasks when exterior areas are least used.

V Integrated Pest Management, Erosion Control, Landscape Management Plan

Pursuant to SS Credit 3, facilities can earn one point towards certification if they have in place an environmentally sensitive management plan for the site’s natural components. The plan must use best management practices that significantly reduce harmful chemical use, energy waste, water waste, air pollution, solid waste and / or chemical runoff from gasoline, oil, antifreeze, salts. Specifically, the plan must address all of the operational elements discussed below.

The plan must include an outdoor integrated pest management (IPM) program. An outdoor IPM program effectively manages outdoor pests, such as plants, fungi, insects, and animals, in such a way that protects human health and the surrounding environment by employing the most effective, least-risk option. IPM calls for: using the least-toxic chemical pesticides; minimizing the use of chemicals; targeting locations and use only for targeted species. In addition, IPM relies on routine inspection and monitoring to ensure it addresses the issue of pests in a proactive, rather than a reactive manner.

Moreover, an outdoor IPM plan must address all of the specific IPM requirements listed in EQ Credit 3.9, Green Cleaning: Indoor Integrated Pest Management (described above) including:

- Preferred use of non-chemical methods;
- Definition of universal notification and emergency conditions notification (advance notice of not less than 72 hours under normal conditions and 24 hours in emergencies before a pesticide, other than a least-toxic pesticide, is applied in a building or on surrounding grounds that the building management maintains). The outdoor IPM plan must also be integrated with any indoor IPM plan for the building, as appropriate.

In addition, in order to earn the one point provided under SS Credit 3, facilities must provide for erosion and sedimentation control for ongoing landscape operations (where applicable) and future construction activity. The plan must address both site soil and potential construction materials. The plan must also include measures that prevent erosion and sedimentation, prevent air pollution from dust or other particulate matter and restore eroded areas.

Furthermore, the facility plan must address the following operational elements to the extent they are applicable:

- The plan should provide for the diversion of landscape waste from the waste stream by employing such strategies as using mulching lawn mowers, composting, or other similar means that minimize the impact to the environment.
- In addition, the plan should minimize the use of chemical fertilizers through such strategies as using: locally adapted plants that need no or little fertilizer; less polluting alternatives to artificial chemicals; or other approaches that minimize the impact to the environment.

In implementing such a plan, facilities should consider other appropriate strategies such as reducing the use of power equipment, improving control of stormwater runoff, creating wildlife habitats, removing or not installing invasive plants, protecting natural areas and using plants to reduce heating and cooling needs. In addition the use of mulching mowers can significantly reduce the generation of yard waste, the need for fertilizer and water consumption through the retention of organic material.

VI Solid Waste Management

The Materials & Resources (MR) credits provided under LEED-EBOM provide up to three points for solid waste reduction and recycling activities that result in a significant reduction in the amount of waste generated from the use of ongoing consumable products by building occupants and operations that are traditionally hauled to and disposed of in landfills or incineration facilities.

Under LEED-EBOM, an effective waste reduction and recycling program begins with an audit of the waste stream generated by a facility, followed by the reuse, recycling or composting of the ongoing consumable waste stream as outlined below.

A. Waste Stream Audit (1 Point)—MR Credit 6. An effective solid waste management program begins with conducting a waste stream audit of the building's entire ongoing consumable waste stream. For purposes of LEED-EBOM, ongoing consumable waste stream consists of those materials with a low cost per unit that are regularly used and replaced through the normal course of business. These materials include, but are not limited to, paper, toner cartridges, glass, plastics, cardboard and old corrugated cardboard, food waste and metals. It does not include durable goods or construction waste from the alteration or additions to facilities.

The purpose of the waste stream audit is to establish a baseline figure that identifies the types of waste making up the waste stream as well as the amounts of each type of waste by weight or volume. A clear understanding of the waste production patterns in a building is an important first step to waste reduction because it helps to identify opportunities for increased recycling and waste diversion. Facilities should work with the service provider or waste hauler to collect and analyze information on the amounts and types of waste generated by the facility.

In addition, the baseline derived from the waste stream audit is a crucial factor in assessing the effectiveness of the overall waste reduction and recycling program.

B. Ongoing Consumables (1-2 Points)—MR Credits 7.1 and 7.2. While a critical step in a solid waste management program, the waste stream audit in and of itself does not result in a diversion of waste. Diversion of waste from landfills and incinerators can only occur through the conduct of an active waste reduction and recycling program. To earn credit towards LEED-EBOM certification, facilities must do the following:

- Have a battery recycling program that diverts at least 80% of discarded batteries from the trash. The program must cover all portable dry-cell types of batteries, including single-use and/or rechargeables used in radios, phones, cameras, computers and other devices or equipment.
- Facilities must:
 - Reuse, recycle or compost 50% of the ongoing consumable waste stream by weight or volume (1 point); or
 - Reuse, recycle or compost 70% of the ongoing consumable waste stream by weight or volume (2 points).

While waste reduction and recycling activities can contribute significantly towards LEED-EBOM certification, it is also an especially difficult challenge for multi-tenant buildings because these activities literally involve the cooperation of everyone in the building. Consequently, an effective waste reduction and recycling program relies on communication and education to make building occupants aware of the need to recycle and otherwise reduce the amount of waste generated.

As a practical matter, a waste recycling program requires the placement and use of convenient recycling receptacles for paper, plastics, glass and metals; in addition to monitoring of receptacles and proper disposal of the collected materials. All of which requires coordinated communication and cooperation of tenants. Cleaning service providers can play a critical role in pulling these elements together as part of a comprehensive cleaning and maintenance program.

VII Conclusion

A comprehensive cleaning and maintenance program that includes green cleaning, hardscape and landscape maintenance, IPM, and waste management can contribute significantly toward LEED-EBOM certification at a relatively low cost. Stated differently, cleaning and maintenance provides a high-return on investment in regard to LEED-EBOM certification.

All of which underscores the critical role providers of cleaning products and services play in relation to achieving LEED status.

As more and more buildings seek certification pursuant to LEED-EBOM or otherwise adopt the tenets of this program, it provides great opportunities for the cleaning industry to play a supportive role. Perhaps more importantly, it is the perfect opportunity to emphasize the critical role cleaning and maintenance activities play in reducing the environmental footprint of buildings and facilities, as well as insuring a safe and healthy indoor environment. And now, LEED-EBOM rewards more thorough cleaning activities by providing greater number of points toward certification for facilities that invest more in high performance cleaning operations that protect the health of occupants.

All in all, LEED-EBOM provides a roadmap that can help cleaning professionals expand their business and, at the same time, help reduce the overall impact on the environment. We urge you to use the framework provided by LEED-EBOM to help elevate the importance of the cleaning industry and encourage an increased investment in cleaning and maintenance activities.

¹ <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=221>