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LEED v5 REFERENCE GUIDE

OPERATIONS AND MAINTENANCE

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TRADEMARK

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IN REMEMBRANCE

The USGBC community lost two volunteers in 2024. We honor their memory and dedication to creating a more sustainable world through green building.

Ganesh Nayak
USGBC volunteer from 2023 to 2024

As the chair of our Equity Working Group at the USGBC, Ganesh was a long-standing leader, mentor, and champion of sustainable and inclusive design. His dedication to LEED certification and sustainable architecture transformed over four million square feet of space, leaving a lasting legacy of environmental stewardship.

Stewart Comstock
USGBC volunteer from 2020 to 2024

Stewart donated his time as the vice chair of the Sustainable Sites Technical Advisory Group, bringing decades of deep expertise in stormwater management to our work. His influence helped shape some of the most critical aspects of LEED as it evolved over the years. Stewart helped lay the foundation on which many of today's green infrastructure principles and best practices are built.

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PREFACE

THE CASE FOR GREEN BUILDING

Green buildings are an integral part of the solution to the environmental challenges facing the planet.

The impetus behind development of the Leadership in Energy and Environmental Design (LEED) rating systems was recognition that the design, construction, and building management industry has the expertise, tools, and technology to transform buildings and make significant advances toward a sustainable planet. LEED projects throughout the world have demonstrated the benefits of taking a green design and operations approach that reduces the environmental harms of buildings and restores the balance of natural systems.

Buildings have a major role to play in sustainability through their construction, the lifetime of their operation, and patterns of development.

What we build today, how we build it, and where we build it are profoundly important.

ABOUT LEED

LEED is a concise framework for identifying and implementing practical and measurable green building, design, construction, operations, and maintenance strategies and solutions. LEED is a voluntary, market-driven, consensus-based tool that serves as a guideline and assessment mechanism. LEED does not certify, endorse, or promote any products, services, or companies.

Within the appropriate rating system, projects that meet the prerequisites and earn enough credits to achieve the certification threshold have demonstrated performance that spans the goals in an integrated way. LEED certification is awarded at four levels (Certified, Silver, Gold, Platinum) to incentivize higher achievement and, in turn, faster progress toward the goals.

HISTORY OF LEED

LEED for New Construction v1.0 was developed by the U.S. Green Building Council in 1998 for the commercial building industry.

Since its launch, LEED has evolved to address new markets and building types, advances in practice and technology, and greater understanding of the environmental and human health

effects of the built environment. These ongoing improvements are developed by USGBC member-based volunteer technical advisory groups, committees, subcommittees, and working groups in conjunction with USGBC staff. Once development is complete, changes are reviewed by the LEED Steering Committee and the USGBC Board of Directors and are approved by the Consensus Committees acting as the membership consensus body before being submitted to USGBC members for a ratification vote. The process is based on principles of transparency, openness, and inclusiveness as detailed in the Foundations of LEED. To learn more please visit: usgbc.org/resources/foundations-leed.

In 2007, USGBC launched Green Business Certification, Inc. (GBCI) as an independent organization to manage the LEED certification and professional credentialing process to scale the demand for LEED and ensure ongoing quality and integrity.

For more information on the history of LEED, USGBC, and GBCI, visit: usgbc.org/about/mission-vision

LEED'S GOALS

LEED seeks to optimize the use of natural resources, promote regenerative and restorative strategies, maximize the positive and minimize the negative environmental and human health consequences of the construction industry, and provide high-quality indoor environments for building occupants. LEED emphasizes integrative design, integration of existing technology, and state-of-the-art strategies to advance expertise in green building and transform professional practice. The technical basis for LEED strikes a balance between requiring today's best practices and encouraging leadership strategies. LEED sets a challenging yet achievable set of benchmarks that define green building for interiors, buildings, and cities and communities. LEED v5 has been developed around three central areas of impact:

- Decarbonization
- Quality of life
- Ecological conservation and restoration

Every credit and prerequisite in LEED v5 are connected to decarbonization, quality of life, and/or ecological conservation and restoration, and this is annotated throughout the rating system enabling project teams to easily shape and communicate their sustainability stories.

BENEFITS OF USING LEED

LEED is designed to address environmental challenges while responding to the needs of a competitive market. LEED-certified buildings are designed to deliver many benefits. Examples include:

- Lower operating costs and increased asset value
- Reduced waste sent to landfills
- Energy and water conservation
- Conserved and restored habitat for improved ecosystem function and biodiversity
- Increased market transparency and expanded access to industry leading green products and materials
- More healthful and productive environments for occupants
- Reductions in greenhouse gas emissions
- Qualification for tax rebates, zoning allowances, and other incentives in many cities

By participating in LEED, owners, operators, designers, and builders make a meaningful contribution to the green building industry. By documenting and tracking buildings' resource use, they contribute to a growing body of knowledge that will advance research in this rapidly evolving field. This will allow future projects to build on the successes of today's designs and bring innovations to the market.

GBCI independently verifies sustainability performance against LEED, ensuring the integrity of outcomes and strengthening market confidence in sustainability investment and innovation.

LEED CERTIFICATION PROCESS

A LEED project begins when the scope is determined, the appropriate rating system is selected, alignment with the Minimum Program Requirements is confirmed, and the project is registered on the Arc platform. The project is designed to meet the requirements for all prerequisites and for the credits the team has chosen to pursue, in coordination with their sustainability goals. The required documentation is compiled and submitted to GBCI for review. Feedback is provided from GBCI on the received documentation, offering the opportunity for project teams to make any needed design and construction changes or take additional steps to improve an existing project's performance and/or provide additional clarification needed for GBCI to determine compliance. Additional rounds of review follow, as needed and allowed, to earn certification of the project. For a more in-depth understanding of the certification process, see the Guides to Certification.

GETTING STARTED

ABOUT THIS GUIDE

This guide explains the requirements of the LEED v5 Operations and Maintenance (O+M) rating system, offering essential background information for contractors, engineers (mechanical, structural, and civil), architects, designers (interior and landscape), architects, designers, building operators, and LEED consultants. Early attention to rating system selection, minimum program requirements, and project boundaries ensure a smoother path to certification.

This guide is the first in a series of detailed resources for project teams pursuing LEED v5. It builds on the rating system requirements, providing background on each LEED category and a detailed explanation of the technical requirements for each credit.

WHAT'S INSIDE

This guide builds on the requirements listed in the rating system to provide background on each LEED category and an in-depth explanation of the technical requirements of each credit.

This guide contains:

- LEED v5 rating system requirements
- Rating system requirements explained
- Documentation requirements
- Referenced standards

As teams review each credit and prerequisite, they should carefully evaluate the options and pathways available, ensuring they align with the project's specific goals, constraints, and characteristics.

When preparing documentation to submit for review, these materials may consist of contract documents (plans, specifications, elevations, sections, construction details, etc.) calculations, reports, manufacturer product information, photographs, and/or descriptive narratives.

The USGBC glossary is an additional resource: usgbc.org/glossary/v5

For O+M projects, documentation may also include maintenance logs, energy and water bills, data from field or lab verified testing, and/or survey results.

CREDIT CATEGORIES

The prerequisites and credits within the LEED rating system are organized into eight categories, each addressing a fundamental aspect of sustainable, high-performance designs and construction practices:

- *Integrative Process, Planning, and Assessments (IP)*
- *Location and Transportation (LT)*
- *Sustainable Sites (SS)*
- *Water Efficiency (WE)*
- *Energy and Atmosphere (EA)*
- *Materials and Resources (MR)*
- *Indoor Environmental Quality (EQ)*
- *Project Priorities (PR)*

RATING SYSTEM SELECTION

LEED offers rating systems designed for specific project types. Projects must register under the most appropriate LEED rating system and use the guide appropriate to the project's registration. In cases where the most appropriate rating system is unclear, additional guidance is provided in the USGBC Help Center: support.usgbc.org/hc/en-us. The project team may also raise a request to consult with GBCI: support.usgbc.org/hc/en-us/requests/new. The consultation should occur prior to registration to avoid the risk of GBCI determining, during the Preliminary Review, that an inappropriate rating system has been selected.

LEED FOR BUILDING DESIGN AND CONSTRUCTION (BD+C)

New Construction and Major Renovations

Applicable to whole buildings, and whole additions to buildings, of various use types that are either new construction or undergoing major renovations and where at least 60% of the gross floor area is complete.

Major renovations are buildings with extensive interior alteration work in addition to work on the exterior shell of the building and/or primary structural components and/or the core and peripheral MEP (mechanical, electrical, plumbing) and service systems and/or site work. Typically, the extent and nature of the work prevents the primary function space from being used for its intended purpose while the work is in progress, and the project team must obtain a new certificate of occupancy before reoccupying the work area.

Core and Shell Development
Applicable to whole buildings of various use types that are either new construction or undergoing major renovations and at least 40% of the gross floor area is incomplete. Incomplete: does not have its basic floor, wall, and/or ceiling finishes installed, or essential mechanical, electrical, plumbing systems (or fixtures) necessary to occupy the space for its intended use, within the contracted scope of work.

LEED FOR INTERIOR DESIGN AND CONSTRUCTION (ID+C)

Commercial Interiors
Applicable to interior renovation projects of commercial spaces (that have no scope for the exterior shell of the building and/or site work). The team installs movable furnishings, fixtures, and equipment (FF&E) to support the intended regular operations of the space.

LEED FOR BUILDING OPERATIONS AND MAINTENANCE (O+M)

Existing Buildings
Applicable to existing buildings projects focused on operational improvement. This rating system focuses on whole buildings that have been fully operational and occupied for at least one year. Focusing on performance-driven strategies and outcomes allows buildings in use to achieve greater efficiency.

PROJECT TYPE REQUIREMENTS

A LEED project must have its entire gross floor area certified under a single rating system (LEED BD+C*,* either New Construction or Core and Shell; LEED ID+C: Commercial Interiors; or LEED O+M: Existing Buildings) and is subject to all prerequisites and attempted credits in that rating system, regardless of mixed construction or space usage type.

However, in some prerequisites and credits, there may be requirements identified for specific project types such as schools, warehouse and distribution centers, health care, or residential.

Project type requirements must be met if 60% or more of the gross floor area of a project is comprised of that project type. For example, if a project is 75% residential and 25% retail, that project must follow the residential requirements in the rating system. In the Core and Shell Rating System or in a New Construction/Major Renovation project with incomplete space, the use type of the incomplete space must be based on the expected future use.

TENANT EXCLUSION PROVISIONS FOR EXISTING BUILDINGS

For projects pursuing LEED v5 O+M: Existing Buildings, up to 10% of the LEED project (by gross floor area) may be excluded from an individual prerequisite or credit if it is not possible to gather the necessary tenant data, or if the applicant does not have control over the required element because it is controlled by a tenant. The specific tenant spaces excluded as part of the 10% can vary by credit. Tenant exclusion provisions do not apply to *EQp2 No Smoking* where the entire building must be considered.

When excluding tenant spaces, the exclusion must include the entire tenant space. For example, projects cannot exclude a data center without excluding the entire tenant space that it serves. Clearly note which tenant spaces have been excluded in each prerequisite and credit documentation where tenant exclusion provisions are employed.

KEY TIMELINES FOR EXISTING BUILDINGS

Reporting period

Performance-based prerequisites and credits require data to be reported for a 12-month reporting period, unless otherwise specified within the credit requirements. The project reporting period begins with the start of the project selected 12-month reporting window and must be consistent across all prerequisites and credits.

Submittal timeline

To ensure that certification is awarded based on current building performance data, LEED v5 O+M certification applications must be submitted for review within 120 calendar days of the end of the 12-month reporting period.

Certification period

Certification under LEED v5 O+M: Existing Buildings is valid for three years from the date of certification acceptance. To maintain certification, projects must report energy and water data annually. Certification will expire three years from the date of certification acceptance.

PROJECT OCCUPANCY

Occupancy counts for the project that will be used consistently throughout the application are important to establish early and share with the whole project team. Whenever possible, use actual or predicted occupancies. LEED requires occupancy to be assessed and reported in two ways: regular building occupants and visitors.

REGULAR BUILDING OCCUPANTS

Regular building occupants are routine users of a project (full- and part-time) such as:

- Employees, daily volunteers, support staff (e.g., janitors)
- Residents (e.g., dormitory, apartment, condo), overnight hotel guests, medical inpatients
- K–12 students

VISITORS

Visitors are intermittent users of a project, such as:

- Retail customers
- Medical outpatients
- Volunteers who only periodically use a building (e.g., once per week)
- Higher-education classroom students

DEFAULT OCCUPANCY COUNTS

If the occupancy is unknown and cannot be reasonably projected, use one of the following resources to estimate occupancy:

- Default occupant density from *ASHRAE 62.1-2022*, Table 6-1[1]

Table 1. Default occupancy counts based on gross floor area (excluding structured parking)

	Gross square feet per occupant		Gross square meters per occupant	
	Regular	**Visitors**	**Regular**	**Visitors**
General office	250	0	23	0
Retail, restaurant	435	95	40	9
Retail, grocery store	550	115	51	11
Retail, general	550	130	51	12
Retail, service	600	130	56	12
Medical office	225	330	21	31
R&D or laboratory	400	0	37	0
Warehouse, distribution	2,500	0	232	0
Warehouse, storage	20,000	0	1860	0
Educational, daycare	630	105	59	10

[1] "The Standards for Ventilation and Indoor Air Quality," ASHRAE, accessed March 21, 2025, https://www.ashrae.org/technical-resources/bookstore/standards-62-1-62-2.

	Gross square feet per occupant		Gross square meters per occupant	
	Regular	**Visitors**	**Regular**	**Visitors**
Educational, K–12	1,300	140	121	13
Educational, postsecondary	2,100	150	195	14

NOTE: For residential (i.e., apartment or condo), use the number of bedrooms in the dwelling unit plus one, multiplied by the number of such dwelling units.

NOTE: For a hotel or motel, use 1.5 occupants per guest room multiplied by the total number of guest rooms. Then multiply the resulting total by 60%.

AVERAGE VS. PEAK OCCUPANCY

In prerequisite/credit calculations, occupancy may be calculated in different ways:

- **Regular building occupants**. The value representative of all the regular building occupants for a typical 24-hour day of operation. If numbers vary seasonally, use occupancy numbers that are a representative daily average over the entire operating season of the building.
- **Peak total**. The value representative of the highest number of occupants expected in the project at one time (ex. shift overlap, events). Sometimes this value may be generated by the building code for fire-safety, but a lower number can be used if justified.
- **Visitors**
  - Daily average visitors. For existing buildings, the total number of visitors within a year divided by the number of days the building is open to visitors
  - Typical peak visitors. For existing buildings, the average number of visitors for facilities that host regular or intermittent events that may not occur daily, such as sports stadiums, convention centers, event venues, or similar facilities where hosting visitors is a common function

If using default occupancy counts from Table 1, these must be used as the peak occupancy values.

Peak outpatients are the highest number of outpatients at a given point in a typical 24-hour period.

MINIMUM OCCUPANCY

Minimum occupancy is a requirement for LEED v5 O+M: Existing Buildings and is addressed under *EAp3: Minimum Energy Performance*. No other credits specify a minimum occupancy threshold.

EQUIVALENCIES

The LEED rating system is written based on the most up-to-date and widely available standards. However, alternative standards or compliance paths may also be available to project teams. The Project Priority Library includes a list of equivalencies and alternative compliance paths available by credit, project types, or region.

If there is no guidance available allowing an equivalency or alternative compliance path, project teams may submit a request for USGBC to determine equivalency.

LEED PLATINUM REQUIREMENTS

LEED v5 has added specific requirements to advance decarbonization goals to achieve platinum certification. In addition to earning all prerequisites and enough credits to reach the overall platinum point threshold, all platinum projects must achieve decarbonization requirements in the following credits:

LEED BD+C

- *EAc1: Electrification*
- *EAc3: Enhanced Energy Efficiency*
- *EAc4: Renewable Energy*
- *MRc2: Reduce Embodied Carbon*

LEED ID+C

- *EAc1: Electrification*
- *EAc2: Enhanced Energy Efficiency*
- *EAc3: Renewable Energy*
- *MRc2: Assess and Reduce Embodied Carbon*

LEED O+M: Existing Buildings

- *EAc Enhanced Energy Efficiency Performance*
- *EAc Greenhouse Gas Emissions Reductions Performance (Option 1 and Option 2)*
- *EAc Decarbonization and Efficiency Plans*

See Appendix I for the full list of LEED Platinum requirements.

MINIMUM PROGRAM REQUIREMENTS (MPR)

The Minimum Program Requirements (MPRs) are the minimum characteristics or conditions that make a project appropriate to pursue LEED certification. These requirements are foundational to all LEED projects and define the types of buildings, spaces, and neighborhoods that the LEED rating system is designed to evaluate.

MPR 1. MUST BE IN A PERMANENT LOCATION ON EXISTING LAND

INTENT

The LEED rating system is designed to evaluate buildings, spaces, neighborhoods, communities, and cities in the context of their surroundings. A significant portion of LEED requirements are dependent on the project's location, therefore it is important that LEED projects are evaluated as permanent structures. Locating projects on existing land is important to avoid artificial land masses that have the potential to displace and disrupt ecosystems.

REQUIREMENTS

All LEED projects must be constructed and operated on a permanent location on existing land. No project that is designed to move at any point in its lifetime may pursue LEED certification. This requirement applies to all land within the LEED project.

MPR 2. MUST USE REASONABLE LEED BOUNDARIES

INTENT

The LEED rating system is designed to evaluate buildings, spaces, neighborhoods, communities, cities, and all environmental impacts associated with those projects. Defining a reasonable LEED boundary ensures the project is accurately evaluated.

REQUIREMENTS

The LEED project boundary must include all contiguous land that is associated with the project and supports its typical operations. This includes land altered as a result of construction and features used primarily by the project's occupants, such as hardscape (parking and sidewalks), septic or stormwater treatment equipment, and landscaping. The LEED boundary may not

unreasonably exclude portions of the building, space, or site to give the project an advantage in complying with credit requirements. The LEED project must accurately communicate the scope of the certifying project in all promotional and descriptive materials and distinguish it from any non-certifying space.

MPR 3. MUST COMPLY WITH PROJECT SIZE REQUIREMENTS

INTENT

The LEED rating system is designed to evaluate buildings, spaces, or neighborhoods of a certain size. The LEED requirements do not accurately assess the performance of projects outside of these size requirements.

REQUIREMENTS

All LEED projects must meet the size requirements listed below.

LEED BD+C and LEED O+M rating systems
The LEED project must include a minimum of 1,000 square feet (93 square meters) of gross floor area.

LEED ID+C rating systems
The LEED project must include a minimum of 250 square feet (22 square meters) of gross floor area.

Further guidance on the MPRs can be found here:
usgbc.org/credits?MinimumProgramRequirements

RATING SYSTEM SCORECARDS

CREDIT CATEGORY VIEW

Integrative Process, Planning, and Assessments (IP)		2
IPp1	Climate Resilience Assessment	Required
IPp2	Human Impact Assessment	Required
IPp3	Operations Assessment and Policy	Required
IPp4	Current Facilities Requirements and O+M Plan	Required
IPc1	Operational Planning for Resilience	1
IPc2	Worker Safety and Training	1

Location and Transportation (LT)		8
LTc1	Sustainable Transportation Performance	6
LTc2	Transportation Demand Management	1
LTc3	Electric Vehicles	1

Sustainable Sites (SS)		2
SSc1	Heat Island Reduction	1
SSc2	Light Pollution and Bird Collision Reduction	1

Water Efficiency (WE)		15
WEp1	Water Metering and Reporting	Required
WEc1	Water Efficiency Performance	14
WEc2	Advanced Water Metering	1

Energy and Atmosphere (EA)		34
EAp1	Carbon Projection from Energy Use	Required
EAp2	Energy Monitoring and Reporting	Required
EAp3	Minimum Energy Performance	Required
EAp4	Fundamental Refrigerant Management	Required
EAc1	Greenhouse Gas Emissions Reduction Performance	12
EAc2	Optimized Energy Performance	12
EAc3	Enhanced Refrigerant Management Performance	2
EAc4	Peak Load Reduction Performance	1
EAc5	Decarbonization and Efficiency Plans	4
EAc6	Peak Load Management	1
EAc7	Commissioning	2

Materials and Resources (MR)		**13**
MRc1	Waste Reduction Performance	12
MRc2	Waste Reduction Strategies	1
Indoor Environmental Quality (EQ)		**26**
EQp1	Verification of Ventilation and Filtration	Required
EQp2	No Smoking	Required
EQc1	Indoor Air Quality Performance	10
EQc2	Ventilation Performance	5
EQc3	Occupant Experience Performance	3
EQc4	Facility Stewardship Performance	3
EQc5	Air Filtration	1
EQc6	Resilient Spaces	1
EQc7	Green Cleaning	2
EQc8	Integrated Pest Management	1
Project Priorities (PR)		**10**
PRc1	Project Priorities	10
Total	**Possible Points**	**110**

IMPACT AREA VIEW

Decarbonization		
IP Prerequisite	Climate Resilience Assessment	Required
IP Prerequisite	Operations Assessment and Policy	Required
IP Prerequisite	Current Facilities Requirements and O+M Plan	Required
LT Credit	Sustainable Transportation Performance	6
LT Credit	Transportation Demand Management	1
LT Credit	Electric Vehicles	1
SS Credit	Heat Island Reduction	1
WE Credit	Water Efficiency Performance	14
WE Credit	Advanced Water Metering	1
EA Prerequisite	Carbon Projection from Energy Use	Required
EA Prerequisite	Energy Monitoring and Reporting	Required
EA Prerequisite	Minimum Energy Performance	Required
EA Prerequisite	Fundamental Refrigerant Management	Required
EA Credit	Greenhouse Gas Emissions Reduction Performance	12
EA Credit	Optimized Energy Performance	12
EA Credit	Enhanced Refrigerant Management Performance	2
EA Credit	Peak Load Reduction Performance	1
EA Credit	Decarbonization and Efficiency Plans	4
EA Credit	Peak Load Management	1
EA Credit	Commissioning	2
MR Credit	Waste Performance	12
MR Credit	Waste Reduction Strategies	1

Quality of life		
IP Prerequisite	Climate Resilience Assessment	Required
IP Prerequisite	Human Impact Assessment	Required
IP Prerequisite	Operations Assessment and Policy	Required
IP Credit	Operational Planning for Resilience	1
IP Credit	Worker Safety and Training	1
LT Credit	Sustainable Transportation Performance	6
LT Credit	Transportation Demand Management	1
LT Credit	Electric Vehicles	1
SS Credit	Heat Island Reduction	1
EQ Prerequisite	Verification of Ventilation and Filtration	Required
EQ Prerequisite	No Smoking	Required
EQ Credit	Indoor Air Quality Performance	10
EQ Credit	Ventilation Performance	5
EQ Credit	Occupant Experience Performance	3
EQ Credit	Facility Stewardship Performance	3
EQ Credit	Air Filtration	1
EQ Credit	Resilient Spaces	1
EQ Credit	Green Cleaning	2
EQ Credit	Integrated Pest Management	1

Ecological Conservation and Restoration		
IP Prerequisite	Operations Assessment and Policy	Required
LT Credit	Sustainable Transportation Performance	6
LT Credit	Transportation Demand Management	1
LT Credit	Electric Vehicles	1
SS Credit	Heat Island Reduction	1
SS Credit	Light Pollution and Bird Collision Reduction	1

WE Prerequisite	Water Metering and Reporting	Required
WE Credit	Water Performance	14
WE Credit	Advanced Water Metering	1
MR Credit	Waste Reduction Performance	12
MR Credit	Waste Reduction Strategies	1
EQ Credit	Integrated Pest Management	1

INTEGRATIVE PROCESS, PLANNING, AND ASSESSMENTS (IP)

OVERVIEW

The industry has shifted its focus to prioritizing a whole building's overall performance rather than just isolated systems. The Integrative Process, Planning and Assessments (IP) category encourages collaborative efforts to identify synergies among building systems and components. This approach is valuable, highlighting the collaborative process as a tool to ensure alignment among occupants, project owners, and facility managers.

This holistic approach promotes proactive consideration of how each project assesses current operations, sets goals, and prioritizes action. This contributes to high performance across all aspects of building operations while addressing decarbonization, quality of life, and ecosystem conservation and restoration from the outset. By embedding these considerations, the IP category helps shape environmentally responsible, resilient, and equitable buildings that benefit both occupants and the broader community.

Key aspects of this category include:

- **Engagement**. Incorporate the expertise of those directly responsible for the ongoing building operations.
- **Interdisciplinary collaboration**. Leverage synergies across credit categories and operations team members to maximize efficiencies and inform data-driven decision-making.
- **Assessment**. Evaluate the building and operations to provide insights into natural hazards, carbon emissions, and human impacts, which are referenced throughout the rating system.
- **Planning and documentation**. Create and update plans to implement best practices and fine-tune operations to continue excellence in building management.

Decarbonization

Building operations account for 30% of global final energy consumption and contribute to 26% of energy-related emissions, confirming that existing buildings hold immense potential for carbon reduction.[2] To support this work, the IP category addresses decarbonization by first evaluating operations. Projects can sustain energy-efficient operating strategies through a planning approach that promotes continuity of information (*IPp3: Operations Assessment and*

[2] "Buildings Overview," International Energy Agency (IEA), accessed March 21, 2025, https://www.iea.org/energy-system/buildings.

Policy, *IPp4: Current Facilities Requirements and O+M Plan*). Findings from this assessment are integrated throughout the rating system (*EAc5: Decarbonization and Efficiency Plans*, *EAc6: Peak Load Management*).

Quality of life

Environmental justice and similar movements have brought the importance of understanding the social context of the local community, workforce, and supply chain to the forefront. The IP category addresses social inequities through an assessment encouraging project teams to evaluate the social context of those who support the operations and maintenance of the building, the local community, and occupants to provide a more equitable and inclusive environment (*IPp2: Human Impact Assessment*, *IPc2: Worker Safety and Training*).

Resilience is a key topic throughout the *LEED O+M: Existing Buildings* rating system. Munich Reinsurance America reported that global disaster losses in 2023 totaled $250 billion, highlighting the significant financial impact of natural disasters worldwide.[3] The required assessment of observed, projected, and future natural hazards for climate resilience is meant to enhance awareness, increase transparency, reduce vulnerabilities, and ensure long-term safety and sustainability (*IPp1: Climate Resilience Assessment*).

Ecological conservation and restoration

With requirements that evaluate site operations, construction and renovation, occupant connection with nature, and green cleaning, IP sets the framework for developing an understanding and optimization of strategies that support ecological systems beyond building operations (*IPp3: Operations Assessment and Policy*).

The IP category in LEED v5 promotes a process-driven approach to sustainable building operations. Focusing on real-time assessments, collaboration, and real-world impacts empowers project teams to tackle key environmental and social challenges. This framework supports high-performing, resilient, equitable buildings and is aligned with long-term sustainability goals.

[3] "Global climate disasters hit record $320bn – Munich Re," Reinsurance Business, January 10, 2025, accessed March 21, 2025, https://www.insurancebusinessmag.com/reinsurance/news/breaking-news/global-climate-disasters-hit-record-320bn--munich-re-520075.aspx#:~:text=An%20analysis%20from%20insurance%20company,year%20for%20the%20insurance%20industry.

Impact Area Alignment

— Decarbonization

☑ Quality of Life

— Ecological Conservation and Restoration

Integrative Process, Planning, and Assessments Prerequisite

CLIMATE RESILIENCE ASSESSMENT

IPp1

REQUIRED

INTENT

To promote a comprehensive assessment of observed, projected, and future natural hazards for climate resilience, aiming to enhance awareness of hazards, increase transparency of risks, reduce vulnerabilities, and ensure long-term safety and sustainability.

REQUIREMENTS

Achievement pathways	Points
Existing Buildings	N/A
Climate and Natural Hazard Assessment	

Complete a climate and natural hazard assessment.

As part of the assessment, identify observed, projected, and future natural hazards that could potentially affect the project site and building function. For the purpose of this prerequisite, hazards are site-specific natural hazards that include but are not limited to drought, earthquakes, extreme heat, extreme cold, flooding, hurricanes and high winds, hail, landslides, sea level rise and storm surge, tornadoes, tsunamis, wildfires and smoke, winter storms, and other relevant hazards (specify).

Identify two priority hazards, at minimum, to address through proposed operations and maintenance strategies. For each priority hazard, the project team must assess and specify the following:

- Intergovernmental Panel on Climate Change emissions scenario used, specifying the Shared Socioeconomic Pathways
- Projected service life of the LEED project (e.g., fiscal year 2050 or 100 years)
- Hazard level
- Hazard risk rating
- Exposure, sensitivity, adaptive capacity, vulnerability, and overall risk levels
- Potential impact on the project site and building function

Where possible, use the information from the assessment to inform the operations and maintenance of the project and describe how project-specific strategies were considered.

REQUIREMENTS EXPLAINED

This prerequisite seeks to enhance awareness of potential climate hazards, increase transparency about associated risks, reduce vulnerabilities, and preserve the long-term safety and sustainability of projects.

Integrating climate resilience throughout a project's lifecycle helps address the impacts of climate change and promotes the long-term durability of structures from key vulnerabilities. A Climate Resilience Assessment guides project teams in identifying and evaluating site-specific climate hazards that could impact structural integrity, occupant well-being, and operational continuity. It provides a framework for integrating data-driven, forward-looking strategies that align with regional climate projections and sustainability goals.

Addressing climate risks at the project level also supports broader goals of public safety, economic stability, cultural preservation, and community resilience by reducing vulnerability to the shocks of extreme weather events and adapting to long-term climate stressors. Integrating these considerations strengthens the built environment’s ability to endure changing conditions while maintaining functionality and sustainability.

This prerequisite requires project teams to conduct a comprehensive climate and natural hazard assessment, identifying current and projected hazards that may impact the project site and building operations. For many teams, this will be an educational and goal-setting process. In identifying risks and vulnerabilities, teams can begin to integrate project-specific resilience strategies aimed at mitigating the impacts of natural hazards and enhancing the project’s adaptation capacity.

Climate and Natural Hazard Risk Assessment

A climate and natural hazard assessment is a systematic process to identify, evaluate, and understand the potential risks that climate change and natural hazards pose to a specific project and its functionality. This assessment considers observed and projected hazards, including extreme weather events such as droughts, floods, wildfires, and hurricanes, as well as long-term phenomena such as sea level rise. The analysis involves gathering data on the likelihood, severity, and timing of these hazards using The Intergovernmental Panel on Climate Change's (IPCC) Shared Socioeconomic Pathways (SSPs). Key elements of the assessment include evaluating the project’s exposure, sensitivity, adaptive capacity, and vulnerability to these risks and identifying the overall hazard risk levels.

Climate risk emerges from the interaction of hazard, exposure, and vulnerability.[4] Hazards refer to climate-related physical events or trends that have the potential to cause damage or loss, while exposure encompasses the presence of assets, services, resources, and infrastructure that may be affected. For the purposes of this credit, natural hazards include drought, extreme heat or cold, flooding, hurricanes and high winds, hailstorms, landslides, sea level rise, storm surge, tornadoes, tsunamis, wildfires and smoke, and winter storms.[5] For each identified hazard, the team must complete the *Climate Resilience Assessment Template* or an equivalent, documenting exposure, risk levels, and potential mitigation strategies.

Vulnerability is the tendency or predisposition to experience negative effects. It can include things such as land use, public infrastructure, the burden of disease in the population, and previous exposure to hazards.[6] A climate and natural hazard assessment evaluates the potential risks climate change and natural hazards pose to a project, helping to identify, analyze, and plan for these risks to protect the long-term safety, functionality, and resilience of infrastructure, communities, and ecological systems.

Identification of Priority Hazards

Based on the assessment, project teams must identify at least two priority hazards by evaluating site-specific climate conditions, historical hazard data, projected future risks, and the building's exposure, sensitivity, and adaptive capacity. The assessment should incorporate regional climate models, hazard mitigation plans, and available climate risk databases to determine the likelihood and severity of each potential hazard. Teams should also consider how local infrastructure, soil conditions, and water management systems may exacerbate or mitigate risks.

To support this evaluation, project teams can use tools such as the Federal Emergency Management System's (FEMA) National Risk Index, NOAA Climate Explorer,[7] or state and municipal hazard mitigation and adaptation plans to identify patterns of past and projected hazard events. Stakeholder engagement with local authorities, utilities, and community resilience groups can further inform risk prioritization. For example, if a site is in a flood-prone area with increasing extreme precipitation events, flooding may be identified as a priority hazard due to its potential to damage flooring, walls, and electrical systems. Similarly, in regions

[4] "Climate hazard assessment," Climate Resilience Policy Indicator, International Energy Agency, 2022, https://www.iea.org/reports/climate-resilience-policy-indicator/climate-hazard-assessment.
[5] D. D. Saulnier, A. M. Dixit, A., A. R. Nunes, and V. Murray, "Disaster risk factors – hazards, exposure and vulnerability," WHO Guidance on Research Methods for Health Emergency and Disaster Risk Management, accessed March 31, 2025, https://extranet.who.int/kobe_centre/sites/default/files/pdf/WHO%20Guidance_Research%20Methods_Health-EDRM_3.2.pdf.
[6] "A Framework for Understanding Vulnerability", U.S. Global Change Research Program, accessed March 31, 2025, HTTPS://health2016.globalchange.gov/populations-concern.
[7] "Home page", The Climate Explorer, accessed March 31, 2025, https://crt-climate-explorer.nemac.org/.

experiencing rising temperatures, extreme heat may be prioritized due to its impact on material degradation and increased cooling loads.

Once priority hazards are identified, teams must document findings in the USGBC Climate Resilience Assessment Template or submit an equivalent assessment using an external tool.

Assessing hazards

After project teams identify two priority hazards, evaluate the impact by specifying the IPCC emissions scenario used in the assessment, which outlines possible future atmospheric greenhouse gas (GHG) concentrations. Define scenarios that are both acceptable and appropriate for the project's geographic location, taking into account local climate action plans to guide their selection. For instance, *Shared Socioeconomic Pathways (SSP) 1-2.6* (Low Emissions Scenario) are recommended for projects aiming to align with ambitious global climate mitigation goals or for those with shorter lifespans (20–30 years), where less severe climate impacts are expected. Conversely, *SSP5-8.5* (High Emissions Scenario) is more suitable for projects in high-risk areas, those with longer lifespans (50+ years), or where significant climate impacts are anticipated due to limited mitigation measures or regional vulnerabilities.

Next, teams define the projected service life of the project. For LEED projects, the projected service life refers to the project's expected lifespan, which could extend to fiscal year 2050 or up to 100 years, during which the assessment of hazard risks remains applicable. Project teams must also evaluate the hazard level and assign a hazard risk rating based on the potential severity and impact. The hazard level reflects the intensity of a specific hazard event, categorized as low, medium, or high. Project teams should report and identify the level of each potential hazard using historical data and future projections. Teams can refer to the IPCC climate projections for historical data or climate projections. The hazard risk rating typically comes from local or regional hazard mitigation plans, and it assesses the likelihood of a hazard occurring. Teams must provide a risk rating for each identified hazard.

Project teams must evaluate the project's susceptibility to each hazard and consider multiple factors, including exposure, sensitivity, adaptive capacity, vulnerability, and overall risk levels. Exposure refers to the degree to which the project is vulnerable to hazards, such as its proximity to water bodies or seismic zones. Sensitivity indicates how significantly these hazards may affect the project based on factors like materials, structural design, and infrastructure. Adaptive capacity is the project's ability to adapt, withstand, or recover from the impacts of hazards through resilient design, contingency planning, or technology. A project with backup generators and multiple water supply systems has a higher adaptive capacity compared to one without.[8]

[8] R. Askar, L. Bragança, and H. Gervásio, "Adaptability of Buildings: A Critical Review on the Concept Evolution," *Applied Sciences* 11, no. 10 (2021): 4483, https://doi.org/10.3390/app11104483.

Vulnerability reflects the project's overall susceptibility, considering both its sensitivity and adaptive capacity. The overall risk level is a combined assessment of hazard severity, exposure, sensitivity, adaptive capacity, and vulnerability, categorized as low, medium, or high.

Teams must assess the potential impacts of each hazard on the project. Project hazards can disrupt essential services, damage structures, cause long-term operational challenges, and impact the project's operational aspects. During the operations phase, the assessment must consider the impact of these hazards on facility management, occupant safety, and service continuity. This includes potential disruptions to building systems, energy and water supply reliability, indoor environmental quality, emergency preparedness, workforce safety, and the long-term performance of structural and mechanical components. Hazards may also affect maintenance schedules, operational costs, and the ability to provide critical services during extreme weather events.

Integration into Project Planning and Operations

As part of the Climate Resilience Assessment, the hazard assessment findings will be used to inform ongoing operations and maintenance (O+M) strategies for the project. This includes updating emergency preparedness protocols, adjusting maintenance schedules to address climate-related stressors, and implementing procedures to enhance building resilience. For example, if flooding is identified as a priority hazard, the facility team may establish protocols for inspecting and maintaining drainage systems, installing temporary flood barriers during extreme weather events, and securing critical equipment in elevated locations. If extreme heat is a concern, operations teams can optimize HVAC (heating, ventilation, and air conditioning) performance, schedule proactive cooling system maintenance, and implement adaptive occupant comfort strategies.

Where possible, integrate resilience considerations into preventive maintenance programs, staff training, and operational decision-making to ensure facilities remain adaptable to changing climate conditions. Identifying risks and vulnerabilities allows teams to develop long-term strategies to mitigate natural hazards and enhance resilience. This approach strengthens operational continuity, reduces disruptions, and supports ongoing adaptation to evolving threats. Through proactive facility management, teams can better sustain building functionality, occupant well-being, and asset longevity, ensuring that resilience measures remain effective throughout the project's lifespan.

DOCUMENTATION

Project types	Options	Paths	Documentation
All	All	All	The project's climate and natural hazard assessment (using the USGBC Climate Resilience Assessment Template or equivalent)

REFERENCED STANDARDS

- IPCC (ipcc.ch)

Impact Area Alignment

— Decarbonization

☑ Quality of Life

— Ecological Conservation and Restoration

Integrative Process, Planning, and Assessments Prerequisite

HUMAN IMPACT ASSESSMENT

IPp2

REQUIRED

INTENT

To ensure that the project is guided by a thorough understanding of the social context of the local community, workforce, and supply chain, helping to address potential social inequities and incorporate information about people impacted by the project into operations.

REQUIREMENTS

Achievement pathways	Points
Existing Buildings	N/A
Site Survey and Human Impact Assessment	

Complete and document a site survey and human impact assessment that draws on relevant information from the following categories, as applicable:

- **Demographics**: This may include race and ethnicity, gender, age, income, employment rate, population density, education levels, household types, and identification of nearby vulnerable populations.
- **Local infrastructure and land use**: This may include adjacent transportation and pedestrian infrastructure, adjacent diverse uses, relevant local or regional sustainability goals/commitments, and applicable accessibility codes.
- **Human use and health impacts**: This may include housing affordability and availability, availability of social services (e.g., healthcare, education, and social support networks), community safety and local community groups, and supply chain and construction workforce protections.
- **Occupant experience**: This may include an opportunity for daylight, views, and operable windows; environmental conditions of air and water; and adjacent soundscapes, lighting, and wind patterns within the context of the surrounding buildings (e.g., a microclimate, a solar scape, neighboring structures).
- **Working conditions**: Address wages, benefits, training, worker protections, right to organize, and production rates for low-wage, on-site maintenance staff and contractors such as cleaners, window washers, landscapers, parking attendants, security guards, mail room attendees, food service workers, and other service workers
- **Other**: (specify)

Where possible, use the information from the assessment to inform the operations and maintenance of the project and describe how project-specific strategies were considered.

At a minimum, the assessment must address the parameters within the control of project and site management. The assessment may be used for multitenant complexes or campus projects in the same location.

REQUIREMENTS EXPLAINED

A Human Impact Assessment serves as guidance for integrating equitable strategies throughout the operational phase. Addressing social and economic needs and disparities requires purposeful design, policy reforms, and inclusive community engagement to foster spaces that are accessible, sustainable, and equitable for everyone. Creating healthier and supportive environments for local communities can target their specific needs and ensure a fair distribution of benefits and challenges.

This prerequisite requires that the project team comprehensively evaluate and understand the social, economic, and environmental context of the local community, workforce, and supply chain while operating the building. Teams will gather and analyze this information through methods such as community outreach, census reports, and partnerships with local organizations to ensure the project aligns with community needs and promotes equitable outcomes.

Teams must select key characteristics to evaluate within the categories of demographics, local infrastructure and land use, human use and health impacts, occupant experience, and working conditions. These analyses and findings are intended to inform the project's operations and maintenance strategies.

This assessment balances environmental goals with the needs and aspirations of the people affected, fostering projects that are both ecologically and socially responsible. This will be an educational process for those who have not conducted similar assessments previously. With intentional planning, teams can integrate project-specific strategies by identifying potential disparities and work collectively toward creating a more inclusive and equitable community.

Human Impact Assessment

A Human Impact Assessment is a process in which quantitative and qualitative data for a proposed project is collected through identifying characteristics unique to the project site and its surrounding community. It requires projects to understand the socio-political context of the site, such as the cultural makeup of neighboring residents or average income rates. Additionally, it

asks projects to identify relevant infrastructure and policy such as local sustainability commitments or accessibility codes. The assessment also requires taking stock of what resources may be accessible to the residents, staff, or potential users, such as transit availability or health care. It then evaluates impacts on occupant experience, such as air and water quality.

Lastly, it asks projects to address working conditions for low-wage staff/contractors, including wages. Project teams must consider how these elements interact with and impact each other to ensure that they guide project development with a comprehensive understanding of its social context.

Defining community

Project teams must first establish the scope of their assessment by identifying the project's community. Communities can be geographic and functional. Geographic communities start with the project's neighborhood — the people who live and work in and near the project and interact with it by proximity. Geographic communities can also extend beyond to include towns, cities, or counties. Functional communities include all occupants, construction workers, and visitors who come to the building. These people may or may not live nearby.

Teams can also define community through various affinities or commonalities, such as age, ethnicity, income level, housing status, or educational background. The community may extend to include project team members, contractors, and managers who oversee the operations and maintenance of the project.

Community within the context of the supply chain includes material suppliers, manufacturers, distributors, along with the workforce involved in production and transportation, highlighting local engagement and fair labor practices.

Address the core categories of human impact

Teams must complete a thorough human impact assessment that evaluates the potential impact of the project on people, their living conditions, health, food security, education, and access to other resources. The assessment must include data collection and analysis of core human impact categories such as demographics, infrastructure, health, occupant experience, and working conditions, as well as other relevant social impacts identified, providing a comprehensive overview of the human impacts of project operations.

Project teams are encouraged to engage with community members and other relevant groups to gather insights, understand local needs, and validate data using these metrics:

- **Demographics**: Evaluate the local demographics of the area surrounding the building site to better understand how the project operations may influence the social fabric of the

surrounding community. This process involves analyzing key demographic characteristics, including factors such as race and ethnicity, gender, age distribution, income levels, employment rates, population density, education levels, and household types. Additionally, it includes identification of nearby vulnerable populations to consider whether their needs can be addressed in the project's operations and maintenance strategies. Teams are suggested to collaborate with non-profit organizations that work directly with the people of the community.

- **Local Infrastructure and land use**: Examine the project's relationship to local infrastructure and land use in order to understand how it is accessible to those who live or work in and around the building. Assess the adjacent public transit systems such as walkways, bike lanes, and road networks to thoroughly connect occupants and staff with existing mobility options and promote sustainable transportation.

  The assessment encourages reviewing the local community's sustainability commitments, such as goals to reduce greenhouse gas emissions or promote energy efficiency, highlighting that the project can support broader efforts to create a more sustainable future through its operations.

  Identifying and complying with relevant accessibility codes and standards is another key aspect of the assessment to strengthen the project's adherence to legal requirements regarding access for people with disabilities, while following best practices for creating inclusive, barrier-free environments.

- **Human use and health impacts**: Evaluate the project's effects on human use and its impact on public health and well-being. This involves consideration of the community's current access to essential resources, as well as the overall quality of life for residents and staff. The assessment also considers the project's access or proximity to social services, such as health care facilities, educational opportunities, and support networks, and whether these are available to those working in the building.

  The assessment must address health considerations specific to interior spaces, such as mold, asbestos, and other potential hazards that directly affect occupant well-being.

  Community safety is another important factor to public health and well-being. Projects that incorporate safety features such as public spaces, adequate lighting, and pedestrian-friendly designs can foster a sense of safety and belonging.

- **Occupant experience**: Examine how the operations of the project can influence the health, comfort, and well-being of its occupants. This includes an analysis of key

environmental factors such as the availability of natural daylight, the quality and orientation of views, the presence of operable windows for fresh air circulation, as well as the quality of indoor air and water.

Consider how external elements — such as the surrounding soundscapes, the quality of artificial and natural lighting, and the impact of wind patterns on the project and adjacent structures — affect the indoor environment and the overall experience of those inhabiting the space. This assessment encourages the operations and maintenance team to promote a positive and health-conscious environment for occupants and staff.

- **Working conditions**: Evaluate the working conditions for low-wage workers onsite. This includes those working on the exterior of the building, such as window washers, landscapers, and parking attendants, who may be exposed to unfavorable weather for example. It also includes cleaners, security guards, mail room attendees, food service, and other service workers.

  Project teams must address wages and benefits, such as how wages compare to local, regional, or national averages, and whether these wages are suitable for the cost of living in the area. Additionally, it includes analyzing training and worker protections, such as understanding compliance with OSHA standards, as well as the right to organize if staff recognize unsafe or unjust conditions. Consider production rates, allowing for an understanding of whether progress is reasonably and realistically made within a particular timeframe.

- **Other**: Project teams may include any additional relevant social factors that are evaluated as part of the Human Impact Assessment.

Integration into operations and maintenance strategies

Project teams are recommended to use the findings from the Human Impact Assessment to inform the operations and maintenance of the project. Things to consider include how the identified social factors informed project-specific decisions, such as changes to design features, operational practices, or community engagement strategies. Implementing strategies such as these promote inclusivity, fair labor practices, and equitable access to opportunities, while supporting the community's economic and social well-being. This integration is a tool to drive meaningful change within the project as well as the surrounding community, creating a more resilient and sustainable outcome.

DOCUMENTATION

Project types	Options	Paths	Documentation
All	All	All	The project's human impact assessment (using the USGBC Human Impact Assessment Template or equivalent)

REFERENCED STANDARDS

- None

Impact Area Alignment

- ☑ Decarbonization
- ☑ Quality of Life
- ☑ Ecological Conservation and Restoration

Integrative Process, Planning, and Assessments Prerequisite

OPERATIONS ASSESSMENT AND POLICY

IPp3

REQUIRED

INTENT

To support holistic, high-performing, sustainable operations that address the LEED system goals: decarbonization, quality of life, and ecosystem conservation and restoration.

REQUIREMENTS

Achievement pathways	Points
Existing Buildings	N/A
Operations Assessment and Policy	

For the operational elements described below, complete the following:

- Assess current operational practices.
- As appropriate, establish a baseline measurement and annual goals for maintaining or improving the project's ongoing performance.
- Identify opportunities for implementing sustainable practices.
- Create and implement a sustainable operations policy for managing each operational element within the facility. At a minimum, the policy (or a combination of policies) must address the parameters within the project and site management control for all elements listed below.
- Identify the individual(s) responsible for implementing each element of the policy, communicate the policy to the building manager, and make the policy available to all project occupants.

Operational elements

- **Site operations**: Address best management practices to reduce harmful environmental impacts on the site, surrounding communities, and vulnerable populations. As applicable to the site, address the following: maintenance equipment; snow and ice removal; organic waste management; invasive plant species removal; cleaning of building exterior, pavement, and other impervious surfaces; irrigation management; fertilizer use; pest management; and bird-window collisions (through monitoring and/or identifying opportunities for mitigation)

- **Materials purchasing**: Address purchasing practices to reduce environmental harm from materials by considering the embodied carbon of products. As applicable, address ongoing consumables and durable goods
- **Construction and renovations**: Address the environmental and air quality impacts of construction and renovation projects. As applicable, address materials purchased, waste diversion, and indoor air quality practices implemented during renovation and maintenance activities
- **Occupant needs**: Identify how people are currently using the building and opportunities to improve underused spaces or spaces not meeting the needs of people. Identify opportunities to improve access to building features, usability, customization, connection with nature, and physical health. As applicable, provide recommendations for improving indoor environmental quality and experiential delight
- **Green cleaning**: Address how the building and site areas are cleaned. Address the products used to clean the building and the janitorial paper, trash can liners, and miscellaneous janitorial products purchased for the project during regular operations. Identify safe handling, use, and disposal of products. Evaluate the cleaning performance and staffing methods, and cleaning personnel training

REQUIREMENTS EXPLAINED

This prerequisite encourages the building operations team to review current operations, compare current operations against an identified desired state, identify gaps and strategies to meet stated goals, and create or update an operations policy (or policies) implementing identified operational practices.

At a minimum the assessment and ensuing policy must address the operational elements identified in the rating system including site operations, materials purchasing, construction and renovations, occupant needs, and green cleaning.

Perform an Operations Assessment

Assess current operational practices at the project for the operational elements identified in the rating system, at a minimum. The assessment is a discovery process where the project team discusses, inspects, and analyzes current operational practices.

For each of the operational elements addressed in the prerequisite, evaluate current practices. This includes understating practices and systems currently in place at the project. The assessment will identify how individuals are currently using the building and evaluate practices related to site operations.

Once the team understands current practices in place, identify goals for each operational element. The goals identified will reflect sustainable best practices that align with how the building operates, where it is located, and the function that the building serves.

These goals should be specific, measurable, and aligned with the project's long-term sustainability targets. As appropriate for each of the Operational Elements, establish a baseline measurement to assess the current performance in relation to identified goals. Establishing a baseline allows facility managers to identify how the building and site are currently performing in relation to sustainability objectives and also provides a benchmark for future improvements. Establishing clear baselines and goals provides a direct path to achieve long-term objectives and quantitative metrics for comparison. For example, the team could aim to divert 30% of organic waste from landfills by implementing more effective waste sorting or composting.

Identify operational practices that will be implemented and maintained to assist the project in achieving stated goals. These are the strategies and practices that will be maintained or adopted to move the project toward desired sustainable operations.

Develop a Sustainable Operations Policy

Building on the operational practices identified, develop, implement, and/or update a sustainable operations policy (or combination of policies). The sustainable operations policy communicates identified processes, procedures, and actions to all operating within the project. The policy(ies) must, at a minimum, cover the operational elements within the scope of the project and site management control.

Policy implementation and communication

Identify the individual(s) responsible for implementing each element of the policy. This could be identifying a specific individual or the role responsible such as Assistant Facilities Manager or Groundskeeper, for example. Communicate or share the policy with the building manager so they are abreast of the policy and can facilitate the implementation of the policy. The policy must be made available to all occupants to ensure transparency and collective commitment to sustainable practices.

Operational Elements

At a minimum the following elements must be assessed onsite but may be expanded to address additional elements reflecting project priorities. These operational elements reflect areas of building operations that address decarbonization, quality of life, and ecosystem conservation and restoration, and are critical elements of a holistic approach to sustainable building operations.

Address, at minimum, the following elements:

Site operations
Site operations focus on practices that minimize harmful environmental impacts on the site and within surrounding communities, including consideration for vulnerable populations. Considerations of sustainable practices include:

- **Maintenance equipment**. Using low-emission and eco-friendly machinery while conducting regular maintenance
- **Snow and ice removal**. Prioritizing environmentally friendly de-icing agents, like calcium magnesium acetate or sand, that are less corrosive and have a lower environmental impact compared to traditional salt-based chemicals
- **Organic waste management**. Implementing waste separation systems that clearly distinguish between recyclables, compostables, and landfill waste
- **Invasive plant species control**. Landscaping with native plants that support local biodiversity reduces the spread of invasive species
- **Cleaning of building exteriors, pavements, and impervious surfaces**. Using non-toxic agents, such as biobased and biodegradable detergents, and efficient equipment to reduce water usage
- **Irrigation management**. Implementing strategies that conserve water, such as the use of drought-resistant landscaping
- **Fertilizer use**. Adhering to recommended application rates, choosing slow-release fertilizers to prevent runoff, and eliminating the use of “weed and feed” type fertilizers
- **Pest management**. Adopting integrated pest management (IPM) principles that emphasize prevention and non-chemical controls[9]
- **Bird-window collisions (monitoring and/or mitigation)**. Collecting data on collision frequency and risk factors allows organizations to implement effective solutions, such as using bird-friendly glass or applying visual markers to windows

Materials purchasing
Developing guidelines for materials purchasing reduces environmental harm, promotes responsible practices, and addresses the purchasing practices for both ongoing consumables and durable goods. Considerations of sustainable practices include:

- Choosing products designed for durability

[9] “Integrated Pest Management (IPM) Principles”, U.S. Environmental Protection Agency, last updated September 3, 2024, https://www.epa.gov/safepestcontrol/integrated-pest-management-ipm-principles.

- Reducing the use of raw materials, reusing materials, and selecting those with lower embodied carbon
- Incorporating strategies for supplier engagement, encouraging partnerships with vendors who share a commitment to sustainability
- Identifying product certifications that indicate responsible sourcing and production practices, such as *ENERGY STAR*,[10] *Forest Stewardship Council (FSC*),[11] *Programme for the Endorsement of Forest Certification (PEFC)*,[12] or *Cradle to Cradle*.[13]

Construction and renovations

Addressing the environmental and indoor air quality (IAQ) impacts of construction and renovation projects promotes sustainability and the health of occupants. The policy must focus on selecting sustainable materials, implementing waste diversion practices, and ensuring effective IAQ measures.

Occupants' needs

Building operations managers can optimize space utilization and user experience by systematically collecting data on how people currently use the building. This is possible with simple visual assessments or more advanced tracking usage patterns. Regardless, the goal is to identify underused spaces and consider opportunities to improve accessibility, which may include strategies to enhance the experience of neurodivergent occupants, connections with nature, and general indoor environmental quality so that the space can more consistently meet the diverse needs of occupants.

For all regularly used spaces, determine opportunity for improvement regarding access to building features, usability, customization, connection with nature, and physical health. Consider the following:

- Occupants' ability to access the features of the building, regardless of physical or mental capability
- Occupants' ability to alter the space to better meet their unique needs or comfort requirements
- Biophilic design and ways to better connect occupants with natural systems
- Air quality, lighting quality, thermal environment, acoustics, and ergonomics impacting occupants
- Opportunities for improving occupant health

[10] "Home page", ENERGY STAR®, accessed March 31, 2025, https://www.energystar.gov/.
[11] "Home page", FSC, accessed March 31, 2025, https://fsc.org/en.
[12] "Home page", PEFC, accessed March 31, 2025, https://www.pefc.org/.
[13] "Home page", Cradle to Cradle, accessed March 31, 2025, https://c2ccertified.org/.

The policy must outline clear strategies to improve accessibility and perceptions of belonging, opportunities for more flexibility or customization, connections with nature and biophilic design, and enhanced physical health.

Green cleaning
The policy must clearly define green cleaning criteria to ensure that cleaning practices for both interior and exterior areas of the building support a healthy environment and minimize environmental impact. The following must be addressed:

- How the building and site areas are cleaned
- Products used during regular operations, including janitorial paper, trash can liners, and miscellaneous janitor products purchased (see *EQc7: Green Cleaning* for product standards)
- Protocols for the safe handling, use, and disposal of these products to prevent contamination and ensure health and safety standards are met
- Conducting regular evaluation of cleaning performance and staffing methods
- Training for cleaning personnel should focus on the proper use of green cleaning products and techniques and provide knowledge of environmentally responsible practices

Incorporating these elements enhances the indoor environmental quality and fosters a culture of sustainability within the building. Prioritizing green cleaning practices significantly reduces the project's ecological footprint while promoting a healthier space for occupants and cleaning staff.

DOCUMENTATION

Project types	Option	Path	Documentation
All	All	All	The project's operations assessment (using the *USGBC Operations Assessment Template* or equivalent)
			Confirmation that an operations policy or policies have been developed and/or updated to address the parameters within the project and site management control for all required operational elements
			Description of how the policy or policies were communicated to all occupants and the building manager
			List of individuals responsible for implementation

REFERENCED STANDARDS

- None

Impact Area Alignment

- ☑ Decarbonization
- ☑ Quality of Life
- ☑ Ecological Conservation and Restoration

Integrative Process, Planning, and Assessments Prerequisite

CURRENT FACILITIES REQUIREMENTS AND O+M PLAN

IPp4

REQUIRED

INTENT

To promote continuity of information to ensure that energy-efficient operating strategies are maintained and provide a foundation for green jobs training and system analysis.

REQUIREMENTS

Achievement pathways	Points
Existing Buildings	N/A
Current Facilities Requirements and O+M Plan	

Maintain a current facilities requirements (CFR) and operations and maintenance (O+M) plan that contains the information necessary to operate the project efficiently.

The plan must include the following:

- Current sequence of operations for the building
- Project occupancy schedule
- Equipment run-time schedules
- Set points for all HVAC equipment
- Set points for lighting levels throughout the project
- Information on ventilation system operation and preventative maintenance as outlined in *ASHRAE 62.1-2022*,[14] Table 8.1
- Changes in schedules or set points for different seasons, days of the week, and times of day
- Systems narrative for mechanical and electrical systems and equipment in the project
- Preventive maintenance plan for mechanical, electrical, and envelope systems and equipment in the project

The CFR and O+M plan must be current at the time of the LEED application.

[14] "The Standards for Ventilation and Indoor Air Quality," ASHRAE, accessed March 21, 2025, https://www.ashrae.org/technical-resources/bookstore/standards-62-1-62-2 .

REQUIREMENTS EXPLAINED

This prerequisite requires the project team to maintain a current facilities requirements (CFR) and operations and maintenance (O+M) plan.

The CFR and O+M plan provide a foundation for establishing energy-efficient operating strategies and training staff in system maintenance, monitoring, and evaluation over the life of the building. By developing an operations and maintenance plan and updating the current facility requirements, operators can see how the building's current use relates to its original design and analyze actual and intended operations. These two documents are intended to be living records of building systems, operations, and maintenance procedures. Regularly recording any changes in systems, operation, and usage ensures that knowledge can be easily passed from operator to operator and is also available to support future upgrades, audits, or commissioning activities.

Current Facilities Requirements (CFR)

The CFR, which is developed to confirm the owner's current operational needs and requirements, outlines the operational strategy and current functional requirements for the building and its systems, such as HVAC, lighting, and ventilation. It lists each of the following:

PROPERTY TYPE DESCRIPTION

While not a requirement for this prerequisite, consider a summary of the project property type(s), such as office, data center, retail store, or multifamily housing. In *EAp3: Minimum Energy Performance*, *ENERGY STAR® Portfolio Manager®*[15] (ESPM) refers to these as "property types," and *ASHRAE 100*[16] refers to them as "building activities" or "building types." Listing these in the CFR helps project teams ensure the schedules and other pertinent information are tracked appropriately per functional use.

PROJECT OCCUPANCY SCHEDULES

Provide the weekly and daily schedule of occupied operation at the project level and by property type or space type where the occupancy schedules vary significantly for the remainder of the project, for example, a call center that operates continuously or retail on the first floor of a high-rise office building that has different operating hours. If the project has regular after-hours maintenance shifts where the project is sparsely occupied, report this separately from the main project occupancy schedules.

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[15] "ENERGY STAR® PortfolioManager®", ENERGY STAR®, accessed March 21, 2025, https://portfoliomanager.energystar.gov/pm/login?testEnv=false .

[16] "ANSI/ASHRAE/IES STANDARD 100," ASHRAE, accessed March 21, 2025, https://www.ashrae.org/technical-resources/bookstore/standard-100.

EQUIPMENT RUN-TIME SCHEDULES

Provide the weekly and daily schedules for equipment, such as HVAC, lighting, and process equipment, contributing substantially to overall building energy use. For HVAC equipment, this generally corresponds to the occupancy schedules, extending some time before and after occupied operation. By tracking these schedules in the CFR, facilities managers can ensure that equipment operates only when necessary, in alignment with the occupancy schedules. This reduces operational costs, minimizes wear and tear on equipment, and maintains comfortable indoor conditions. Proactively managing these schedules contributes to improved operational performance and supports sustainability efforts.

- Address the major HVAC and service water heating equipment serving the project and any significant variances in runtime for equipment serving different areas. For projects that do not operate continuously, identify the subset of equipment operating hours when ventilation is supplied to the project or spaces.
- Identify indoor and outdoor lighting schedules and separately summarize lighting addressed by centralized building controls versus lighting addressed with localized controls. If the project has decorative or display lighting with operating hours that differ from the general lighting, differentiate between these lighting schedules in the CFR.
- Summarize equipment runtime for other systems that contribute significantly toward overall building energy use, such as commercial kitchen equipment or other process energy-using systems.
- Briefly summarize HVAC and lighting operation during unoccupied periods, including HVAC load cycling, HVAC start/stop controls that adjust equipment start time to optimize energy efficiency, and lighting overrides for centrally controlled lighting systems.

SETPOINTS FOR HVAC EQUIPMENT

Delineate the temperature and humidity setpoints for HVAC equipment, including any significant differences between HVAC systems, property types, or space types. This helps facilities managers ensure occupant comfort while limiting overheating or overcooling that wastes energy.

LIGHTING LEVELS

Tracking required lighting levels empowers facilities managers to improve energy efficiency and occupant satisfaction by maintaining the controls to achieve these levels. This is particularly effective for lighting with stepped or continuous dimming controls for daylit spaces or new lighting with initial full-load illumination exceeding occupant needs.

SEASONAL AND TIME=BASED ADJUSTMENTS

The CFR must also include seasonal and time-based adjustments to operational settings. For example, in the summer, a building may adjust its HVAC settings to maintain a cooler indoor temperature during peak occupancy hours while allowing the temperature to rise slightly during unoccupied periods. This aligns operational settings with seasonal and time-based changes and optimizes energy use while creating a more comfortable indoor environment for occupants.

- Required temperature setpoints and, if applicable, humidity setpoints
- Setpoints for lighting levels

If the project participates in a demand response program or has automated demand side management consistent with *EAc6: Peak Load Management*, Option 1, list the adjusted setpoints, lighting levels, and enabled equipment associated with a demand response event in the Current Facilities Requirements.

OPTIONAL APPENDIX: BUILDING PLANS

To maximize utilization of the CFR for its intended purpose, project teams can append available building drawings for mechanical/electrical/plumbing systems to the CFR. However, this is not required for prerequisite compliance.

O+M Plan

The operations and maintenance (O+M) plan outlines major system operating parameters and limits, maintenance procedures, schedules, and documentation methods that are necessary to demonstrate proper operation and maintenance of the project's HVAC, service water heating, electrical, and process energy systems.

Establishing preventive maintenance procedures and frequency for the building systems is crucial for ensuring efficient operation. For example, monthly air filter inspections and quarterly thermostat calibrations help prevent system failures, extend equipment lifespan, and promote overall reliability and energy efficiency.

The O+M Plan includes the following elements:

SYSTEMS NARRATIVE

Provide an overview of the project's mechanical and electrical systems and equipment, summarize the types of systems, provide an overview of controls, and address key system parameters. Information may be collected through auditing, direct workers' feedback, and

performance data to assess how systems are currently functioning. This enhances understanding and facilitates effective management and troubleshooting.

Cover all major building systems and associated controls, including the following:

- **HVAC**. Describe the project's predominant HVAC system configuration for the plant, AHU(s), and terminal units as applicable. Include information on the type of system(s), equipment capacity ranges and total capacities, high-level summary of equipment efficiencies, and controls contributing to efficiency (such as Energy Recovery Ventilation, Demand Control Ventilation, or variable speed and flow configuration). Describe how the design achieves quality of life for the building occupants.

  Further describe non-predominant HVAC system types, the spaces they serve, and any key factors affecting these spaces' energy efficiency, indoor air quality, or thermal comfort. Provide greater detail for the systems that contribute more strongly to overall energy use, such as systems with high ventilation loads.

  In the systems summary, provide detailed information on the ventilation system operation, including a description of the ventilation air delivery mechanism (such as a dedicated outside air system) and a description of minimum required flow rates at design conditions and, if adjusted using demand control ventilation, during periods of low occupancy.

- **Service water heating**. Provide a brief description of the service water heating for commercial applications with low service water heating loads and a more detailed description of the service water heating equipment types, capacity ranges, efficiency, and distribution type for projects with high service water heating loads, such as residential spaces or hospitals.

- **Electrical power**. Provide a summary description of the type(s) of interior and exterior lighting, estimated overall lighting power controls to reduce lighting energy use such as occupant sensor controls or daylight dimming controls, and key parameters pertaining to occupant well-being and energy efficiency.

  Additionally, provide a summary of electrical submetering at the panels, on-site power generation and/or energy storage, and if applicable, delineate any major power losses in the electrical systems (for example, data centers with losses through the incoming electrical service segment, UPS, and the IT equipment distribution segment).

- **Building automation system and/or energy information system**. If the project has a building automation system (BAS) with or without fault detection diagnostics and/or an energy information system (EIS), describe the system's key functions.

- **Process equipment including process heating and cooling**. Describe any process equipment contributing significantly to project energy use, including controls and key operating parameters.

Current Sequence of Operations for the Building

Provide the current sequence of operations detailing how the building systems interact to ensure seamless integration and optimal performance.

PREVENTATIVE MAINTENANCE PLAN

A key element of the O+M plan is a preventive maintenance plan for mechanical, electrical, and envelope systems and equipment within the project. This proactive approach identifies and addresses inefficiencies or potential failures through regular checks and routine maintenance, ultimately improving operational efficiency, enhancing indoor environment quality, and prolonging the lifespan of building systems. Equipment downtime, controllability, and thermal comfort may improve as a result of improvements made during preventive maintenance, enhancing the occupant's experience.[17]

The plan must provide detail regarding the tasks associated with each activity and specified frequencies for each task. Alternatively, the plan may reference where this detail is provided, such as a preventative maintenance tracker in the BAS system:

- Include daily, weekly, monthly, quarterly, and annual tasks, based on manufacturers' specifications, vendor requirements, industry knowledge, or an automated work order system.
- Address commonly overlooked systems like tenant lighting, domestic hot water, and building automation systems.
- Describe building systems that are maintained by a third party and the current status of the maintenance contracts.

[17] *Practice preventive maintenance of major HVAC equipment*, The American Society for Health Care Engineering (ASHE) of the American Hospital Association, (2023), https://www.ashe.org/system/files/media/file/2022/04/10-Preventative-Maintenance.pdf.

VENTILATION SYSTEM PREVENTATIVE MAINTENANCE

For the project's ventilation systems, include all applicable inspection/maintenance tasks from *ASHRAE 62.1-2022*, Table 8-1 Minimum Maintenance Activity and Frequency for Ventilation System Equipment and Associated Components.[18] Ensure the project's preventative maintenance plan references at least the minimum frequency required in Table 8-1.

DOCUMENTATION

Project types	Options/ Paths	Documentation
All	All	Confirm that a current facilities requirement and operations and maintenance plan containing the following information is maintained and all information in the plan is up to date: • Current sequence of operations for the building • Project occupancy schedule • Equipment run-time schedules • Setpoints for all HVAC equipment • Setpoints for lighting levels throughout the project • Information on ventilation system operation and preventative maintenance as outlined in *ASHRAE 62.1-2022*, Table 8.1 • Changes in schedules or setpoints for different seasons, days of the week, and times of day • Systems narrative for mechanical and electrical systems and equipment in the project • Preventive maintenance plan for mechanical, electrical, and envelope systems and equipment in the project

		CFR and O+M Plan or excerpts from the plan for the following elements:
		• Project occupancy schedule
		• Systems narrative for mechanical and electrical systems and equipment
		• And for at least two distinct systems:
		
		  • Equipment run-time schedules
		  • HVAC equipment setpoints
		  • Preventative maintenance plan, including specific tasks and schedule. At least one system must include *ASHRAE 62.1-2022,* Table 8.1 tasks.
		
		Include additional excerpts for systems or processes referenced in the following credits (if pursued):
		
		• *EAc6: Peak Load Management*, Option 1. Demand Side Management
		• *EQp1: Verification of Ventilation and Filtration*
		• *EQc6: Resilient Spaces*
		• *EAc7: Commissioning*

[18] "The Standards for Ventilation and Indoor Air Quality," ASHRAE, https://www.ashrae.org/technical-resources/bookstore/standards-62-1-62-2 (accessed March 21, 2025).

REFERENCED STANDARDS

- ASHRAE 62.1-2022: The Standards for Ventilation and Indoor Air Quality (ashrae.org/technical-resources/bookstore/standards-62-1-62-2)

Impact Area Alignment

— Decarbonization

☑ Quality of Life

— Ecological Conservation and Restoration

Integrative Process, Planning, and Assessments Credit

OPERATIONAL PLANNING FOR RESILIENCE

IPc1

1 point

INTENT

To encourage effective hazard response plans and readiness measures to ensure safety and maintain critical operations during and after emergencies.

REQUIREMENTS

Achievement pathways	Points
Existing Buildings	1
Emergency Response Plan	1

Support or institute an emergency response plan that addresses the priority hazards identified in *IPp1: Climate Resilience Assessment*.

Procedures and protocols in the plan must include the following:

- Identify essential personnel responsible for implementing the emergency response plan.
- Perform ongoing emergency preparedness training and drills for essential personnel.
- Communicate across departments during emergencies.
- Control pedestrian and vehicle traffic during emergencies.
- Address special needs for vulnerable population.
- Ensure protection and restoration of critical facilities and systems.
- Ensure backup power is available for command centers and essential systems.
- Perform ongoing maintenance of emergency response plan.

Communicate the emergency response plan to relevant service providers, facilities staff, and occupants, including the points of contact for each procedure and protocol.

REQUIREMENTS EXPLAINED

This credit requires the development or support of an Emergency Response Plan (ERP) that addresses the priority natural hazards identified in *IPp1: Climate Resilience Assessment*, such as drought, earthquakes, extreme heat, extreme cold, flooding, wildfires, and other relevant hazards. This comprehensive plan serves as a management framework to prepare for, respond to, and recover from emergencies, while also enhancing resilience against climate-related risks.

A proactive approach to resilience planning such as this strengthens a building's ability to withstand shocks, safeguard occupant well-being, and support continued functionality in the face of evolving challenges.

Project teams must identify and address at least the two priority hazards determined in the assessment. While the assessment may highlight multiple priority hazards, this credit focuses on a minimum of two selected for mitigation planning. The plan must explicitly list these hazards and provide clear examples of how the project addresses the associated risks.

Procedures and Protocols in the Emergency Response Plan (ERP)

ESSENTIAL PERSONNEL

Establish clear roles and responsibilities for essential personnel, or those responsible for implementing the ERP during an emergency. Assigning specific roles in advance helps all personnel clearly understand their responsibilities so they are prepared to act decisively in an emergency.

TRAINING

Emergency preparedness training and drills are important to ensure that essential personnel are aware of the ERP and capable of executing procedures and protocols effectively under stress. Regular training sessions, supplemented by simulated emergency drills, allow individuals to practice their response actions, use emergency equipment correctly, and gain familiarity with evacuation routes and safety protocols.

Exercises may be tailored to address different types of emergency scenarios. Conducting frequent training helps essential personnel identify knowledge gaps, refine their procedures, and build confidence among team members, which significantly enhances the plan's effectiveness in real situations.

COMMUNICATION

A well-designed ERP requires reliable interdepartmental communication channels to ensure seamless coordination during emergencies. Establishing diverse communication channels, such as emergency notification systems, dedicated communication platforms, email alerts, and regular briefings, enables departments to share crucial information in real-time. Train personnel on these communication channels and incorporate them into emergency drills.

TRAFFIC MANAGEMENT PROCEDURES

Develop traffic management procedures for pedestrian and vehicle movement in and around the site during emergencies, ensuring safe evacuation and access for emergency services. This

includes creating detailed evacuation plans that specify designated routes, exit points, shelter-in-place areas and assembly zones, and strategies for managing the flow of vehicles and pedestrians to prevent congestion and reduce the risk of accidents.

Include protocols to address special considerations for high-risk zones, such as areas near hazardous materials or locations with limited access.

VULNERABLE POPULATIONS

The ERP must incorporate specific strategies to protect vulnerable populations who require additional support during emergencies. This involves planning for accessible evacuation routes, aiding those with mobility impairments, and ensuring that communication methods are inclusive and reach everyone, regardless of language barriers or sensory limitations.

Develop strategies in collaboration with experts and representatives of these groups to address their unique needs. Prioritizing the safety of vulnerable populations is not only a legal and ethical obligation but also strengthens the overall resilience and inclusivity of the emergency response plan.

PROTECTION AND RESTORATION OF CRITICAL FACILITIES AND SYSTEMS

The ERP must outline procedures for protecting and restoring critical facilities and systems that are essential to the site's operation during and after an emergency. This includes ensuring the integrity of infrastructure such as water, power, communications, and transportation systems. Identify key facilities and systems that must be protected from potential damage and establish strategies to prevent or minimize disruption. This may involve reinforcing physical structures, installing backup power for command centers and essential systems, and ensuring redundancy in communication networks.

Additionally, the ERP must outline protocols for the rapid restoration of services after an emergency, including steps for securing temporary alternatives or repairs and prioritizing the most vital systems to minimize downtime. Safeguarding critical facilities and systems ensures quick recovery and reduces the long-term impact of emergencies on both the building and its occupants.

ONGOING MAINTENANCE

Ongoing maintenance of the ERP is crucial for ensuring that it remains effective and relevant for all personnel. The project team must establish a process for continuous review and updates to keep the plan up to date on addressing identified hazards. Triggers for updates may include the release of new climate data, insights gained from emergency drills, changes in personnel, or

modifications to the building's layout or systems. Regularly review these triggers and incorporate feedback from drills, personnel experiences, and updated hazard assessments.

Communicate the ERP

The ERP must be communicated to all relevant service providers, facilities staff, and occupants, including the points of contact for each procedure and protocol.

DOCUMENTATION

Project types	Option	Path	Documentation
All	All	All	Emergency response plan
			Narrative describing the process for ongoing review and plan updates

REFERENCED STANDARDS

- None

Impact Area Alignment

— Decarbonization

☑ Quality of Life

— Ecological Conservation and Restoration

Integrative Process, Planning, and Assessments Credit

WORKER SAFETY AND TRAINING

IPc2

1 point

INTENT

To promote and further social impact by addressing the needs and disparities among those working to operate and maintain the project by supporting safety and personal well-being and encouraging transparency through planning and training.

REQUIREMENTS

Achievement pathways	Points
Existing Buildings	1
Operations Safety Plan	1
AND	
Worker Safety Training	

Maximize worker safety by meeting the following requirements:

Operations Safety Plan

Develop an operations safety plan to promote worker safety for all workers on-site. The plan must include recommendations for using personal protective equipment (PPE) such as foot, head, eye, face, ear, respiratory, and/or fall protection, where applicable. Include provisions to ensure staff can take breaks, access essential services, and be protected from inclement weather while working in and around the building. Display safety policies and emergency procedures prominently in common areas and staff break rooms.

Perform an annual safety review to inform the operations safety plan. Assess each of the following systems, where applicable, for access, confined space, and fall and hazard exposures. Incorporate at least one protective measure for each of the following systems into the operations safety plan:

- **Roof systems**: For example, personnel access, equipment location, and fall protection needs
- **Equipment rooms and systems**: For example, evaluate personnel access, confined spaces, and safety features, such as fall protection and eye wash stations
- **Building exterior enclosure and window cleaning systems**: For example, access for cleaning and maintenance

- **Storage and collection of recyclables**: For example, handling and reporting measures for recyclables, landfills, compost, and hazardous waste
- **Green infrastructure features**: For example, confined space hazards and access to specific systems
- **Cleaning and sanitary systems**: For example, physical and chemical hazards for janitorial, pest management, and window-cleaning staff
- **Security systems**: Evaluate physical hazards for security personnel
- **Essential services**: Ensure accessibility to safe essential services such as water and restrooms

AND

Worker Safety Training

Develop or adopt comprehensive safety training modules specific to each system or service worker role. The training is to address general ergonomic and safety practices, emergency procedures, PPE usage, and role-specific hazard safety. Implement the following:

- Conduct training for all new hires and provide annual training review sessions for existing staff.
- Maintain detailed records of all training sessions, including attendance, topics covered, and trainer credentials.
- Include procedures for workers to report safety incidents and address unsafe conditions.
- Use in-person, online, and hands-on training methods to accommodate different learning styles and ensure effective knowledge transfer.
- For projects with over 100 FTEs, provide first aid, CPR, and AED training for at least one operations and maintenance staff member.

REQUIREMENTS EXPLAINED

Safe and healthy workplaces allow all workers to perform their duties without the risk of illness or injury while providing opportunities for employees to improve their physical, mental, and social well-being. Ensuring worker safety promotes social impact by guaranteeing that all workers, regardless of their background, gender, or ethnicity, have access to the necessary protections and resources to stay safe on site.

This credit requires supporting the safety of all workers on-site by developing a detailed, comprehensive Operations Safety Plan (OSP) that addresses relevant safety hazards and implementing Worker Safety Training programs. Workers include, but are not limited to, employees, temporary workers, contractors, subcontractors, and service providers. Project teams are responsible for identifying which workers are included.

Operations Safety Plan

An Operations Safety Plan protects workers from hazards in their working environment across different building systems. Implementing protective measures for each system is a proactive strategy to avoid injuries, illnesses, and incidents. It minimizes safety and health risks and assists employers in providing safe and healthy working conditions.[19] A one-size-fits-all approach to safety is inadequate as different systems have distinct operational processes, types of equipment, and potential hazards. Customizing safety protocols for each system enables organizations to effectively minimize risks.

PERSONAL PROTECTIVE EQUIPMENT

Projects are responsible for providing adequate PPE to all workers to reduce potential safety risks. Equipment needs, while dependent on the task, typically include foot, head, eye, face, ear, respiratory, and/or fall protection.

STAFF PROVISIONS

Prioritizing the well-being of workers is as important as promoting safety. The OSP is required to include provisions for regular breaks and access to essential services such as drinking water and restrooms.[20] Exposure to extreme heat, cold, rain, and high winds contributes to serious health issues such as heat exhaustion or hypothermia, which contextualizes the need for protecting workers from inclement weather. Providing adequate shelter and appropriate protective gear reduces risks at work, while neglecting these measures can lead to decreased productivity, increased fatigue, and a higher risk of injury among workers.

COMMUNICATION OF POLICIES AND PROCEDURES

Clearly communicate safety policies and emergency procedures to all workers, displaying them prominently in break rooms, lobbies, and other common areas. This visibility allows workers to easily access and review critical safety information, enabling them to know how to report incidents and address unsafe conditions effectively.

ANNUAL SAFETY REVIEW

The OSP must include an annual safety review that evaluates fall hazards, access points, confined spaces, and other critical safety aspects. Review and update the plan annually to adapt to evolving hazards brought on by changes in equipment, systems, or operations. For

[19] “Hazard Prevention and Control”, Occupational Safety and Health Administration (osha), accessed March 21, 2025, https://www.osha.gov/safety-management/hazard-prevention.
[20] S. Folkard and D. A. Lombardi, "Modeling the Impact of the Components of Long Work Hours on Injuries and "Accidents," *American Journal of Industrial Medicine* 49, no. 11 (2006): 953–963.

each system, identify one or more specific protective measures that address the unique hazards and minimize associated risks:

- **Roof systems**. Personnel access, equipment placement, and fall protection are key considerations for roof systems. Implement safety measures such as designated access points, safety harnesses and lines, safety nets, stair railings and handrails, ensuring compliance with safety regulations such as OSHA's and minimizing workplace incidents[21]
- **Equipment rooms and systems**. Evaluate personnel access and ventilation quality to ensure safe movement in and out of equipment rooms and other confined spaces. Include safety features such as fall protection and eye wash stations
- **Building exterior enclosure and window cleaning systems**. Provide fall and accident protection to promote safe access for cleaning and maintenance tasks on the building exterior. Evaluate necessary equipment, such as scaffolding, harnesses, or suspended platforms, and methods to allow workers to perform their duties safely and efficiently.
- **Storage and collection of recyclables**. Evaluate proper handling and reporting measures for recyclables, landfill waste, compost, and hazardous waste. Improper storage of hazardous waste has the potential to cause spills or leaks, which can be harmful to workers.
- **Green infrastructure features**. Assess confined space hazards and provide safe access for specific systems associated with green infrastructure features, such as green roofs, rain gardens, and bioswales.[22] Confined space hazards include biological hazards (viruses, bacteria), chemical exposures, and physical hazards. Limited access or exits can exacerbate these risks and complicate emergency evacuations. Allowing workers to enter, operate within, and exit these spaces safely enhances their health and safety.
- **Cleaning and sanitary systems**. Cleaning and sanitary systems focus on upholding hygiene standards across different environments while ensuring that janitorial, pest management, and window cleaning staff are aware of physical and chemical hazards. To safeguard workers' health and safety, address risks such as slips, trips, falls, and exposure to harmful cleaning chemicals to safeguard workers' health and safety.
- **Security systems**. Evaluate physical hazards and unsafe environments that security personnel may encounter while performing their duties. These duties include monitoring facilities, managing access control, and responding to incidents. Potential hazards include poorly lit areas, hazardous materials, or uneven surfaces. Preventing slips, trips, and falls aids in prompting personnel response in emergency scenarios.

[21] "Protecting Roofing Workers". United States Department of Labor, Occupational Safety and Health Administration (OSHA), https://osha.gov/sites/default/files/publications/OSHA3755.pdf.
[22] "Confined Space – Introduction", Canadian Centre for Occupational Health and Safety, April 26, 2023, ccohs.ca/oshanswers/hsprograms/confinedspace/confinedspace_intro.html.

- **Essential services**. Promote accessibility to safe essential services, including water and restrooms, to protect worker well-being, promote hygiene practices, and help prevent the spread of diseases.

Worker Safety Training

Safety training and a culture of informed workers are essential in reducing workplace incidents and increasing overall preparedness. Develop tailored safety training modules for each system or service worker role to prepare workers to recognize, manage, and mitigate hazards associated with their tasks or systems.

The safety training modules must cover general ergonomic and safety practices, emergency procedures, proper PPE usage, and role-specific hazard safety. Conduct training with all workers and new hires to familiarize them with current safety protocols, equipment, and potential risks. Continue to provide training on an annual basis to refresh and update employees on safety procedures, equipment, and operations.

Ergonomic and safety practices address tasks that involve moving or handling things by lifting, lowering, pushing, pulling, carrying or holding, and prolonged sitting, all of which require appropriate ergonomic practices to prevent poor posture, health problems, and related injuries.[23] Safety practices, particularly for physically demanding tasks, must be implemented to avoid injuries such as lower back injuries and pain caused by improper lifting techniques. Workers are to be familiarized with emergency procedures, including evacuation plans, the location of emergency exits, and the appropriate use of emergency equipment such as fire extinguishers. This aids in the reduced likelihood of accidents and improved response during emergencies.

Educate workers on the proper selection, use, and maintenance of PPE. Include guidance on its limitations, clarifying that while PPE provides critical and life-saving protection at times, it is a secondary defense considering hazard protocol and general safety provisions to avoid incidents.

Role-specific safety training includes effectively addressing specific safety hazards associated with each worker's duties and responsibilities. This includes considerations for cleaning staff and workers that may face chemical exposure risks, while others working in equipment rooms, on rooftops, or on scaffolding must be trained to handle fall hazards and confined spaces appropriately. Tailoring training to roles gives workers full awareness of the risks they face and effective preventive measures.

[23] “Ergonomics,” Canadian Centre for Occupational Health and Safety, n.d., ccohs.ca/oshanswers/ergonomics.

Maintain detailed records of all training sessions. These records are expected to include attendance, documentation of the topics covered, and noting of the trainers' certification. Review records to track employee compliance and identify areas for improvement.
Worker training must address a well-defined process for reporting safety incidents and unsafe situations. Establishing and communicating the process for safety reporting promotes transparency, addresses issues promptly, and helps to maintain a safe work environment.
Offer a variety of training methods to cater to diverse learning preferences. Combining in-person, online, and hands-on training methods increases the likelihood that all workers retain the knowledge required to perform their jobs safely.

For projects involving over 100 full-time employees (FTEs), provide first aid, CPR, and AED training for at least one O+M staff member. Training personnel on-site helps to ensure that immediate assistance can be provided during emergencies, potentially saving lives until medical help arrives.

DOCUMENTATION

Project types	Options	Documentation
All	All	Operations safety plan
		Confirm that an annual safety review has been performed and was used to inform the operations safety plan
		Narrative summarizing the training strategy, including information on training conducted (e.g., frequency and number of training sessions, number of workers trained, topics covered, types of training modules (e.g., in-person, online, hands-on) and trainer credentials)
		Description of procedures for workers to report safety incidents and address unsafe conditions
		Confirm that training for all new hires and training review sessions have been conducted annually, at a minimum, for existing staff
		For projects with over 100 FTEs, confirm that first aid, CPR, and AED training was conducted for a minimum of one O+M staff member

REFERENCED STANDARDS

- None

LOCATION AND TRANSPORTATION (LT)

OVERVIEW

The Location and Transportation (LT) credit category empowers facility managers to promote sustainable mobility solutions for building occupants. It focuses on promoting alternative mobility solutions and transportation options that help reduce carbon emissions. Managers can help alleviate congestion and improve air quality by encouraging these choices. The strategies outlined are aligned with performance benchmarks and are designed to provide options for various Operations and Maintenance (O+M) projects.

Decarbonization

Transportation accounts for nearly one-quarter of global energy-related carbon emissions.[24] Recognizing the momentum in the transportation sector to reduce carbon emissions, LEED v5 introduces measures aimed at fostering a decarbonized future. These measures include enhanced incentives for electric vehicles (EV), discouraging the use of parking, and promoting low-carbon and micromobility alternatives like scooters, bicycles, and bike shares (*LTc2: Transportation Demand Management, LTc3: Electric Vehicles*). Projects are encouraged to reconsider the dominance of traditional transportation methods and to support a fundamental shift away from single-occupancy vehicles to low-carbon alternatives.

Quality of life

Active and shared modes of transportation contribute to occupants' quality of life by promoting efficient transportation alternatives that increase equitable access to the site (*LTc2: Transportation Demand Management, LTc1: Sustainable Transportation Performance*). These strategies promote healthier communities through increased exercise from active travel and improvements in air quality from reduced vehicle miles traveled and associated emissions.

Ecological conservation and restoration

Implementing low-carbon transportation and compact development options helps reduce emissions and mitigates urban sprawl, which disrupts ecosystems and natural habitats.[25] If global urbanization continues at its current rate through 2050, it is estimated that about one-third of all terrestrial species will experience habitat loss, with some losing at least a tenth of their remaining habitat.[26] Projects can lessen the likelihood of these outcomes through their transportation decisions. By offering low-carbon transportation options, these projects contribute to communities where people and ecosystems can thrive.

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[24] *Transport - Energy System – IEA*, IEA, n.d., www.iea.org/energy-system/transport.

[25] Catlyne Haddaoui, "Cities Can Save $17 Trillion by Preventing Urban Sprawl," World Resources Institute, n.d., www.wri.org/insights/cities-can-save-17-trillion-preventing-urban-sprawl.

[26] William F. Laurance, and Jayden Engert, "Sprawling Cities Are Rapidly Encroaching on Earth's Biodiversity," *Proceedings of the National Academy of Sciences* 119, no. 16 (2022a), https://doi.org/10.1073/pnas.2202244119.

The LT category aims to accelerate the adoption of EV infrastructure adoption and encourages project teams to envision broader decarbonization impacts. These strategies extend beyond individual buildings to promote community-wide sustainability. The holistic approach of the LT category supports transformative outcomes, helping projects contribute to a resilient, low-carbon built environment.

Impact Area Alignment

- ☑ Decarbonization
- ☑ Quality of Life
- ☑ Ecological Conservation and Restoration

Location and Transportation Credit

SUSTAINABLE TRANSPORTATION PERFORMANCE

LTc1

1–6 points

INTENT

To promote livability, walkability, and transportation efficiency, including reduced vehicle distance traveled and associated emissions.

REQUIREMENTS

Achievement pathways	Points
Existing Buildings	1–6
Option 1. Transportation Survey	1–6
OR	
Option 2. Location Efficiency Score	1–6

Option 1. Transportation Survey (1–6 points)

SURVEY (1–6 POINTS)

Using the results of a transportation survey conducted during the 12-month reporting period, demonstrate a sustainable transportation rate (Equation 1) that meets the thresholds specified in Table 1.

Table 1. Points for project sustainable transportation rate

Sustainable transportation rate	Points
> 0%	1
10%	2
25%	3
40%	4
65%	5
80%	6

Required survey methodology

- Regular building occupants must be surveyed. Visitors must be surveyed if either the typical peak or daily average is greater than the number of regular building occupants.
- Meet survey response requirements addressed in Appendix III.

Equation 1. Calculating the sustainable transportation rate

Sustainable transportation rate = the total percentage of occupants who traveled to the project by the following active and shared modes of transportation:

- Walked
- Cycled
- Took public transportation (e.g., bus, streetcar, subway, railroad, ferryboat)
- Carpooled/vanpooled (i.e., car, truck, or van with two or more people in the vehicle)
- Worked at home (telecommuted)

The transportation mode choices presented in the survey may be modified to reflect local options, provided all options are mapped to the list of modes above in the survey results.

OR

Option 2. Location Efficiency Score (1–6 points)

Demonstrate that the project location meets a location-efficiency score via Walk Score®. Points are awarded according to Table 2.

Table 2. Points for location efficiency

Walk Score®	Points
50–59	1
60–69	2
70–79	3
80–84	4
85–89	5
90–94	6

REQUIREMENTS EXPLAINED

For newly constructed buildings, project teams can consider how a chosen location may affect travel patterns for building occupants and the surrounding community. Although existing buildings don't have this same opportunity, there are still important ways a project team can assess and enhance sustainable transportation performance for occupants. Project teams may wish to understand their occupants' travel behaviors so they can improve them.

The Transportation Survey provides an opportunity to evaluate the Sustainable Transportation Rate (STR) of travel behavior. The STR survey focuses on modes of transportation rather than greenhouse gas emissions, simplifying calculations while emphasizing low-carbon travel modes.

For projects already situated in location-efficient places, see Option 2. Location-efficiency Score rewards buildings with high Walk Score® rankings. Walkability indices like Walk Score® correlate to higher multi-modal behavior, which makes it a reliable and convenient substitute for the Transportation Survey.

Option 1. Transportation Survey

Surveys are an effective strategy to get real-time data on building occupants' commuting patterns. This may be especially helpful for project teams wanting to understand commuting patterns and make data-driven decisions based on the results. For instance, a facility operator who learns that 10% of staff are cycling to work may want to consider enhancing cycling facilities onsite to accommodate this travel. Also, the Transportation Survey can be a helpful option for projects located in rural or suburban areas that may not achieve a high Walk Score®. The survey awards points based on sustainable travel behaviors.

DETERMINING THE SURVEY GROUP

Regular building occupants

Include all regular building occupants in the survey distribution. Only include employees who are assigned to the project as their primary place of work, i.e., those who work at the project's location at least one day per work week, on average. Do not include employees assigned to other locations or who are permanently remote. Hotel or lodging guests may be excluded from the surveying for hospitality projects.

Visitors

Visitors must be surveyed if the typical peak visitor's total or daily average visitors total is greater than the number of regular building occupants. Typical peak visitors should be used for facilities with intermittent large events (e.g., sports stadium, convention center). Daily average visitors applies to most other facilities.

Use the USGBC survey provided to achieve the credit. Doing so ensures that the survey meets the credit requirements and that responses are automatically calculated. Alternatively, if the project team desires to use a different survey or format, they must receive prior approval from USGBC and compile custom survey results.

RESPONSE RATE

To achieve this credit, project teams must demonstrate required response rates as outlined in Appendix III. Achieving a response rate that accurately reflects the operations can be a challenge. Working with the building owner and a group of stakeholders from the building occupants, teams should identify the best survey method that captures data from the most respondents. For example, if a building has a secure entry point where all occupants enter each

day, the survey team can set up information desks, signage, laptops, and/or tablets as people enter the building. Other projects may have higher success rates with electronic surveys e-mailed directly to occupants.

ANALYZING THE RESULTS

Analyze the survey results, reviewing information from regular building occupants and visitors, as applicable. Teams earn points based on the percentage of occupants who commuted using sustainable transportation methods compared to the total number of respondents.

Equation 1. Sustainable transportation rate

$$Sustainable\ transportation\ rate = \frac{\#\ people\ who\ traveled\ by\ way\ of\ active\ or\ shared\ modes\ of\ transportation}{\#\ of\ total\ respondents} \times 100$$

Option 2. Location-efficiency score

Knowing the Walk Score® of the project site provides a better understanding of how the building location can encourage physical activity, reduce GHG emissions, and foster social interactions.[27] Walk Score® data is categorized as either "supported" or "unsupported." A supported Walk Score® is based on verified, publicly available data and can be used to demonstrate compliance with walkability requirements for credit achievement. An unsupported Walk Score®, however, relies on incomplete or estimated data and cannot be used to achieve this credit.

A high Walk Score® means that the location is highly walkable and that the area is likely to have many amenities and services within a short walking distance. A location with a low Walk Score® indicates that it is not very walkable, and/or building users would most likely rely heavily on public or private transportation for daily activities.

DOCUMENTATION

Project types	Options	Paths	Documentation
All	Option 1. Transportation Survey	All	Copy of the transportation survey(s) administered to regular building occupants and visitors (if applicable)
			Dates during which the survey was conducted
			If survey was administered outside of Arc: transportation survey data input template
			Proof of USGBC approval of custom survey (if applicable)
			Required response rate calculations

[27] "Walk Score®," Walk Score®, n.d., https://www.walkscore.com/.

Project types	Options	Paths	Documentation
			Sustainable transportation rate calculations
	Option 2. Location-Efficiency Score	All	Project's Walk Score®

REFERENCED STANDARDS

- SAE Surface Vehicle Recommended Practice J1772 (sae.org/standards/content/j1772_201710/)
- SAE Electric Vehicle Conductive Charge Coupler (sae.org/standards/content/j1772_200111)
- IEC 62196 of the International Electrotechnical Commission for projects outside the U.S. (webstore.iec.ch/en/publication/59922)
- Energy Star (energystar.gov)

Impact Area Alignment

- ☑ Decarbonization
- ☑ Quality of Life
- ☑ Ecological Conservation and Restoration

Location and Transportation Credit

TRANSPORTATION DEMAND MANAGEMENT

LTc2

1 point

INTENT

To promote multimodal transportation choices and reduce single-occupancy vehicles and associated emissions.

REQUIREMENTS

Achievement pathways	Points
Existing Buildings	1
Option 1. Unbundled Parking	1
OR	
Option 2. Shared Mobility Options	1
OR	
Option 3. Bicycle Network and Storage	1

Communicate the low-carbon transportation options to all project occupants, including information for the local transportation options and any supportive measures that are available to occupants.

Option 1. Unbundled Parking (1 point)

Implement a daily, monthly, or annual parking fee at a cost equal to or greater than the local market rate for parking for tenant- and owner-occupied projects.

For tenant-occupied projects, sell the spaces separately from the rental or purchase fees for the life of the project so that tenants have the option of renting or buying parking spaces at an additional cost.

OR

Option 2. Shared Mobility Options (1 point)

Host or provide complimentary access to one of the following shared mobility services on-site or within a walking distance of 0.25 miles (400 meters) of a functional entrance for a minimum of 2% of regular building occupants:

- A fleet of bicycles or bicycle share
- A carshare service
- Other shared mobility options

OR

Option 3. Bicycle Network and Storage (1 point)

BICYCLE NETWORK

Provide a functional entry and/or bicycle storage within a 600 foot (180 meters) walking distance or cycling distance of a bicycle network that meets the following criteria:

- Is a contiguous network that spans a distance of at least three miles (4,800 meters)
- Consists of bicycle paths, lanes, or multiuse trails that are at least eight feet (2.5 meters) wide for a two-way path and at least four feet (1.2 meters) wide for a one-way path, or streets with a maximum speed limit of 25 mph (40 kph). Sidewalks where local code permits bicycles are acceptable

Planned bicycle trails or lanes may be counted if they are fully funded by the end of the 12-month reporting period and are scheduled for completion within three years of that date.

School

- Provide dedicated bicycle lanes, or sidewalks where local code permits bicycles, that extend from the student bike-parking location to at least the end of the school property without any barriers (e.g., fences on school property).

AND

BICYCLE STORAGE

Provide short-term bicycle storage within a 600-foot (180 meters) walking distance to any main entrance but no fewer than four storage spaces per building.

Provide long-term bicycle storage within a 300-foot (90 meters) walking distance from any functional entry but no fewer than four storage spaces per building, in addition to the short-term bicycle storage spaces.

Points are awarded according to Table 1.

Shared micromobility storage, bicycle-sharing stations, and/or publicly available bicycle parking may be counted for up to 50% of the required short-term and long-term storage space if it meets the maximum allowable walking distance and is not double counted (i.e., the short-term and the long-term storage spaces are counted separately). The storage location is communicated to the building occupants and visitors.

Table 1. Number of spaces required for short- and long-term bicycle storage

<table>
<tr><th></th><th>Commercial, institutional, schools, health care</th><th>Residential</th><th>Mixed-use</th><th>Retail</th></tr>
<tr><td>Short-term storage</td><td colspan="2">At least 2.5% of all peak visitors but no fewer than four spaces per building</td><td rowspan="2">Meet the storage requirements for the nonresidential and residential portions of the project separately</td><td>At least two short-term bicycle storage spaces for every 5,000 sq. ft. (465 sq. m.) but no fewer than two storage spaces per building</td></tr>
<tr><td>Long-term storage</td><td>At least 5% of all regular building occupants but no fewer than four storage spaces per building, in addition to short-term storage spaces</td><td>At least 15% of all regular building occupants but no less than one storage space per three dwelling units in addition to short-term storage spaces</td><td>At least 5% of regular building occupants but no fewer than two storage spaces per building, in addition to the short-term bicycle storage spaces</td></tr>
</table>

NOTE: School projects can exclude students in third grade and younger from the regular building occupant count for long-term storage.

NOTE: Healthcare projects can exclude patients from the regular building occupant count for long-term storage.

REQUIREMENTS EXPLAINED

This credit awards projects that implement Transportation Demand Management (TDM) measures. The intent of TDM measures is to encourage modes of travel that reduce vehicle miles traveled (VMT) and emissions associated with using single-occupancy vehicles (SOVs). TDM promotes alternative transportation options such as walking, cycling, and public transit, offering more sustainable commuting choices. Incentivizing these alternatives requires new ways of managing parking and access to facilities that support alternatives to SOVs, such as bicycle parking and carshare services.

Regardless of which option is pursued, all projects must clearly communicate the low-carbon transportation options available to all occupants. This communication must include available local transportation options and additional supporting materials.

Option 1. Unbundled Parking

In tenant-occupied projects, bulk parking spaces are frequently bundled with leases regardless of actual demand, meaning tenants pay for parking regardless of vehicle ownership. Unbundling parking spaces separately from leases creates parking efficiency by allowing the owner to allocate excess parking to other uses and allowing the tenant to opt-in to only the amount of parking they need. Over time, this approach can prevent underused and excess parking.

For both tenant- and owner-occupied projects, it is required to charge market-rate fees for parking spaces, aligning the cost with local rates and discouraging unnecessary car use. A market rate is comparable to fees charged by nearby parking facilities (public or private), and it considers similar facility types (e.g., surface parking, structure parking, underground parking). In owner-occupied projects, this involves requiring all employees to pay market-rate fees for parking.

To comply with this option, all parking spaces included in the project's total parking inside and outside the project boundary must be unbundled from the tenant lease or sales. This commitment must start before the end of the 12-month reporting period and extend for a minimum of three years beyond the reporting period.

Option 2. Shared Mobility Options

Shared mobility is a strategy to reduce dependence on single-occupancy vehicles (SOVs) by offering multiple transportation options that minimize car use, lower emissions, and ease congestion. Strategies for shared mobility include providing a fleet of micromobility devices, such as a fleet of bicycles or bicycle share, carshare services, and other shared mobility options such as scooters, that are accessible to all regular building occupants free of charge. This encourages a shift toward sustainable transportation alternatives for short trips, reducing the need to use a personal vehicle during the workday.
Setting the devices and facilities within 0.25 miles (400 meters) from a functional entry will ensure occupants can conveniently and spontaneously choose a shared mobility option.

Equation 1. Calculating share mobility facilities

$$Shared\ mobility\ devices = Regular\ project\ occupants\ \times\ 0.02$$

A fleet of bicycles or bicycle share

A bicycle fleet is a collection of bikes owned and managed by an organization for exclusive use by its members, typically stored on-site for short trips. In contrast, a bike share program operates at multiple locations throughout a city or community, allowing users to temporarily use bikes for a period of time before returning them to a permitted location.

Carshare service

Carsharing is a form of car rental designed for users who want the flexibility to rent vehicles for short periods and only pay based on their usage. It provides urban residents with an alternative to car ownership, allowing them access to cars without the commitment of owning one.

Other shared mobility options

Other shared mobility options are also eligible if the alternative strategy targets reducing reliance on SOVs and decreases VMT. These can include shared mobility device services such as e-scooter and e-bike sharing.

> **Additional considerations**
> Local shared mobility services, including bicycle shares, car shares, and other shared mobility options that meet the above requirements and are not owned or managed by the project, may be used to demonstrate compliance, provided that the project owner or management covers any associated fees.

Option 3. Bicycle Network and Storage

Active travel facilities promote sustainable, healthy, and efficient alternatives to car-based transportation by providing facilities that support cycling, e-bicycles, scooters, and other eco-friendly travel modes.

This option has two requirements: providing long-term and short-term bicycle storage and access to a "bicycle network." Projects with connectivity to a robust bicycle network provide seamless access to well-integrated routes. This connectivity links users to paths, trails, designated bicycle lanes, and slow-speed roadways, creating a cohesive and accessible system that encourages cycling as a practical and safe transportation option. Short-term and long-term bicycle storage capacity is considered separately, as visitors and regular project occupants have different bicycle storage needs.

Bicycle network

A bicycle network must be within 600 feet (180 meters) walking distance or cycling distance of the project. A building near a cycle network makes commuting by bicycle safer and more convenient for occupants and incentivizes alternatives to SOVs. A "bicycle network" must be a contiguous network that spans a distance of three miles (4,800 meters) but does not need to span three miles in a single direction. For example, it could consist of one mile to the north and two miles to the south, totaling three miles of connected network.

Schools

- This option for schools is in lieu of connecting to a bicycle network. Project teams must ensure safe access to school buildings by providing on-site bicycle lanes or a multi-modal path that is either on-road or off-road that safely connects the edge of school property to school buildings without any barriers.

Bicycle storage

Project teams must provide short-term and long-term bicycle storage within 600 feet (180 meters) and 300 feet (90 meters) of any main entrance and functional entry point, respectively. The number of required spaces for short-term and long-term bicycle storage is based on the number of occupants in the building.

Shared micromobility storage facilities, such as those for e-scooters and e-bicycles, as well as bicycle sharing stations and publicly accessible bicycle parking, can account for up to 50% of the required short-term and long-term bicycle storage needs to encourage the use of communal, readily available transportation solutions and reduce the need for dedicated on-site storage infrastructure. Shared micromobility storage locations must be communicated to the building occupants and visitors.

For commercial, institutional, school, and health care projects, use Equation 2 to determine the number of short-term and long-term bicycle storage. School projects can exclude students in third grade and younger from regular building occupant count for long-term storage. Health care projects can exclude patients from regular building occupant count for long-term storage.

Equation 2. Calculating bicycle storage for commercial, institutional, school and health care projects

$$Short\text{–}term\ storage = Peak\ visitor\ \times\ 0.025$$
$$Long\text{-}term\ storage = Regular\ building\ occupants\ \times\ 0.05$$

For residential projects, use Equation 3 to determine the number of short- and long-term bicycle storage:

Equation 3. Calculating bicycle storage for residential projects

$$Short\text{–}term\ storage = Peak\ visitor\ \times\ 0.025$$
$$Long\text{–}term\ storage = Regular\ building\ occupants\ \times\ 0.15$$

For mixed-use projects, use the above equations to determine the number of short- and long-term bicycle storage for the nonresidential and residential portions of the project.

For retail projects, use Equation 4 to determine the number of short- and long-term bicycle storage:

Equation 4. Calculating bicycle storage for retail projects

$$Short\text{–}term\ storage = (2\ \times\ \frac{[Building\ gross\ floor\ area\ (sf\ or\ m2)]}{5000\ or\ 465})$$

$$Long\text{-}term\ storage = Regular\ building\ occupants \times 0.05$$

DOCUMENTATION

Project types	Options	Paths	Documentation
All	Option 1. Unbundled Parking	All	Narrative identifying the parking fees and explaining how the rate charged is equal to or greater than the local market rate for parking
			Documentation confirming local market parking rate
	Option 2. Shared Mobility Options	All	Documentation demonstrating mobility services on site or a functional entrance within a walking distance of 0.25 miles (400 meters) (e.g., a site plan or annotated aerial image with scale)
			Calculation demonstrating the mobility option serves a minimum of 2% of regular building occupants
			Confirmation that the project owner or management covers any associated fees for the identified shared mobility services used by specified regular building occupants
	Option 3. Bicycle Network and Storage	Bicycle Network	Vicinity map showing the bicycle network meeting the required criteria and walking/bicycling distance from the functional building entrance and/or bicycle storage to existing or planned bicycle network
			Confirmation that any sidewalks contributing as part of the bicycle network are permitted for bicycle use by local code
		Bicycle Storage	Site plan or aerial image showing main and functional building entrances, short-term bicycle storage and long-term bicycle storage and shared micromobility storage (if applicable), walking distance from short-term storage to the main entrance and from long-term storage to a functional entrance
			Short-term bicycle parking calculations by space type
			Long-term bicycle parking calculations by space type
Schools	Option 3. Bicycle Network and Storage	Bicycle Network	Documentation demonstrating dedicated bicycle lanes, or sidewalks if applicable, that extend from the student bike-parking location to at least the end of the school property without any barriers

REFERENCED STANDARDS

- SAE Surface Vehicle Recommended Practice J1772 (sae.org/standards/content/j1772_201710/)
- SAE Electric Vehicle Conductive Charge Coupler (sae.org/standards/content/j1772_200111)
- IEC 62196 of the International Electrotechnical Commission for projects outside the U.S. (webstore.iec.ch/en/publication/59922)
- ENERGY STAR® (energystar.gov)

Impact Area Alignment

☑ Decarbonization

— Quality of Life

— Ecological Conservation and Restoration

Location and Transportation Credit

ELECTRIC VEHICLES

LTc3

1 point

INTENT

To encourage the use of electric vehicles and infrastructure and help diminish the negative health effects on communities by lowering greenhouse gas emissions and other pollutants emitted from conventionally fueled cars and trucks.

REQUIREMENTS

Achievement pathways	Points
Existing Buildings	1
Electric Vehicle Supply Equipment	1

Install electric vehicle supply equipment (EVSE) meeting the thresholds listed in Table 1. EVSE must meet the following criteria:

- Provide Level 2 or Level 3 charging capacity per manufacturer's requirements and the requirements of the National Electrical Code (NFPA 70).
- Ensure 208–240 volts or greater for each required space.
- Comply with the relevant regional or local standard for electrical connectors, such as SAE Surface Vehicle Recommended Practice J1772, SAE Electric Vehicle Conductive Charge Coupler, or IEC 62196 of the International Electrotechnical Commission for projects outside the U.S.
- Meet the connected functionality criteria for ENERGY STAR®-certified EVSE and be capable of responding to time-of-use market signals (e.g., price).
- At least one EV charging station must be an accessible parking space at least nine feet (2.5 meters) wide with a 5-foot (1.5-meter) access aisle with charging station accessibility features for use by persons with mobility, ambulatory, and visual limitations.

Table 1. Points for installed EVSE (percent of total parking spaces)

Commercial minimum EVSE parking	**Points**
5% or at least 2 spaces, whichever is greater	1
Residential minimum EVSE parking	**Points**
10% or at least 5 spaces, whichever is greater	1

REQUIREMENTS EXPLAINED

Buildings play a critical role in providing solutions to encourage the shift away from conventional-fuel vehicles. Electric Vehicle Supply Equipment (EVSE) continues to be identified as a primary barrier to the adoption of electric vehicles (EVs), which play a critical role in reducing global transportation emissions.[28] Increasing access to EVSEs provides convenient charging opportunities during daily activities and reduces concerns of having insufficient battery power to commute between destinations.

This credit rewards projects with EV supply infrastructure installed in existing buildings to incentivize the use of EVs and lower greenhouse gas emissions emitted from fueled vehicles.

Install Electric Vehicles Supply Equipment

A project must demonstrate that the required number of EVSE is provided to regular building occupants. To determine the number of spaces required to earn credit, teams must first determine the project's total parking capacity, inside and outside the project boundary (both commercial and residential). Parking capacity includes all off-street parking spaces leased or owned by the project, including parking that is outside the project boundary but is used by the project. On-street parking in public rights-of-way is excluded from these calculations. Projects that do not own or lease parking are not eligible for this credit.

The definition of residential for this credit should align with the residential occupancy classifications in the *International Building Code (IBC), Section 310, Residential Group R* or in accordance with local building code where IBC is not adopted. This includes not only multi-family buildings but also dormitories, hotels, assisted living facilities, and other places where people stay overnight.[29]

Install EVSE for the minimum number of spaces, as required in Table 1. Percentage thresholds will only apply to projects if the minimum number of spaces provided meets or exceeds those listed in Table 1.

Equation 1. Minimum EVSE parking requirements — commercial

$$Number\ of\ commercial\ minimum\ EVSE\ parking = Total\ number\ of\ parking\ spaces \times 0.05$$

Equation 2. Minimum EVSE parking requirements — residential

$$Number\ of\ residential\ minimum\ EVSE\ parking = Total\ number\ of\ parking\ spacesx \times 0.1$$

[28] "'It's just like plugging in your phone' – one founder on the mindset shift needed to scale EVS," World Economic Forum, September 30, 2024, www.weforum.org/stories/2024/09/electric-vehicles-charging-infrastructure/.
[29] "Chapter 3 Occupancy Classification and Use," 2021, International Building Code, https://codes.iccsafe.org/content/IBC2021P2/chapter-3-occupancy-classification-and-use#IBC2021P2_Ch03_Sec310.

All EVSE must have a Level 2 or Level 3 charging capacity, with dedicated services of 208–240 volts for each required space.

Teams must also confirm with the appropriate regional or local standards for electrical connectors used in the project to help guarantee the compatibility and safety of electrical vehicle charging infrastructure and other related systems across different regions. In the U.S., this typically includes standards such as the *SAE Surface Vehicle Recommended Practice J1772* or the *SAE Electric Vehicle Conductive Charge Coupler*.[30] For projects located outside the U.S., compliance with international standards such as *IEC 62196*,[31] established by the International Electrotechnical Commission, is required.

ENERGY STAR®-certified EVSE[32] has been verified to meet performance claims by manufacturers and fully tested for safety and energy use. All EVSE installed in the project must meet the connected functionality criteria, as outlined by ENERGY STAR®,[33] including capabilities of responding to time-of-use market signals. Include specifications for all installed EVSE, identifying capabilities of the equipment to integrate with industry networks and connect to other devices. Devices may include wi-fi routers and electric utility energy management and price signals.

Projects must have at least one EV charging station located in an accessible parking space that is a minimum of nine feet (2.5 meters) wide, with an adjacent access aisle measuring at least five feet (1.5 meters). Note that this space does not need to be reserved only for people with disabilities. This station must have features designed to accommodate individuals with mobility, ambulatory, and visual limitations, ensuring full accessibility. Teams are suggested to include easy-to-reach charging ports, clear signage, and tactile indicators for users with visual impairments.

[30] SAE International, “SAE Standards,” n.d., https://www.sae.org/standards/.
[31] International Electrotechnical Commission, “IEC 62196-1”, n.d., https://webstore.iec.ch/en/publication/59922.
[32] Energy Star, “Electric Vehicle Chargers,” n.d., https://www.energystar.gov/products/ev_chargers.
[33] Energy Star, “Electric Vehicle Chargers,” n.d., https://www.energystar.gov/products/ev_chargers.

DOCUMENTATION

Project types	Options	Paths	Documentation
All	All	All	Site plan or photograph identifying all parking spaces used by the project and all parking with EVSE including clear identification of at least 1 EVSE in an accessible parking space
			Confirmation that an accessible parking space is provided that measures at least nine feet (2.5-meters) wide with a five-foot (1.5-meters) access aisle and has charging station accessibility features for use by persons with mobility, ambulatory and visual limitations
			Number of commercial EVSE parking spaces
			Number of residential number of EVSE parking spaces
			Confirmation that EVSE meets all criteria identified in the rating system requirements (for example, product information from manufacturer or contract specification)

REFERENCED STANDARDS

- SAE Surface Vehicle Recommended Practice J1772 (sae.org/standards/content/j1772_201710/)
- SAE Electric Vehicle Conductive Charge Coupler (sae.org/standards)
- IEC 62196 of the International Electrotechnical Commission for projects outside the U.S. (webstore.iec.ch/en/publication/59922)
- ENERGY STAR® (energystar.gov/products/ev_chargers)

SUSTAINABLE SITES (SS)

OVERVIEW

The Sustainable Sites (SS) category rewards decisions that promote sustainable relationships between buildings and their surrounding environments. It addresses critical environmental concerns, such as identifying opportunities to mitigate harm from rising temperatures and reducing the consequences of development on wildlife and people.

As the building industry increasingly calls for investments in resilience and biodiversity, the SS category responds with a streamlined focus on existing building projects to optimize their connections to the surrounding landscape, preserving healthy ecosystems and improving human well-being and ecological balance. The strategies to accomplish this critical work include heat mitigation, light pollution reduction, and bird collision abatement.

Decarbonization

Some urban areas are covered in up to 50–90% dark, non-reflective surfaces that absorb and retain heat, creating "heat islands" that are significantly warmer than surrounding areas.[34] These heat islands can drive energy consumption to maintain comfortable temperatures within buildings, increasing their carbon emissions.

To reduce the building's contribution to these effects, the SS category tackles local temperature increases through shading, increased tree canopy cover and vegetation, and reflective or green roofs (*SSc1: Heat Island Reduction*). Green roofs, for instance, can be up to 30–40°F cooler than typical roofs and reduce building air conditioning costs by up to 75%.[35] Decreasing the building's reliance on energy-intensive systems to maintain indoor temperatures improves resilience and mitigates urban heat for the larger community.

Quality of life

While the human health and well-being benefits from access to urban green space are well-documented, research continues to correlate these benefits with increased biodiversity.[36] [37] The

[34] Lennart Olsson, Humberto Barbosa, Suruchi Bhadwal, Annette Cowie, Kenel Delusca, Dulce Flores-Renteria, Kathleen Hermans et al., "Land Degradation," in *Climate Change and Land: An IPCC Special Report on Climate Change, Desertification, Land Degradation, Sustainable Land Management, Food Security, and Greenhouse Gas Fluxes in Terrestrial Ecosystems*, by Aliyu Salisu Barau, ed. José Manuel Moreno and Carolina Vera (2019): 345–405, www.ipcc.ch/site/assets/uploads/sites/4/2022/11/SRCCL_Chapter_4.pdf.

[35] Environmental and Energy Study Institute (EESI), "Fact Sheet | Nature as Resilient Infrastructure – an Overview of Nature-Based Solutions | White Papers | EESI," n.d., www.eesi.org/papers/view/fact-sheet-nature-as-resilient-infrastructure-an-overview-of-nature-based-solutions.

[36] Matthew P. White, Lewis R. Elliott, James Grellier, Theo Economou, Simon Bell, Gregory N. Bratman, Marta Cirach, et al., "Associations Between Green/Blue Spaces and Mental Health Across 18 Countries," *Scientific Reports* 11, no. 1 (2021a), doi.org/10.1038/s41598-021-87675-0.

[37] Chen Gong, Rongtian Yang, Shuhua Li, "The Role of Urban Green Space in Promoting Health and Well-being is Related to Nature Connectedness and Biodiversity: Evidence from a Two-factor Mixed-design Experiment,"

SS category encourages the creation of biodiverse green spaces while mitigating public health risks associated with rising temperatures.

Ecological conservation and restoration

Birds are particularly susceptible to building structures, with an estimated 365 to 988 million birds dying annually in the U.S. due to collisions with buildings.[38] Using the *American Bird Conservancy's (ABC) Threat Factor Database*,[39] buildings can reduce bird fatalities by at least 50% according to estimates. By reducing these daily disruptions, projects enable ecosystems to reestablish their natural patterns, fostering a more resilient and biodiverse habitat.

These credits align with global commitments to conserve and restore at least 30% of the world's land and seas by 2030, offering LEED projects a meaningful role in advancing this initiative.[40] By integrating these strategies, projects not only protect their ecosystems but also position themselves for long-term resilience and success in an increasingly interconnected world.

[38] American Bird Conservancy, "New Study Confirms Building Collisions Kill Over One Billion Birds Annually in U.S. - American Bird Conservancy," August 7, 2024, abcbirds.org/news/bird-building-collisions-study-2024/.
[39] American Bird Conservancy, "Downloadable Resources," https://abcbirds.org/glass-collisions/resources/.
[40] Secretariat of the Convention on Biological Diversity, "Kunming-Montreal Global Biodiversity Framework," n.d., www.cbd.int/gbf.

Impact Area Alignment

- ☑ Decarbonization
- ☑ Quality of Life
- ☑ Ecological Conservation and Restoration

Sustainable Sites Credit

HEAT ISLAND REDUCTION

SSc1

1 point

INTENT

To mitigate disparate impacts on microclimates and habitats caused by heat islands and extreme heat events.

REQUIREMENTS

Achievement pathways	Points
Existing Buildings	1
Heat Island Reduction Strategies	

Implement strategies to minimize the project's overall contribution to heat island effects that meet the criteria outlined in Equation 1 below:

Equation 1. Nonroof and roof calculation

$$\frac{\text{Area of nonroof measures}}{0.5} + \frac{\text{Area of high-reflectance roof}}{0.75} + \frac{\text{Area of vegetated roof}}{0.5} \geq \text{Total site paving area} + \text{Total roof area}$$

Alternatively, a solar reflectance index (SRI) and solar reflectance (SR) weighted average approach may be used to calculate compliance.

Use any combination of nonroof, high-reflectance roof, and vegetative roof strategies so that the weighted sum of site design strategies is greater than or equal to the sum of the total pavement and roof areas. Each surface may only be counted once, even if it is addressed through multiple strategies.

Nonroof Measures

- Provide shade over pavement areas, measured in plain view at noon, through:
  - Plants or vegetated structures that provide shade over paving areas (including playgrounds) on the site. For newly installed plants, base shade area on 10-year canopy.
  - Vegetated planters.

- Structures covered by energy generation systems, such as solar thermal collectors, photovoltaics, and wind turbines.
- Architectural devices or structures. If the device or structure is a roof, it shall have an aged SR value of at least 0.28 as measured in accordance with *ANSI/CRRC S100*. If the device or structure is not a roof, or if aged SR information is not available, it shall have an initial SR of at least 0.33 as measured in accordance with *ANSI/CRRC S100*.

- Use paving materials with an initial SR value of at least 0.33.
- Create an open-grid pavement system (at least 50% unbound).

High-Reflectance Roof

Use roofing materials that have an aged solar reflectance index (SRI) value equal to or greater than the values in Table 1. If an aged SRI is not available, the roofing material shall have an initial SRI equal to or greater than the values in Table 1.

Table 1. Minimum solar reflectance index value, by roof slope

	Slope	Initial SRI	Aged SRI
Low-sloped roof	≤ 2:12	82	64
Steep-sloped roof	> 2:12	39	32

A roof area that consists of functional, usable spaces (such as helipads, recreation courts, and similar amenity areas) may meet the requirements of nonroof measures. Applicable roof area excludes roof area covered by mechanical equipment, solar energy panels, skylights, and any other appurtenances.

Vegetated Roof

If newly installed, sufficient growing medium and plant material must be in place to provide full vegetative cover within three years.

REQUIREMENTS EXPLAINED

This credit encourages the use of combined strategies that minimize a project's overall contribution to the heat island effect. This includes both nonroof and roof measures such as reducing hardscape, incorporating high solar reflectance index (SRI) or high solar reflectance (SR) materials, increasing tree cover, and implementing vegetation across the site. SRI is used to measure a roofing material's ability to reject solar heat, while SR is used to measure the solar heat rejection of hardscape materials. Projects pursuing this credit should review the building

and site conditions and determine where nonroof and roof strategies can be implemented to reduce the heat island effect.

Nonroof Measures

Nonroof measures include shading with new or existing plant material or shading structures, using high reflectance paving and open-grid paving, and having an overhead canopy that provides shade. Using a variety of plant species allows for biodiversity, while tree canopies and shading structures create areas of respite during warm temperatures.

Roof Measures

Roof measures, including the use of vegetated and high reflectance roofs, can improve energy efficiency and thermal comfort and can reduce carbon emissions associated with building energy use.

HIGH-REFLECTANCE ROOF

Projects pursuing this option must consider the slope of the roof, and both the initial and aged SRI value when selecting compliant materials. For low-sloped roofs, the roofing material must meet the minimum values of an initial SRI of 82 or aged value of 64. For steep-sloped roofs, the minimum required values are an initial SRI of 39 or aged SRI of 32. These specific SRI values are indicative of a material that performs well in reducing heat absorption when it is new and after it has aged.

VEGETATED ROOF

Vegetated roofs must prioritize the use of native or adapted plant species. These species are well-adapted to the local environment and typically require less maintenance and support local biodiversity.[41]

Nonroof and roof measures calculation

Projects pursuing this option must demonstrate compliance with the combined roof and nonroof strategies by calculating the total area associated with each measure (e.g., nonroof, high reflectance roof, and vegetated roof areas) and dividing it by its weighted value. The total value of implemented strategies must meet or exceed the total site paving area plus the total roof area within the project's boundary. Calculations must account for parking that is leased or owned by the project, including parking that is outside the project boundary but is used by the project.

[41] Audubon, "Why native plants matter," n.d., audubon.org/content/why-native-plants-matter#:~:text=Because%20native%20plants%20are%20adapted%20to%20local%20environmental,and%20perhaps%20the%20most%20valuable%20natural%20resource%2C%20water.

Equation 1. Standard nonroof or roof calculation

$$\frac{\text{Area of nonroof measures}}{0.5} + \frac{\text{Area of high-reflectance roof}}{0.75} + \frac{\text{Area of vegetated roof}}{0.5} \geq \text{Total site paving area} + \text{Total roof area}$$

Projects are encouraged to evaluate and achieve compliance using Equation 1. If the project does not achieve the standard nonroof or roof calculations, teams may use an SRI and SR weighted average approach to calculate compliance. The weighted nonroof or roof equation weights the SR and SRI for total hardscape and roof area, showing its overall consequence on heat island effect. This equation is useful for projects that have multiple roof angles and nonroof or roof materials that fall both above and below the required SR and SRI values.

Equation 2. Weighted nonroof or roof calculation

$$\frac{\left(\text{Area of high reflectance nonroof A} \times \frac{\text{SR of high reflectance nonroof A}}{\text{Required SR}}\right)1}{0.5} + \frac{\text{Area of other nonroof measures}}{0.5} + \frac{\left(\text{Area of high reflectance roof A} \times \frac{\text{SRI of high reflectance roof A}}{\text{Required SR}}\right)2}{0.75} + \frac{\left(\text{Area of vegetated roof}\right)}{0.5} \geq \text{Total site paving area} + \text{Total roof area}$$

1 Summed for all high reflectance nonroof areas

2 Summed for all high reflectance roof areas

DOCUMENTATION

Project types	Options	Paths	Documentation
All	All	All	Weighted average nonroof and roof calculation
			Heat island reduction calculations
			Site plan or annotated aerial view image identifying nonroof measures, roof areas including high reflectance and vegetated areas, and hardscape areas
			The plant species list for the vegetated roof if applicable

REFERENCED STANDARDS

- None

Impact Area Alignment

— Decarbonization

— Quality of Life

☑ Ecological Conservation and Restoration

Sustainable Sites Credit

LIGHT POLLUTION AND BIRD COLLISION REDUCTION

SSc2

1 point

INTENT

To increase night sky access, improve nighttime visibility, and reduce the consequences of development for wildlife and people.

REQUIREMENTS

Achievement pathways	Points
Existing Buildings	1
Option 1. Limit Uplight	1
OR	
Option 2. Bird Collision Reduction	1

Option 1. Limit Uplight (1 point)

Meet all of the following uplight, interior lighting, and exterior lighting requirements:

UPLIGHT

All exterior fixtures with a light output greater than 1,000 lumens must meet the full cutoff requirements as defined in the *IESNA Cutoff Classifications*.[42]

AND

INTERIOR LIGHTING

Meet at least one of the following measures:

- Limit the total duration of all nighttime lighting programmed "on" to less than 90 minutes per day. A manual override capability may be provided for occasional after-hours use.
- Reduce the amount of uplight leaving the building. Any suspended or wall- or floor-mounted luminaires with a direct line of sight above the horizon, through any glass windows, skylights, or doors, must be automatically controlled to turn "off" during all nighttime hours (the time between sunset and sunrise).

[42] The Lighting Authority, "Standards," n.d., https://www.ies.org/standards/.

- Install automatic window shades or shielding that limit light transmittance to 10% or less during nighttime.
- The lighting in at least 50% of the nonresidential spaces adjacent to the building's perimeter is controlled to turn off after hours and/or when there are no occupants.

AND

EXTERIOR LIGHTING

Meet at least one of the following measures:

- All nonessential exterior fixtures are turned off between midnight and 6 a.m.
- Meet the exterior lighting control requirements of *ASHRAE 90.1-2019*, Section 9.4.1.4.

OR

Option 2. Bird Collision Reduction (1 point)

Glass used below specified heights, on the exterior of the building and site structures, must have a maximum threat factor of 30, as defined in the American Bird Conservancy Threat Factor database.

This applies to all glass, including spandrel glass, when located:

- From grade up to 50 feet (15 meters) measured at all points
- Up to 20 feet (6 meters) measured from the finished grade of a green roof
- At any distance from grade or roof for glass in guardrails and windshields

REQUIREMENTS EXPLAINED

This credit rewards projects that meet the requirements of limiting uplight and interior nighttime lighting or implementing strategies to reduce the instances of bird collision on site.

Minimizing light pollution helps to preserve our night skies, protect wildlife, and improve human health. Strategies include using light shielding, where fixtures direct light downward, and using dimmers, motion sensors, and timers to ensure lights are only on when needed.

To reduce the instances of bird collision, certain architectural features, like glass corners and large windows, can be modified to assist birds in distinguishing reflections of trees and sky in glass. Bird collisions with buildings, especially glass surfaces, are a significant issue, causing millions of bird deaths annually.

Option 1. Limit Uplight

Avoiding uplight is an effective strategy to reduce light pollution. Uplighting occurs from exterior and interior fixtures that direct light upwards. Teams must implement measures for both exterior and interior lighting.

UPLIGHT

All exterior fixtures with a light output greater than 1,000 lumens must meet the full cutoff requirements defined in the *IESNA Cutoff Classifications*.

The Illuminating Engineering Society of North America (IESNA) defines several cutoff classifications for outdoor luminaires, which help manage light pollution and improve visibility. These include:

- **Full cutoff**. No light is emitted at or above a 90° angle from the nadir (directly downward). Additionally, at 80° above the nadir, the luminous intensity does not exceed 10% of the total light output.
- **Cutoff**. Light emitted at or above 90° does not exceed 2.5% of the total light output, and at 80° above the nadir, the luminous intensity does not exceed 20%.
- **Semicutoff**. Light at or above 90° does not exceed 5% of the total output, while at 80° above the nadir, the luminous intensity does not exceed 20% of the total light output.
- **Noncutoff**. There are no restrictions on light emitted above the maximum intensity angle.

INTERIOR LIGHTING

All nonemergency interior lighting fixtures must meet at least one of the following measures to reduce light trespass from the building:

- Install lighting systems with automatic scheduling that limit the amount of time fixtures which are allowed to be on at night to up to 90 minutes.
- Lighting fixtures or luminaires that directly emit light to the outdoors through unshielded windows or skylights must be programmed to automatically turn off during nighttime hours.
- Install shielding or automatic shades on all exterior openings that block at least 90% of the light that can pass through the glazing to the outside.
- For non-residential spaces, at least 50% of lighting located along the exterior walls of the building must be automatically programmed to turn off during nighttime hours.

Any non-emergency lighting within covered parking areas must also meet the interior lighting requirements of this credit. For the measures using lighting controls, controls may be automatic

sweep timers, occupancy sensors, or programmed master lighting control panels. Projects with 24-hour operations are exempt from the interior lighting requirements.

EXTERIOR LIGHTING

Program time of day controls or meet exterior lighting control requirements of *ASHRAE Standard 90.1-2019*.[43] It is important to note the following:

- Turn off all nonessential exterior lights between midnight and 6 a.m. Essential exterior lighting, like pathway lighting or any lighting required for safety, may be on during this time.
- *ASHRAE 90.1-2019*, Section 9.4.1.4 requires exterior lighting controls for exterior fixtures. This includes building façade, landscape, exterior signage, and parking lot lights. Controls may include daylight controls, time-of-day operations, and dimming controls

EXEMPTIONS TO UPLIGHT AND EXTERIOR LIGHTING REQUIREMENTS

The following exterior lighting is exempt from the requirements, provided it is controlled separately from the nonexempt lighting:

- Specialized signal, directional, and marker lighting for transportation
- Lighting that is used solely for façade and landscape lighting and is automatically turned off from midnight until 6 a.m.
- Lighting for theatrical purposes for stage, film, and video performances
- Government-mandated roadway lighting
- Hospital emergency departments, including associated helipads
- Lighting for the national flag
- Internally illuminated signage

Option 2. Bird Collision Reduction

Option 2 promotes the use of bird-friendly glass in building exteriors. The American Bird Conservancy (ABC) has developed a system to evaluate and rate materials based on their potential threat to birds, known as the Material Threat Factor (TF).[44] This system assigns scores to materials, providing a relative measure of how well they deter bird collisions. The scores help architects and designers select bird-friendly materials for buildings.

[43] ASHRAE, "Standard 90.1-2022," n.d., https://www.ashrae.org/technical-resources/bookstore/standard-90-1.

[44] ABC Birds, "What is a Material Threat Factor," n.d., January 23, 2023, https://abcbirds.org/wp-content/uploads/2023/01/What-is-a-Material-Threat-Factor-1_23.pdf.

The façade material distances analyzed must consist of the first 50 feet (15 meters) above grade, or up to 20 feet (six meters) from the finished grade of a green roof. All glass, including spandrel glass, located within these distances must have a maximum threat factor of 30 under the ABC Data Base.[45] Glass used in guardrails and windshields must not exceed the threat factor, regardless of the height.

Materials with a Threat Factor of 30 or below are considered to significantly reduce the risk of bird collisions, with an estimated reduction of at least 50% less occurrences. This is particularly important for areas like glazed corners and fly-through conditions, where birds are more likely to collide with glass due to reflections or transparency.[46]

DOCUMENTATION

Project types	Options	Paths	Documentation
All	Option 1. Limit Uplight	All	Documentation demonstrating that all exterior fixtures with a light output greater than 1,000 lumens meet the full cutoff requirements (e.g., product cutsheets with luminaire shielding information and/or photographs of the fixture)
			Identification of the interior lighting measures that are in place
			Identification of the exterior lighting measures that are in place
	Option 2. Bird Collision Reduction	All	List of exterior glass types used in the project, and their installed height (from relevant grade), identified by type according to the American Bird Conservancy's (ABC) Threat Factor Database
			Documentation identifying all glass used below specified heights on the exterior of the building and site, the relevant grade points, and relevant elevation markers (i.e., exterior elevations, photographs, window specifications)

REFERENCED STANDARDS

- ASHRAE 90.1-2019, Section 9.4.1.4 (ashrae.org/technical-resources/bookstore/standard-90-1)
- The American Bird Conservancy Material Threat Factor (abcbirds.org/glass-collisions/resources)
- Illuminating Engineering Society of North America (IESNA) Cutoff Classifications (https://www.ies.org/standards/)

[45] American Bird Conservancy, "Bird Collision Deterrence: Summary of Material Threat Factors," October 2011, https://abcbirds.org/wp-content/uploads/2015/05/Docs10397.pdf.
[46] American Bird Conservancy, "About the ABC rating system," January 2023, https://abcbirds.org/What-is-a-Material-Threat-Factor-1_23.pdf.

WATER EFFICIENCY (WE)

OVERVIEW

In LEED v5, water efficiency performance is the central focus of the water category, highlighting water as a valuable and limited resource. The Water Efficiency (WE) category motivates projects to conserve potable water to safeguard ecosystems, reduce energy use, and boost resilience on site and in their community.

In the O+M rating system, projects focus on conservation through an efficiency-first strategy of identifying, measuring, and reducing water use. This process starts with metering and submetering to gain a clear understanding of the building's current water performance (*WEp1: Water Metering and Reporting*, *WEc2: Advanced Water Metering*). The WE category encourages measuring water use intensity and awards projects that have reduced potable water use (*WEc1: Water Efficiency Performance*).

Decarbonization
Improving water performance reduces emissions associated with energy use in domestic water distribution, treatment, and heating (*WEc1: Water Efficiency Performance*, *WEc2: Advanced Water Metering*).

Ecological conservation and restoration
The WE category encourages projects to consistently track, reduce, and optimize their water stewardship, lessening the strain on ecosystems and preserving critical resources. Tracking water data enables building operations teams to take action to further conserve valuable resources (*WEc1: Water Efficiency Performance*).

By embracing the performance and monitoring strategies in the WE category, projects protect one of the planet’s most essential resources and contribute to the foundation of a more resilient and sustainable future for all.

Impact Area Alignment

— Decarbonization

— Quality of Life

☑ Ecological Conservation and Restoration

Water Efficiency Prerequisite

WATER METERING AND REPORTING

WEp1

REQUIRED

INTENT

To conserve potable water resources, support water management, and identify opportunities for additional water savings by tracking water consumption.

REQUIREMENTS

Achievement pathways	Points
Existing Buildings	N/A
Water Metering	

Install (or use existing) permanent water meters to monitor, record, and report the total water consumption for potable and alternative water sources for the building and associated grounds.

Report whole-project use for each type of water source supplied to the building and associated grounds with the following additional provisions:

- The facility manager and/or tenant must be able to access the meter data.
- Meter alternative water sources separately from municipally supplied potable water.
- Measure and report total water use for the entire 12-month reporting period.
- Commit to sharing with USGBC the resulting whole-project water usage data on an annual basis following certification.

REQUIREMENTS EXPLAINED

Measuring water usage within the project's boundary allows facility managers complete transparency into actual water consumption. Tracking and reviewing water usage data allows the facility manager to identify inefficiencies in the building, create pathways to increasing conservation efforts on-site, and mitigate potential problems, including leaking pipes or valves, within water-using systems.

Projects must install or use existing meters and collect water consumption data (gallons or liters) from all water sources within the project boundary for the 12-month reporting period. This includes potable water sources and alternative water sources.

Potable water sources include municipally supplied potable water, well water, groundwater, and water from naturally occurring surface bodies of water (such as streams, lakes, or rivers), even if not treated to potable drinking water standards.

Alternative water sources include water from other than potable water sources, including municipally supplied reclaimed wastewater (“purple pipe” water), gray water, rainwater, stormwater, treated seawater, water recovered from condensate, foundation dewatering water, treated blowdown from process water, reverse osmosis reject water, and other recycled water sources. On-site water treatment systems may also contribute as an alternative water source. If alternative water sources are used, these must be metered separately from municipally supplied potable water.

Report total project water consumption to USGBC annually, at a minimum, for all water within the building and associated grounds. Provide data access to facility managers, operations managers, tenants, and/or other appropriate person(s).

Identifying all Water Sources and Meters

Meters must be installed and function properly to capture water usage from all potable water sources and alternative water sources within the building and associated grounds. Ensure all water end uses in the building and the project site have been accounted for, such as water used for plumbing fixtures, cooling towers, laundry facilities, dishwashers, indoor and outdoor water features, irrigation, and other building and site processes.

Teams must identify whether multiple sources of potable water or alternative water are used within the project boundary. A single meter per water source can meet the requirement if the existing meters (or newly installed meters) have proper placement within the system. Otherwise, a combination of utility or whole project water use and alternative water meter(s) can meet the requirements.

There are no requirements for the type of meter except that the meter must be permanent, and the data must be accessible to the facility manager and/or tenant(s). Utility-owned meters and project-owned meters may be used. For projects located on a campus, campus-level metering for irrigation meets the prerequisite requirements.

Tracking and reporting

Demonstrate that the facility manager and/or tenant(s) responsible for tracking and reporting water consumption data can access the data from the utility-owned meter, either through visual readings or utility bill(s). If projects cannot demonstrate access through direct, visual readings,

or utility bills, teams must install additional meter(s) to meet the prerequisite. Water consumption data must be based on actual readings and not estimates.

Commitment to sharing data with USGBC

Projects must commit to ongoing reporting of whole-project water usage data on an annual basis following certification.

DOCUMENTATION

Project types	Options	Paths	Documentation
All	All	All	Confirmation the project has permanent water meters for all potable and alternative water sources for the building and associated grounds
			Confirmation that alternative water sources are metered separately from municipally supplied potable water
			Confirmation that the facility manager and/or tenant(s) can access the meter data
			Commit to ongoing reporting of whole-project water usage data on an annual basis following certification
			Narrative describing the location of the water meters and the water source for each meter serving the building and associated grounds
			Documentation confirming water consumption values and dates highlighted verifying all consumption data provided for the 12-month reporting period. Acceptable documentation includes utility bills, data directly imported from the utility to the ENERGY STAR® Portfolio Manager, direct exports from utility providers, in-house meter logs, and BAS data. If providing data directly imported from the utility to ENERGY STAR® Portfolio Manager, direct exports from utility providers, in-house meter logs, and BAS data, and indicate the source and type of the documentation.
Campus	All	All	Documentation demonstrating campus-level irrigation water sources with prorated irrigation data and supporting calculations, methodology for proration, and documentation with campus water consumption values and dates highlighted verifying campus consumption data provided for the 12-month reporting period. Acceptable documentation includes utility bills, data directly imported from the utility to the ENERGY STAR® Portfolio Manager, direct exports from utility providers, in-house meter logs, and BAS data. If providing data directly imported from the utility to ENERGY STAR® Portfolio Manager, direct exports from utility providers, in-house meter logs, and BAS data, and indicate the source and type of the documentation.

REFERENCED STANDARDS

- Energy Policy Act (EPAct) of 1992 and as amended (usgbc.org/resources/energy-policy-act-epact-1992-and-amended-1)

Impact Area Alignment

- ☑ Decarbonization
- — Quality of Life
- ☑ Ecological Conservation and Restoration

Water Efficiency Credit

WATER EFFICIENCY PERFORMANCE

WEc1

1–14 points

INTENT

To reduce potable water consumption and the associated energy consumption and carbon emissions required to treat and distribute water, and to preserve potable water resources through an efficiency-first approach.

REQUIREMENTS

Achievement pathways	Points
Existing Buildings	1–14
Water Performance	1–14

Points are awarded based on total potable water consumption during a 12-month reporting period using the metric of gallons per square foot per year (or liters per meter per year). To earn one point, meet the baseline water use intensity threshold for the applicable space type as shown in Table 1. To earn additional points, demonstrate a percent reduction from the baseline water use intensity threshold as shown in Table 2.

Table 1. Baseline water use intensity threshold

Space type	Water use intensity threshold (gal/sq. ft./yr)	Water use intensity threshold (l/sq. m./yr)
College/university	12	489
Hospital	53	2,160
Hospitality	49	1,997
Industrial manufacturing	14	570
K–12 school	11	448
Laboratory	53	2,160
Medical office	22	896
Office	13	530
Other	22	896
Public assembly	12	489
Public order and safety	26	1,059
Residential	44	1,793
Retail	9	367
Senior living community	57	2,323
Service	9	367
Supermarket	30	1,222
Transit	15	611
Warehouse/distribution center	2	81

Table 2. Points for water performance

Percent reduction from one-point water use intensity threshold (Table 1)	Points
Meet space type baseline threshold	1
2%	2
6%	3
10%	4
14%	5
18%	6
22%	7
26%	8
30%	9
34%	10
38%	11
42%	12
46%	13
50%	14

REQUIREMENTS EXPLAINED

This credit rewards projects that annually reduce potable water consumption compared to a baseline water use intensity for the specific building type. Projects can optimize points by upgrading to high-efficiency fixtures and fittings, monitoring meters and sensors for leaks, and taking corrective actions to reduce wasted water use. Using alternative water sources, such as municipally reclaimed water for flush fixtures or harvested rainwater for irrigation, can improve a project's water performance by replacing potable water with these alternative sources.

Data Collection

Determine the project's total water consumption from potable water sources. Water from alternative water sources is excluded from the calculation.

Report annual consumption for the 12-month reporting period, using data from meters of all potable water sources serving the project per *WEp1: Water Metering and Reporting*. If using utility bills to determine the water consumption, ensure the readings reported on the utility bills are actual readings and not estimates. When reporting the data, teams must confirm there are no gaps or missing data from the 12-month period.

Determining the Baseline

The baseline water use intensity threshold is based on the primary space type(s), function(s), or main activities of the building. Table 1 in the Rating System identifies primary space types and their baseline intensity thresholds.

In many cases, teams can select a single space type, like *hospital* or *industrial manufacturing*, to directly calculate the baseline threshold using Equation 1.

Equation 1. Baseline water consumption

$$Baseline\ water\ consumption = GFA \times Table\ 1\ value$$

where:

GFA: gross floor area (sq. ft. or sq. m.)

In cases where projects are mixed-use, like a project with both office and retail, use multiple Space Types from Table 1 to determine the prorated baseline, using Equation 2.

Equation 2. Prorated baseline (multiple space types)

$$Prorated\ baseline = (GFA_A \times Table\ 1\ value_A) + (GFA_B \times Table\ 1\ value_B)$$

where:

GFAA: gross floor area of Space Type A (sq. ft. or sq. m.)

Table 1 ValueA: water use intensity for Space Type A from Table 1

GFAB: gross floor area of Space Type B (sq. ft. or sq. m.)

Table 1 ValueB: water use intensity for Space Type B from Table 1

Calculating a Project's Water Performance

Using the project's total water consumption from potable water sources for the 12-month reporting period, determine the performance water use intensity using Equation 3.

Equation 3. Performance water use intensity

$$Performance\ water\ use\ Intensity = \frac{total\ annual\ potable\ water\ consumption}{GFA}$$

where:

Total annual potable water consumption: annual potable water use in gallons or liters

GFA: gross floor area (sq. ft. or sq. m.)

DOCUMENTATION

Project types	Options	Paths	Documentation
All	All	All	Project baseline water use intensity threshold
			Project water use intensity
			Percent reduction from baseline water use intensity threshold

REFERENCED STANDARDS

- U.S. EPA ENERGY STAR® Portfolio Manager (portfoliomanager.energystar.gov/pm/login?testEnv=false)
- U.S. EPA WaterSense (epa.gov/watersense)

Impact Area Alignment

- ☑ Decarbonization
- — Quality of Life
- ☑ Ecological Conservation and Restoration

Water Efficiency Credit

ADVANCED WATER METERING

WEc2

1 point

INTENT

To support water management and identify opportunities for additional water savings by tracking water consumption.

REQUIREMENTS

Achievement pathways	Points
Existing Buildings	1
Submeters	1

Establish permanently installed meters for at least two water subsystems through the following:

- **Irrigation**: Meter water systems serving at least 80% of the irrigated landscaped area.
- **Indoor plumbing fixtures and fittings**: Meter water systems serving at least 80% of the indoor plumbing fixtures and fittings, either directly or by deducting all other measured water use from the measured total water consumption of the building and grounds.
- **Cooling towers**: Meter replacement water use of all cooling towers serving the facility.
- **Domestic hot water**: Meter water use of at least 80% of the installed domestic hot water heating capacity (including both tanks and on-demand heaters).
- **Reclaimed water**: Meter reclaimed water, regardless of rate. A reclaimed water system with a makeup water connection must also be metered so that the true reclaimed water component can be determined.
- **Other process water**: Meter at least 80% of expected daily water consumption for process end uses, such as humidifiers, dishwashers, clothes washers, and pools.

All meters, including whole-building meters, must be recorded at least weekly and used to regularly analyze time trends. If the building owner, management organization, or tenant owns the meter, it must be calibrated within the manufacturer's recommended interval.

REQUIREMENTS EXPLAINED

This credit encourages projects to develop a metering strategy beyond the requirements of *WEp1: Water Metering and Reporting*. Projects pursuing this credit must permanently install submeters that track water use from at least two water subsystems. Submetering allows facility managers to monitor water consumption at the system level. With transparency into water usage, facility managers can take an active approach to water-saving strategies, leading to decreased demand on the water supply.

Selecting Applicable Subsystems

Identify all water-using subsystems within the project boundary. As applicable to the project, install or use existing submeters for at least two of the following subsystems: irrigation systems, indoor plumbing fixtures and fittings, cooling towers, domestic hot water systems, reclaimed water usage, or other process water systems, including but not limited to commercial kitchen or laundry water use.

For multifamily buildings, submeters for water use in each residential unit comply with credit requirements.

Determine Scope of Submetering

If the project team is claiming credit for irrigation, indoor plumbing fixtures, domestic hot water, or other process water submeters, at least 80% of water distribution must be submetered. If 100% of the water used by a subsystem is metered, no calculation is necessary.

Determine how much of the total water system will be submetered by comparing the submetered portions with the total landscape area, number of indoor fixtures, domestic water heating units, or process use quantities, as follows:

IRRIGATION

Calculate the percentage of irrigated landscape area as the total metered irrigated landscape area divided by the total irrigated landscape area. Landscape areas fully covered with xeriscaping or native vegetation that require no routine irrigation may be excluded from the calculation.

Equation 1. Landscape area

$$(\text{Metered irrigated landscape area}) / (\text{Total irrigated landscape area}) \geq 0.8$$

INDOOR PLUMBING FIXTURES AND FITTINGS

Water closets, urinals, lavatories, breakroom faucets, showerheads, and kitchen faucets must be included within the metered water systems serving at least 80% of the indoor plumbing fixtures and fittings, either directly or by deducting all other measured water use from the measured total water consumption of the building and grounds.

Equation 2. Fixtures

$$\textit{(Number of metered indoor fixtures and fittings)/ (Total number of indoor fixtures)} \geq 0.8$$

DOMESTIC HOT WATER

Domestic hot water heating systems accounted for within the calculations must include both tanks and on demand heaters.

Equation 3. Domestic hot water

$$\textit{(Heating capacity of metered domestic water heating units) / (Total heating capacity of all domestic water heating units} \geq 0.8$$

OTHER PROCESS WATER

Process water systems include, but are not limited to, humidifiers, dishwashers, laundry facilities, and pools, including swimming pools and landscape water features. Each application is unique. Identify project-specific process end-uses applicable to the building, and meter at least 80% of the expected daily water consumption.

Equation 4. Other process water

$$\textit{(Daily metered gallons, or liters, for process-type end uses)/(Total expected daily gallons, or liters, for process-type end uses)} \geq 0.8$$

Meter Equipment and Recording Requirements — All Subsystems

Submeters may be manually read or connected to a building information system. The meters may be equipped with data logging capability independent of a building information system.

Calibrate all project-owned meters per the manufacturer's recommended intervals. Regularly calibrating meters allows for accurate data reporting and analysis.

Record water consumption at least weekly. Compile data into monthly and annual summaries for each subsystem to perform time trend analysis on all water-consuming systems. Regular reviews of the time-trended water data help identify anomalies and allow facility managers to act

quickly on observed inefficiencies. Understanding regular water consumption patterns can lead to immediate resolutions when abnormal water use occurs.

Additional considerations

All reclaimed water use must be metered to meet the credit requirements. If reclaimed water is used in multiple subsystems (e.g., for irrigation, cooling tower makeup water, or process water), deduction calculations may be used for one subsystem. For example, a project uses municipally supplied reclaimed water for irrigation and cooling tower makeup water. The reclaimed water is metered at the building level, with a submeter on the irrigation system. The cooling tower makeup water usage can be calculated by subtracting the irrigation water usage (measured by the submeter) from the total reclaimed water measured at the building level.

If a project uses reclaimed water exclusively for a subsystem and the subsystem is metered, it satisfies the credit requirements for submetering two end uses. For example, if a project meters reclaimed water used solely for irrigation, it meets the credit requirements for submetering irrigation and reclaimed water usage, which counts as two end uses.

Projects with water subsystems metered at the campus level, without individual metering for subsystems within the project boundary, are not eligible for this credit. For example, projects with irrigation metered solely at the campus level, without metering for landscape areas within the project boundary, do not qualify for this credit.

DOCUMENTATION

Project types	Options	Paths	Documentation
All	All	All	Identification of two or more water subsystems that are metered
			Confirmation water meters (including whole-building meters) are recorded at least weekly and used to regularly analyze time trends
			Narrative describing the time trend analysis process and how the information is used at the project
			Confirmation meters are calibrated within the manufacturer's recommended interval if the building owner, management organization, or tenant owns the meter (as applicable)

REFERENCED STANDARDS

- Energy Policy Act (EPAct) of 1992 and as amended (usgbc.org/resources/energy-policy-act-epact-1992-and-amended-1)

ENERGY AND ATMOSPHERE (EA)

OVERVIEW

As of 2025, buildings are responsible for one-third of global energy emissions, with approximately 26% stemming from operational emissions and 7% from embodied emissions related to construction materials and processes.[47] There is immense opportunity for decarbonization in the building industry. Much of that onus lies with existing buildings, which account for 80% of the building stock that will exist in 2050.[48] But unlike new buildings, which can be designed from the start as the low-carbon buildings of the future, some existing buildings were not built with carbon in mind. They can have leaky, poorly insulated envelopes, fuel-fired space heating, and service hot water systems, issues that lead to high carbon emissions over the long term that can be complex and expensive to fix.

Many regions and organizations have identified zero energy and zero carbon goals, seeking to achieve them by 2050 for existing buildings.[49] Businesses and regulatory agencies now frequently prioritize sustainability and resilience as cornerstones of their financial and social continuity planning. Decarbonization is an increasingly central priority for leaders worldwide.[50] Well-operated buildings use less energy, produce fewer emissions, and increase building resilience to withstand disruptions like power outages or extreme weather events.

LEED v5's Energy and Atmosphere (EA) credit category provides paths to support existing buildings in significantly reducing or eliminating emissions, achieving greater energy independence and security, and streamlining operational energy costs.

Decarbonization

LEED v5 focuses on decarbonization, and nearly half of the LEED v5 credits that support decarbonization are found in the EA category. The EA category has been designed to help existing buildings make progress toward lower operational carbon emissions through three core strategies: increasing the carbon literacy of all project teams, rewarding projects that are already achieving benchmarks for low carbon emissions and energy use, and encouraging projects to make carefully considered plans to significantly reduce their emissions over time.

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[47] IEA, "Buildings – Breakthrough Agenda Report 2023 – Analysis – IEA," n.d., www.iea.org/reports/breakthrough-agenda-report-2023/buildings.

[48] Assuming a 1% growth rate.

[49] World Green Building Council, "Every Building on the Planet Must Be 'Net Zero Carbon' by 2050 to Keep Global Warming Below 2°C - New Report - World Green Building Council," March 15, 2022, worldgbc.org/article/every-building-on-the-planet-must-be-net-zero-carbon-by-2050-to-keep-global-warming-below-2c-new-report/.

[50] World Economic Forum, "Alliance of CEO Climate Leaders – Home," n.d., initiatives.weforum.org/alliance-of-ceo-climate-leaders/home.

EAp1: Carbon Projection from Energy Use is a new prerequisite in LEED v5 that aims to increase the carbon literacy of all owners and project teams. This prerequisite will provide a visual prediction of the future carbon emissions of every project in their business-as-usual (BAU) scenario, where the building's operations don't change. This illustration is important because, unlike energy use, which is constant in the no-change scenario, annual carbon emissions will be reduced over time due to the decarbonization of most electric grids. In addition, time does not impact all sources equally: the annual emissions from electricity use will nearly vanish with a fully decarbonized grid while those from onsite combustion will remain unchanged, an essential distinction for approaching neutrality by 2050.

LEED v5 rewards projects that achieve energy and carbon benchmarks. Starting from a baseline of energy efficiency, EA credits pair efficient building systems and management practices (*EAp3: Minimum Energy Performance*, *EAc2: Optimized Energy Performance*, *EAp2: Energy Monitoring and Reporting*). *EAc1: Greenhouse Gas Emissions Reduction Performance* incentivizes renewables and carbon emission reductions, specifically rewarding lowered carbon emissions from onsite combustion.

As buildings, vehicles, and industries transition from on-site combustion to electricity, grid demand will rise. By reducing peak thermal loads, project teams can increase the building's resilience to extreme temperatures and reduce demand on the electrical grid. LEED v5 includes two credits for lowering these loads: *EAc4: Peak Load Reduction Performance* rewarding measured improvements and *EAc6: Peak Load Management* rewarding demand side management and improved envelopes.

Planning for decarbonization is necessary to achieve it. New to LEED v5, *EAc5: Decarbonization and Efficiency Plans* outlines how existing buildings can plan and commit to strategic reductions in greenhouse gas emissions from building energy and refrigerants. Achieving deep reductions cost-effectively requires long-term planning to take advantage of strategic events, such as end-of-life major equipment retirements or refinancing. With this credit, project teams can map out and visualize actionable improvements over time.

LEED incentivizes further industry-leading best practices to reduce greenhouse gas emissions through commissioning, phasing out refrigerants with high global warming potential and reducing leakage (*EAp4: Fundamental Refrigerant Management* and related *EAc3: Enhanced Refrigerant Management Performance*). LEED v5 Platinum projects will demonstrate a high level of energy efficiency, low on-site operational emissions, procure renewable energy, and create a decarbonization plan for further operational emissions reductions.

By capitalizing on planning, technology advancements, and industry expertise, project teams can use the EA prerequisites and credits to create more value for owners, occupants, and communities.

Quality of life

By reducing energy demand and emissions, and using technology to communicate with the grid, buildings can maintain operations and provide an enhanced value to the community they serve. *EAc6: Peak Load Management* and *EAc4: Peak Load Reduction Performance* credits encourage teams to reduce air leakage from the building envelope and mechanical systems while incentivizing energy storage opportunities. These strategies, combined with energy-efficient design and electrified operations, can lead to a more resilient and reliable building.

By reducing energy demand and emissions, buildings support the likelihood of a more stable climate, provide more reliable continuity of operations, and increase the quality of life for occupants and communities.

LEED v5 EA prerequisites and credits provide clear paths to greater efficiency and reduced costs and emissions. These tactics will enhance energy and carbon literacy in the building industries and empower communities to achieve energy and carbon neutrality by 2050.

Impact Area Alignment

☑ Decarbonization

— Quality of Life

— Ecological Conservation and Restoration

Energy and Atmosphere Prerequisite

CARBON PROJECTION FROM ENERGY USE

EAp1

REQUIRED

INTENT

To provide a baseline operational carbon emissions projection from energy use and to increase carbon literacy at the project level and throughout the real estate industry.

REQUIREMENTS

Achievement pathways	Points
Existing Buildings	N/A
Operational Carbon Projection	
AND	
Building Performance Standard Business-as-Usual Projection	

Comply with the following requirements:

Operational Carbon Projection

Using the annual energy use data submitted, the project's current grid data, and the project's location, USGBC will generate a 25-year "business-as-usual" (BAU) projection of the project's carbon emissions, including a comparison with a straight-line reduction.

Provide a high-level estimated end-use breakdown as shown in Table 1.

Table 1. Estimated end use breakdown

End use	Electrical used (Y/N)	Fuel used (Y/N) and type	% of Total electrical use	% of Total fuel use	% of Site energy use
Space heating					
Water heating					
Cooking					
Space cooling					
Lighting					
Plug, process, and other					

AND

Building Performance Standard Business-as-Usual Projection

Projects subject to a carbon-based or energy use intensity (EUI)-based building performance standard (BPS) must create an ordinance-specific 25-year BPS-BAU projection, with an overlay of the BPS caps. For EUI-based BPS, the BPS-BAU must be an energy BAU, and for carbon-based BPS, the BPS-BAU must be a carbon BAU reflecting the electrical carbon coefficients as defined in the ordinance. If applicable, calculate the assessed annual fines or fees that will apply for exceeding the caps, and the cumulative fines or fees over the 25-year period.

The owner or owner's representative must attest that they have reviewed the project's BAU and fee projections.

REQUIREMENTS EXPLAINED

This prerequisite provides the project team with a view of the baseline operational carbon emissions projection from energy use. The prerequisite requires projects subject to certain types of Building Performance Standards (BPS) to gain an understanding of the impact of the project's performance over time in relation to BPS requirements.

These operational carbon projections only include carbon emissions from energy use, not emissions from refrigerants or the embodied carbon emissions due to renovations.
One purpose of these requirements is to help owners and project teams visualize the basic contours of how their carbon emissions will change over time, with emissions from electricity declining to almost nothing over 25 years while the emissions from onsite combustion remain. Another aim is to enable project teams to understand which end-uses are responsible for the long-term emissions from onsite combustion.

The aim of the BPS business-as-usual (BAU), or do-nothing, projection is to enable building owners subject to a BPS to understand their exposure to fees or fines for non-compliance in the BAU scenario.

Operational Carbon Projection

Using one year of data provided by the project team, a carbon projection will be created for the project. Data referenced to create this projection includes the building's gross area, location, and one year of energy data, by energy type. The carbon projection developed is a 25-year "business-as-usual" (BAU) carbon projection that assumes the following:

- The project energy use remains consistent over a 25-year time period.

- Annual CO2 emissions from onsite combustion are fixed over time and equal the sum of the amount of each type of fuel used times its carbon coefficient as provided by the U.S. Environmental Protection Agency.
- The CO2 emissions from electricity are based on the project's local grid and will show a decline over time.
- Emissions are calculated by multiplying the amount of electricity used by the carbon coefficient of its current grid based on the most recently available data. For the U.S., the carbon coefficient is the regional eGRID factor published by the EPA. For Canada, there are the published carbon coefficients per province. For projects elsewhere, the carbon coefficient is from national grid data.
- The carbon coefficient of each grid is calculated to decline by 95% over 25 years in a linear fashion. While this is not strictly true of any specific grid, it is directionally true of electric grids globally, which are rapidly decarbonizing because it has become less expensive to develop new renewable power plants than new fuel-fired plants.
- The BAU carbon projection includes a trendline showing a straight-line reduction to zero over 25 years for reference purposes.

This USGBC operational carbon projection is not based on predictions for specific grids but on the general prediction that grids will substantially decarbonize over the next quarter century, continuing the trends of the last 15 or 20 years. High-level takeaways from this exercise are:

- The project's carbon emissions from electricity will diminish dramatically over 25 years.
- The project's carbon emissions from onsite combustion will remain.
- The project's carbon emissions from electricity are non-zero now and will continue to be significant over the next 10 to 15 years, except for a few very clean grids.

Develop a high-level estimated end-use breakdown

Determine the end-use breakdown for all applicable end-uses in the building, including energy type (electric, fuel), the total percentage of the building's energy consumed by each end-use, and the total percentage of site energy associated with the end-use. When developing these estimates, only a high-level analysis is required. The exercise aims to educate project teams about the end-uses that are driving most of the onsite fuel and electrical use to help project teams better understand what is driving carbon emissions; it is not meant to be used for more detailed processes.

Developing an end-use estimate is a standard engineering exercise in an energy audit. Listed below are ways end-use breakdowns are created, depending on the granularity of the available data and the level of technical resources available to the team.

- **Monthly metered data per energy source**. Where only whole building energy meters are available, teams can analyze annual energy use and use the months with the lowest loads to determine the base load. For example, a project in a region with minimal heating or cooling in the spring would have low heating and cooling usage. Teams can then determine the percentage of load associated with heating and cooling by analyzing the winter and summer month meter data, respectively.
- **ASHRAE Level 1 audit**. Conducting an *ASHRAE* Level 1 Energy Audit allows projects to have a third-party reviewer investigate the building conditions, analyze energy meters, inventory building systems, and develop an end-use breakdown for all project energy sources.
- **End-use summary**. Develop the end-use summary from trend logs for buildings with a comprehensive building automation system (BAS) or an energy information system (EIS).
- **National databases**. Databases that account for climatic differences can be used alone or in conjunction with analyzing the project's monthly metered data. If this method is used, it will be important to correctly assign the project's fuel type for each end-use.
    - Commercial Buildings Energy Consumption Survey (CBECS).[51] CBECS is a national sample survey that collects information on the stock of U.S. commercial buildings, including their energy-related characteristics and energy usage data, in consumption and expenditures.[2] For projects in the U.S., teams can reference the closest building type(s) and extrapolate data from the monthly metered information.
    - ENERGY STAR® Portfolio Manager (ESPM) Data Explorer.[52] Similar to CBECS, ESPM provides a database of energy usage data compiled from projects that have submitted applications to ENERGY STAR®. This option is recommended for teams that are using the ENERGY STAR® score to comply with *EAp3: Minimum Energy Performance.*
- **Energy model outputs**. Teams that can perform a simplified energy simulation or have an existing model from the original design phase efforts can use the simulation's outputs to provide guidance on the expected percentage breakdowns. While the total energy use may not be identical, depending on the accuracy of the model, teams can determine the expected percentage energy use for each category.

While the total energy use may not be identical, depending on the accuracy of the model, teams can determine the expected percentage energy use for each category.

[51] Commercial Buildings Energy Consumption Survey (CBECS. U.S. Energy Information Administration (EIA), n.d.-c, eia.gov/energyexplained/use-of-energy/commercial-buildings.php.

[52] ENEGRY STAR, "ENERGY STAR Portfolio Manager Data Explorer," n.d., energystar.gov/buildings/resources-topic/portfolio-manager-data-explorer.

Building Performance Standard BAU Projection

A BPS is a local ordinance requiring existing buildings to improve energy performance, reduce carbon emissions over time, or face fees or fines. This requirement applies to projects subject to a Building Performance Standard (BPS) targeting EUI or carbon emissions reductions. If the project is not located in a jurisdiction with a BPS or the BPS applicable to the project does not target EUI or carbon emissions reduction, this requirement does not apply.

Unlike the Operational Carbon Projection, which will be generated by USGBC, the BPS BAU Projection must be developed by the project team. Unlike the Operational Carbon Projection, which provides a generic prediction about grid decarbonization, the BPS BAU projection must accurately reflect any carbon coefficients, exemptions, or other relevant requirements that are part of the BPS. This requirement aims to accurately inform building owners of their exposure to fees or fines in the BAU or "do-nothing" scenario, which may be significant. An assessment of the annual fees and 25-year cumulative fees is required.

Owner's attestation

The owner or owner's representative must attest that they have reviewed the project's operational carbon projection and the carbon and fees projections as applicable.

DOCUMENTATION

Project types	Options	Paths	Documentation
Existing Buildings	All	All	Ordinance-specific building-as-usual (BAU) carbon projection showing energy and/or carbon caps applicable to the project, and, if applicable, annual fines for exceeding caps over a 25-year period (for projects subject to a BPS only)
			Confirmation that the building owner or owner's rep has reviewed the carbon projection
			High-level estimated end-use breakdown

REFERENCED STANDARDS

- None

Impact Area Alignment

☑ Decarbonization

— Quality of Life

— Ecological Conservation and Restoration

Energy and Atmosphere Prerequisite

ENERGY MONITORING AND REPORTING

EAp2

REQUIRED

INTENT

To support energy management practices and facilitate identification of ongoing opportunities for energy and greenhouse gas (GHG) emissions savings by tracking and reporting building energy use and demand.

REQUIREMENTS

Achievement pathways	Points
Existing Buildings	N/A
Energy Monitoring	
AND	
Report Energy Data	

Comply with the following requirements:

Energy Monitoring

- Have permanently installed energy meters or submeters that measure total building energy consumption for each energy source (electricity, on-site renewable electricity, natural gas, chilled water, steam, hot water, fuel oil, propane, etc.). Utility-owned meters capable of aggregating total project energy use by energy source are acceptable. Delivered fuels, such as propane, oil, diesel, or wood, must be tracked and reported by delivery date and amount if they are not metered or submetered.
- Calibrate meters within the manufacturer's recommended interval if the project owner or management organization has oversight over the meter.
- Tenant meters may be excluded for up to 10% of the gross building area. When excluded, the associated area shall also be excluded to determine the intensity of energy use or GHG emissions.

Report Energy Data

Report monthly energy use data by energy source for the 12-month reporting period. Following certification, commit to ongoing reporting of monthly energy data on an annual basis.

REQUIREMENTS EXPLAINED

This prerequisite requires metering for each energy source. This includes any utility-provided energy source, like electricity, natural gas, district-chilled water, or district heat. It also includes district energy supplied from a campus plant, such as chilled water, steam, hot water, or electricity. Additionally, meter any on-site renewable electricity used on the project site.

Energy Monitoring

DELIVERED FUEL WITH NO METERS

For projects that have fuel delivered to the site but do not have installed meters, report fuel data based on delivery date and total amount of fuel. This may include propane or oil tanks. Track any wood used onsite and report usage for the reporting period.

NET METERING OF ON-SITE RENEWABLE ELECTRICITY GENERATION

If the building has net-metering for on-site renewable electricity generation, confirm that the net metering utility bills report the total monthly on-site renewable electricity generation and total monthly electricity use (including grid electricity and site-generated electricity). If these are not reported and cannot be derived from the utility bills, the project team must provide additional monthly metering of the renewable generation or the project's total electricity use to track the required data.

EXCLUDED ENERGY USE

The following energy uses may be excluded from reporting total energy use for the project.

Tenant spaces

If tenant energy data is inaccessible to the building owner or facilities manager, this data may be excluded for up to 10% of the project's gross floor area (GFA). Align information on excluded areas with calculations assessing energy use intensities, greenhouse gas emissions intensities, or ENERGY STAR® score documented in ENERGY STAR® Portfolio Manager (ESPM)[53] for the Energy and Atmosphere credit category.

Parking

If energy associated with parking garages or parking lots is separately metered, teams can exclude this energy use. If it is not sub-metered, it is not excluded. For example, ESPM adjusts the score to account for estimated usage based on the size of the parking area and whether it is fully enclosed, partially enclosed, or a surface lot.

[53] Energy Star, "Portfolio Manager," n.d., https://portfoliomanager.energystar.gov/pm/login?testEnv=false.

Electric vehicle chargers
Separately metered energy for Electric Vehicle Service Equipment (EVSE) used to recharge vehicles may be excluded from the total project metered energy use. If it is not sub-metered, ESPM adjusts the score for estimated EVSE usage.

EMERGENCY SUPPORT SYSTEMS

Metering is not required for fuel input to emergency support systems that generate electricity, heating, or cooling upon failure of the primary system in a power outage or extreme temperature event. Emergency support systems are not exempt for locations where power outages commonly occur for more than 200 hours per year.

> **Additional considerations: Optional additional metering**
>
> Additional metering not required for this prerequisite can support achievement of credit compliance for the other EA credits.
>
> - Interval meters capturing peak monthly electric demand or peak thermal heating and demand for the reporting period and a historical baseline year are required to document *EAc4: Peak Load Reduction Performance*.
>
> - Sub-meters that capture energy use from data center spaces, parking garages, or EVSE provide a more accurate benchmark comparison of the project's energy use intensity and greenhouse gas emissions intensity.
>
> - For projects with on-site renewable energy generation, meters that track the monthly portion generated and used on the site inform lower source energy use intensities for on-site renewable usage.
>
> - *EAc7: Commissioning*, Option 2 requires incremental metering and software functionality, building on the requirements in this prerequisite.

Meter calibrations
Meter calibrations are critical to maintaining accuracy in the recorded data. For any installed meter within the facility manager's control, calibrate the devices based on the manufacturer's recommended intervals. This requirement does not apply to utility-provided meters where the utility service provider holds responsibility for meter calibration.

Data recording
Record monthly data for each energy source so that building owners and facility managers can access and use the data to make informed decisions on energy efficiency and carbon emission

reduction strategies. In most cases, recording monthly metered data from utility bills will meet the prerequisite requirements.

Report Energy Data

The data must include 12 months of consecutive energy consumption from each energy source, including on-site renewable energy generation. Projects must also commit to reporting this monthly data on an annual basis following certification.

DATA ACCURACY

Teams must maintain accurate reporting, including an accurate representation of the total energy consumed on site. Automating data collection will allow for efficiencies in reporting and additional quality control and assurance during data entry.

Teams must confirm that all site energy use is accounted for within the reporting period. If the reported energy use includes sub-metered data or renewable energy generated on-site or off-site, review the annual reported site energy use to confirm that this energy is neither double counted nor excluded from total usage except where specifically allowed.

DOCUMENTATION

Project types	Options	Paths	Documentation
Existing Buildings	All	All	Narrative listing the energy meters or submeters, energy sources, and meter configurations measuring the total building energy consumption
			If applicable, tenant gross floor area excluded from monitoring per property type, not to exceed 10% of total gross floor area
			Confirmation meters were calibrated within the manufacturer's recommended interval if the project owner or management organization has oversight over the meter
			Commit to ongoing reporting of monthly energy data on an annual basis following certification
			Method of data sharing
			Documentation with energy consumption values and dates highlighted, verifying all consumption data provided for the 12-month reporting period. Acceptable documentation includes utility bills, data directly imported from the utility or Energy Management Information System (EMIS) to the ENERGY STAR® Portfolio Manager, direct exports from utility providers, in-house meter logs, and BAS data. If providing data directly imported from the utility or EMIS to ENERGY STAR® Portfolio Manager, direct exports from utility providers, in-house meter logs, and BAS data, and indicate the source and type of the documentation.

REFERENCED STANDARDS

- ENERGY STAR® Portfolio Manager (portfoliomanager.energystar.gov/pm/login)

Impact Area Alignment

☑ Decarbonization

— Quality of Life

— Ecological Conservation and Restoration

Energy and Atmosphere Prerequisite

MINIMUM ENERGY PERFORMANCE

EAp3

REQUIRED

INTENT

To promote resilience and reduce the environmental and economic harms of excessive energy use and greenhouse gas emissions by achieving a minimum level of energy efficiency.

REQUIREMENTS

Achievement pathways	Points
Existing Buildings	N/A
Option 1. ENERGY STAR® Score	
OR	
Option 2. Energy Use Intensity Targets	
OR	
Option 3. Performance Relative to Historical Baseline	

Building energy efficiency

- Property types eligible to receive an ENERGY STAR® score in the U.S. and Canada must comply with Option 1.
- Property types eligible to receive an ENERGY STAR® score outside of the U.S. and Canada must comply with either Option 1 or Option 2.
- Property types referenced in Appendix II, Table 1 that are ineligible to receive an ENERGY STAR® score must comply with either Option 2 or Option 3.
- All other property types must comply with Option 3 or review additional guidance/requirements.

Option 1. ENERGY STAR® Score

During the 12-month reporting period, achieve an ENERGY STAR® score of at least 60 using the U.S. Environmental Protection Agency (EPA) ENERGY STAR® Portfolio Manager[54] tool.

To apply Option 1 to projects outside of the U.S. and Canada, consult *ASHRAE Standard 169-2021*, "Climatic Data for Building Design Standards,"[55] and select an ENERGY STAR® Portfolio Manager location in the same climate zone and with similar climate characteristics.

[54] Energy Star, "Portfolio Manager," n.d., https://portfoliomanager.energystar.gov/pm/login?testEnv=false.

[55] ASHRAE, "ASHRAE 169-2021," 2021, https://store.accuristech.com/ashrae/standards/ashrae-169-2021?product_id=2238548.

OR

Option 2. Energy Use Intensity Targets

For the 12-month reporting period, meet the site energy use intensity (EUI) or source EUI targets established for the project's building type(s) and climate zone in Appendix II based on *ASHRAE 100-2024*.

OR

Option 3. Performance Relative to Historical Baseline

For property types not eligible to receive an ENERGY STAR® score, compare the building's total annual site and source energy consumption for the 12-month reporting period with historical baseline site and source energy consumption data from a 12-month reporting period with similar occupancy occurring within eight years before the end of the 12-month reporting period. Demonstrate at least an 8% reduction in either site energy use or source energy use beyond the historical baseline. Historical data may be normalized against the reporting period for weather or operational variables such as occupancy or production throughput.

High-process-load buildings that meet the following criteria demonstrate a 4% reduction in energy use for performance relative to the historical baseline.

- Building activity classification not referenced in Appendix II, Table 1, "Building Category Classifications," or a project narrative demonstrates that the building function is directly linked to heightened energy usage compared to other buildings with the same building activity classification
- Energy use associated with manufacturing or industrial equipment, including equipment used for conveyance of people or objects, uncontrollable loads, life safety requirements, and/or security requirements, contributes at least 50% of the total energy consumption, meaning that at least 50% of the total building energy consumption cannot be modified using standard efficiency/retrofit measures, including:
    - Envelope improvements
    - Internal load reductions to lighting, ENERGY STAR®-eligible equipment, etc.
    - HVAC or domestic hot water (DHW) efficiency upgrades
    - Controls upgrades to HVAC, DHW, or lighting systems

REQUIREMENTS EXPLAINED

This prerequisite requires improved energy performance beyond benchmarks for comparable buildings or beyond past performance for project types with limited benchmarked data available. Projects must select an option that applies to their property type and project location per Table 1.

Table 1. Minimum energy performance option applicability

Located in U.S. or Canada?	Property Type		Applicable option(s)
	Eligible for ENERGY STAR® score 1–100?[1]	*ASHRAE 100-2024* primary building activity?[2]	
Yes	Yes	N/A	Option 1. ENERGY STAR® score
	No	Yes	Option 2. Energy use intensity targets OR Option 3. Performance relative to historical baseline (default 8% threshold; not eligible for the 4% threshold for high process load buildings)
	No	No	Option 3. Performance relative to historical baseline
No	Yes	Yes	Option 1. ENERGY STAR® score OR Option 2. Energy use intensity targets
	Yes	No	Option 1. ENERGY STAR® score
	No	Yes	Option 2. ENERGY STAR® score OR Option 3. Performance relative to historical baseline (default 8% threshold; not eligible for the 4% threshold for high process load buildings)
	No	No	Option 3. Performance relative to historical baseline

NOTE: ENERGY STAR® eligible projects are those with at least 50% of the property's gross floor area (GFA) from a single eligible property type, and at least 75% of the property's GFA from any eligible property type.

NOTE: At least 75% of the GFA must be associated with building activities referenced by *ASHRAE 100-2024* (listed in LEED v5 O+M Appendix II, Table 1) to be eligible to apply Option 2.

Option 1. ENERGY STAR® Score

The ENERGY STAR® score is a 1–100 percentile-based comparison of the building's energy efficiency with that of similar buildings from a national peer group, normalized for occupancy, climate, and other factors. An ENERGY STAR® score of 60, which is required for prerequisite compliance, means the building performs better than 60% of similar buildings. ENERGY STAR® Portfolio Manager (ESPM) performs this comparison using a metric of source energy.

Applicability of Option 1 to LEED Projects

Compliance with Option 1 is mandatory for projects in the U.S. and Canada that are eligible to receive a 1–100 ENERGY STAR® score since ESPM represents the best nationally available energy benchmark for these project applications.

Projects in other locations with property types identified by ESPM as eligible for an ENERGY STAR® score may follow Option 1 or Option 2.

ESPM defines eligibility for a 1–100 ENERGY STAR® score relevant to the project's property type and property use details.[56]

- ESPM requires that at least 50% of the property's gross floor area (GFA) be from a single eligible property type. These encompass many office, retail, warehouse, health care, and lodging applications, and some buildings with specialized functions such as data centers, worship facilities, wastewater treatment plants, or ice/curling rinks. At least 75% of the GFA must be associated with eligible property types to be eligible for an ENERGY STAR® score. Furthermore, the parking garage area cannot exceed the project's gross floor area (GFA).
- Property use details refer to the project area, hours of operation, and other relevant criteria that ensure alignment with the benchmarked data comparison. For example, for most property types, eligibility for an ENERGY STAR® score requires at least 30 hours of weekly building operation.

To determine if the project is eligible for a 1–100 ENERGY STAR® score, refer to the current list of eligible property types and corresponding property use details in ESPM.

COMPUTING AN ENERGY STAR® SCORE

Enter the energy data and property details into ESPM for the reporting period to generate an ENERGY STAR® score. Follow all current ESPM guidance when calculating a score. Confirm the project is tracking all property details required by ESPM for the project's property type(s) at the start of the reporting period to ensure the generation of an ENERGY STAR® score at the end of the reporting period.

Inputs of project location outside the U.S. and Canada

Projects outside the U.S. and Canada must select the weather station that best represents the project's climatic conditions in ESPM to generate an ENERGY STAR® score for the project.[57] If ESPM does not list a weather station for the project's country, select a weather station from a different country. Match both the thermal climate zone and the moisture zone for the project location and selected weather station, referencing *ASHRAE 169 Climatic Data for Building Design Standards*[58] or tools that leverage this climatic data. Thermal climate zones are

[56] ENERGY STAR Portfolio Manager (ESPM), "Eligibility Criteria for the 1–100 ENERGY STAR Score," n.d., www.energystar.gov/buildings/benchmark/understand-metrics/score-criteria.
[57] ENERGY STAR Portfolio Manager (ESPM), "How do I Assign a Weather Station for a Property That is Not Located in the U.S. or Canada?", August 7, 2024, energystar.my.site.com/PortfolioManager/s/article/How-do-I-assign-a-weather-station-for-a-property-that-is-not-located-in-the-United-States-or-Canada-1600088537246.
[58] ASHRAE, "ASHRAE 169-2021," 2021, https://store.accuristech.com/ashrae/standards/ashrae-169-2021?product_id=2238548.

numerically identified in *ASHRAE* 90.1[59] from Zone 0 (extremely hot) to Zone 8 (subarctic). Moisture zones are designated with letters: A (humid), B (dry), or (C) marine.

Projects with vacancy
For the following building types, ESPM requires minimum occupancy averaged across the annual reporting period to be eligible for an ENERGY STAR® score:

- **Office/Bank/Courthouse/Financial Office**. At least 55% occupied, with no more than 45% of gross floor area vacant
- **Hotel**. Annual average totaling at least 60% of hotel rooms occupied daily
- **Multifamily**. At least 80% of residential units leased or sold

District energy for ENERGY STAR® scored buildings
ENERGY STAR® Portfolio Manager (ESPM) includes guidance on inputting meters from purchased district chilled water, hot water, or steam plants.[60] Using ESPM, teams must identify the energy associated with the source on their own meter.

For projects in a campus environment, where the building owner also owns the district energy system, instead of entering district energy meters, projects may prorate the fuel and electricity used to generate thermal energy in the campus plant to the project based on the proportion of district energy consumed by the project. These should be reported as separate electric and fuel meters from the building meters.

Option 2. Energy Use Intensity Targets

Option 2 requires projects to achieve an energy use intensity (EUI) less than EUI targets for the project's building activity and climate. The *ASHRAE 100-2024*, Appendix B EUI targets are similar to an ENERGY STAR® score of 60, requiring lower energy use than 60% of similar buildings.[61] The *ASHRAE 100* EUI targets referenced in Option 2 address many more property types (or building activities) than the ENERGY STAR® score referenced in Option 1. However, *ASHRAE 100* only normalizes for large variations in operating shift hours and does not adjust for other property details like ESPM.

At least 75% of the GFA must be associated with building activities referenced by *ASHRAE 100-2024* to be eligible to apply Option 2.

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[59] ASHRAE, "ASHRAE Standards Addenda, ERRata, and Interpretations," n.d., https://www.ashrae.org/technical-resources/standards-and-guidelines/read-only-versions-of-ashrae-standards.
[60] ENERGY STAR Portfolio Manager (ESPM), "How do I enter energy district steam, district hot water, and/or district chilled water?", April 12, 2023, energystar.my.site.com/PortfolioManager/s/article/How-do-I-enter-district-steam-district-hot-water-and-or-district-chilled-water-1600088551444.
[61] ASHRAE, "ANSI/ASHRAE/IES Standard 100," n.d., https://www.ashrae.org/technical-resources/bookstore/standard-100.

DETERMINING ENERGY USE INTENSITY TARGETS

Teams may comply using a metric of either site energy or source energy.

Site EUI

Site energy use intensity targets for the project's climate zone and building activity are listed in *ASHRAE 100-2024*, Table B-1.

Source EUI

Source energy use intensity targets for the project's climate zone and building activity are calculated using the *ASHRAE 100-2024*, Appendix B site EUI targets for electricity (Table B-3) and natural gas (Table B-4), and source energy conversion factors for electricity and natural gas. The same source energy conversion factors (SEF) are used to determine the project's source EUI and the source EUI targets. Refer to additional guidance on Source Energy Conversion Factors for Options 2 and 3.

Equation 1.

$$Source\ EUI\ Target\ = \left(SEF_{Electricity}\right)\left(Site\ EUI\ Target_{Electricity}\right) + \left(SEF_{NG}\right)\left(Site\ EUI\ Target_{NG}\right)$$

Building activity/type

Select the building activity that most closely aligns with the project's functional use (for example, admin/professional office, a convenience store with gas, or a college/university). Building activities are listed in *ASHRAE 100-2024*, Tables B-1 or LEED v5 O+M Rating System Appendix II, Table 1. More information is provided in *ASHRAE 100-2024*, Appendix M Guidance on Building Type Definitions.[62]

Per *ASHRAE 100-2024*, for mixed-use properties with more than one building activity, calculate a weighted average EUI target based on the gross floor area of each building activity. If the building's primary activity is greater than 75% of the total area, projects may elect to only use the primary building activity to determine the target. Refer to *ASHRAE 100-2024*, Section 7.2.3[63] for further information on EUI determination for projects with multiple building activities.

Operating shift adjustments

An operating shift multiplier (S) from *ASHRAE 100-2024*, Table 7-7[64] is applied to the Energy Use Intensity targets when the project's operating hours vary significantly from the median in the

[62] "ASHRAE Standards Addenda, ERRata, and Interpretations," ASHRAE, ACCESSED March 20, 2025, https://www.ashrae.org/technical-resources/standards-and-guidelines/read-only-versions-of-ashrae-standards.
[63] "ASHRAE Standards Addenda, ERRata, and Interpretations," ASHRAE.
[64] "ASHRAE Standards Addenda, ERRata, and Interpretations," ASHRAE .

referenced dataset used to establish the EUI targets. The multiplier is greater than one for longer operating hours and less than one for shorter operating hours.
For mixed-use buildings, the operating shift multiplier is determined separately for each building activity prior to calculating the weighted average EUI target.

Equation 2. Weighted average EUI target for mixed-use building

$$EUI\_Target = \frac{\sum(GFA \times EUI_{Target} \times S) \; for \; all \; building \; activities}{\sum(GFA) \; for \; all \; building \; activities}$$

Projects with vacancy
At least 70% of the project must be occupied to pursue Option 2. For projects with partial vacancy, refer to *ASHRAE 100-2024*, Section 7.2.4 Energy Use Intensity Targets for Vacant and Partially Vacant Buildings[65] for further guidance.

Option 3. Performance Relative to Historical Baseline

For property types ineligible for an ENERGY STAR® score, teams can prove compliance by comparing the current reporting period to a historical baseline.

HISTORICAL BASELINE

The historical baseline represents a consecutive 12-month period occurring no more than eight years before the end of the current reporting period. At least an 8% reduction, in either site energy use or source energy use, must be demonstrated for compliance with the prerequisite unless the project is a high process load building.

The historical baseline must have similar operational attributes, like quantity of occupants, schedule of operations, and percentage of vacant space. If these are more than 10% higher in the historical reporting period than the current reporting period, teams must select a new historical reporting period that aligns more closely with the current reporting period operations, or provide further justification to support that the differences would not significantly affect project energy use.

Normalization
Teams may opt to normalize historical data against the reporting period for operational variables that affect energy consumption such as weather, production throughput, quantity of major events for an event venue, or addition of new functionality. Justification must be provided for each variable that is normalized. The following resources provide guidance on normalization:

[65] ASHRAE, "ASHRAE Standards Addenda, Errata, and Interpretations," n.d., https://www.ashrae.org/technical-resources/standards-and-guidelines/read-only-versions-of-ashrae-standards.

- ENERGY STAR® Portfolio Manager (ESPM) Technical Reference on Climate and Weather provides guidance on weather normalization that can be applied to some building types that are ineligible for an ENERGY STAR® score.[66]
- *EVO 10000 – 1:2022 International Performance Measurement and Verification Protocol (IPMVP) Compliance for High Process Facilities*.[67]

SOURCE ENERGY

Based on the annual site energy use reported for each energy source, the same source energy conversion factors (SEF) are used to determine source energy use for the current reporting period and for the historical baseline. Refer to additional guidance below on Source Energy Conversion Factors for Options 2 and 3.

HIGH PROCESS LOAD BUILDINGS

Projects with high process loads often have further difficulty improving energy consumption beyond a historical baseline, since these loads cannot be modified using standard efficiency measures. To make prerequisite achievement feasible for property types that do not have benchmark comparisons available through *ESPM* or *ASHRAE 100*, demonstrate at least a 4% reduction in site energy use or source energy use.

Eligibility to apply this lower 4% threshold requires both of the following:

- **Property type not benchmarked**. The project's building type must be different than the *ASRHAE 100-2024* building activities, listed in Appendix II. Alternatively, the project team may provide a narrative demonstrating that the building function is directly linked to heightened energy usage compared to other buildings with the same *ASHRAE 100* building activity classification.
- **Process energy 50% or above**. At least 50% of the project's annual energy use must be from plug and process energy. Include the following in the determination of this total:
  - Receptacle equipment
  - Cooking equipment
  - Refrigeration equipment
  - People conveyance equipment, including elevators, escalators, or moving walkways
  - Object conveyance equipment, including conveyor belts or baggage handling equipment
  - Process heating or process cooling (e.g., for manufacturing processes)

[66] ENERGY STAR, "ESPM, Technical Reference – Climate and Weather," August 2020, https://www.energystar.gov/sites/default/files/tools/Climate_and_Weather_2020_508.pdf.
[67] Efficiency Valuation Organization, "International Performance Measurement and Verification Protocol (IPMVP)," n.d., https://evo-world.org/en/products-services-mainmenu-en/protocols/ipmvp.

- Data center IT equipment and electrical loss component when the project's primary property type is not a data center
- All other process energy used to support a manufacturing, industrial, or commercial activity other than conditioning spaces and maintaining comfort and amenities for the occupants of a building

Manufacturing or industrial facilities, specialty laboratories, stadiums, and airports are examples of building types often classified as high process load buildings.

Source Energy Conversion Factors for Options 2 and 3

The terms "source energy" and "source energy conversion factor" referenced below may be used interchangeably with the corresponding terms "primary energy" and "primary energy factor" (PEF) commonly used in the European Union.

Source energy is defined as the site energy plus the estimated energy consumed or lost in the extraction, processing, and transportation of primary energy forms such as coal, oil, natural gas, biomass, and nuclear fuel; energy consumed in conversion to electricity or thermal energy; and energy consumed or lost in transmission and distribution to the building site.

Source energy conversion factors must be at least one for all electricity and combustible fuel sources.

ELECTRICITY AND FOSSIL FUELS FOR PROJECTS IN THE U.S. AND CANADA

Projects in the U.S. and Canada must use the default source energy conversion factors for fossil fuels and grid-purchased electricity, which are based on the national average site-to-source energy conversion factors for the project location. These factors are not adjustable with custom factors.

ELECTRICITY AND FOSSIL FUELS FOR OTHER PROJECT LOCATIONS

For fossil fuels and grid-purchased electricity, projects in other countries must use either the default U.S. source energy conversion factors or the most recent published national average source energy conversion factors for the project's country, determined consistently with the definition of source energy above. Alternatively, projects in Europe may use the current default factor from the EU directive (1.9 for electricity as of this publication).[68]

[68] Directive (EU) 2023/1791 of the European Parliament and of the Council of September 13, 2023 on energy efficiency and amending Regulation (EU) 2023/955 (recast) (Text with EEA relevance), https://eur-lex.europa.eu/eli/dir/2023/1791/.

OTHER FUELS FOR ALL PROJECT LOCATIONS

For other fuels, such as wood fuels, use the default source energy conversion factors or provide published data supporting the determination of a custom conversion factor, determined consistent with the definition of source energy above.

DISTRICT ENERGY SYSTEMS (DES)

Source energy is typically a more appropriate metric than site energy for projects with district energy systems (DES). District chilled water artificially inflates total estimated site energy consumption compared to the benchmark which is derived using onsite cooling generated from electricity.

When using the source energy metric, projects may use the default factors if default factors were used for electricity and fossil fuel.

Projects may also use published source energy conversion factors (SEF), determined consistently with the definition above if available. These source energy conversion factors must be derived using the same source-to-site factors for electricity ($SEF_{Electricity}$) and natural gas ($SEF_{NaturalGas}$) as those referenced above. When published data is not available, Equations 3 through 5 can be used to derive these site-to-source energy conversion factors.

Equation 3. Source energy conversion factor: Chilled water from water-cooled electric chillers

$$SEF_{CHW(Water-cooled)} = 0.325 \times SEF_{Electricity}$$

Equation 4. Site-to-source conversion factor: Chilled water from air-cooled electric chillers

$$SEF_{CHW(Air-cooled)} = 0.400 \times SEF_{Electricity}$$

Equation 5. Site-to-source conversion factor: District heat from hot water or steam (SEF_{HHW})

$$SEF_{HHW} = 1.2 \times SEF_{NaturalGas}$$

DOCUMENTATION

Project types	Options	Paths	Documentation
All	Option 1	All	ENERGY STAR® score
			ENERGY STAR® Data Verification Checklist with a "For Year Ending" that aligns with the 12-month reporting period
	Options 2 and 3	Projects using custom source energy factors	Published documentation for custom source energy factors
	Option 2	All	Compare the building's site energy use intensity and source energy use intensity (EUI) with the site EUI and source EUI targets established for the project's building type(s) and climate zone in Appendix II based on *ASHRAE 100-2024*.
			For projects in the U.S. and Canada, confirm that the property type is not eligible for an ENERGY STAR® score.
	Option 3	All	The historical baseline site (or source) energy consumption per energy source for a 12-month baseline reporting period with similar occupancy occurring within the past eight years
			Narrative description of selected historical baseline period confirming similar occupancy
			Compare the building's total annual site and source energy consumption for the 12-month reporting period with the historical baseline site and source energy consumption.
			Confirm that the property type is not eligible for an ENERGY STAR® score
			If normalization is applied, documentation or calculations supporting determination of normalized results
High process load projects	Option 3	High process load projects	Confirm the property type is not referenced in Appendix II
			Narrative description and energy load profile justifying that the project meets the *High Process Load Buildings* criteria

REFERENCED STANDARDS

- Free access to ASHRAE 100-2024 (ashrae.org/technical-resources/standards-and-guidelines/read-only-versions-of-ashrae-standards)
- ENERGY STAR® Portfolio Manager (portfoliomanager.energystar.gov/pm/login)
- EVO 10000 – 1:2022 International Performance Measurement and Verification Protocol (IPMVP) (evo-world.org/en/products-services-mainmenu-en/protocols/ipmvp)
- ASHRAE 169 (store.accuristech.com/ashrae/standards/ashrae-169-2021?product_id=2238548)
- ASHRAE 90.1 (ashrae.org/technical-resources/standards-and-guidelines/read-only-versions-of-ashrae-standards)

Impact Area Alignment

☑ Decarbonization

— Quality of Life

— Ecological Conservation and Restoration

Energy and Atmosphere Prerequisite

FUNDAMENTAL REFRIGERANT MANAGEMENT

EAp4

REQUIRED

INTENT

To reduce greenhouse gas emissions from refrigerants by accelerating the phaseout of refrigerants with high global warming potential (GWP) and by reducing refrigerant leakage.

REQUIREMENTS

Achievement pathways	Points
Existing Buildings	N/A
Refrigerant Policy	
AND	
Refrigerant Performance	

Comply with all of the following requirements:

Refrigerant Policy

Provide and implement a refrigerant policy addressing the following:

- Removal of refrigerant-containing equipment. Track the removal of refrigerant-containing equipment and ensure that such equipment and the refrigerants are disposed of properly, as per national and local requirements.
- Refrigerant leakage management. Comply with the current refrigerant leakage management requirements from the U.S. Environmental Protection Agency Section 608, the European Union F-Gas regulation, or relevant national or local requirements.

AND

Refrigerant Performance

Comply with the following requirements for all of the refrigerant-using equipment under the control of the property owner or management during the 12-month reporting period:

- **Refrigerant inventory**: Complete an inventory of all refrigerant-containing equipment, including the type, GWP, amounts of refrigerants contained in each, and the total GWP of all refrigerants.

- **Refrigerant leakage inspection and recharge**: Perform a visual inspection for refrigerant leaks and recharge equipment with leaks detected during inspection.
- **Refrigerant leakage tracking**: For the 12-month reporting period, track and report, by refrigerant type and weight, the project's refrigerant recharge or total procurement of refrigerants, and report the total GWP of the leaked refrigerants. For initial certifications, implement refrigerant tracking for no less than the last three months of the 12-month reporting period and report all recharge occurring during refrigerant leakage inspection and recharge.

REQUIREMENTS EXPLAINED

The prerequisite requires projects to create a refrigerant policy, aimed at tracking all refrigerants within the project boundary and managing leakage from those systems. The prerequisite also requires teams to conduct a full refrigerant inventory and track the performance of each system. Through visual inspections and tracking of refrigerant recharge, teams can effectively mitigate environmental and safety risks associated with exposing occupants to hazard gases.

Refrigerant Policy

All projects are required to implement a refrigerant leakage management policy to avoid ozone depletion for any chlorofluorocarbons (CFCs) in older equipment, and to limit global warming potential from other refrigerants. The policy must address removal of refrigerant-containing equipment and refrigerant leakage management.

REMOVAL OF REFRIGERANT-CONTAINING EQUIPMENT

At equipment end-of-life, the policy must require proper removal or disposal of refrigerants, consistent with standards for the project location. Examples include U.S. EPA regulations (*40 CFR Part 82, Subpart F*)[69] or European Union F-gas regulations, which both require refrigerant recovery and proper disposal:

- **Recovery**. Extract all refrigerant from the equipment, including refrigerant in refrigerant piping. Store in a leak-free container.
- **Disposal options**. Recycle, reclaim, or destroy the recovered refrigerant, as follows:
  - **Recycling**. Clean the refrigerant and reuse it on site, in other equipment owned by the same owner.

[69] National Archives and Records Administration, "Code of Federal Regulations," n.d., https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-82/subpart-F.

- **Reclamation**. Clean the refrigerant for resale. The refrigerant must meet specific purity requirements. Reclamation efforts commonly occur in a dedicated processing facility.
- **Destruction**. Incineration or other technologies break down the refrigerants into less harmful components that will not contribute to ozone depletion or high GWP.

REFRIGERANT LEAKAGE MANAGEMENT

The policy must stipulate compliance with the current refrigerant leakage management requirements from the *U.S. Environmental Protection Agency Section 608*, the *European Union F-Gas regulation*,[70] or relevant national or local requirements. These requirements prohibit venting of refrigerants and include:

- Procedures to limit refrigerant loss when servicing or repairing refrigerant-using equipment
- Leak testing for new refrigerant system installations
- Leakage monitoring for larger HVAC and refrigeration equipment, and reporting and repairing large leaks
- Safe disposal of refrigerants

NO REFRIGERANTS

If the project does not have refrigerant-using equipment, the refrigerant policy must address potential future equipment installations.

Refrigerant Performance

For all refrigerant-using equipment under the control of the property owner or management, teams are required to develop a refrigerant inventory, perform a leakage inspection, recharge equipment that is undercharged due to leakage, and track refrigerant leakage. Projects with no refrigerant-using equipment under the control of the property owner or management have no obligations under this section.

> **Additional considerations**
> If pursuing *EAc3: Enhanced Refrigerant Management Performance*, inventory the equipment under tenant control as well as the equipment under owner and/or facilities manager control.

[70] European Union, "EUR-Lex," n.d., https://eur-lex.europa.eu/eli/reg/2024/573/oj.

REPORTING PERIOD AND TRACKING REQUIREMENTS

The reporting period for this prerequisite is 12 months. For initial LEED v5 O+M: Existing Buildings certification, refrigerant leakage tracking and reporting is only mandatory for the final three months of the reporting period.

> **Additional considerations**
> If pursuing *EAc3: Enhanced Refrigerant Management Performance*, provide leakage tracking and reporting for the full 12-month reporting period.

REFRIGERANT INVENTORY

The refrigerant inventory tracks the total global warming potential (GWP) of equipment in the project. GWP measures the relative contribution of a substance toward heating the atmosphere compared to the same mass of carbon dioxide (CO2). For example, R-410A with a GWP of 2,088 traps 2,088 times more heat in the atmosphere than CO2.

During the 12-month reporting period, complete or update an inventory of all refrigerant-containing equipment in the project boundary owned or controlled by the project owner and/or facilities manager.

Equipment that contains less than 0.5 pounds (225 grams) of refrigerant, such as standard residential refrigerators, can be excluded from the calculations. Table 1 is a sample, non-comprehensive list of equipment that may be present in a project.

Table 1. Refrigerant-containing equipment

Application	Equipment/System type
HVAC, space cooling equipment	Stationary air conditioners and heat pump Chillers Computer room air conditioning (CRAC) units
Service water heaters	Heat pump service water heaters
Retail	Food refrigeration Cold storage
Commercial	Vending machines Ice machines
Industrial process refrigeration	Process chillers Ice rink chillers Other process refrigeration

Data collection

For each piece of equipment, document the refrigerant properties, including type of refrigerant, GWP of refrigerant ($GWP_{REFRIGERANT}$), and refrigerant charge (Rc). When the project includes field-assembled refrigerant piping with long pipe lengths or large pressure drops (e.g., variable refrigerant flow, systems or industrial process equipment), teams must account for additional Rc

per manufacturer's specifications or confirm that the manufacturer's default charge or referenced submittals already account for this additional charge.

Calculate the equipment GWP for each equipment using Equation 1.

Equation 1. $GWP_{EQUIPMENT}$ calculation

$$GWP_{EQUIPMENT} = Rc \times GWP_{REFRIGERANT}$$

The project's total GWP is the sum of the GWPs for all refrigerant-using equipment in the inventory:

Equation 2. GWP_{TOTAL} calculation

$$GWP_{TOTAL} = \sum GWP_{EQUIPMENT}$$

Determine the weighted average GWP for the inventoried equipment by dividing the total GWP by the sum of refrigerant charge for all equipment:

Equation 3. Weighted average GWP calculation

$$Weighted\ Average\ GWP = \frac{GWP_{TOTAL}}{\Sigma Rc}$$

REFRIGERANT LEAKAGE INSPECTION

For inventoried equipment, check for refrigerant leaks in the system. Leak check inspections may leverage electronic leak detectors, data from the building automation system, visual inspections for oil residue on joints or for bubbling from leaks after applying soapy water, audible detection of hissing or bubbling sounds, and/or pressure testing.

REFRIGERANT RECHARGE

All leaks, even minor ones, can cause performance issues with HVAC and refrigeration systems and impact the air quality of the mechanical room and surrounding spaces.

Where refrigerant leakage is observed, teams must recharge equipment and track how much refrigerant was needed to fully recharge the system. Teams can then determine the leakage rate percent using the total recharge amount.

If the leak exceeds the applicable trigger rate within EPA Standard 608, EU F-gas regulations, or other applicable codes, project teams must repair the leak within 30 days or as otherwise indicated in the legislation. For the U.S., a 10% annual leak rate trigger will apply to most large

comfort cooling and other appliances, while larger trigger rates are identified for commercial refrigeration and industrial process refrigeration.[71]
Additional Considerations: Fixing smaller leaks below the trigger rates will further reduce GHG emissions from the equipment and support achievement of *EAc3: Enhanced Refrigerant Management Performance*.

Refrigerant leakage tracking
Track refrigerant leakage for a minimum of three months for initial LEED v5 O+M: Existing Building certifications and at least the 12-month reporting period for recertifications or projects pursuing *EAc3: Enhanced Refrigerant Management Performance*. Tracking must commence no later than the visual leakage inspection for initial certifications. Include the weight of refrigerant added during recharge, the type of refrigerant, and the date and time of recharge.

Calculate the total GWP of all refrigerants used for recharging equipment during the performance period per Equation 4.

Equation 4. Total GWP leaked calculation

$$Total\ GWP\ leaked = \sum_{i=1}^{n} [(GWP)\ x\ (Weight\ of\ refrigerant\ leaked)]_i$$

where:

i = Each refrigerant-using system recharged during the tracking period

GWP = The global warming potential for the refrigerant used in each system

Rc = Refrigerant charge: the amount (lbs or kg) of refrigerant in the system at full charge

Alternatively, for prerequisite compliance only, purchasing records can be used to determine the weight of refrigerant by type procured during the performance period, and approximate total GWP leaked.

DOCUMENTATION

Project types	Options	Paths	Documentation
All	All	All	Confirm that the project has developed and implemented a conforming refrigerant policy
Projects with no refrigerant-containing equipment			Confirm no refrigerant-using equipment under the control of the property owner or management (if applicable)
Projects with refrigerant-containing equipment			Refrigerant inventory with complete list of all refrigerant-containing equipment under the control of the property owner or management. Include the equipment type, refrigerant type, GWP, and refrigerant charge for each piece of equipment
			Total GWP of all refrigerants

[71] U.S. EPA, *Stationary Refrigeration Leak Repair Requirements*, December 15, 2023, www.epa.gov/section608/stationary-refrigeration-leak-repair-requirements.

Project types	Options	Paths	Documentation
			Narrative describing the refrigerant leakage inspection, including confirmation that the leakage inspection has occurred for all equipment under the control of the property owner or management during the reporting period
			Refrigerant leakage tracking with complete list of refrigerant recharge and total procurement of refrigerants, tracked and reported, by refrigerant type and weight
			Total GWP of the leaked refrigerants

REFERENCED STANDARDS

- United States EPA regulations (40 CFR Part 82, Subpart F) (ecfr.gov/current/title-40/chapter-I/subchapter-C/part-82/subpart-F)
- U.S. Environmental Protection Agency Section 608 (epa.gov/section608/section-608-clean-air-act)
- European Union F-Gas regulation (eur-lex.europa.eu/eli/reg/2024/573/oj)

Impact Area Alignment

☑ Decarbonization

— Quality of Life

— Ecological Conservation and Restoration

Energy and Atmosphere Credit

GREENHOUSE GAS EMISSIONS REDUCTION PERFORMANCE

EAc1

1–12 points

INTENT

To reduce environmental and economic harm associated with greenhouse gas (GHG) emissions from building energy use that disproportionately impacts frontline communities.

REQUIREMENTS

Achievement pathways	Points
Existing Buildings	1–12
Option 1. Greenhouse Gas Emissions from On-Site Combustion	1–5
Path 1. *ENERGY STAR® NextGen™* Target	1–5
OR	
Path 2. Historical Baseline Target	1–5
OR	
Path 3. On-Site Combustion Emissions Intensity Target	1–5
AND/OR	
Option 2. Renewable Energy	1–4
AND/OR	
Option 3. Total Greenhouse Gas Emissions from Building Energy Use	1–3
Path 1. Performance Relative to Similar Buildings	1–3
OR	
Path 2. Performance Relative to Historical Baseline	1–3

Option 1. Greenhouse Gas Emissions from On-Site Combustion (1–5 points)

Demonstrate a percentage improvement in on-site combustion emissions below the on-site combustion emissions target based on the project energy data reported in *EAp3: Minimum Energy Performance*. Points are awarded according to Table 1.

Projects that neither use on-site combustion except for emergency support systems (used less than 200 hours per year) nor use district heating automatically achieve five points.

Determine the on-site combustion emissions target using any applicable path.

PATH 1. ENERGY STAR® NEXTGEN™ TARGET (1–5 POINTS)

Determine the target by multiplying the *ENERGY STAR® NextGen™* Direct GHGi target by 1.4.

Reference the ENERGY STAR® Portfolio Manager Technical Reference for *ENERGY STAR® NextGen™* and direct GHGi Targets.[72]

OR

PATH 2. HISTORICAL BASELINE TARGET (1–5 POINTS)

Calculate the total GHG emissions from on-site combustion for the current 12-month reporting period compared to a historical baseline from a 12-month reporting period with similar occupancy occurring within eight years before the end of the 12-month reporting period.

Historical data may be normalized against the reporting period for weather or operational variables such as occupancy or production throughput.

OR

PATH 3. ON-SITE COMBUSTION EMISSIONS INTENSITY TARGET (1–5 POINTS)

Available only to projects using *EAp3: Minimum Energy Performance, Option 2*.

Determine on-site combustion emissions intensity targets for the project's building type(s) and climate zone according to Appendix II.

Table 1. Points for percentage reduction below on-site combustion emissions targets

Points	% reduction below on-site combustion emissions targets
1	20%
2	40%
3	60%
4	80%
5	100%

AND/OR

Option 2. Renewable Energy (1–4 points)

Supply or procure renewable energy meeting the renewable energy criteria below. Points are awarded according to Table 2.

[72] ENERGY STAR, "ENERGY START NextGen™ Direct GHGi Targets," 2024, https://www.energystar.gov/buildings/tools-and-resources/technical-reference-energy-star-nextgen-ghgi-targets.

Points documented for Tier 1, Tier 2, and/or Tier 3 renewable energy may be added together up to a maximum of four points.

Table 2. Points for renewable energy procurement

Points	Tier 1			Tier 2	Tier 3
	Minimum rated capacity*	OR	Percent of annual electric energy use	Percent of annual electric energy use	Percent of annual electric energy use
1	A * 1 W/sq. ft. (A * 10.8 W/sq. m.)	OR	5%	20%	50%
2	A * 2 W/sq. ft. (A * 22.5 W/sq. m.)	OR	10%	40%	100%
3			20%	60%	
4			30%	80%	

*A = the sum of gross floor area of all floors up to the three largest floors.

RENEWABLE ENERGY CLASSIFICATIONS

Tier 1. On-site renewable energy generation or social impact project

The renewable generation equipment may be located:

- On the project site
- On the campus on which a project is located
- On the site of an social impact project, provided that the renewable power system is provided, installed, and commissioned at no cost to the social impact entity; that the ownership of the renewable power system is transferred to the social impact entity; and that the rights to the power provided be given to the social impact entity

Tier 2. New off-site Renewable Electricity

Off-site renewable electricity produced by new generation asset(s):

- Off-site renewable electricity produced by new generation asset(s) initially contracted no more than five years after the asset's commercial operations date

Tier 3. Off-site Renewable Energy

- Off-site renewable electricity that is Green-e® Energy certified or equivalent
- Renewable fuels that are Green-e® Energy certified or equivalent

RENEWABLE ENERGY CRITERIA

Contract Length

Project shall demonstrate a minimum of a three-year contractual commitment that begins no later than the project's reporting period start date. Contract length shall be three years or prorated across three years for shorter contract lengths.

Environmental Attributes

Ownership

All environmental attributes (energy attribute certificates, EACs) or renewable energy certificates, RECs) associated with renewable energy generation must be retired on behalf of the LEED project for the renewable energy procurement to contribute to credit achievement.

Vintage

EACs/RECs credited to the project must be generated no earlier than 18 months before the LEED project's initial submission date.

Location

Tier 2 and Tier 3 renewable assets must be in the same country or region where the LEED project is located.

AND/OR

Option 3. Total Greenhouse Gas Emissions from Building Energy Use (1–3 points)

Demonstrate a percentage improvement in project GHG emissions from building energy use below the total GHG emissions target. Points are awarded according to Table 3.

Calculate the project GHG emissions for the 12-month reporting period using the project energy consumption for each energy source and the project GHG emissions factors for each energy source. Report project electricity use with a GHG emissions factor of zero when the electricity is supplied or offset by Tier 1, on-site renewable energy generation or social impact project, and/or Tier 2, new off-site renewable electricity, documented in Option 2. Renewable Energy.

Calculate GHG emissions targets using one of the following:

PATH 1. PERFORMANCE RELATIVE TO SIMILAR BUILDINGS (1–3 POINTS)

GHG emissions targets shall be calculated based on the site energy use intensity targets for fuel and electricity for the project's building type and climate zone in Appendix II. For all project locations, multiply these targets by the published U.S. Environmental Protection Agency national CO_2 equivalent (CO_2eq) emissions factors for natural gas and electricity from the most recently published year.

OR

PATH 2. PERFORMANCE RELATIVE TO HISTORICAL BASELINE (1–3 POINTS)

Calculate the historical baseline target derived using the site energy data for each building energy source from a 12-month reporting period with similar occupancy occurring within eight years before the end of the 12-month reporting period, and the project GHG emissions factor for each energy source during the historical reference period.

Historical data may be normalized against the reporting period for weather or operational variables such as occupancy or production throughput.

If the project generated on-site renewable energy or procured off-site renewable energy during the historical reporting period, treat this identically to nonrenewable energy for the purposes of calculating the GHG emissions target.

Table 3. Points for percentage reduction below GHG emissions target

Points	% reduction
1	15%
2	30%
3	60%

For all options

District Energy

- Projects with district energy must comply with the requirements of this credit at the district facility or see additional guidance for interpretation of credit requirements.

REQUIREMENTS EXPLAINED

Each option of this credit places a different lens on decarbonization associated with the project's energy use. Option 1. Greenhouse Gas Emissions for On-Site Combustion prioritizes reduction or elimination of on-site combustion, enabling the project to reap the benefits of rapidly decarbonizing electric grids. Option 2. Renewable Energy incentivizes further decarbonization of electricity through renewable supply or procurement. Option 3. Total Greenhouse Gas Emissions from Building Energy Use rewards an overall reduction in greenhouse gas emissions achieved collectively through energy efficiency, electrification, and renewable energy. Projects can combine all options for up to 12 points.

Option 1. Greenhouse Gas Emissions from On-Site Combustion

Full achievement of points for this option requires electrification of all traditionally fuel-powered systems serving the project, such as space heating, service water heating, or cooking. Projects that neither use on-site combustion nor use district heating automatically achieve five points.

Lower point thresholds for demonstrating reduced on-site combustion emissions below a target can be achieved either through electrifying building systems and district heating sources serving the project, or through energy efficiency addressing these systems. Data provided under *EAp3: Minimum Energy Performance* informs credit compliance with this option, often requiring no further data entry to confirm project performance. The on-site combustion emissions target must be derived using one of the applicable paths:

- **Path 1. ENERGY STAR® NextGen™ Target**. All projects with an *ENERGY STAR*® NextGen™ target available can apply Path 1. For projects documenting *EAp3: Minimum Energy Performance* using Option 1. ENERGY STAR® Scores, this is the most streamlined path.
- **Path 2. Historical Baseline Target**. All projects can apply Path 2 to show improvements in on-site combustion emissions compared to a historical baseline target. This requires additional historical data entry for projects that used *EAp3: Minimum Energy Performance,* Option 1. ENERGY STAR® Scores or Option 2. Energy Use Intensity Targets.
- **Path 3. On-site Combustion Emissions Intensity Target**. This path is only available to projects that used *EAp3: Minimum Energy Performance*, Option 2. Energy Use Intensity Targets.

Table 4. Applicable paths for Option 1 greenhouse gas emissions from on-site combustion

Option used for *EAp3: Minimum energy performance*	***ENERGY STAR® NextGen™* target available?**	**Applicable path(s)**
Option 1. ENERGY STAR® Score	Yes	Path 1. *ENERGY STAR® NextGen™* target OR Path 2. Historical baseline target
	No	Path 2. Historical baseline target
Option 2. Energy Use Intensity Targets	Yes	Path 1. *ENERGY STAR® NextGen™* target OR Path 2. Historical baseline target OR Path 3. On-site combustion emissions intensity target
	No	Path 2. Historical baseline target OR Path 3. On-site combustion emissions intensity target
Option 3. Performance Relative to Historical Baseline	No	Path 2. Historical baseline target

PATH 1. ENERGY STAR® NEXTGEN™ TARGET

This path uses *ENERGY STAR® NextGen™* Direct Greenhouse Gas Emissions Intensity (GHG_i) targets as the basis for credit compliance. To apply Path 1, at least 75% of the project's gross floor area must consist of one or more of the property types with *ENERGY STAR® NextGen™* targets available. As of this publication, this includes data centers, hospitals, hotels, K–12 schools, medical office buildings, multifamily housing, offices, retail stores, senior living facilities, supermarkets, and warehouses.[73]

For the purpose of pursuing LEED v5O+M: Existing Buildings, *ENERGY STAR® NextGen™* targets may be used for similar buildings, if applicable. For example, a university classroom building can use the K–12 school entry, or a retail mall can use a retail store. Justification must be provided to support any alternative selections.

Determination of GHG_i Target

The *ENERGY STAR® NextGen™* Direct GHG_i target is calculated in *ENERGY STAR®* Portfolio Manager (ESPM) or Arc, as described in the Technical Reference*: ENERGY STAR® NextGen™* GHGi Targets.

- The target is always at least 0.1 kg CO2e/sq. ft. (1.1 kg CO2e/sq. m.).

[73] ENERGY STAR, "ENERGY START NextGen™ Direct GHGi Targets," 2024, https://www.energystar.gov/buildings/tools-and-resources/technical-reference-energy-star-nextgen-ghgi-targets.

- Simple target equations for each property type account for standard combustion use patterns for the property type and further adjust for annual heating degree days (HDD).

LEED v5 O+M: Existing Buildings multiplies the NextGen™ Direct GHGi target by 1.4 for on-site combustion emissions. The two-point threshold aligns with *ENERGY STAR® NextGen™* target achievement.

Mixed use buildings
For mixed-use buildings that include more than one property type referenced in *ENERGY STAR® NextGen™*, determine the overall target based on the weighted average target determined for the gross floor area associated with each property type. For any property types without an *ENERGY STAR® NextGen™* target available, use either the most similar property type or the primary property type comprising the largest proportion of building gross floor area.

District heating
District heating combustion must be accounted for in determining on-site combustion emissions for LEED, even when excluded under *ENERGY STAR® NextGen™* (see additional guidance below).

PATH 2. HISTORICAL BASELINE TARGET

All projects can use Path 2, which establishes the on-site combustion emissions target based on a historical baseline.

For more information on determining the historical baseline, refer to the guidance from the section entitled Historical Baseline from *EAp3: Minimum Energy Performance*, Option 3. Performance Relative to Historical Baseline. Projects that used *EAp3: Minimum Energy Performance*, Option 3 must use the same historical baseline reporting period for compliance with this Path.

PATH 3. ON-SITE COMBUSTION EMISSIONS INTENSITY TARGET

This path only applies to projects complying with *EAp3: Minimum Energy Performance* using *Option 2. Energy Use Intensity Targets*. For projects in climate zones 0A, 0B, and 1A, the target for this path is zero, meaning that these projects must have zero on-site combustion emissions to earn points using this path.

On-site combustion emission intensity targets for the project's climate zone and building activity are calculated as the product of the *ASHRAE 100-2024*, Appendix B site EUI target for natural

gas (NG) (Table B-4), referenced to U.S. EPA published values, and the operating shift multiplier (S) from *ASHRAE 100-2024*, Table 7-7.[74]

For mixed-use properties with more than one building activity, calculate a weighted average on-site combustion emissions intensity target based on gross floor area and operating shift multiplier of each building activity per Equation 1.

Equation 1.

$$GHGi\_Target = \frac{\sum\left(GFA \times NG\ EUI_{Target} \times GHG\ emissions\ factor_{NG} \times S\right) for\ all\ building\ activities}{\sum(GFA)\ for\ all\ building\ activities}$$

For more information, refer to the guidance from *EAp3: Minimum Energy Performance*, Option 2. Energy Use Intensity Targets.

Calculation of project on-site combustion emissions for all Option 1 paths

For projects where only one fuel is used for on-site combustion, such as natural gas, total annual on-site combustion emissions are equal to the annual fuel consumption, multiplied by the GHG emissions conversion factor for that fuel.

If multiple fuels are used in the project, sum together the total annual on-site combustion emissions for each fuel.

Refer to the additional guidance in *Option 3. Total Greenhouse Gas Emissions from Building Energy Use* below addressing GHG emissions conversion factors for fuels.

District heating systems

For projects supplied with district heating, either refer to District Energy System (DES) compliance paths in the Project Priorities Library or assign the combustion emissions associated with district heating generation to the project.

Use the published district heating combustion emissions factor, if available, when assigning combustion emissions. A default district heating on-site combustion GHG emissions factor of 66.4 kg/MBTU (227 g/kWh) may be used if this information is unavailable. District energy provider information on the fuel energy input per unit of delivered district heat for each nonelectric fuel used in the district plant(s) can also be used in conjunction with the GHG

[74] ASHRAE, "ASHRAE Standards Addenda, Errata, and Interpretations," n.d., https://www.ashrae.org/technical-resources/standards-and-guidelines/read-only-versions-of-ashrae-standards.

emissions factor for each fuel to derive the on-site combustion emissions factor for the district heating.

> **Exclusions for All Option 1 Paths**
> On-site combustion use for the following limited circumstances may be excluded from the total recorded usage to show credit compliance:

Emergency support systems
Metering is not required for fuel input to emergency support systems that generate electricity, heating, or cooling upon failure of the primary system in a power outage or extreme temperature event.

To apply the exemption, the sequence of operations must specifically limit emergency support system operations to emergency events associated with power disruptions or with extreme temperatures falling outside of historical temperature highs and lows for the project location.

Emergency support systems are not exempt for locations where power outages commonly occur for more than 200 hours per year.

Portable equipment
Portable equipment for outdoor cooking amenities or outdoor patio heating may be excluded when limited to less than 200 hours per year. Fuel lines cannot be permanently piped to the equipment.

Special circumstances
Limited on-site combustion may be excluded from the total reported in certain cases, where on-site combustion is integral to system function. Examples include:

- Portable laboratory equipment
- Wood-fired ovens in commercial kitchens fitted with emissions control devices
- Vocational schools using fossil fuels solely for the purpose of training
- Electric incinerators for medical waste
- Fireplaces, hearths, and fire pits exclusively designated to support ceremonial practices (such as those unique to Indigenous cultures or religious practices that require the use of fire)

These special circumstances do not extend more broadly to process equipment except when approved by GBCI on a project-specific basis for systems with very low greenhouse gas emissions.

Option 2. Renewable Energy

This option establishes a three-tier hierarchy for renewable energy, preferentially rewarding renewable energy supply and procurement that has the most direct and long-term impacts on building decarbonization:

- **Tier 1**. On-site renewable energy generation or social impact project
- **Tier 2**. New off-site renewable electricity
- **Tier 3**. Off-site renewable energy

For all three tiers of renewable energy, it is recommended that the project team first confirm that the project will comply with the credit requirements for renewable energy environmental attributes and renewable contract length before proceeding with procurement and/or installation of the renewable energy.

Annual electric use calculations

For each Tier, credit is awarded based on the percentage of annual renewable supply or procurement compared to total annual electric use for the building, as reported in *EAp3: Minimum Energy Performance*.

If the project claims credit for Tier 3 renewable fuels, the numerator includes all annual Tier 3 fuel and electricity procurement, and the denominator includes only project annual electricity use.

RENEWABLE ENERGY CLASSIFICATIONS

Tier 1. On-site Renewable Energy Generation or Social Impact Project

To qualify as a Tier 1 renewable system, the renewable energy must be produced and generated on the project site, on the site of the contiguous campus where the project is located, or on the site of a social impact project.

Eligible Tier 1 renewable resource types

Eligible Tier 1 renewable energy resources include:

- Solar electric (photovoltaic)
- Solar thermal (i.e., for service water heating or hot water heating)
- Wind
- Recovered heat from municipal wastewater

Only usable energy generated from the renewable system shall be considered toward the Tier 1 renewable energy contribution. Usable energy is defined as the output energy from the system

less any transmission and conversion losses, such as standby heat loss, losses when converting electricity from DC to AC, or waste heat that is exhausted to the atmosphere. Excess energy, beyond the building's energy demand at a given point, can be sold to the utility company (net metering) when all associated renewable attributes are retained by the project owner.

> **Additional considerations: Non-qualifying systems**
> Renewable fuels harvested, produced, or refined offsite and used to generate thermal energy or electricity onsite are classified as Tier 3 renewable energy, and shall not be counted as Tier 1 renewable energy.

Tier 1 social impact project

Project owners may opt to install renewable energy on a social impact project site with a capital investment similar to that incurred for installing a new renewable system on their own project site. A social impact project is defined as a building or project site providing housing and/or community services to historically marginalized communities. Examples include but are not limited to affordable housing projects, community centers, schools, or recreational facilities serving historically marginalized communities.

For social impact projects, the project owner who owns, operates, and/or occupies the building shall have no financial burden for the renewable equipment, the installation, or the commissioning of the renewable system. The social impact project owner must gain ownership of the system. They will have the right to power generated from the new system. This provides affordable, clean power that will result in permanent cost savings to members of historically marginalized communities.

For residential social impact projects, residents responsible for paying their electricity bills must receive proportionate cost savings from renewable power generation. Renewable generation may be allocated first to central water heating and HVAC equipment serving the residential units before proportioning the remainder to the residents.

This social impact project contributes toward credit compliance perpetually, regardless of when the transfer of the project was made.

> **Additional considerations: Non-qualifying Tier 1 social impact projects**
> Most community renewable energy installations do not comply with the social impact project requirements for the location of the renewable system and permanent transfer of ownership and rights to the power to the social impact project owner.

Tier 1 methods for demonstrating compliance

To achieve points in Tier 1 on-site renewable energy systems, a project must either install the minimum rated capacity of on-site renewable energy as a function of the project area for the three largest floors or install qualifying renewable energy to generate the specified percent of the project's annual electricity. Projects may quickly calculate compliance using either method and apply the method that leads to the greatest achievement of points.

TIER 1 MINIMUM RATED CAPACITY METHOD FOR DEMONSTRATING COMPLIANCE

The minimum rated capacity method is most appropriate for multi-story building projects or projects with high process loads that cannot supply a significant proportion of building site energy use through on-site renewable energy.

The area (*A*) used to calculate the minimum rated capacity is "the sum of the gross project floor area of all the floors up to the three largest floors." This value refers to the project dimensions, regardless of whether the renewable system is installed on the project site, on the campus, or on the site of a social impact project.

- For projects with three or fewer floors, A is equal to the total gross floor area of the project.
- For multi-story buildings with equal floor plates across all floors, A equals three times the floor plate area.
- For all other projects, A is determined by identifying the three largest floors and summing the area for these three floors.

Use the area (A) to calculate the required minimum rated capacity of renewable energy for up to two points. For solar photovoltaic panels, use the Direct Current (DC) rated capacity, without degrading for system losses.

Table 5.

Points	Minimum Rated Capacity	
	IP Units	SI Units
1	A x 1.0 Watt/sq. ft.	A x 10.8 Watt/sq. m.
2	A x 2.0 Watt/sq. ft.	A x 21.6 Watt/sq. m.

For a building three stories or taller, the minimum required rated capacity corresponds to approximately 20% of gross roof area covered by solar photovoltaics for one point or approximately 40% of gross roof area covered by solar photovoltaics for two points.

Tier 1 percent of annual electricity Method for demonstrating compliance
This method is most appropriate for projects with three or fewer floors and relatively low process loads. Projects must use the percent of annual electricity method when documenting more than two points for Tier 1 renewable energy.

Tier 2: New Off-site Renewable Electricity

Age of the renewable generator marks the key difference between Tier 2 and Tier 3 qualified electricity generation resources. Tier 2 requires new off-site renewable power from generators with a commercial operations date (COD) no more than five years before the execution of the purchase contract.

Older contracts
It is acceptable to use older long-term purchase contracts to comply with the COD requirement, provided that the contract shows the COD for the generators occurred less than five years before the contract was executed, and the allocated energy generation from the contract meets all *Renewable criteria* below. For example, a 20-year purchase contract for newly installed wind power executed ten years ago allocated to the project in accordance with *Renewable criteria* below qualifies as Tier 2 renewable energy.

Tier 3: Off-site Renewable Energy

Tier 3 encompasses renewable electricity that is Green-e® Energy certified or equivalent, and renewable fuels certified to the Green-e® Renewable Fuels standard or equivalent. The Green-e® renewable fuels standard certifies biomethane (also called Renewable Natural Gas, RNG) that meets specific production facility and feedstock criteria and is purified to meet gas pipeline specifications.

For renewable electricity, the Commercial Operations Date of the renewable power generator may be up to 15 years old to meet the Green-e® Energy "Generator Age and New Date" criteria.[75]

Eligible Renewable Electricity Resource Types — Tier 2 and Tier 3
Eligible renewable power generation resources for Tier 2 and Tier 3 electricity include:

- Solar electric (photovoltaics)
- Wind
- Geothermal energy (i.e., electricity or heat generated from subterranean steam or hot water)

[75] Green-e, "Green-e® Renewable Electricity Standard for International Certification," n.d., https://www.green-e.org/docs/energy/international/Green-e%20International%20Standard%20v1.0.pdf.

- Ocean-based energy (e.g., wave or tidal energy conversion)*
- Low-impact hydropower*
- Biomass production*

These renewable electricity generation sources should meet the criteria in *Green-e® Framework for Renewable Energy Certification* Section III. A Renewable Resource Types,[76] including any applicable location-specific criteria (e.g., Section II. Eligible Sources of Supply from the *Green-e® Renewable Energy Standard for Canada and the United States*).[77]

Nearly all solar electric, wind, and geothermal power generation systems that meet the Green-e® "New Date" criteria qualify as Green-e® renewable resource types.

By contrast, many hydropower, biomass power generation, and ocean-based energy systems do not meet the *Green-e® Framework*[78] criteria governing those system types. If considering a renewable resource that is not wind or solar, and is not Green-e® certified, review applicable Green-e® criteria to confirm resource eligibility.

For instance, in the U.S., hydropower must meet one of the following criteria per the *Green-e® Renewable Energy Standard for Canada and the United States*, Section II. Eligible Sources of Supply:

- New generation capacity on a non-impoundment
- New generation capacity on an existing impoundment from a hydropower facility certified by the Low Impact Hydropower Institute (LIHI), or from a hydropower facility consisting of a turbine in a pipeline or in an irrigation canal

Additional considerations: Geoexchange systems ineligible
Geoexchange systems such as geothermal heat pumps that use vapor compression cycles are not considered a renewable energy resource. These systems are credited in *EAc2: Optimize Energy Performance*.

RENEWABLE ENERGY CRITERIA

Contract Length

Projects must retain Energy Attribute Certificates (EACs) for the annual renewable energy generation for a minimum of three years. Contractual documentation must show ownership of

[76] Green-e®, "Green-e® Framework for Renewable Energy Certification, Center for Resource Solutions," 2024, https://www.green-e.org/programs/energy/documents.
[77] Green-e®, "Green-e® Framework for Renewable Energy Certification, Center for Resource Solutions," 2024, https://www.green-e.org/programs/energy/documents.
[78] Green-e®, "Green-e® Framework for Renewable Energy Certification, Center for Resource Solutions," 2024, https://www.green-e.org/programs/energy/documents.

the EACs for the required duration, with the contractual commitment beginning no later than the project's reporting period start date. Examples include a minimum three-year contract for renewable power from:

- **Tier 1**. Third party-owned on-site renewable energy system
- **Tier 2**. Virtual Power Purchase Agreement (VPPA)
- **Tier 3**. Green Tariff

For contract durations shorter than three years, prorate the renewable energy across three years. For a one-time bulk purchase of renewable energy, the annual renewable energy quantity allocated to the project is the total purchase quantity divided by three.

For older contracts, only count the remaining time left per the *vintage* requirements below.

Environmental attributes

When procuring off-site electricity, environmental attributes must meet specific requirements for ownership, vintage, and location.

An *Energy Attribute Certificate* (EAC) is a transferrable certificate, record, or guarantee used to track the environmental attributes for a unit of energy and the rights to those attributes. Examples of EACs include Renewable Energy Certificates (RECs) and Guarantees of Origin (GOs), where one REC or one GO corresponds to one Megawatt-Hour (MWH) of renewable electricity.

> **OWNERSHIP**
>
> Ownership of the renewable energy environmental attributes must reside with the LEED O+M project, demonstrated through retirement of the Energy Attribute Certificates (EACs) on behalf of the LEED project.
>
> If the renewable attributes are not retained by the project owner, the renewable project is disqualified from credit compliance. For example, if the project cedes ownership of the RECs from on-site photovoltaics in exchange for a utility incentive, the system is ineligible for credit.
>
> The renewable energy contract shall not permit replacement of EACs from one project with that of a different renewable energy project (referred to as REC Arbitrage) unless the contract specifies that the replacement EACs meet all relevant LEED criteria. For example, the contract shall not allow replacement of Tier 2 EACs with those of an asset older than five years at the time of contract execution.

VINTAGE

EACs/RECs credited to the project must be generated no earlier than 18 months before the initial submission date or 18 months before they are applied to project energy use, whichever occurs first.

For example, the project must have a history of consistently applying RECS to the project from a 10-year-old bulk purchase to claim credit for the current application.

Similarly, for a 20-year contract with allocation to the project beginning at the start of the reporting period, the allocated power cannot be produced more than 18 months before the start of the reporting period.

LOCATION

For projects in large countries such as the U.S., India, and China, renewable energy must be generated in the same country as the project. For projects in smaller countries such as those in the European Union, renewable energy must be generated in the same multi-country geographical region as the project, provided that these countries share an interconnected electric utility grid or that EACs are unavailable in the project's country.

Green-e® equivalence

Projects not using Green-e® certified products for Tier 3 electricity or fuel must demonstrate equivalency to the Green-e® requirements.

For electricity, the EACs retired on behalf of the LEED project must:

- Be certified under an eco-label or similar program developed by an independent organization or government entity with transparent accounting process and standards in place
- Be from an eligible renewable energy resource (see *Green-e® Framework for Renewable Energy Certification*, Section IIIA, "Renewable Resource Types," and additional regional requirements as applicable, i.e., *Appendix D: Green -e® Renewable Energy Standard for Canada and the United States*, Section II (Eligible Sources of Supply)[79]
- Be from renewable assets that have come online within the last 15 years; or, for projects outside the U.S., the eco-label program may instead include provisions ensuring incremental environmental benefits for assets older than fifteen years
- Have a verifiable chain of custody
- Have a mechanism to prevent double-counting

[79] Green-E, "Documents," n.d., https://www.green-e.org/programs/energy/documents.

For Tier 3 fuel, the EACs retired on behalf of the LEED project must have a mechanism to prevent double counting and meet one of the following criteria:

- Be certified under an eco-label or similar program developed by an independent organization with transparent accounting process and standards in place
- Be officially recognized as a renewable fuel source in the country, province, state, or locality in which the project is located

Option 3. Total Greenhouse Gas Emissions from Building Energy Use

This option rewards projects for achieving a percentage reduction in total greenhouse gas emissions associated with building energy use, calculated using two different pathways. *Path 1. Performance Relative to Similar Buildings* compares the emissions target to a similar building, while *Path 2. Performance Relative to Historical Baseline* compares the target to a historical baseline.

It is recommended that projects pursuing Option 3 analyze the emissions factor from the utility grid and align decarbonization efforts based on the grid context. For example, projects can prioritize electrification on a cleaner grid before installing onsite renewables. On a dirty grid or a grid powered by fossil fuel generation equipment, energy efficiency and renewable energy will have the greatest impact on reducing greenhouse gas (GHG) emissions.

PROJECT TOTAL GHG EMISSIONS DETERMINATION

Project total GHG emissions are calculated based on project annual energy use reported in *EAp3: Minimum Energy Performance*, Tier 1 and Tier 2 renewable energy reported in Option 2. Renewable Energy above, and the greenhouse gas emissions factors for each energy source serving the project.

Project GHG Emissions Factors

Default GHG Emissions factors for each energy source are based on the project's location. These may be adjusted with custom factors in certain instances.

ELECTRICITY

DEFAULT ELECTRICITY GHG EMISSIONS FACTORS

For the U.S., default electricity GHG emissions factors are per eGRID region. For Canada, default electricity GHG emissions factors are per province. European emissions factors come from the European Environment Agency (EEA). Other locations use available Climate Transparency Data.

CUSTOM ELECTRICITY GHG EMISSIONS FACTORS

Projects may use published utility emissions factors from the utility supplier delivering electricity to the project. Non-compliance RECS from the utility or unbundled RECS procured directly for the project shall not be recognized within these custom factors.

TIER 1 AND TIER 2 RENEWABLE ELECTRICITY

Both Tier 1 and Tier 2 renewable electricity have a 0 GHG emissions factor, up to 100% of annual project electricity use. Refer to Option 2 for further details on qualifying renewable energy.

100% electric projects that supply or procure all annual energy use from Tier 1 and/or Tier 2 renewable resources have zero annual GHG emissions.

TIER 3 RENEWABLE ELECTRICITY

Tier 3 systems must use the same emissions factor as the purchased electric grid.

FUELS

FOSSIL FUELS

For fossil fuels, projects in the U.S. and Canada must use the default GHG emissions factors. U.S. defaults are based on the national average. Canadian defaults are per province. These factors are not adjustable with custom factors.

Projects outside the U.S. and Canada may use published GHG emissions factors for their project location or the default values.

OTHER FUELS

For other fuels, like wood, biodiesel, or renewable natural gas, use published national or local GHG emissions factors for the project's location.

DISTRICT ENERGY

Projects may use the default factors if these default factors were used for electricity and fossil fuel. Projects may also use published GHG Emissions factors from the District Energy Providers. When published data is not available, Equations 2–4 can be used to calculate the GHG emissions conversion factors based on the electricity and natural gas emission factors referenced above.

Equation 2. GHG Emissions factor: Chilled water from water-cooled electric chillers

$$GHG\ factor_{CHW(Water-cooled)} = 0.325 \times GHG\ factor_{Electricity}$$

Equation 3. GHG Emissions factor: Chilled water from air-cooled electric chillers

$$GHG\ Factor_{CHW(Air-cooled)} = 0.400 \times GHG\ Factor_{Electricity}$$

Equation 4. GHG emissions factor: District heat from hot water or steam

$$GHG\ factor_{HHW} = 1.2 \times GHG\ factor_{NaturalGas}$$

PATH 1. PERFORMANCE RELATIVE TO SIMILAR BUILDINGS

This path compares the project's total GHG emissions calculated in accordance with the guidance above to those of similar buildings. At least 75% of the project's gross floor area must be associated with building activities referenced by *ASHRAE 100-2024* to be eligible to apply Path 1.

GHG emissions intensity targets

For all project locations, targets are derived using U.S. EPA national average GHG emissions factors for natural gas and electricity, resulting in a single target per building type and climate zone regardless of local grid conditions. This makes *Path 2. Performance Relative to Historical Baseline* achievement easier for projects in clean grid locations recognizing the further challenges for these projects to earn *Option 2. Renewable Energy* due to market penetration of renewable energy.

GHG emissions intensity targets for the project's climate zone and building activity are calculated using the *ASHRAE 100-2024*, Appendix B site EUI targets for electricity (Table B-3) and natural gas (Table B-4) and the U.S. EPA national average GHG emissions factors for natural gas and electricity and multiplying the total by the operating shift adjustment (S).

For mixed-use properties with more than one building activity, calculate a weighted average GHG emissions intensity target based on gross floor area and operating shift multiplier of each building activity.
For more information, refer to the guidance from *EAp3: Minimum Energy Performance*, Option 2. Energy Use Intensity Targets.

Path 2. Performance relative to historical baseline

All projects can use Path 2, which establishes the GHG emissions target based on a historical baseline.

For more information on determining the site energy use per energy source used to calculate the historical baseline, refer to the guidance from the section entitled *Historical Baseline from EAp3: Minimum Energy Performance, Option 3. Performance Relative to Historical Baseline*.

Projects that used EAp3: Minimum Energy Performance, Option 3 must use the same historical baseline reporting period for compliance with this path.

Historical baseline total GHG emissions are calculated based on site energy use per energy source determined in the historical baseline, and the greenhouse gas emissions factors for each energy source serving the project.

Use the same GHG emissions factors for the current year and the historical baseline for fuels. For electricity and district energy, projects may either use the same GHG emissions factor for the current year and the historical baseline or use the GHG emissions factor for the historical baseline year referencing the same data source used for the current reporting period. For example, if using published utility GHG emission factors for the current reporting period, the project may use the GHG emissions from the same utility published for the historical reporting year.

Use grid electricity emission factors for Tier 1 or Tier 2 renewable energy generation occurring during the historical period.

DOCUMENTATION

Project types	Options	Paths	Documentation
Existing Buildings	Option 1	Path 1	Percentage reduction below on-site combustion emissions target by comparing the greenhouse gas intensity (GHGi) for the 12-month reporting period with the *ENERGY STAR® NextGen™* target
		Path 2	Percentage reduction below on-site combustion emissions target by comparing the on-site combustion emissions for the 12-month reporting period with the historic baseline on-site combustion emissions
			If not provided in EAp3: Minimum Energy Performance: historical baseline site energy consumption per energy source for the 12-month baseline reporting period, and a narrative description confirming similar occupancy for the historical baseline, and describing any normalization
			If normalization is applied, documentation or calculations supporting determination of normalized results
		Path 3	Percentage reduction below on-site combustion emissions target by comparing the on-site combustion emissions with the On-Site Combustion Emissions Intensity Targets for the project's building type(s) and climate zone in Appendix II based on *ASHRAE 100-2024*

Project types	Options	Paths	Documentation
		All Paths. Projects with district heating	District heating on-site combustion emissions
Existing Buildings	Option 2	All	Quantity of each tier of renewable energy generation during the reporting period
			Percent of annual electric energy use provided by each Tier of renewable energy
		Projects with shared renewable assets or EACs	Provide confirmation of allocation of EACs/RECs to the project
		Tier 1 on-site renewable systems	Confirmation of renewable attribute ownership with an affirmation by an owner's representative
		Tier 1 3rd party-owned systems	Contract including confirmation of renewable attribute ownership, quantity of renewable energy, duration of contract
		Tier 1 social impact projects	Upload documentation verifying renewable power system is provided, installed, and commissioned at no cost to the social impact entity; the ownership of the renewable power system is transferred to the social impact entity; and the rights to the power provided are given to the social impact entity
		Tier 1 area-based method	Gross conditioned floor area for all floors up to the three largest floors
			Evidence, such as plans or other documentation confirming Tier 1 renewable systems and their rated capacity (DC and AC)
		Tier 2 or Tier 3	Provide a purchase letter or contract of commitment showing renewable energy for targeted point threshold, including confirmation of renewable attribute ownership, quantity of renewable energy, type of renewable energy, duration of contract, country/region, and for Tier 2: commercial operations date (COD).
			Documentation showing Green-e® certified or Green-e® equivalency for any Tier 2 bulk purchases or Tier 3 purchases
	Option 3	Path 1 or 2	Percentage reduction below GHG emissions target by comparing the project GHG emissions for the 12-month reporting period with the chosen GHG emissions target
		Path 1 or 2 Projects with non-default GHG emissions factors	Published documentation for any non-default GHG emissions factors
		Path 2	If normalization is applied, documentation or calculations supporting determination of normalized results

Project types	Options	Paths	Documentation
			If not provided in *EAp3: Minimum Energy Performance* or Option 1 of this credit, historical baseline site energy consumption per energy source for the 12-month baseline reporting period, and a narrative description confirming similar occupancy for the historical baseline and describing any normalization

REFERENCED STANDARDS

- Green-e® Framework for Renewable Energy Certification (green-e.org/programs/energy/documents)

Impact Area Alignment

☑ Decarbonization

— Quality of Life

— Ecological Conservation and Restoration

Energy and Atmosphere Credit

OPTIMIZED ENERGY PERFORMANCE

EAc2

2–12 points

INTENT

To operate buildings that minimize energy use to reduce the environmental damage caused by resource extraction, air pollution, and greenhouse gas emissions and facilitate the transition to a clean energy future.

REQUIREMENTS

Achievement pathways	Points
Existing Buildings	2–12
Option 1. ENERGY STAR® Score	2–12
OR	
Option 2. Energy Use Intensity Targets	2–12
OR	
Option 3. Performance Relative to Historical Baseline	2–12

Refer to *EAp3: Minimum Energy Performance* for requirements associated with each path. No further data entry or calculations are required for this credit.

- Property types eligible to receive an ENERGY STAR® score in the U.S. and Canada must comply with Option 1.
- Property types eligible to receive an ENERGY STAR® score outside of the U.S. and Canada must comply with either Option 1 or Option 2.
- Property types referenced in Appendix II, Table 1, that are ineligible to receive an ENERGY STAR® score must comply with either Option 2 or Option 3.
- All other property types must comply with Option 3 or see additional guidance/requirements.

Option 1. ENERGY STAR® Score (2–12 points)

Points are awarded for ENERGY STAR® scores of 69 or above from the Environmental Protection Agency Portfolio Manager tool, according to Table 1.

Table 1. Points for ENERGY STAR® performance rating (2–12 points)

ENERGY STAR® rating	Points
69	2

ENERGY STAR® rating	Points
71	3
73	4
75	5
77	6
79	7
81	8
83	9
86	10
89	11
92	12

OR

Option 2. Energy Use Intensity Targets (2–12 points)

Points are awarded according to Table 2 based on the building category (Category 1 or Category 2) referenced in Appendix II, and the greater of:

- The percent improvement in project site energy use intensity (EUI) beyond the median site EUI target, OR
- The percent improvement in project source EUI beyond the median source EUI target

Table 2. Points for percentage improvement over EUI target

Category 1 building % improvement	Category 2 building % improvement	Points
8%	6%	2
12%	9%	3
16%	12%	4
20%	15%	5
24%	18%	6
28%	21%	7
32%	24%	8
36%	27%	9
40%	30%	10
44%	33%	11
48%	36%	12

OR

Option 3. Performance Relative to Historical Baseline (2–12 points)

Points are awarded according to Table 3 based on the greater of:

- The percent reduction in normalized site energy use beyond the historical baseline, OR
- The percent reduction in normalized source energy use beyond the historical baseline

Table 3. Points for percentage energy improvement over historical baseline

Percentage reduction	Percentage reduction high process load buildings*	Points
15%	8%	2
18%	10%	3
21%	12%	4
24%	14%	5
27%	16%	6
30%	18%	7
33%	20%	8
36%	22%	9
40%	24%	10
44%	27%	11
48%	30%	12

*High process load buildings applying the lower percentage reduction thresholds must meet all criteria for high process load buildings referenced in *EAp3: Minimum Energy Performance*.

REQUIREMENTS EXPLAINED

This credit rewards projects for exceeding the minimum performance thresholds required by *EAp3: Minimum Energy Performance*. Projects must use the same Option for this credit selected in *EAp3: Minimum Energy Performance*.

Option 1. ENERGY STAR® Score

Projects that use Option 1 must demonstrate that the building scores at least 69 or higher to claim points for the credit.

Option 2. Energy Use Intensity Target

For Option 2, percentage improvement thresholds are dependent on whether the building category is Category 1 or 2, per the *LEED v5 O+M, Appendix II Table 1*. Points are awarded based on the percent improvement over the site energy or source energy use intensity (EUI), whichever results in a greater percentage improvement.

Option 3. Performance Relative to Historical Baseline

For Option 3, projects that meet at least a 15% reduction in either site or source energy use beyond the historical baseline will achieve points for the credit. For projects that met the high process load building eligibility criteria in the prerequisite, teams must show at least an 8% reduction to achieve two points.

DOCUMENTATION

Project types	Options	Paths	Documentation
Existing Buildings	Option 1	All	Documentation provided in EAp3: Minimum Energy Performance
	Option 2	All	
	Option 3	All	

REFERENCED STANDARDS

- None

Impact Area Alignment

☑ Decarbonization

— Quality of Life

— Ecological Conservation and Restoration

Energy and Atmosphere Credit

ENHANCED REFRIGERANT MANAGEMENT PERFORMANCE

EAc3

1–2 points

INTENT

To encourage reduced leakage of older refrigerants with high global warming potential (GWP) and ozone-depleting potential (ODP), and to encourage the installation of equipment using refrigerants with low GWP.

REQUIREMENTS

Achievement pathways	Points
Existing Buildings	1–2
Enhanced Refrigerant Management Performance	1–2

Refrigerant leakage emissions ratio

To calculate the refrigerant leakage emissions ratio, divide the total GWP of the refrigerants leaked during the 12-month reporting period by the total weight of all refrigerants present in the project.

Points are awarded according to Table 1.

Table 1. Refrigerant leakage emissions ratio

Refrigerant leakage emissions ratio	Points
≤ 50	1
≤ 25	2

Projects that neither have refrigerant-using equipment in the project nor receive district thermal energy generated from refrigerant-using equipment automatically achieve the two-point threshold.

Equation 1. Refrigerant leakage emissions ratio

$$Refrigerant\ leakage\ emissions\ ratio = \frac{\sum_{i=1}^{n}[(GWP)\ x\ (Weight\ of\ refrigerant\ leaked)]_i}{\sum_{i=1}^{n}[Rc]_i}$$

where:

- i = Each refrigerant-using system in the project
- GWP = The global warming potential for the refrigerant used in each system
- Rc = Refrigerant charge — the amount (pounds or kilograms) of refrigerant in the system at full charge

REQUIREMENTS EXPLAINED

The credit requires teams to document low refrigerant global warming potential (GWP) vented to the atmosphere during the 12-month reporting period.

No Refrigerants

Projects automatically achieve both points for this credit if they do not have refrigerant-using equipment within the LEED boundary and do not receive energy from a district energy system (DES) that has refrigerant-using equipment.

Refrigerant Leakage Emissions Ratio

The refrigerant leakage emissions ratio encourages teams to properly maintain systems and target a transition to lower GWP refrigerants when equipment replacements are warranted, or new refrigerant-using equipment is installed.

Calculate the refrigerant leakage emissions ratio using Equation 1 from the Rating System. Use the refrigerant inventory and refrigerant leakage tracked for all refrigerant-using equipment in the project, including equipment not under the control of the property owner or management. Follow the guidance in *EAp4: Fundamental Refrigerant Management* to complete the refrigerant inventory and calculate total refrigerant leakage for the 12-month reporting period.

Tenant spaces

If tenant refrigerant data is not accessible to the building owner or facilities manager, this data may be excluded for refrigerant-using systems serving up to 20% of the project's Gross Floor Area (GFA).

Table 1 shows the maximum annual refrigerant leakage rate for refrigerant leakage emissions ratios by refrigerant. It lists common refrigerants and the maximum allowable leakage rate per refrigerant type necessary to fall under the maximum annual refrigerant leakage emissions ratio. If some project refrigerants exceed this leakage rate, other refrigerants must have lower leakage rates to achieve the overall targeted refrigerant leakage emissions ratio.

Table 1. Maximum annual refrigerant leakage rate for refrigerant leakage emissions ratios by refrigerant

Refrigerant name	GWP	Maximum annual refrigerant leakage rate for refrigerant leakage emissions ratio (RLER)	
		RLER ≤ 50 (1 point)	RLER ≤ 25 (2 points)
R-12	10,900	0.5%	0.3%
R-11	4,750	1.1%	0.6%
R-507	3,985	1.3%	0.7%
R-404A	3,922	1.3%	0.7%
R-410A	2,088	2.4%	1.2%
R-22	1,810	2.8%	1.4%
R-407C	1,774	2.9%	1.5%
R-134A	1,430	3.5%	1.8%
R-449A	1,400	3.6%	1.8%
R-470A	909	5.6%	2.8%
R-32	675	7.5%	3.8%
R-513A	630	8.0%	4.0%
R-450A	601	8.4%	4.2%
R-451A	149	33.6%	16.8%
HFO-1234ze(E) (alternative to R-134a)	6	Not limited	Not limited
Solstice™ 1233zd(E)	5	Not limited	Not limited
R-441A	4	Not limited	Not limited
R-290 (Propane)	3	Not limited	Not limited
R-744 (CO2)	1	Not limited	Not limited
R-717 (Ammonia)	0	Not limited	Not limited
R-718 (Water)	0	Not limited	Not limited

The following strategies support the achievement of these rates:

- **Preventative maintenance**. Effective refrigerant management plans include preventative maintenance considerations for all equipment. Regular inspections occurring monthly for larger equipment or quarterly for smaller equipment will increase the chances that minor leaks are corrected early, which leads to lower annual leakage rates.
- **Automatic leak detection**. Using automatic leak detection systems provides facility teams with continuous monitoring of refrigerant-containing equipment. When alarms are triggered, immediate corrective action for repair and refrigerant recharge reduces the refrigerant leakage emissions ratio.
- **Existing equipment service**. Along with routine maintenance, existing equipment requires service per the manufacturer's recommendations. Contracting a licensed

service provider will ensure that annual (or required) services conform to best practices in the industry.

- **Refrigerant replacement**. Where equipment is not past its useful life, projects may consider replacing higher GWP refrigerants with lower GWP refrigerants that have similar thermodynamic properties. For example, for equipment that used R-410A, consider replacing R470A.

Equipment Replacement

As equipment reaches the end of its useful life, decommissioning the systems and disposing of the equipment and refrigerant properly enforce the refrigerant management plan practices. When selecting new equipment, prioritize low GWP refrigerants. Teams are encouraged to use self-contained units for as many systems as possible to minimize higher leakage rates associated with field-installed refrigerant piping.[80]

When prioritizing electrification of fossil fuel-burning equipment with efficient heat pump equipment, include low refrigerant GWP in the equipment selection criteria (see *EAc1: GHG Emissions Reduction Performance, Option 1* and *EAc5: Decarbonization and Efficiency Plans* for further details on electrification).

Refrigerant Leakage Emissions Ratio Calculations and Examples

Example 1. High GWP refrigerants

The project contains 50 VRF units. Each unit contains R-410A and has an initial refrigerant charge (R_c) of three lbs. The project also has an 80-ton chiller. The chiller uses R-22 and has an initial R_c of 160 lbs. During the performance period, five of the VRFs required additional refrigerant, for a total of seven lbs. There were no observed leaks in the chiller and no added refrigerant added.

Using Equation 1, the total refrigerant emissions ratio is 47.1, which achieves one point.

Table 1.

Refrigerant Type	GWP	R_c (lbs)	Equipment Type	# Units	Total Refrigerant (lbs)	Annual Recharge (lbs)	Leakage Rate (%)
R-410A	2088	3	VRF	50	150	7	4.66
R-22	1810	160	Chiller	1	160	0	0

[80] City of Seattle Refrigerant Emissions Analysis, May 5, 2020, www.seattle.gov/documents/Departments/OSE/Building%20Energy/SEA_Refrigerant_Analysis_May2020.pdf.

Equation 1.

$$Refrigerant\ Leakage\ Emissions\ Ratio = \frac{[(2088\ \times 7\ lb) + (1810 \times 0\ lb)]}{(150\ lb + 160\ lb)} = 47.1$$

Example 2. Low GWP refrigerants

The project contains 50 VRF units. Each unit contains R-32 and has a refrigerant charge (R_c) of 3 lbs. The project also has an 80-ton chiller. The chiller uses R-1234$_{ZE}$ and has an initial R_c of 160 lbs. During the performance period, five of the VRFs required additional refrigerant for 10 lbs. A leak was also detected in the chiller and five lbs. of refrigerant was added to the system.

Using Equation 1, the total refrigerant emissions ratio is 21.8, which achieves two points.

Refrigerant type	GWP	R_c (lbs)	Equipment type	# Units	Total refrigerant (lbs)	Annual recharge (lbs)	Leakage rate (%)
R-32	675	3	VRF	50	150	10	6.67
R-1234$_{ZE}$(E)	6	160	Chiller	1	160	5	3.13

$$Refrigerant\ Leakage\ Emissions\ Ratio = \frac{[(675\ \times 10\ lb) + (16 \times 5\ lb)]}{(150\ lb + 160\ lb)} = 21.8$$

District Energy Systems (DES)

Teams can elect to include the refrigerant impacts from the District Energy System (DES) supplying the project when compliance cannot be demonstrated based solely on equipment within the project scope, and required information is available for the DES.

When including DES equipment in the calculations, account for all new and existing equipment containing refrigerant from all district energy sources serving the project. Coordinate with the district energy provider to determine the equipment type, refrigerant type, refrigerant charge, and annual refrigerant leakage.

For projects that also have refrigerant-containing equipment within the building, the weighted average refrigerant leakage emissions ratio must be determined based on the proportion of annual thermal energy delivered from refrigerant-using systems in the DES, and the proportion of annual energy generated from refrigerant-using systems in the building.

EXAMPLE. WEIGHTED AVERAGE REFRIGERANT LEAKAGE EMISSIONS RATIO

- A DES generates 100% of district cooling capacity from refrigerant-using equipment supplying 40% of the project's total annual thermal energy. Refrigerant Leakage Emissions Ratio of 15 is calculated for this equipment.

- The DES generates 50% of district heating capacity from refrigerant-using equipment, supplying 50% of the project's total thermal energy. Refrigerant Leakage Emissions Ratio of 30 is calculated for this equipment.
- The remaining 10% of the project's annual thermal energy is generated from air conditioning on-site. Refrigerant Leakage Emissions Ratio of 51 is calculated for this equipment.
- The building does not have any other refrigerant-using systems.
- 75% of the project's total thermal energy is supplied from refrigerant-using equipment:
  - 75% = (50% x 50%) from DES Heat
  - + (100% x 40%) from DES Cooling
  - + (100% x 10%) from building systems
- Weighted average Refrigerant Leakage Emissions Ratio (RLER) is 24.8, which is less than the maximum threshold of 25 required for 2 points.

$$Weighted\ Average\ RLER\ = \frac{(50\% \times 50\% \times 30) + (100\% \times 40\% \times 15) + (100\% \times 10\% \times 51)}{75\%} = 24.8$$

DOCUMENTATION

Project types	Options	Paths	Documentation
Existing Buildings	All	All projects with refrigerants	Refrigerant leakage emissions ratio
			Attestation that all refrigerant-using equipment in the project is reported in refrigerant inventory and 12-month refrigerant leakage tracking, or narrative identifying allowed exclusions
		(Optional) If DES is included in determination	Weighted average refrigerant leakage emissions ratio
		No refrigerants	Confirm no refrigerant-using equipment is used in the project or in DES equipment serving the project

REFERENCED STANDARDS

- None

Impact Area Alignment

☑ Decarbonization

— Quality of Life

— Ecological Conservation and Restoration

Energy and Atmosphere Credit

PEAK LOAD REDUCTION PERFORMANCE

EAc4

1 point

INTENT

To reduce the stress on the grid from peak loads, reduce greenhouse gas emissions, increase grid reliability, and make energy generation and distribution systems more affordable and more efficient.

REQUIREMENTS

Achievement pathways	Points
Existing Buildings	1
Option 1. Electric Demand Reduction	1
OR	
Option 2. Thermal Demand Reduction	1

Option 1. Electric Demand Reduction (1 point)

Have electric interval meters that measure building electric demand at least hourly. Utility meters with monthly peak electric demand reporting capabilities are acceptable. For a building with multiple electric meters, building peak monthly demand may be determined using either monthly peak coincident demand or the sum of peak monthly demand from each meter. Tenant meters or meters without hourly interval metering capabilities may be excluded for up to 20% of the gross building area.

Report the monthly peak building electric demand for the current 12-month reporting period and for a baseline 12-month reporting period occurring within eight years before the end of the 12-month reporting period. Comparing the current reporting period to the baseline reporting period, demonstrate a 10% reduction in the sum of monthly peak demand for the two months with highest demand. Data may be normalized for equipment electrification.

OR

Option 2. Thermal Demand Reduction (1 point)

Have thermal meters or measurement devices capable of measuring and recording the following for at least 80% of the project's total installed thermal capacity:

- Heating demand, for climate zones 3–8, measure total hourly thermal energy consumed for space heating, service water heating, and process heating.
- Cooling demand, for climate zones 0–5, measure total hourly thermal energy consumed for space cooling and process cooling.

Report the monthly peak hourly heating demand and the monthly peak hourly cooling demand for the current 12-month reporting period and for a baseline 12-month reporting period occurring within eight years before the end of the 12-month reporting period. Comparing the current reporting period to the baseline reporting period, demonstrate a 10% reduction in the sum of the maximum monthly heating demand and the maximum monthly cooling demand.

REQUIREMENTS EXPLAINED

This credit rewards reduced peak demand to limit strain on the electric grid during peak summer and winter operation when grid capacity and associated grid emissions are highest, and to improve the project's resilience.

There are two options for compliance. Projects can demonstrate a 10% reduction in either peak electric demand or peak thermal demand compared to a historical baseline.

All Projects

HOURLY DATA

Hourly data is required for all projects pursuing this credit. For projects pursuing Option 1, monthly electric utility bills that report peak electric demand may be used. Teams that do not have at least 24 months of hourly metered data capturing peak electricity or peak heating and cooling demand are ineligible for this credit.

Use the same meters to report peak demand for the historical baseline and the current reporting period to ensure accuracy in the reported data or provide additional justification on why different meters were used.

HISTORICAL BASELINE

The historical baseline represents a consecutive 12-month period that occurred more than eight years before the end of the reporting period. Projects that used *EAp3: Minimum Energy Performance, Option 3* or *EAc1: Greenhouse Gas Emissions Reduction Performance, Option 3, Path 2* must use the same historical baseline for this credit, unless the project added monitoring functionality to record peak demand after that baseline reporting period started.

EXCLUSIONS FOR ELECTRIC OR THERMAL STORAGE CHARGING

For projects that have on-site electric or thermal storage, the peak period can be selected during a time when these systems are not being charged if the following criteria can be demonstrated for the project.

- **Separate metering**. Systems must be separately metered or be capable of providing an accurate estimate of the conditions for the historical reporting year and current reporting year.
- **Timing of system charge**. Systems cannot be charged during either the peak electric grid demand or the peak electric grid emissions period.

Option 1. Electric Demand Reduction

This option requires a 10% reduction in the sum of monthly peak demand for the two months with highest demand, comparing the current reporting year to the historical baseline reporting period.

EXCLUDED ELECTRIC DEMAND FOR TENANT SPACES OR SPACES WITHOUT HOURLY METERING

If tenant peak demand data is not accessible to the building owner or facilities manager, or hourly metering is not available for some spaces, this data may be excluded for up to 20% of the project's gross floor area (GFA). This encompasses all area excluded from *EAp2: Energy Monitoring and Reporting*. Equipment or amenities serving a significant proportion of the project's occupants such as dedicated outside air systems, elevators, or commercial kitchen equipment in a shared cafeteria space cannot be excluded from hourly metering.

ELECTRIC DEMAND METERING CRITERIA

Types of metered data

To document peak demand, use monthly utility bills that indicate peak demand, power metering from the project's building automation system (BAS), or a stand-alone electricity monitoring system.

Use either hourly peak electric demand or 15-minute peak electric demand consistently for all reported data.

Multiple meters

Buildings that use multiple meters to report monthly peak demand can demonstrate compliance using one of the following approaches:

- **Sum of monthly peak demand**. Collect the monthly peak demand from each meter and sum the values.
- **Monthly peak coincident demand**. Projects that have more detailed data can use the hourly or 15-minute interval demand to determine the peak coincident demand. Analyze the data to determine the hour (or 15-minute interval) when the sum of the peaks is greatest. The building coincident peak demand is calculated by summing the demand from that hour (or interval) for all meters included in the analysis.

Normalization

In some cases, projects may have to normalize the data. Weather normalization is commonly done to ensure external conditions do not impact the energy use comparison. Refer to guidance in *EAp3: Minimum Energy Performance* for further context.

As buildings electrify, normalization for electrification should also be considered for more accurate comparisons. Replacing fossil fuel-using equipment, like boilers and water heaters, with an electric alternative will increase the electric peak demand. In these cases, the biggest increase will be observed in the winter months, especially in climates with large heating requirements.

Option 2. Thermal Demand Reduction

Due to the requirement for hourly thermal metering, Option 2 is best suited for buildings with at least 80% of the project's peak thermal loads supplied by chilled water, hot water, or steam from the project's central plant or a district energy system (DES). This option requires a 10% improvement over the sum of the peak coincident heating demand (usually occurring in the summer) and the peak coincident cooling demand (usually occurring in the winter). Peak coincident thermal demand for heating or cooling refers to the highest one-hour period of energy use supplied to meet the project's heating or cooling loads, respectively. It does not refer to electricity demand.

Thermal demand metering criteria

Metering must be provided for at least 80% of the total combined peak heating and peak cooling thermal load, with exceptions for climate zones described below. For heating, this includes all space heating, service water heating, process heating, and heating for amenities such as pools. For cooling, address any space cooling, data center and computer room cooling, and process cooling.

- For projects in Climate Zones 0–2, metering for heating loads is optional. Metering for cooling loads is required.
- For projects in Climate Zones 3–5, metering for both heating and cooling is required.

- For projects in Climate Zone 6–8, metering for cooling loads is optional. Metering for heating loads is required.

Thermal demand may be directly logged and recorded with energy meters (often referred to as BTU meters) or may leverage data from the project's building automation system (BAS) to calculate the hourly demand based on measured flow rates and water temperature for chilled and hot water.

Multiple heating meters or multiple cooling meters
For projects with multiple meters for either heating or cooling, analyze the metered hourly data for the heating or cooling to determine the hour with peak coincident energy use.

DOCUMENTATION

Project types	Options	Paths	Documentation
Existing Buildings	All	All	Narrative describing the meters or submeters, and the method for determining peak coincident load
			If different than historical performance period in *EAp3: Minimum Energy Performance* or *EAc1: Greenhouse Gas Emissions Reduction Performance*, narrative description confirming similar occupancy for the historical baseline and describing any normalization
			If normalization is applied, documentation or calculations supporting determination of normalized results
	Option 1	All	Provide electric demand for the 12-month reporting period
			Percentage electric demand reduction by comparing the sum of monthly peak demand for the two months with the highest peak demand for the 12-month reporting period with a baseline 12-month reporting period (Equation 1)
		Projects with excluded tenant area	If applicable, meters and associated gross floor area excluded from hourly demand metering. Total combined area excluded for this credit and *EAp2: Energy Monitoring and Reporting* cannot exceed 20% of total project gross floor area
	Option 2	All	Monthly peak hourly heating demand for the 12-month reporting period, and the historical baseline 12-month reporting period (Climate Zones 3–8)
			Monthly peak hourly cooling demand for the 12-month reporting period, and the historical baseline 12-month reporting period (Climate Zones 0–5)
			Percentage reduction in the sum of the monthly peak hourly heating demand and the monthly hourly peak cooling demand for the 12-month reporting period with a baseline 12-month reporting period (Equation 3)

REFERENCED STANDARDS

- None

Impact Area Alignment

☑ Decarbonization

— Quality of Life

— Ecological Conservation and Restoration

Energy and Atmosphere Credit

DECARBONIZATION AND EFFICIENCY PLANS

EAc5

2–4 points

INTENT

To support long-term planning for deep reductions in greenhouse gas emissions from building energy and refrigerants through 2050.

REQUIREMENTS

Achievement pathways	Points
Existing Buildings	2–4
Option 1. Strategic Decarbonization Plan	2–4
OR	
Option 2. Carbon-Neutral and Energy-Efficient	4

Option 1. Strategic Decarbonization Plan (2–4 points)

Create a strategic decarbonization plan (SDP) and commit to a five-year capital plan.
Create an SDP that will deliver deep reductions in carbon emissions from on-site combustion and site energy use within 20 years. Create a five-year capital plan that includes the measures in the SDP to be pursued within the next five years and commit to implementing the capital plan. The following conditions apply:

- All project energy use is included, including tenant energy use.
- On-site combustion emissions include emissions from fuel burned on-site and from nonrenewable fuels burned by district heating systems.
- Carbon emissions from emergency power systems are excluded.
- Energy provided by on-site renewables is not included in site energy.
- Energy used to charge electric vehicles is not included in site energy.
- In developing the SDP and five-year capital plan, projects must complete all process steps listed in Table 3.

Points are awarded according to Table 1 and Table 2.

Table 1. Required reductions for SDPs and five-year plans

Points	SDP on-site combustion emissions reduction	SDP site energy use reduction	Sum of five-year reductions of on-site combustion emissions and site energy use
2	≥ 50%	≥ 20%	≥ 10%
3	≥ 75%	≥ 25%	≥ 10%
4	100%	≥ 30%	≥ 10%

Projects that earn a minimum of seven points in *EAc2: Optimized Energy Performance* or that have process loads that equal 30% or more of their site energy must meet the requirements in Table 2. For the 12-month reporting period, on-site combustion must represent at least 25% of site energy for a project pursuing three or four points in Table 2.

Table 2. Required reductions for SDPs and five-year plans for high-performing projects

Points	SDP on-site combustion emissions reduction	SDP site energy use reduction	Sum of five-year reduction of on-site combustion emissions and site energy use
2	≥ 50%	≥ 10%	≥ 5%
3	≥ 75%	≥ 12%	≥ 5%
4	100%	≥ 15%	≥ 5%

Table 3. Required process for strategic decarbonization plan and five-year capital plan

Phase	Action
Pre-planning	**Create project team:** Include, at least, team leader; owner or owner's representative; energy expert or mechanical, electrical, and plumbing engineer; expert on the building's operations; financial expert and/or asset manager; architect; someone with construction experience; and cost estimator. The team list must include name, company, and expertise.
	Create carbon business as usual (BAU): Basic BAU will be provided by USGBC. Projects subject to building performance standards (BPSs) must create energy and/or carbon BAUs as per *EAp1: Carbon Projection from Energy Use.*
	Create financial BAU: Use estimated costs of energy, cost to replace major equipment in kind, and carbon or energy fees
	Develop inventories: Develop these for equipment and system information, including end of useful life for major equipment.
	Create end-use analysis: Create breakdown of energy use by type and system. Determine the percent of each type of energy used for heating, servicing hot water, cooking, and other process loads.
	Collect energy-related analyses: Include any audits, retro-commissioning reports, and other energy-related analyses that have been performed.
	Create a list of trigger events and a timeline: Include replacement of major equipment or façade elements, refinancing, sunsetting of incentives, asset repositioning, etc.
	Develop conceptual plans: Develop at least two with a rough estimate carbon impact analysis, including at least one that achieves an estimated reduction of on-site combustion emissions > 90%.
Planning	**Conduct a design charette**: This may be in-person, virtual, or hybrid, and should include as many team members as possible. Present materials developed in the pre-

Phase	Action
	planning stage. Discuss conceptual plans, issues that make them unfeasible, how to overcome the obstacles, possible changes to the plans, and other ideas to consider.
	Develop multiple decarbonization options: Building on the charette discussion, develop at least two decarbonization options, one of which must reduce on-site combustion emissions by >90%. Each option must include a narrative and a list of measures, with the timeline and projected impact of each measure on energy and carbon emissions and realistic costs of the decarbonization measures, including architectural, structural, and code costs incurred.
	Create the strategic decarbonization plan (SDP): Develop the SDP the project intends to pursue, which may be a decarbonization option from above, an amendment of either, or a new plan. The plan must include a narrative and a list of measures, with the timeline and projected impact of each measure on energy and carbon emissions, and realistic costs of the decarbonization measures, including architectural, structural, and code costs incurred.
	Create a five-year capital plan: Include SDP measures to be pursued in the next five years. Develop the five-year plan sufficiently for accurate carbon assessments and budgeting. The five-year plan must include a list of measures, with the timeline, cost, and projected impact of each measure on energy and carbon emissions.
Attestation and commitment	**Attestation**: The owner or owner's representative must attest that they have reviewed the SDP and the five-year capital plan.
	Commitment: Provide documentation of the owner's commitment to implement the measures in the five-year plan, with changes limited to minor modifications, more ambitious implementation, or delays outside of the owner's control.

Visualization of plans

From the information provided, USGBC will generate graphs of the carbon and energy trajectories of the SDPs.

OR

Option 2. Carbon-Neutral and Energy-Efficient (4 points)

Demonstrate carbon neutrality and high performance by achieving 12 points in *EAc1: Greenhouse Gas Emissions Reduction Performance* and 12 points in *EAc2: Optimize Energy Performance*.

REQUIREMENTS EXPLAINED

This credit incentivizes teams to develop long-term planning for deep reductions in carbon emissions from energy use in existing buildings. By planning, analyzing, and strategically incorporating deeper measures, projects will progress toward decarbonization.

Option 1. Strategic Decarbonization Planning

The building sector must achieve near-zero carbon emissions by 2050 to stabilize the climate. Existing buildings will be critical to achieving that end as roughly 80% of the buildings that will be in use in 2050 are buildings that already exist today (assuming a rate of new construction of

1%). Consequently, existing buildings must dramatically reduce their greenhouse gas emissions from operations.

However, decarbonizing an existing building is typically complex and expensive. While new buildings can be built efficiently and free from onsite combustion (see EA section of LEED v5 for New Construction, which provides a recipe for the design of ultra-low carbon new buildings), most existing buildings were not built with carbon in mind. They often have leaky, under-insulated envelopes, other inefficient systems, and fuel-fired heating equipment. To achieve an ultra-low-carbon state, existing buildings will have to do much of the following: improve their envelopes, invest in efficiency strategies, and replace at least some of their heat-related systems (space heating and service hot water).

The way to achieve deep decarbonization as cost effectively as possible is to create a “strategic decarbonization plan” (SDP), which lays out a series of decarbonization measures to be undertaken over a long period; this credit uses a 20-year time window. Such a plan coordinates with “trigger events,” events in the life of a building, such as the end of life of existing equipment or refinancing, to bring costs down. The development of such plans will be essential in decarbonizing the building sector; therefore, this credit is more heavily weighted to reflect the importance of decarbonizing existing buildings.

DEVELOPING A STRATEGIC DECARBONIZATION PLAN

This credit outlines a process for the development of an SDP which is divided into a pre-planning and a planning phase.

Pre-planning

The pre-planning phase is the investigation phase and includes the creation of a planning team and the assembling of necessary information about the building and its energy systems. Pre-planning must include:

- The creation of a project team, including a team leader and members with a broad range of expertise, as outlined in the credit. Developing an SDP is not solely an engineering exercise: it requires asset planning, engineering, and architectural expertise.
- Creating a carbon BAU projection for all projects and a Building Performance Standard (BPS) BAU carbon project for projects that are subject to a BPS as addressed in *EAp1: Carbon Projection from Energy Use*
- Creating a financial BAU, including the cost of equipment replacement and anticipated fees due for projects subject to a BPS

- Developing an inventory of systems and equipment, including identifying the estimated end of useful life and replacement costs. The systems inventory will build off the systems identified in *IPp4: Current Facilities Requirements and O+M Plan*.
- Creating an end-use analysis of fuel and electricity. This step in the preplanning process is a requirement under *EAp1: Carbon Projection from Energy Use*.
- Collecting any audits, retro-commissioning reports, and other energy-related analyses that have been performed. Such documents will likely contain useful information to inform the development of the SDP.
- Creating a list of trigger events and timeline. Trigger events could include major equipment replacement or other events such as lease turnover, sun-setting of incentives, or refinancing.
- Develop a minimum of two rough, conceptual plans for how the project could be decarbonized. Such plans must include ballpark estimates of onsite emissions reductions and site energy reductions and could include some estimates of capital costs. It is recommended that these plans be presented at the charrette at the beginning of the planning phase to initiate planning.

In addition to the above requirements, it is recommended that project teams collect examples or case studies of decarbonization plans for similar projects. These can provide ideas and starting points for thinking about what might or might not work for the project.

Planning

The Planning Phase outlines an iterative process with increasing levels of rigor and analysis that must be used to be used in developing an SDP. Such an iterative process allows the team to think broadly at first and then to explore and compare different options that have been more carefully defined and analyzed, eventually deciding on the SDP they will pursue. Planning must include:

- Conducting a design charrette that includes as many team members as possible. Use the charrette to present information collected in the pre-planning phase, discuss conceptual plans, share insights into the implications of these plans, and sketch out a few decarbonization options to be further explored.
- Developing at least two decarbonization options, one of which must reduce on-site combustion by at least 90%. These options must include distinctly different strategies, not the same strategy with a few measures adjusted.
- Developing the SDP that the project team intends to pursue, which may be one of the decarbonization options but could be a new plan that may have developed from one of the options presented.

- Creating a five-year capital plan for the SDP. The plan must include thorough cost estimates of the measures to be implemented in the first five years, an assessment of how the project will be financed, and any incentives that might be available.

Attestation and Commitment

The owner or owner's representative must attest that they have reviewed the SDP, the five-year capital plan, and they must document their commitment to pursuing the capital plan.

Option 2. Carbon-Neutral and Energy-Efficient

Projects that achieve 12 points in *EAc1: Greenhouse Gas Emissions Reduction Performance* and *EAc2: Optimize Energy Performance* will automatically receive four points.

DOCUMENTATION

Project types	Options	Path	Documentation
Existing Buildings	Option 1	All Projects	Provide completed *USGBC Strategic Decarbonization Workbook* or equivalent documentation such as the *U.S. Department of Energy Audit Template LEED EB v5 Report*
	Option 2	All Projects	Achievement demonstrated under *EAc1: Greenhouse Gas Emissions Reduction Performance* and *EAc2: Optimized Energy Performance*

REFERENCED STANDARDS

- None

Impact Area Alignment

☑ Decarbonization

— Quality of Life

— Ecological Conservation and Restoration

Energy and Atmosphere Credit

PEAK LOAD MANAGEMENT

EAc6

1 point

INTENT

To reduce the stress on the grid from peak loads, reduce greenhouse gas emissions, increase grid reliability, and make energy generation and distribution systems more affordable and more efficient.

REQUIREMENTS

Achievement pathways	Points
Existing Buildings	1
Option 1. Demand Side Management	1
Path 1. Demand Response Program Participation	1
OR	
Path 2. Automated Demand Side Management	1
OR	
Option 2. Building Envelope Performance	1
Path 1. Low Air Leakage	1
OR	
Path 2. Reduced Air Leakage Rates	1

Option 1. Demand Side Management (1 point)

Participate in a demand response program and/or provide automated demand side management. For both Path 1 and Path 2, include the demand side management processes in the current facilities requirements and operations and maintenance plan and perform at least one full test of a demand response event or automatic load-shedding event.

On-site electricity generation and fuel combustion cannot be used to meet the demand side management criteria.

PATH 1. DEMAND RESPONSE PROGRAM PARTICIPATION (1 POINT)

During the 12-month reporting period, participate in an existing demand response program with a utility or demand response aggregator.

OR

PATH 2. AUTOMATED DEMAND SIDE MANAGEMENT (1 POINT)

Have in place a control system that automatically sheds 10% of peak electricity demand for a minimum of one hour in response to triggers denoting strain on the grid or high grid emissions. Examples include:

- Data obtained through an API indicating high grid emissions
- Peak demand tariff period, when the grid is operating in the highest demand window
- Time-of-use rate when pricing is highest
- Signal from a demand response aggregator

OR

Option 2. Building Envelope Performance (1 point)

PATH 1. LOW AIR LEAKAGE (1 POINT)

Demonstrate a measured air leakage rate of the building envelope that is less than or equal to the maximum air leakage rates in Table 1 (for Path 1). Air leakage testing must have occurred no later than eight years before the end of the 12-month reporting period.

Table 1. Limits on air leakage rates

Building conditioned floor area (CFA)	Pressure test conditions across the building envelope	Maximum air leakage
≥ 5,000 sq. ft. (465 sq. m.)	At pressure difference of 50 Pascals (0.2 in H_2O)	0.27 cfm/sq. ft. (1.4 L/s*sq. m.)
	At pressure difference of 75 Pascals (0.3 in H_2O)	0.35 cfm/sq. ft. (1.8 L/s*sq. m.)
< 5,000 sq. ft. (465 sq. m.)	At 50 Pascals (0.2 in in H_20)	2.5 ACH
	At 75 Pascals (0.3 in H_2O)	3.4 ACH

NOTE: For projects ≥ 5,000 sq. ft. (465 sq. m.), air leakage is per sq. ft. or sq. m. of building envelope area.

NOTE: Complete air leakage testing using ASTM E779, ANSI/RESNET/ICC 380, ASTM E3158, ASTM E1827, or equivalent.

OR

PATH 2. REDUCED AIR LEAKAGE RATES (1 POINT)

Demonstrate a minimum reduction in air leakage rates of 25% through air leakage testing before and after alterations are implemented. Both air leakage tests must have occurred no later than eight years before the end of the 12-month reporting period.

REQUIREMENTS EXPLAINED

This credit rewards projects that implement solutions to reduce stress on the grid and increase building resilience.

Option 1. Demand-Side Management

Projects that pursue this option must include the selected demand side management process in the *IPp4: Current Facilities Requirements* and *O+M Plan*. Projects must also perform and document one full test of the demand response (DR) or automatic load-shedding event during the 12-month reporting period.

On-site electricity generation and fuel combustion cannot be used to meet the demand-side management criteria. This includes renewable electricity generation, which is separately credited in *EAc1: GHG Emissions Reduction Performance*.

PATH 1. DEMAND RESPONSE PROGRAM PARTICIPATION

Participating with a qualified provider in an established DR program offers a streamlined path to credit compliance. Projects can contract directly with the utility or with a DR program provider. Program participation requires the project to have a contractual obligation or commitment for a specific building response to a demand response event initiated by the DR program provider. Examples include:

- Automatic reduction of demand by a specified percentage in response to a signal
- Automated Demand Response (ADR) controls activated in response to a signal from the DR program provider
- Commitment to reduce demand by a specified amount upon receipt of a request from the DR provider. Commitment does not need to be for every event but should be for a minimum of one event per year if requested.

Contracts

Contracts must be executed and in place for the entire reporting period. Teams should also indicate an intention to renew contracts for future reporting periods.

DR event participation

If at least one DR event occurs during the reporting period, project teams must document evidence of participation and that the building met all contractual obligations. If an event is triggered, and the building does not participate, compliance is not met for this path.

PATH 2. AUTOMATED DEMAND-SIDE MANAGEMENT

Path 2 requires building-level controls that automatically shed at least 10% of peak electricity demand for a minimum of one hour in response to triggers denoting strain on the grid.

Option 2. Building Envelope Performance

This option offers two paths for compliance. Path 1 is the prescriptive approach, where air leakage testing results do not exceed the established thresholds. Path 2 allows buildings to show a 25% reduction in air leakage from baseline testing.

Air leakage testing standards

Testing should conform to one of the referenced standards:

- ASTM defines air leakage testing criteria. *ASTM E779* uses the fan-pressurization method for testing, which is simpler than tracer gas measurements.[81] *ASTM E3158* provides a standard method for testing large or multizone buildings.[82] *ASTM E1827* determines air tightness using an orifice blower door.[83]
- Residential spaces may also apply *ANSI/RESNET/ICC 380*.

PATH 1. LOW AIR LEAKAGE

Projects must conduct an air leakage test no more than eight years before the end of the 12-month reporting period that shows the project's air leakage rates do not exceed those in the Rating System Table 1.

PATH 2. REDUCED AIR LEAKAGE RATES

For older projects that implement measures to improve the project's air barrier or projects whose initial testing did not result in prescriptively meeting the requirements of Path 1, Path 2 offers an approach for showing improvement over the initial, baseline test. This offers owners and facility managers an opportunity to improve the building envelope through repairs or alterations.

For this path, projects are required to perform two tests. The initial test creates the baseline leakage rates. The second test confirms that leakage rates have been reduced due to the envelope improvements. If the leakage rates decrease by a minimum of 25%, projects will achieve compliance with this credit.

Timing for testing

Testing conducted within eight years of the end of the reporting period may be used for this path.

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[81] ASTM, "Standard Test Method for Determining Air Leakage Rate by Fan Pressurization," January 23, 2019, www.astm.org/e0779-19.html.
[82] ASTM, "Standard Test Method for Measuring the Air Leakage Rate of a Large or Multizone Building," n.d., https://www.astm.org/e3158-18.html.
[83] ASTM, "Standard Test Methods for Determining Airtightness of Buildings Using an Orifice Blower Door," n.d., https://www.astm.org/e1827-11r17.html.

DOCUMENTATION

Project types	Options	Paths	Documentation
All	Option 1	All	Confirm the demand side management processes in the current facilities requirements (CFR) and operations and maintenance (O+M) plan
			Confirm at least one full test of a demand response event or automatic load-shedding event during the reporting period
		Path 1	Contract with Demand Response Program Provider, and evidence of participation during the reporting period
		Path 2	Narrative describing control system and how 10% of the load will automatically be shed
	Option 2	All	Test results showing measured air leakage rates (and subsequent test results if pursuing Option 2. Path 2)
			Date(s) of test(s)

REFERENCED STANDARDS

- ASHRAE Grid-Interactive Buildings for Decarbonization: Design and Operation Resource Guide (store.accuristech.com/ashrae/standards/grid-interactive-buildings-for-decarbonization-design-and-operation-resource-guide?product_id=2574822)
- NBI GridOptimal Buildings Initiative (newbuildings.org/resource/gridoptimal)
- ASTM E779 Standard Test Method for Determining Air Leakage Rate by Fan Pressurization (astm.org/e0779-19.html)
- ASTM E3158 Standard Test Method for Measuring the Air Leakage Rate of a Large or Multizone Building (astm.org/e3158-18.html)
- ASTM E1827 Standard Test Methods for Determining Airtightness of Buildings Using an Orifice Blower Door (astm.org/e1827-11r17.html)
- ANSI/RESNET/ICC 380 Standard for Testing Airtightness of Building, Dwelling Unit, and Sleeping Unit Enclosures; Airtightness of Heating and Cooling Air Distribution Systems; and Airflow of Mechanical Ventilation Systems (resnet.us/wp-content/uploads/Std380-2022_Strk-Undrln_blk_wCover_cln5.pdf)

Impact Area Alignment

☑ Decarbonization

— Quality of Life

— Ecological Conservation and Restoration

Energy and Atmosphere Credit

COMMISSIONING

EAc7

1–2 points

INTENT

To use the existing building commissioning process to improve building operations and energy and resource efficiency.

REQUIREMENTS

Achievement pathways	Points
Existing Building	1–2
Option 1. Retro-Commissioning	2
OR	
Option 2. Monitoring-Based Commissioning	1–2
Path 1. Basic MBCx	1
OR	
Path 2. Enhanced MBCx	1

Option 1. Retro-commissioning (2 points)

Complete a retro-commissioning (RCx) process no more than three years before the end of the 12-month reporting period.

Engagement phase

- Engage a third-party retro-commissioning provider (RCxP) with experience on at least two projects of similar type and scale.

Planning phase

- Assemble a project team to include, at a minimum, the RCxP, an owner's representative, and the building operator.
- Develop the owner's objectives for the RCx process.

Assessment phase

- Develop the RCx plan to include owner and tenant requirements, documentation requirements, regulatory requirements, etc.
- Perform a site visit and site assessment, including functional tests.

- Develop a list of retro-commissioning measures (RCMs), identifying all problems to be remedied and the responsible party who will address each measure, timeline and estimated cost, if applicable.
- Develop a rough estimate of predicted energy savings due to RCx.

Implementation phase

- Complete all RCMs except for RCMs that entail significant capital expense, as determined by the owner.

Verification phase

- Verify that RCMs are performing as intended.

Handoff phase

- Finalize the RCx report. Update the current facilities requirements (CFRs) and operations and maintenance (O+M) plan and train the building operator.

OR

Option 2. Monitoring-based Commissioning (1–2 points)

PATH 1. BASIC MBCX (1 POINT)

Implement a monitoring-based commissioning (MBCx) process during the 12-month reporting period with a plan for continuing MBCx for a minimum of three years. Include all of the following:

MBCx plan

Develop an MBCx plan and include it in the CFR and O+M plan. The MBCx plan must describe:

- Roles and responsibilities
- Training of facilities staff
- Software technology description, including frequency and duration of trend monitoring
- Action plan for identifying, prioritizing, and correcting operational errors, and for verifying the correction of operational errors
- Review and report criteria. At least annually, provide a summary report of trends, benchmarks, faults, energy savings opportunities, corrective actions taken, and planned actions to facilities management and/or building ownership

Energy information systems (EIS)

Have in place a remotely accessible platform with software functionality to perform smart analytics and visually present energy consumption and electricity demand data. Tenant energy use and electricity demand may be excluded. Include the following functionality:

- Annual energy benchmarking of energy use intensities
- Comparison of total energy consumption and energy consumption by energy source to the prior interval annually and monthly
- Metering and visualization of electricity, at least hourly, including an hourly “loadshape” and comparison of hourly electricity to the prior interval, and to the same interval of the prior year: annually, monthly, weekly, and daily

Training
Train building facilities staff to use the EIS to proactively inform energy-efficient operations or confirm training occurred within the past six years.

LEED reporting period
During the 12-month reporting period, initiate corrective action addressing anomalies or faults identified, and provide at least one annual MBCx summary report.

OR

PATH 2. ENHANCED MBCX (1 POINT)

Comply with Path 1 AND implement the following enhanced MBCx practices and software capabilities:

MBCx provider (MBCxP)
Contract MBCx services or assign MBCx responsibilities to a qualified staff person with tasks included in their job description. Fully coordinate the MBCx process between the facilities management staff and the MBCxP

Process and communications
The MBCx process must include:

- Expeditious communication of major anomalies or faults identified by the MBCxP to facilities staff.
- At least quarterly, an MBCxP summary of anomalies and faults detected and communication with facilities staff to discuss and prioritize issues.
- For projects with fault detection and diagnostics (FDD), train building facilities staff in the use of FDD to proactively identify and correct building system issues for optimized system operation, or confirm training occurred within the past six years.

Enhanced EIS
Include the following additional functionality:

- Normalization of energy consumption
- Automated reporting of energy use anomalies
- Greenhouse gas emissions reporting
- Hourly metering and visualization of electricity for the following, if applicable:
  - On-site electricity generation
  - HVAC or refrigeration equipment with thermal energy capacity exceeding 900,000 Btu/hr (264 kW, 75 tons), or with rated fan power exceeding 75 hp (56 kW)
  - Electricity use for process equipment with thermal energy capacity exceeding 900,000 Btu/hr (264 kW, 75 tons)
  - Commercial kitchen equipment in spaces with more than 25 kW of rated capacity
  - Process equipment in spaces with more than 25 kW of rated capacity

FDD for projects with large HVAC and refrigeration capacity
For total project installed capacity of either cooling systems, heating systems, or refrigeration systems exceeding 7,200 kBtu/hr (600 tons or 2110 kW), provide a remotely accessible FDD system that addresses at least 60% weighted by capacity of:

- Air-handling equipment AND
- Large hydronic or commercial refrigeration equipment (chillers, boilers, etc.).

The FDD system must include the following functionality:

- Perform smart analytics and visually present FDD data
- Direct link from reported fault to view relevant trend data
- Fault sorting and filtering
- Exporting of fault reports (summary reports and detailed individual faults)
- Data historian capable of storing critical trend data for at least three years

REQUIREMENTS EXPLAINED

The credit rewards projects that provide retro-commissioning (RCx) or implement monitoring-based commissioning (MBCx) in the building operations.

Option 1. Retro-Commissioning

Retro-commissioning (RCx) is an energy performance assessment that ensures systems function as originally intended.

Teams pursuing this option must complete RCx efforts, from the engagement phase through hand-off, for an RCxP process concluding no more than three years before the end of the 12-

month reporting period. Refer to details in the Rating System for specific criteria associated with each phase.

RETRO-COMMISSIONING PROVIDER (RCXP)

During the Engagement Phase, projects must identify a third-party Retro-commissioning Provider (RCxP) who will lead the project team through all aspects of the process. Either an entity or an individual can serve as the RCxP.

The RCxP must have direct experience on at least two similar projects. The previous experience should address buildings of similar types and size ranges, similar types and capacities of HVAC and service water heating equipment, and controls with similar complexity.

Experience documented for an RCxP entity must reflect the team performing the work for the project.

FUNCTIONAL TESTS

For buildings that have undergone an initial commissioning (Cx) effort, confirm if the initial functional and performance tests used during the Cx process can be leveraged for the RCx efforts. For projects new to commissioning, develop functional performance test scripts written specifically for the equipment and systems included in the scope of work.

The RCxP must be on-site at least once to perform a site assessment and participate in functional testing.

Sampling

A sampling strategy for testing similar systems is acceptable for credit compliance. Sampling will only give teams a partial analysis of the building operations. Unlike new construction, the age and condition of each piece of equipment can vary greatly.

RETRO-COMMISSIONING MEASURES (RCMS)

Develop a list of retro-commissioning measures (RCMs) that identify all problems observed during the RCx process. This should identify no or low-cost items, items that have quick paybacks, and capital expenditure projects. Depending on their priorities and available funds, these items may be subjective to each owner. A no or low-cost item to one owner may be classified as an item with a quick payback to another. The RCxP and the owner must develop boundaries for each RCM category before developing the final list.

- **No or low-cost items**. No or low-cost items are issues that can be resolved quickly, with the owner or operator’s staff. Labor efforts are minimal. Necessary parts (if needed) are

usually onsite in the maintenance shop. Programming or control issues can be handled during routine service by the vendor, the building operator, or the RCxP if they are qualified. Examples include fixing broken occupancy sensors for lighting, ensuring HVAC equipment is operating in “AUTO” (to cycle through the occupancy schedule versus always being “ON”), and calibrating sensors to ensure accurate readings are reported to the BAS.

- **Items with quick paybacks**. Items that require labor, parts, and/or hiring a third-party vendor may exceed a no-cost or low-cost threshold. While “quick payback” terms will vary by owner and project, traditionally, these items have a three- to five-year payback. Examples may include performing a test and balance on all air handling units, replacing compact fluorescent lights with LED fixtures, or replacing a fan or a coil on an air handling unit.
- **Capital expenditures**. These items are high-cost measures that will require significant upfront capital and may have a payback of seven years or more. Examples include replacing major air handling equipment or upgrading advanced control systems.

For each RCM, teams must report the expected energy savings, the expected cost to implement, the proposed implementation schedule, and who holds the primary responsibility for leading the completion of those efforts.

By the end of the reporting period, the project owner must implement the no- or low-cost items and items with quick paybacks vetted through the project team during the Assessment Phase. The RCxP must verify that the RCMs were correctly implemented and work as expected, by either re-testing or using trend data to capture energy use and compare the operations to a previous benchmark.

After the conclusion of the RCxP process, the RCxP authors an RCxP report summarizing the RCx process, including the results of the project’s testing efforts, an updated RCM log that identifies implemented items and proposed timelines for capital expenditure projects, and copies of the completed tests or trend data analysis conducted during the assessment phase and the verification phase.

Ensure that the *IPp4: Current Facilities Requirements and O+M Plan* reflects any changes made to building systems or operations during RCx and that the building operator receives training addressing these changes.

Option 2. Monitoring-based Commissioning

Monitoring-based (MBCx) commissioning enables building operators to identify operational issues as they occur, facilitating the achievement of the project's performance goals on an ongoing basis.

Both Paths 1 and 2 require the following:

- Energy Information System (EIS) that enables visualization, analytics, and automated reporting of energy data
- Monitoring and automatic transmission of data to the EIS for energy use under the building owner's or facilities manager's control. Include hourly electricity use and monthly use for each nonelectric source supplied to the project.
- Training for facilities staff empowering them to leverage the EIS to review trends, identify anomalies, perform preventative and predictive maintenance, and identify opportunities to decrease energy consumption and greenhouse gas (GHG) emissions. Provide retraining if initial training occurred more than six years before the start of the reporting period.
- Development and implementation of an MBCx plan extending at least three years past the end of the 12-month reporting period. Include the plan in *IPp4: Current Facilities Requirements* and *O+M Plan*. By the end of the 12-month reporting period, the project team must initiate corrective action to address identified anomalies and complete at least one MBCx summary report.

PATH 2. ENHANCED MBCX

In addition to meeting the requirements for Path 1, Path 2 requires projects to provide enhanced MBCx practices and software capabilities.

MBCx provider

Contract with a third-party MBCx Provider (MBCxP) or designate a qualified MBCxP on the building operations team. The MBCxP must have direct experience with similar projects. Many MBCxP providers have a programming or controls integration background and extensive experience with EIS and Fault Detection and Diagnostics (FDD) technologies. The MBCx plan and contract or corporate program must include the required level of communication and reporting between the MBCxP and the facilities staff referenced in the Rating System.
Fault Detection and Diagnostics (FDD) for Projects with Large HVAC or Refrigeration Capacity
FDD Software is only required for project scope with a total capacity of equipment exceeding any of the following values:

- **Cooling**. 7,200 kBtu/h (600 tons or 2110 kW)

- **Heating**. 7,200 kBtu/h (2110 kW)
- **Refrigeration**. 7,200 kBtu/h (600 tons or 2110 kW)

FDD is a program procedure for identifying and isolating operational flaws in a system. FDD uses data-driven or knowledge-driven techniques. Data-driven techniques include artificial intelligence (AI) and machine learning. Knowledge-driven techniques include having an FDD specialist use qualitative methods to analyze fault scenarios.[84] Refer to the credit language for minimum required FDD software functionality.

Include fault detection algorithms that address at least 60% of the total air handling unit capacity. Additionally, include fault detection algorithms that address at least 60% of the total combined capacity for large commercial refrigeration systems, large hydronic heating systems, and large hydronic cooling systems, where a large system is defined as a system with a total installed capacity exceeding 7,200 kBtu/h (600 tons or 2110 kW).

Faults assessed may include improper economizer or energy recovery operation, faulty sensor readings, improper valve and damper operation, improper equipment schedules, improper operation of control system reset algorithms (e.g., setpoint always at maximum value), non-optimal zone temperature setpoints (e.g., lower than recommended deadband; same values for occupied and unoccupied setpoints), equipment short cycling, improper chiller and boiler plant lockouts, and unstable/hunting control loop.

[84] M. Mirnaghi and F. Haghighat, "Fault Detection and Diagnosis of Large-scale HVAC Systems in Buildings Using Data-driven methods: A Comprehensive Review," *Energy and Buildings* 229 (2020), https://doi.org/10.1016/j.enbuild.2020.110492.

DOCUMENTATION

Project types	Options	Path	Documentation
Existing Buildings	Option 1	All	Documentation of third-party retro-commissioning provider (RCxP) provider qualifications
			Summary of retro-commissioning (RCx) activities and RCx Plan
			RCx Final report
			Confirm Current Facilities Requirements (CFR) and Operations and Maintenance (O+M) Plan was updated and the building operator was trained
	Option 2	Paths 1 and 2	MBCx Plan including all required elements
			Confirm training on EIS System for facility managers
			Annual MBCx summary report. Report must confirm initiation of corrective action during reporting period to address anomalies or faults
		Path 2	Evidence of Commitment or contract with third-party MBCx provider or qualifications of MBCx provider on the building operations team
			If applicable, confirm FDD training occurred within the past six years

REFERENCED STANDARDS

- None

MATERIALS AND RESOURCES (MR)

OVERVIEW

The Materials and Resources (MR) category encourages projects to prevent waste and avoid sending materials from building operations and maintenance to landfills or incineration. This approach shifts projects toward a circular model that treats waste as a resource. By consistently tracking and reporting waste streams, projects can gain a clearer understanding of their material consumption. This allows for intentional design of operations to keep materials in use as long as possible, thereby reducing environmental harm and preserving valuable resources.

The goal is to help projects dramatically cut operational waste and work toward zero waste to landfills, incineration, and the environment. High-performing projects are prepared to go even further by pursuing GBCI's TRUE Certification, a complementary system to LEED that requires 90% or more waste diversion while instituting best practices for tracking and measuring success. By rethinking processes to ensure all resources are valued for their highest and best use, projects can significantly reduce greenhouse gas emissions from landfill and incineration while supporting a circular economy.

The MR category highlights the potential of composting, or organics recycling, to reduce waste (*MRc2: Waste Reduction Strategies*) and cut emissions. In 2016, waste management and disposal produced 1.6 billion tons of emissions, accounting for 5% of global emissions.[85] Food waste alone contributed nearly 50%. Recognizing the value of organics diversion, states like Massachusetts have implemented laws to reduce commercial organic waste through composting, resulting in a 25.7% decrease in emissions per ton of disposal, diverting 380,000 tons of food waste and avoiding 3,300 tons of methane emissions annually.[86]

The opportunities for waste diversion continue to grow as methods like composting gain broader acceptance. Research shows that applying circular economy principles in five key sectors (steel, aluminum, cement, plastic, and food) could reduce annual carbon emissions by 9.3 billion tons in 2050 — the equivalent of eliminating all global transportation emissions.

Decarbonization

The MR category provides a pathway toward achieving zero waste through upstream waste prevention, reuse, recycling, and composting. Projects are rewarded for significantly increasing waste diversion rates (*MRc1: Waste Reduction Performance*). Strategies such as using durable

[85] "Trends in Solid Waste Management," n.d., datatopics.worldbank.org/what-a-waste/trends_in_solid_waste_management.html.

[86] Massachusetts Department of Environmental Protection, "New Research Highlights Massachusetts as National Leader in Food Waste Reduction," September 12, 2024, www.mass.gov/news/new-research-highlights-massachusetts-as-national-leader-in-food-waste-reduction.

goods, procuring products with recycled content, implementing composting, offering user training, and conducting zero waste audits offer practical ways to improve performance and reduce emissions associated with waste (*MRc2: Waste Reduction Strategies*).

Ecological conservation and restoration

Waste reduction strategies also mitigate harm to ecosystems by diverting waste from landfills and incineration, which release pollutants into soil, water, and air. Contaminated rainwater can seep harmful chemicals into groundwater, affecting local habitats. Landfills emit methane and carbon dioxide among other harmful pollutants, which deteriorate air quality and contribute to climate change. By reducing waste sent to these systems, projects lessen their environmental burden.

Ultimately, the MR category empowers project teams to rethink the use and procurement of materials, track and reduce waste generation, reduce emissions, and protect ecosystems. These efforts advance sustainability goals and contribute to a healthier, more resilient built environment.

Impact Area Alignment

- ☑ Decarbonization
- — Quality of Life
- ☑ Ecological Conservation and Restoration

Materials and Resources Credit

WASTE REDUCTION PERFORMANCE

MRc1

1–12 points

INTENT

To prevent waste and reduce the amount of materials from building operations and maintenance disposed of in landfills or incinerators.

REQUIREMENTS

Achievement pathways	Points
Existing Buildings	1–12
Waste Diversion	1–12

Divert materials generated from building operations and maintenance activities from reaching landfills, incineration (waste-to-energy), or other disposal methods. Diversion includes strategies such as waste prevention (reduction), reuse, recycling, or composting. Points are awarded according to Table 1.

Table 1. LEED points for waste diversion

Waste diversion	Points
6%	1
12%	2
18%	3
24%	4
30%	5
36%	6
42%	7
48%	8
54%	9
60%	10
70%	11
80%	12

Waste Diversion Calculation

Calculate a waste diversion rate by tracking the total amount of materials generated from ongoing building operations and maintenance activities for a minimum of three consecutive months within the 12-month reporting period. Track waste generation monthly and include the material type and weight of all nonhazardous, solid materials.

Track or estimate variations in materials management that occur outside the reporting period, such as seasonal collection or intermittent waste streams.

Calculate waste diversion by tracking the amount of materials (by weight) diverted from landfills and incineration. For diverted materials, specify the diversion method (reduce, reuse, recycle, compost, etc.). If material quantities are estimated, provide the methodology and/or source references used to make calculations. If actual weights are unavailable for certain material types or hauling methods, volume-to-weight conversion average values can be used.

To calculate the overall diversion rate, divide the weight of materials diverted by the total weight of materials generated for the same reporting period. Account for seasonal collection or intermittent waste streams within the calculations. See Equation 1 for the waste diversion calculation:

Equation 1. Waste diversion calculation

$$Diversion\ (\%) = 100 \times \frac{\left(\begin{array}{c}Amount\ of\\ diverted\ materials:\\ waste\ prevention\\ (by\ weight)\end{array}\right) + \left(\begin{array}{c}Amount\ of\\ diverted\ materials:\\ reuse\\ (by\ weight)\end{array}\right) + \left(\begin{array}{c}Amount\ of\\ diverted\ materials:\\ composting\ or\ organics\\ (by\ weight)\end{array}\right) + \left(\begin{array}{c}Amount\ of\\ diverted\ materials:\\ recycling\\ (by\ weight)\end{array}\right)}{\begin{array}{c}Total\ amount\ of\ materials\ generated\\ from\ ongoing\ operations\ and\ maintenance\ activities\\ (by\ weight)\end{array}}$$

REQUIREMENTS EXPLAINED

This credit rewards projects for waste reduction and diverting materials from landfills or incineration. To do this, projects will measure, track, and report the amount of waste generated at the project and the amount of waste diverted from landfills and incineration facilities. Measuring a building's waste performance and understanding the effectiveness of the waste management practices can help facility managers optimize solutions for zero waste operations.

Projects earn points for increased levels of diversion compared to the total amount of waste generated from ongoing building operations and maintenance.

Scope of Materials

Materials are defined as solid, non-hazardous discards that are generated within the project boundary. This includes materials produced during regular operations as well as during episodic activities (construction and demolition, special events, etc.). Materials generated and managed by tenants must be included.

The following are examples of common non-hazardous materials generated within a project boundary that must be included in the credit calculations:

- **General waste**. Waste stream containing everyday trash such as food wrappers, single plastic items that are not recyclable, used paper/tissues, flimsy plastic wrappers, etc.
- **Recyclables**. Paper, cardboard, plastics, aluminum, other metals, compostables, and glass
- **Organics/compostables**. Materials that originated from living organisms which include: food residuals; yard debris; and wood, plant or paper products
- **Furniture**. Chairs, desks, tables, filing cabinets, systems/workstations, shelving units, etc.
- **Electronic waste (nonhazardous office equipment)**. Computers, monitors, printers, copiers, telephones, etc., that are not considered hazardous materials as defined by the project's local jurisdiction, state, or country
- **Production/manufacturing materials**. Raw materials, semi-finished products, scraps, or components used in the creation of goods during the manufacturing process
- **Materials generated from construction, facility alterations, and additions**. Drywall, flooring tiles, light fixtures, doors, ceiling tiles, electrical wiring, plumbing, concrete, pavers, flooring, etc.

Hazardous materials are defined by the project's local jurisdiction, state, or country. If a material is considered hazardous by the local jurisdiction, state, or country, then it must be properly disposed of according to regulations. Hazardous materials are excluded from the material scope.

Waste Diversion Methods

Projects achieve points by demonstrating waste prevention and diversion. Project teams are recommended to follow the *TRUE* waste hierarchy framework[87] that prioritizes waste management actions to minimize environmental impact. It ranks waste management strategies from most to least preferred, focusing on reducing waste generation and maximizing resource recovery before resorting to disposal, in this order:

REDUCE (WASTE PREVENTION)

A project team may find ways to reduce the materials being purchased and generated by implementing more efficient practices within the project boundary. Examples of reduction strategies include routine office processes, like printing paychecks, going paperless, or switching from disposable cups to reusable ceramic mugs in a kitchen.

[87] GBCI, "Resources," n.d., true.gbci.org/resources.

REUSE

Reuse items would otherwise be disposed of and are instead reused either multiple times within the project boundary or are donated to another entity as a one-time donation. Examples of reduction include durable shipping totes, reusable pallets in the warehouse, or donating extra supplies or food to non-profit organizations.

RECYCLE

Common recyclable materials include mixed paper, corrugated cardboard, glass, plastics, and metals. In certain projects or locations, recyclable materials may include electronic waste (e-waste), LED lamps, construction materials (for a renovation), furniture, and hazardous materials recovered for take-back or recycling.

COMPOST

Organic waste can be recycled and turned into compost either on-site or off-site through a commercial or municipal composting service or program. Allowable diversion methods for organic waste such as food scraps, yard waste, and other organic materials include the following:

- Composting on-site or off-site.
- Anaerobic digestion (end product recovered for productive use in a biodigester) is an allowable diversion method as long as the digestate is recovered for productive use in nature or the economy (i.e., diverted from the landfill).
- Animal feed.

Understanding each diversion method assists in effectively implementing waste prevention and diversion strategies.

Calculating Waste Diversion

Projects earn points for increased levels of diversion compared to the total amount of waste generated from ongoing building operations and maintenance tracked for a minimum of three consecutive months within the 12-month reporting period. Teams must track waste generated and diverted to determine the waste diversion rate using Equation 1. Waste Diversion Calculation of the Rating System.

DATA TRACKING

Track and report data monthly for a minimum of three consecutive months. Regular reporting on waste performance and diversion will allow teams to understand annual patterns of waste and

more easily identify anomalies. Track all material quantities using the same unit (weight, volume).

Project teams must determine what materials are generated within the project boundary, the parties responsible for the information needed on each tracked material, and the diversion category for each material type. Teams must then determine how the items should be weighed and/or counted.

Use accurate, measured data (weights, volume) when possible. However, projects can use estimates where actual unit measures are not available.

CALCULATION FOR ALL MATERIALS (EXCEPT FOR REDUCTION AND REUSE)

Actual weight method[88]

Using actual weights of the materials is the preferred and the most accurate method. The project team can obtain these in several ways. One method is using direct weights using in-house scales. Another is to use waste tracked by third parties. This includes documents such as weight tickets, reports, and invoices. Typically, vendors will provide weights for materials collected in compactors and open top containers but not in toters or front-load dumpsters.

Estimated weight method

If actual weights cannot be measured, estimated weights may be used to determine values of diverted and non-diverted materials.

To simplify reporting, projects can use the following method for determining a volume-to-weight conversion based on observation and/or service levels:

- **Volume-to-weight estimation method for waste materials (non-diverted materials)**. Determine the total amount of waste containers picked up in a given time period, typically one week. Add the volume for each material type collected over the time period. Assume every container picked up over the time period is 100% full at every collection time. Apply a volume to weight conversion factor and multiply the volume per material type to determine the total estimated weight for disposal.
- **Volume-to-weight estimation method (diverted materials only)**. Determine the total amount of reuse, recycling, or composting collected over a given time period, typically one week or over the course of a month. Add the volume for each material type collected over the time period. Assume every container picked up over the time period is 50% full at every collection time. This conservative assumption allows for less measurement but

[88] Green Business Certification Institute, Inc., *TRUE Diversion Data Additional Guidance Version 1.2* (GBCI, 2024), true.gbci.org/sites/default/files/resources/TRUE-Diversion-Data-Technical-Guidance_1.pdf.

does not reward high volumes of diversion. Apply a volume-to-weight conversion factor for each material type and multiply the volume per material type to determine the total estimated weight for disposal.

For either method, project teams can optionally choose to manually monitor the fullness of each bin and then report the average percent full of each materials bin/type at collection over the reporting period, rather than take the default values. This method includes physically observing material volumes to convert to weight using volume-to-weight conversion factors. While the observation time frame should capture what the team considers to be representative, it is recommended to observe the containers for a minimum of one week. U.S. EPA volume-to-weight conversion factors for the specific waste type may be used to quantify the amount of materials for each type. For all cases, facility-specific or regional conversion factors may also be used.

CALCULATION FOR REDUCTION AND REUSE

There are two methods for calculating potential diversion numbers through the reduction and reuse of materials in the project site's material streams.

Calculating reduction

Many projects find ways to reduce the amount of materials being purchased and generated by implementing more efficient practices within the project boundary. When a project switches to a new strategy, like a reusable container, and prevents the generation of material in the process, then this action would be documented under the Reduction category in your diversion data tracking system. The weights of materials not generated due to a reduction action are tracked and used in calculations in the same way as the weights for actual materials.[89]

- Measure the weight of the object that was used and disposed of before switching to the new waste prevention strategy.
- Multiply the weight of that object by the number of objects no longer being purchased or discarded.
- Subtract the current weight total of the object from the weight total that is no longer being purchased to get the reduction.

Reduction weights can continue to be counted every year regardless of when the initial reduction event took place as long as the original reduction strategy is still in place and being implemented.

[89] Green Business Certification Institute, Inc., *TRUE Diversion Data Additional Guidance Version 1.2* (GBCI, 2024), true.gbci.org/sites/default/files/resources/TRUE-Diversion-Data-Technical-Guidance_1.pdf.

Calculating reuse
Measure the weight of the item being reused or donated:

- For items reused within the project, such as wooden pallets, multiply the item's weight by the number of items being reused.
- For on-site furniture reuse programs, account for the reuse when the item is donated to the program.

A volume-to-weight conversion calculation may be used:

- Repairing an item to keep using it instead of disposing it counts as reuse.[90]
- Typically, most reusable items will not be the same number each month, so the items will need to be tracked monthly on how many times they are reused. Estimates may be used here at times as long as the estimate methodology is noted in the diversion spreadsheet.[91]

> **Additional considerations**
> **Seasonal collections and intermittent waste streams**
> Project teams tracking less than 12 months of materials must account for any seasonal collections or intermittent waste streams that may not be accounted for within the period for which the waste data is tracked. Example scenarios:
>
> • The three-month reporting period occurs in winter, when landscape waste is not generated. However, in the summer months, landscape waste is generated. In this instance, use one of the calculation methods described above to estimate the total amount of landscape waste typically generated each year and prorate the annual total to a monthly value. Include the monthly value within each month of the reporting period calculations.
>
> • An annual e-waste drive occurs outside of the three-month reporting period. Prorate the annual total to a monthly value and include the prorated monthly value within each month of the reporting period calculations.
>
> **Shared collection**
> If a project shares waste collection with other buildings or spaces, including individual projects on a campus, it is acceptable to prorate the combined material total for the project based on the total number of occupants, square footage, or

[90] *TRUE Diversion Data Additional Guidance Version 1.2*, Green Business Certification Institute, Inc. (GBCI), (2024), accessed March 31, 2025, https://true.gbci.org/sites/default/files/resources/TRUE-Diversion-Data-Technical-Guidance_1.pdf.
[91] *TRUE Diversion Data Additional Guidance Version 1.2*, Green Business Certification Institute, Inc. (GBCI),

other appropriate methodology. Appropriate proration methodology must be reasonable for projects with mixed space types as proration by gross square footage alone may not be accurate. For example, an office with mixed space types, such as a cafeteria and/or retail, may generate more waste than a standard office project.

DOCUMENTATION

Project types	Option	Path	Documentation
All	Waste prevention and diversion	All	Monthly summary tables detailing the weight of all material types generated and diverted by prevention (reduction), reuse, recycling, or composting for a minimum of three consecutive months within the 12-month reporting period
			Diversion rate calculation (Equation 1)
			Narrative describing the methodologies and/or source references used to determine material quantities for prevention (reduction)
			Narrative describing the methodologies and/or source references used to determine material quantities for reuse
			Narrative describing the methodologies and/or source references used to estimate weight based on volume. Additionally, describe the process used to determine, on average, how full the containers are for diverted materials.
			Narrative describing the methodology used to account for seasonal collection or intermittent waste streams
			Documentation supporting all waste amounts reported and summarized in the monthly summary tables. Acceptable documentation includes hauler reports or invoices, tracking logs, and calculations supporting reduction values, reuse values, volume-to-weight estimated values and intermittent waste stream values.

REFERENCED STANDARDS

- Compostable BPI standard (bpiworld.org)
- TRUE diversion rate guidelines (true.gbci.org/resources)
- TRUE audits, etc. (true.gbci.org/resources)

Impact Area Alignment

- ☑ Decarbonization
- — Quality of Life
- ☑ Ecological Conservation and Restoration

Materials and Resources Credit

WASTE REDUCTION STRATEGIES

MRc2

1 point

INTENT

To prevent waste and reduce the amount of materials generated by building operations and maintenance that are disposed of in landfills or incinerators.

REQUIREMENTS

Achievement pathways	Points
Existing Buildings	1
Option 1. Organics Recycling	1
OR	
Option 2. Waste Collection Management and Education	1
OR	
Option 3. Zero Waste Audit	1

Option 1. Organics Recycling (1 point)

Implement an organics recycling/composting program. Include training, appropriate signage, and implementation guidance for effective organics recycling/composting to minimize contamination. This pathway is available to projects that do not have an organics recycling/composting program prior to the reporting period.

OR

Option 2. Waste Collection Management and Education (1 point)

Inventory all collection infrastructure and clearly label receptacles for recyclables, compostables, landfill material, and other diversion streams as applicable. Evaluate all collection containers to ensure appropriate size and schedules are in place. Implement a strategy for the periodic review of these containers to adjust sizes and pickup frequencies with service providers.

Within the 12-month reporting period, provide training for employees, contractors, vendors, consultants, and other on-site staff on the acceptable items for each receptacle type. Assign at least one staff person to a waste prevention leadership role and provide regular progress updates to employees.

OR

Option 3. Zero Waste Audit (1 point)

Conduct a zero waste audit of all inbound and outbound materials at least once during the 12-month reporting period and analyze results.

REQUIREMENTS EXPLAINED

This credit offers projects multiple options to enhance waste reduction strategies within the existing building. Projects can earn a point for pursuing one of the three options under this credit. By implementing the strategies outlined in this credit, projects can improve waste diversion rates over time, supporting higher performance in future certifications. These strategies are designed to ensure buildings excel in waste diversion during operations by targeting specific actions and methods that are proven to reduce waste. The options draw inspiration from *TRUE*'s preconditions and key credits, incorporating some of its most critical elements to enhance waste management performance.

Teams are encouraged to work with the owner, facility managers, and building occupants to optimize strategies that lead to successful waste diversion.

Option 1. Organics Recycling

When organic materials such as paper, food waste, and landscape trimmings are sent to landfills, they can decompose anaerobically, producing methane — a greenhouse gas 25 times more potent than carbon dioxide. Diverting organic waste through composting or anaerobic digestion can significantly reduce methane emissions and help lower the carbon footprint associated with a building's waste profile.

IMPLEMENT AN ORGANICS RECYCLING/COMPOSTING PROGRAM

This path is only available to projects that do not have an existing program in place prior to the reporting period or projects seeking to expand an existing organic recycling program by introducing a new and separate waste stream, such as adding composting for landscape clippings in addition to an existing indoor food scrap recycling program.

Organic materials include any food waste, compostable packaging, grass clippings, hedge clippings, tree branches, and leaves which make this option a good fit for projects with kitchens, cafeterias, restaurants, or large landscapes.

The organics recycling program must include implementation guidance and training for staff assigned to manage and support the organics recycling program, along with signage at collection points to guide proper sorting. Effective training, signage, and implementation guidance assist in launching a successful organics program.

Option 2. Waste Collection Management and Education

The effectiveness of a waste management system depends on proper labeling, education, and appropriately sized containers. Inadequately sized bins can lead to overflow and improper disposal. Clear labeling, ongoing education, and choosing the right-sized containers can help to ensure users understand and follow waste sorting practices, improving overall system performance.

INVENTORY, EVALUATE, AND REVIEW

Assess the capacity and placement of each container to confirm appropriate sizing and that collection schedules reduce GHG emissions from unnecessary truck trips. Performing this inventory helps prevent overflow, underutilization, or contamination of waste streams.

Teams must develop a comprehensive inventory of the waste collection infrastructure. This includes clearly labeling receptacles for recyclables, compostables, landfill/incineration waste, and any other applicable diversion streams. The inventory must also include the location of all collection bins, number of bins for each material or collection type by place, the size of bins, what condition the bins are in, the status of the labels, and pickup frequency for each bin.

Periodically reviewing collection containers allows for continually improving and optimizing the waste management system in place. Establish a strategy and frequency for periodically reviewing the waste management system.

TRAIN

Teams must train staff and users including contractors, vendors, consultants, and other on-site staff on the acceptable items for each receptacle type at least once within the 12-month reporting period. Projects shall designate at least one team member to take on the role of waste prevention leader to help oversee waste reduction efforts, identify opportunities for improvement, and implement best practices. The waste prevention leader must provide regular progress updates to employees.

Option 3. Zero Waste Audit

A traditional waste audit examines the contents of recycling and waste bins to evaluate contamination rates and identify areas for improvement. A zero waste audit, on the other hand, provides a more holistic approach by analyzing all materials entering and exiting the building. It focuses on reducing waste by identifying opportunities for reuse or recycling, optimizing container sizing, and improving labeling and sorting practices. This type of audit extends beyond the waste bins, involving procurement teams, outside vendors that generate waste, facility staff, department staff, and waste/recycling haulers. A zero waste audit explores strategies to

eliminate waste generation at the source, create circular pathways for materials, and commit to practices that minimize disposal.

Following guidance from TRUE Rating System,[92] use the *Zero Waste Analysis, Credit 1: Conduct Annual Physical Waste Audit* to conduct a zero waste audit to earn credit under this option. The audit can be performed by on-site personnel or a third-party vendor and must be completed during the 12-month reporting period.

DOCUMENTATION

Project types	Option	Path	Documentation
All	Option 1. Organics Recycling	All	Narrative describing the implemented organics recycling/composting program
			Confirmation that there is signage at collection points to guide proper sorting
			Confirmation that staff and maintenance teams have been trained on proper composting practices
			Confirmation that an organics recycling/composting program was not available prior to the reporting period OR Confirmation that an existing organic recycling program was expanded to include a new and separate waste stream
			Photographs of organics recycling/composting program
	Option 2. Waste Collection Management and Education	All	Inventory of all collection infrastructure
			Sample photographs of clearly labeled collection receptacles
			Confirmation that training occurred for employees, contractors, vendors, consultants, and other on-site staff on the acceptable items for each receptacle type within the 12-month reporting period
			Narrative identifying individual(s) or roles responsible for waste prevention leadership
			Narrative describing the implemented periodic review strategy used to adjust sizes and pick-up frequencies with service providers
	Option 3. Zero Waste Audit	All	Zero waste audit report

REFERENCED STANDARDS

- TRUE Rating System, Zero Waste Analysis, Credit 1 (true.gbci.org/sites/default/files/resources/Current-Rating-System-December-2023.pdf)

[92] GBCI, "Resources," n.d., true.gbci.org/resources.

INDOOR ENVIRONMENTAL QUALITY (EQ)

OVERVIEW

Our built environments can serve as inspiration to improve human health and experiences in existing buildings. Through the Indoor Environmental Quality (EQ) credit category, LEED offers a framework to reimagine and operate buildings in a manner in which more people can thrive. The rating system empowers facility managers to explore these opportunities and examine the quality of the indoor environment. Using air quality, occupant experience, facility stewardship, green cleaning, and pest management strategies, project teams can assess and plan for healthier, more adaptable spaces that welcome and care for occupants more effectively.

Decarbonization

Decarbonization is integral for creating a more stable and predictable climate as well as lasting social and economic value. The reduction in fossil fuel use, due to implementing energy efficiency measures, and using renewable energy have the additional benefit of improving air quality, especially in communities close to power plants and highways. Through collaborative operational planning, project teams can create spaces that are energy resource-efficient, healthy, and human-centric.

Quality of life

Human-centric approaches are embedded throughout EQ and help to foster healthy and resilient indoor air conditions, ensure both occupant and worker safety, and incorporate feedback loops to monitor and continually enhance occupant experience.

Improving indoor air quality is a cornerstone of the EQ credit category. The air quality prerequisites and credits establish best practices for measuring and delivering cleaner indoor air (*EQp1: Verification of Ventilation and Filtration*, *EQc5: Air Filtration, EQc2: Ventilation Performance*, *EQp2: No Smoking*). To support building managers in adapting to changing environmental conditions, LEED v5 incentivizes the use of resilience management practices for wildfire smoke and respiratory diseases (*EQ6: Resilient Spaces*). Together, EQ prerequisites and credits help spaces remain conducive to human health and well-being even during adverse conditions.

In order to effectively care for the ongoing well-being of occupants and workers, attention to their experience is essential and is addressed in LEED v5 through a feedback process (*EQc3: Occupant Experience Performance*, *EQc4: Facility Stewardship Performance*). This feedback can improve the building and cultivate a true sense of comfort and stewardship.

Ecological preservation and restoration

Through healthy building management practices, project teams can reduce their building's impact on surrounding environments by minimizing pollutants and pesticides (*EQc7: Green Cleaning*, *EQc8: Integrated Pest Management*). Environmentally sensitive pest control methods promote long-term ecological balance.

EQ prerequisites and credits empower project owners, occupants, and the building community to cultivate buildings in which people can experience a sense of belonging to their built environment, community, and natural world.

Impact Area Alignment

— Decarbonization

☑ Quality of Life

— Ecological Conservation and Restoration

Indoor Environmental Quality Prerequisite

VERIFICATION OF VENTILATION AND FILTRATION

EQp1

REQUIRED

INTENT

To understand the amount of outdoor air being delivered by ventilation, exhaust, and filtration systems in comparison with ventilation standards for indoor air quality (IAQ).

REQUIREMENTS

Achievement pathways	Points
Existing Buildings	N/A
Ventilation and Filtration Verification	

Meet all of the following requirements to verify the operational quality of ventilation, exhaust, and filtration systems:

- Include information on ventilation system operation and preventative maintenance as outlined in *ASHRAE 62.1-2022* (or later), Table 8-1, “Minimum Maintenance Activity and Frequency for Ventilation System Equipment and Associated Component,” in the current facilities requirements and operations and maintenance plan required for compliance with *IPp4: Current Facilities Requirements and O+M Plan.*
- Investigate local and regional outdoor air quality. Determine the regional air quality status and conduct an observational survey of the building site and its immediate surroundings to identify local contaminants from surrounding areas that will be of concern if able to enter the building.

Meet the following requirements for mechanically ventilated spaces (except for residential units. See residential section below):

- Calculate the minimum amount of outdoor air required by *ASHRAE 62.1-2022* or later. Use simplified calculations from the standard or the ventilation rate procedure.
- Measure the amount of outdoor air being delivered by each ventilation system serving the project. Measurements may be made directly or by installed flow measurement devices in the system that are calibrated per manufacturer recommendations. Measurements taken within five years prior to the end of the 12-month reporting period are acceptable.

- Compare the measured results for each ventilation system with the calculated minimum amount of outdoor air required by *ASHRAE 62.1-2022* and determine next steps. If spaces are under-ventilated, document the circumstances and potential corrective actions. Compliance with minimum outdoor rates is highly encouraged but not required for this prerequisite (excluding residential units).
- Identify the filtration level (minimum efficiency reporting value, MERV, level in accordance with *ASHRAE 52.2* or filtration media class as defined by *ISO 16890-2016*) for each ventilation system that supplies outdoor air and each HVAC system that supplies recirculated air to occupied spaces. If filtration levels are below MERV 13 (or equivalent filtration media class of ePM1 50%), evaluate options for improving filter efficiency and document the circumstances and potential corrective actions. Compliance with MERV 13 is highly encouraged but not required for this prerequisite.

For systems with outdoor air economizers, confirm that the current equipment is operating per design intent and modify if necessary.

For naturally ventilated spaces, identify the opening types, location of the openings, and size of the openings. Visually inspect each opening and adjacent areas for cleanliness and integrity and clean as needed. Remove all visible debris or visible biological material observed and repair physical damage to louvers and screens if such damage impairs the item from providing the required outdoor air entry. Test and confirm manual and/or automatic opening apparatus for proper operation and repair or replace as necessary.

For spaces with mechanical exhaust, test and modify if necessary to confirm proper operation of the exhaust systems as outlined in the current facilities requirements and operations and maintenance plan.

Residential

For all common areas in the building, meet the requirements above.

For residential units, have an operable window in each bedroom with the total openable window area a minimum of 4% of the room floor area or meet the following minimum requirements for the entire unit.

Equation 1. Minimum outdoor air rate n IP units

$$\text{Minimum outdoor air rate in cfm} = 0.03\ \text{cfm/sq. ft.} \times \text{dwelling unit floor area (in sq. ft.)} + 7.5\ \text{cfm/person} \times (\text{number of bedrooms} + 1)$$

Equation 2. Minimum outdoor air rate in SI units

*Minimum outdoor air rate in L/s = 0.15 L/s*sq. m. x dwelling unit floor area (in sq. m.) + 7.5 cfm/person x (number of bedrooms + 1)*

Compliance with minimum outdoor rates is required for each residential unit for this prerequisite.

In each full bathroom, have either an exhaust fan that vents directly to the outdoors or an operable window.

On each floor of the residential unit, have a carbon monoxide (CO) monitor hardwired with battery backup. CO monitors are required in all types of units, regardless of the type of equipment installed in the unit.

REQUIREMENTS EXPLAINED

This prerequisite requires that projects understand how indoor air quality (IAQ) is being managed in the building and assess ventilation rates and filtration levels against current recommended minimums. The verification process instills confidence that the building is committed to creating a healthier indoor environment while addressing energy efficiency, IAQ, and resiliency concurrently.

Over the lifespan of a building indoor air quality can become compromised. Deferred HVAC system maintenance, such as skipping filter replacements, reduces the effectiveness of the ventilation system's ability to provide outdoor air with few contaminants. Without regular cleaning, screens and louvers can experience buildup of dirt and biological material that pollutes the outdoor air intake into the building. Natural ventilation strategies that depend on operable windows may be degraded as windows age or if restrictors (i.e., fall safety mechanisms) are added. Regular maintenance and confirmation of adequate outdoor air delivery is paramount to achieving adequate ventilation and a healthy indoor environment in existing buildings.

Ventilation System Operation and Preventative Maintenance

This prerequisite requires a commitment to preventative maintenance for the ventilation-related systems in the building using Table 8-1 in *ASHRAE 62.1*[93] as a guide for determining minimum maintenance activities and frequency.

[93] "ASHRAE 62.1-2022: Ventilation and Acceptable Indoor Air Quality", ASHRAE, (2022), accessed March 31, 2025, https://www.ashrae.org/technical-resources/bookstore/standards-62-1-62-2.

Ventilation system operations and minimum requirements are also addressed in *IPp4: Current Facilities Requirements* and *O+M Plan*. Update the current facilities requirements (CFR) and operations and maintenance (O+M) plan provided in that prerequisite as necessary to include these preventative maintenance details and the results from the outdoor air quality investigation, filtration information, and ventilation verification.

INVESTIGATE REGIONAL AND LOCAL AIR QUALITY

Indoor air quality is significantly influenced by outdoor air quality, which can be highly localized varying over time, season, and throughout the project site.

To understand outdoor air quality for the project, regional air quality and local air quality must be investigated, with consideration given to seasonal variations. *ASHRAE 62.1* provides a template for documenting this investigation (see Informative Appendix I in the *ASHRAE* document).[94]

In many regions, spring months have higher pollen levels from flowering plants and trees. Summer months in some dry, hot regions have higher levels of PM2.5 due to wildfires and ozone from photochemical smog. Air quality for the project's location will likely change over time, therefore an investigation of the local air quality at the time of certification allows projects to implement appropriate ventilation and strategies for the current or future conditions. For example, periods with higher pollen levels and wildfires may have increased or intensified since the ventilation system was originally designed. Information collected during the IP Prerequisite: Climate Resilience Assessment should be included in this investigation.

REGIONAL AIR QUALITY

Regional air quality is partially determined by reviewing compliance with national ambient air quality standards. In the U.S. air quality monitoring data is available to determine the region's status relative to acceptable levels for six regional outdoor air quality pollutants (particulate matter, carbon monoxide, ozone, nitrogen dioxide, lead, sulfur dioxide).

LOCAL AIR QUALITY

Local air quality is typically determined through observations by walking around the project site and reviewing the neighborhood context. Examples of items to survey include facilities on site and on adjacent properties, description of sources of vehicle exhaust on site and adjacent properties, identification of potential contaminant sources on the site and from adjoining properties, outdoor air intake and building exhaust and equipment locations. Most of this information will be gathered in the *IPp2: Human Impact Assessment*.

[94] "ASHRAE 62.1-2022: Ventilation and Acceptable Indoor Air Quality", ASHRAE.

The results of the outdoor air quality investigation contribute to the overall assessment of air quality performance for the building and assist in identifying opportunities for providing or maintaining cleaner indoor air.

Spaces with Mechanical Ventilation (Excluding residential]

CALCULATE MINIMUM OUTDOOR AIR

ASHRAE Standard 62.1-2022 is the referenced ventilation standard for most commercial buildings. The Standard establishes minimum ventilation requirements and other measures for indoor air quality that is acceptable to human occupants and that minimizes adverse health effects.[95] This standard was adapted over recent years to include options for existing buildings to easily calculate the minimum outdoor air requirements. This provides new flexible approaches for buildings to achieve the minimum ventilation standards.

For all spaces with mechanical ventilation, calculate the minimum outdoor air required per *ASHRAE Standard 62.1-2022*,[96] using either the simplified calculations or the ventilation rate procedure:

- **Simplified calculations**. See *ASHRAE 62.1-2022*, Informative Appendix G. If the project's ventilation system serves occupancy types not listed in Table G-1 of Informative Appendix G,[97] use the VRP to calculate the minimum outdoor air.
- **Ventilation rate procedure (VRP)**. See *ASHRAE 62.1-2022*, Section 6.2,[98] which uses outdoor air intake rates based on the space type and application, occupancy level, and floor area.

MEASURE OUTDOOR AIRFLOW

Measure the amount of outdoor air delivered by each ventilation system on the project. Conduct measurements to verify the amount of outdoor air delivered by each ventilation system. Perform measurements when the system is operating at the minimum outdoor airflow settings. Take outdoor airflow measurements at a location prior to mixing with any return air to ensure only the outdoor air flow rate is measured.

Facility managers or a third-party vendor can take measurements manually, or by flow measurement devices in the system. Flow measurement devices can degrade or deviate from the specified ranges over time, leading to inaccurate measurements. Prior to using

[95] "ASHRAE 62.1-2022: Ventilation and Acceptable Indoor Air Quality", ASHRAE.
[96] "ASHRAE 62.1-2022: Ventilation and Acceptable Indoor Air Quality", ASHRAE.
[97] "ASHRAE 62.1-2022: Ventilation and Acceptable Indoor Air Quality", ASHRAE.
[98] "ASHRAE 62.1-2022: Ventilation and Acceptable Indoor Air Quality", ASHRAE.

measurements from installed devices, verify the device has been recently calibrated in accordance with its manufacturer's specifications.

Measurements that were taken within five years prior to the end of the 12-month reporting period may be used to satisfy this rating system requirement.

COMPARE MEASURED OUTDOOR AIRFLOW WITH CALCULATED MINIMUM OUTDOOR AIR

Compare the measured results for each ventilation system with the calculated minimum amount of outdoor air required by *ASHRAE 62.1-2022* and determine the next steps. If spaces are under-ventilated, the project should strive to improve performance. This often involves adjusting damper settings or cleaning ducts, grilles or other components, and sometimes requires system upgrades. Work with the facility manager or third-party vendor to document the circumstances and outline possible options for improvement. This process is also beneficial for projects looking to improve beyond *ASHRAE 62.1* minimums.

Compliance with minimum outdoor rates is highly encouraged but not mandatory for this prerequisite, with compliance recognized in the *EQc2: Ventilation Performance*. Note that this is not extended to residential dwelling units which are required to provide minimum ventilation.

FILTRATION

Evaluate filtration for each ventilation system on the project. Filters will likely be classified using MERV levels in accordance with *ASHRAE 52.2*[99] or filtration media class as defined by *ISO 16890-2016*.

Evaluate all central HVAC systems that supply outdoor air, recirculated air, or outdoor air and recirculated air to occupied spaces. Work with the facility manager or third-party vendor to document the circumstances and outline possible options for improving filtration. MERV 13 filtration (and ePM1 50%) is becoming standard practice, and many HVAC systems can accommodate this level of filtration with proper attention to filter product selection. Studies demonstrated MERV 13 filters typically had a minimal increase in energy use compared to alternative enhanced ventilation strategies, such as HVAC outdoor air flushing or changing to 100% outdoor air units.[100]

Compliance with a specific MERV level or filtration media class is not required, but compliance with MERV 13 or higher is recognized in *EQc5: Air Filtration* and may contribute to supporting

[99] ASHRAE, "ASHRAE 52.2-2017," n.d., https://store.accuristech.com/ashrae/standards/ashrae-52-2-2017?product_id=1942059.
[100] C. CaraDonna and K. Trenbath, "U.S. Commercial Building Stock Analysis of COVID-19 Mitigation Strategies [Conference presentation]," in 5th International Conference on Building Energy and Environment (COBEE 2022), Montreal, Quebec, Canada (July 25–29, 2022), National Renewable Energy Laboratory, nrel.gov/docs/fy22osti/82515.pdf.

indoor air quality during wildfire events or during periods of increased risk of respiratory diseases which is addressed in *EQc6: Resilient Spaces*.

EVALUATE ECONOMIZER OPERATIONS

Evaluate systems using outdoor air economizers. Economizers often save energy but can degrade over time. Economizer controls require dampers, actuators, sensors, and a controller. If any of these parts is not calibrated or fails, it can lead to inadequate economizer performance or failure. When the economizers fail, they could allow insufficient levels of outdoor air into the space leading to indoor air quality issues. Verify the economizers operate in accordance with the design intent and resolve any issues with the economizers.

SPACES WITH NATURAL VENTILATION

This prerequisite requires evaluating the ventilation being provided through the building's openings and identifying any issues or inadequacies. The project must have a list of the ventilation openings including their opening type, location, and size.

Projects without design documentation for the natural ventilation approach may refer to calculation procedures in *ASHRAE Standard 62.1-2022* to assess adequate opening sizes and locations. These calculations are not required for this prerequisite but contribute to compliance with *EQc2: Ventilation Performance*.

VISUAL OPENING INSPECTIONS

A visual inspection is required for this prerequisite to confirm proper operation of the ventilation openings. This includes manually opening the windows (or observing the automatic opening apparatus) to confirm function and openable area. During the inspection, identify any damage to openings, screens, louvers, or mechanical components. If damage is present and prevents the openings from providing outdoor air entry, repair and replace the parts.

Review all openings for cleanliness. Dust, pollen, and biological material can build up on exterior surfaces such as screens or louvers. These can impact the quality of air entering the indoor environment, and if present, the visible debris and biological material must be removed.

Spaces with Mechanical Exhaust

Test exhaust systems to verify proper operation. Natural ventilation designs often rely on exhaust systems to maintain proper pressurization in the building.

Test the exhaust systems and modify if necessary to confirm proper operation as outlined in the CFR and O+M plan from *IPp4: Current Facilities Requirements* and *O+M Plan*.

RESIDENTIAL PROJECTS OR PROJECTS WITH DWELLING UNITS

Projects with residential spaces are required to provide minimum ventilation in every dwelling unit. This is unique for residential spaces. Two pathways are available for flexibility in compliance. Projects are encouraged to go beyond the requirements of this prerequisite and to comply with *ASHRAE 62.2-2022*[101] when possible.

OPERABLE WINDOWS

For this pathway, the project must demonstrate that at least one operable window is in each bedroom of the dwelling unit. Calculate the window openable area using the bedroom floor area to demonstrate that the minimum requirement is met. Additionally, confirm sufficient operation and cleanliness of the window(s). Follow the guidance of the *Visual Opening Inspections* section above.

MINIMUM OUTDOOR AIR RATES PER UNIT

For this pathway, the project must demonstrate that the dwelling unit's ventilation meets or exceeds minimum rates.

Calculate the minimum required rate using the equation in the rating system and then measure outdoor airflow. Follow the guidance of Measured Outdoor Airflow section. The calculations come from *ASHRAE 62.2-2022*, Section 4.1.[102] Sampling procedures for the measurement are acceptable.

Bathroom Exhaust

Each full bathroom within the dwelling unit must exhaust to the exterior.

Carbon Monoxide Monitoring

A carbon monoxide (CO) monitor must be hard-wired on each floor of the dwelling unit and have battery backup. There are no exceptions to this requirement even when residential units may not have permanently installed CO-generating equipment. CO monitors are mandatory in all types of units as a basic life safety measure.

Common areas in residential projects or projects with dwelling units must meet the requirements for non-residential spaces.

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[101] ASHRAE, "The Standards for Ventilation and Indoor Air Quality," n.d., https://www.ashrae.org/technical-resources/bookstore/standards-62-1-62-2.
[102] ASHRAE, "The Standards for Ventilation and Indoor Air Quality," n.d., https://www.ashrae.org/technical-resources/bookstore/standards-62-1-62-2.

DOCUMENTATION

Project types	Option	Path	Documentation
All	All		Excerpt from Current Facilities Requirements and O+M Plan highlighting tasks from *ASHRAE 62.1-2022* (or later), Table 8-1 Minimum Maintenance Activity and Frequency for Ventilation System Equipment and Associated Components
			Results of regional and local air quality investigation, at minimum, date and time of observations, a description of the site, observed odors or irritants, and conclusions regarding acceptability of the outdoor air quality
	Mechanically ventilated spaces	All	Minimum outdoor air calculations for mechanical ventilation and measured outdoor air rates
			Confirm ventilation compliance: (a) spaces are not meeting reference standard; (b) meeting reference standard; (c) exceeding reference standard, including %
			Percentage of OA over minimum requirements for 95% of spaces
			If any spaces are under ventilated, document circumstances and potential corrective actions
			Method or protocol used to measure the amount of outdoor air delivered by each ventilation system
			Describe or list all filtration media and their MERV or class rating for each ventilation system used to meet the *ASHRAE* ventilation rate procedure that supplies outdoor air and/or recirculated air to regularly occupied spaces
	All	All	Maintenance report for exhaust systems
	Naturally ventilated spaces	All	Natural ventilation opening/location calculations and visual inspection report for natural ventilation
			Report for natural ventilation visual inspection and test for proper opening operation
Residential	All	All	For each residential unit, bedroom total openable window area and location or minimum outdoor air rate calculations
			Confirm each full bathroom has an exhaust fan that vents to the outdoors or an operable window
			Documentation showing carbon monoxide (CO) monitors on each floor of the residential units, such as drawings or photos

REFERENCED STANDARDS

- ASHRAE 52.2: Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size (store.accuristech.com/ashrae/standards/ashrae-52-2-2017?product_id=1942059)
- ASHRAE 62.1-2022: Ventilation and Acceptable Indoor Air Quality (store.accuristech.com/ashrae/standards/ashrae-62-1-2022?product_id=2501063)
- ASHRAE 62.2-2022: Ventilation and Acceptable Indoor Air Quality in Residential Buildings (store.accuristech.com/ashrae/standards/ashrae-62-1-2022?product_id=2501063)
- ISO 16890-2016 Air Filters for General Ventilation (www.iso.org/standard/57864.html)

Impact Area Alignment

— Decarbonization

☑ Quality of Life

— Ecological Conservation and Restoration

Indoor Environmental Quality Prerequisite

NO SMOKING

EQp2

REQUIRED

INTENT

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

REQUIREMENTS

Achievement pathways	Points
Existing Buildings	N/A
Prohibit Smoking	
Existing Buildings — Schools	N/A
Prohibit Smoking	
Existing Buildings — Residential	N/A
Option 1. No Smoking	
OR	
Option 2. Compartmentalization of Residential Units	

Comply with all of the following requirements:

- **Indoor smoking**: Prohibit smoking inside the building.
- **Outdoor smoking**: Prohibit smoking outside the building except in designated smoking areas located at least 25 feet (7.5 meters) — or the maximum extent allowable by local code — from all entries, outdoor air intakes, and operable windows.
- Communicate the no-smoking policy to occupants of the building and have in place provisions for enforcement or prohibitive signage.

Schools

- Prohibit smoking on-site. Signage must be posted at the property line indicating the no-smoking policy.

Residential Only

Option 1. No Smoking

Meet the requirements above.

OR

Option 2. Compartmentalization of Residential Units

Meet the requirements above for common areas.

If smoking is not prohibited in the dwelling units and on private balconies, each unit must be compartmentalized to prevent excessive leakage between units:

- Weather-strip all exterior doors and operable windows in the residential units to minimize leakage from outdoors.
- Weather-strip all doors leading from residential units into common hallways.
- Minimize uncontrolled pathways for the transfer of smoke and other indoor air pollutants between residential units by sealing penetrations in the walls, ceilings, and floors and by sealing vertical chases (including utility chases, garbage chutes, mail drops, and elevator shafts) adjacent to the units.
- Demonstrate a maximum leakage of 0.50 cubic feet per minute per square foot (2.54 liters per second per square meter) at 50 Pa of enclosure (i.e., all surfaces enclosing the apartment, including exterior and party walls, floors, and ceilings) or establish a baseline and demonstrate a 30% improvement in leakage for each unit.

REQUIREMENTS EXPLAINED

This prerequisite requires the project to prohibit smoking inside the building and restrict smoking on site. There are separate requirements for schools and residential projects.

Smoke-free policies effectively reduce tobacco use, protect people from secondhand smoke exposure, prevent tobacco-related illnesses and deaths, and help more people successfully quit smoking.[103]

Smoking is prohibited for conventional cigarettes (cigarettes, cigars, pipes), cannabis (medical or recreational), and electronic smoking devices (e-cigarettes). The intent is to keep the air inside the building free from pollutants and contaminants associated with smoking.

Indoor Smoking

Smoking must be strictly prohibited inside the building at all times. Evidence of this prohibition can be obtained via a policy from the owner or facility manager or smoke-free indoor air law. Smoking is strictly prohibited inside the building, and smoking rooms do not meet the requirements of this prerequisite.

[104] The Community Guide, “Tobacco Use: Smoke-free Policies,” November 2012, thecommunityguide.org/findings/tobacco-use-smoke-free-policies.html.

Outdoor Smoking

Smoking must be prohibited on the project site except in areas specifically designated for smoking. No smoking is permitted within 25 feet (7.5 meters) of all building openings, such as doors, windows, and ventilation intakes to minimize the likelihood of smoke entering the building. Emergency exits do not qualify as building openings if the doors are alarmed, as alarmed doors will rarely be opened. Emergency exits without alarms qualify as building openings.

Smoking is not allowed in programmable spaces (e.g., outdoor cigar lounges or casino areas, courtyards, outdoor cafes or sidewalk seating, space used for business purposes).

A designated smoking area is a specific outdoor location where smoking is permitted. It is acceptable for this area to be covered (if it is open-air), have seating to make people feel comfortable, and to have safe disposal bins for cigarettes.

Communicate the No Smoking Policy

This prerequisite requires proactive communication of the indoor and outdoor no-smoking policy to occupants. The project must have established enforcement provisions or smoking signage in place. Examples of enforcement provisions include scheduled inspections, and/or written process for security staff and receptionists to inform visitors of no-smoking policy when necessary. The project determines the placement and design of signage, allowing for flexibility to address site-specific considerations and to accommodate existing signage that may already be in place.

Schools

- Schools must prohibit all smoking on site to ensure no secondhand smoke exposure to students, staff, and visitors. Banning smoking on school premises sets a strong example for students, encouraging them to adopt and maintain healthy, smoke-free lifestyles.
- Signage must be posted on the property line to indicate the no-smoking policy. Signage at the school helps to ensure public awareness and compliance with smoke-free environments, especially in areas where children's health is a priority. The signs serve as a clear visual reminder for staff, visitors, and passersby.

> **Exceptions**
> The enforcement of no-smoking policies does not extend to areas within residential health care projects, such as long-term care facilities, where residents may have a clinical need to smoke.
>
> This prerequisite is not intended to prohibit or deter Indigenous or other cultural ceremonial practices (e.g. smudging) which may include the combustion of

tobacco and other ceremonial materials. LEED projects that accommodate cultural ceremonial practices may still pursue this prerequisite.

Residential Only

Option 1. No Smoking

Meet the requirements above.

Option 2. Compartmentalization of Residential Units

Residential

- Smoking must be prohibited for all areas inside and outside residential buildings except in dwelling units and on private balconies. Prohibiting smoking on private residential balconies is a best practice for protecting nearby nonsmoking units and balconies from ETS infiltration.

- If smoking is permitted in residential projects, leakage from smoking units to other areas of the building must be prevented. Each dwelling unit where smoking is permitted must comply with compartmentalization requirements outlined in the rating system. All building common areas must be smoke-free.

DOCUMENTATION

Project types	Options	Path	Documentation
All	Option 1. No Smoking	All	Confirm that smoking is prohibited inside the building.
			Confirm that smoking is prohibited outside the building except in designated smoking areas located at least 25 feet (7.5 meters) from all entries, outdoor air intakes, and operable windows.
			Indicate if there are designated smoking areas on-site (Yes/No). If yes, provide a site plan or map showing the location of designated outdoor smoking and no-smoking areas, location of property line, and site boundary and indicating 25-foot (7.5-meter) distance from building openings.
			Description of how the no-smoking policy is communicated to the project occupants. Include details of enforcement provisions and/or photographs of no-smoking signage. Address both interior and exterior portions of the policy
	Option 2. Compartmen-talization of Residential Units	All	Door schedule demonstrating weather-stripping at exterior unit doors and doors leading from units to common hallways (if applicable)
			Differential air pressure test report for units in project building (if applicable)
			Outdoor and No-smoking Areas Floor and Site Plan
			Description of how the no-smoking policy is communicated to the project occupants. Include details of enforcement provisions and/or photographs of no-smoking signage. Address both interior and exterior portions of the policy

REFERENCED STANDARDS

- None

Impact Area Alignment

— Decarbonization

☑ Quality of Life

— Ecological Conservation and Restoration

Indoor Environmental Quality Credit

INDOOR AIR QUALITY PERFORMANCE

EQc1

1–10 points

INTENT

To support indoor air quality (IAQ) awareness and identify opportunities for additional air quality improvements or energy savings.

REQUIREMENTS

Achievement pathways	Points
Existing Buildings	1–10
Option 1. Continuous Indoor Air Monitoring	1–10
AND/OR	
Option 2. Targeted One-Time Air Testing	1–3
AND/OR	
Option 3. Targeted One-Time Individual Volatile Organic Compounds Testing	1–2

Option 1. Continuous Indoor Air Monitoring (1–10 points)

Continuously measure one or more of the indicated indoor air parameters for a minimum of three consecutive months at an interval of no longer than one hour (15 minutes for carbon dioxide), with data collected at any point during the 12-month reporting period. Monitors must be building grade or better.

Points for continuously monitoring parameters are shown in Table 1. Projects can earn additional points by demonstrating compliance with the minimum and enhanced IAQ limits indicated in Table 1.

Table 1. Points for continuous indoor air monitoring

Parameter	Benchmark	LEED Points
Carbon dioxide (CO_2)	> 1000 ppm	2
	1000 ppm	3
	800 ppm	4
PM2.5	> 15 µg/m^3	2
	15 µg/m^3	3
	12 µg/m^3	4
TVOC	Any level	2

Meet the data requirements for each parameter for each sensor as follows:

- **Carbon dioxide (CO2)**: 95th percentile value
- **PM2.5**: Daily average
- **TVOC**: Daily average in unity of ppm or micrograms per cubic meter

AND/OR

Option 2. Targeted One-time Air testing (1–3 points)

Test for parameters listed in Table 2 at least once during the 12-month reporting period. Include a concurrent measurement of outdoor ambient air quality within the project boundary for reference comparison.

One point is available for testing and meeting the minimum IAQ limit for every two parameters listed in Table 2, for a total of up to three points. Use one of the allowed test methods listed in Table 2. One-time Air-testing. Project teams may use laboratory-based or direct-read test methods.

Table 2. One-time air testing

Parameter	**Concentration limit ($\mu g/m^3$)**	**Allowed test methods**	
		Laboratory-based	**Direct-reading instrument minimum specifications**
Carbon monoxide (CO)	9 ppm and no more than 2 ppm above outdoor levels	*ISO 4224* *EPA Compendium Method IP-3* *GB/T 18883-2002* for projects in China	Direct calibrated electrochemical instrument with accuracy of +/-3% of reading and resolution of 0.1 ppm NDIR CO sensors with accuracy of 1% of 10 ppm full scale and display resolution of less than 0.1 ppm
Particulates: PM 10	ISO class 8 or lower per *ISO 14644-1:2015* OR meet 50 $\mu g/m^3$	*IP-10A*	Accuracy (+/-): Greater of 5 $\mu g/m^3$ or 20% of reading Resolution (+/-): 5 $\mu g/m^3$
Particulates: PM2.5*	ISO class 8 or lower per *ISO 14644-1:2015* OR meet 12 $\mu g/m^3$	*IP-10A*	Accuracy (+/–): Greater of 5 $\mu g/m^3$ or 20% of reading Resolution (+/-): 5 $\mu g/m^3$
	OR, for projects located in an area where the national standard or guideline for PM2.5 is exceeded, meet 35 $\mu g/m^3$		

Parameter	Concentration limit (µg/m³)	Allowed test methods	
		Laboratory-based	Direct-reading instrument minimum specifications
Ozone	0.07 ppm	*ISO 13964* *ASTM D5149-02* EPA-designated methods for ozone	Monitoring device with accuracy greater of 5 ppb or 20% of reading and resolution (5 min average data) +/- 5 ppb
Nitrogen dioxide (NO_2)	40 µg/m³ (21 ppb)		Monitoring device with measurement range of 0–500 ppb, and lower detectable limit of 5 ppb
TVOC*	N/A		Monitoring device that meets or exceeds building-grade sensor requirements

NOTE: May not earn points for both targeted one-time air testing and continuous indoor air monitoring for the same parameter.

AND/OR

Option 3. Targeted One-Time Individual Volatile Organic Compounds Testing (2 points)

Test for all volatile organic compounds (VOCs) listed in Table 3 at least once during the 12-month reporting period. Laboratories that conduct the tests must be accredited under ISO/IEC 17025 for the test methods they use.

Calculate the total volatile organic compounds (TVOC) value per EN 16516:2017; *CDPH Standard Method v1.2 2017, Section 3.9.4*;[104] or an alternative calculation method if a full method description is included in the test report. If the TVOC levels exceed 500 µg/m³, investigate for potential issues by comparing the individual VOC levels to associated cognizant authority health-based limits. Correct any identified issues and retest.

Two points are available for demonstrating that all contaminants do not exceed the concentration limits listed in Table 3.

Table 3. One-time air testing of individual volatile organic compounds

Contaminant (CAS#)	Concentration limit (µg/m³)	Allowed test methods (laboratory-based)
TVOC	Investigate and take corrective action if levels exceed 500 µg/m³.	*ISO 16000-6;* *EPA TO-17;*

[104] CDPH, "Standard Method for the Testing and evaluation of Volatile Organic Chemical Emissions From Indoor Sources Using Environmental Chambers, Version 1.2," January 2017, https://www.cdph.ca.gov/programs/ccdphp/deodc/ehlb/iaq/cdph%20document%20library/cdph-iaq_standardmethod_v1_2_2017_ada.pdf.

Contaminant (CAS#)	Concentration limit (µg/m^3)	Allowed test methods (laboratory-based)
		EPA TO-15
Formaldehyde 50-00-0	20 µg/m^3 (16 ppb)	*ISO 16000-3, 4; EPA TO-11a; EPA comp. IP-6A; ASTM D5197-16*
Acetaldehyde 75-07-0	140 µg/m^3	
Benzene 71-43-2	3 µg/m^3	*ISO 16000-6; EPA IP-1; EPA TO-17; EPA TO-15; ISO 16017-1, 2; ASTM D6196-15*
Hexane (n-) 110-54-3	7,000 µg/m^3	
Naphthalene 91-20-3	9 µg/m^3	
Phenol 108-95-2	200 µg/m^3	
Styrene 100-42-5	900 µg/m^3	
Tetrachloroethylene 127-18-4	35 µg/m^3	
Toluene 108-88-3	300 µg/m^3	
Vinyl acetate 108-05-4	200 µg/m^3	
Dichlorobenzene (1,4-) 106-46-7	800 µg/m^3	
Xylenes — total 108-38-3, 95-47-6, and 106-42-3	700 µg/m^3	

REQUIREMENTS EXPLAINED

This credit offers three options to identify opportunities for indoor air quality (IAQ) improvement over time. Airborne contaminants can enter a building from outdoors or be introduced by indoor sources and activities, such as cleaning, cooking, candles, 3D printers, or improperly vented heating appliances. Understanding indoor air quality can help identify contaminants to inform a strategy to provide healthy indoor spaces.

Option 1 encourages continuous monitoring and rewards projects that achieve cleaner indoor air targets while Options 2 and 3 require one-time testing for air quality or individual VOCs. More points are included for Option 1 as continuous monitoring better captures the temporal and seasonal variation of the indoor air quality conditions and likely requires more investment to implement and maintain over time.

Projects can enhance their IAQ performance by combining one-time testing with continuous monitoring. This layered strategy allows for a more nuanced view of IAQ over time. One-time testing can be implemented before or during continuous monitoring setup to establish baseline initial air quality conditions, while continuous monitoring tracks changes and fluctuations over

time. One-time testing can also be deployed when continuous monitors reveal IAQ levels significantly above typical levels for the space.

Option 1. Continuous Indoor Air Monitoring

Air monitoring allows for real-time air quality assessment in occupied spaces. Indoor air monitors enable the identification of potential issues and timely corrective actions to help maintain indoor air quality in the building. This option can be achieved with the use of temporary or permanent monitors.

REPORTING PERIOD

Monitoring must occur over a minimum of three consecutive months within a 12-month reporting period. The selected three-month period must fall entirely within the reporting period. Teams can select any three consecutive months within the year.

NUMBER OF MONITORS

A successful monitoring strategy must consider the purpose of the data collection and dedicated resources for ongoing data management. Fewer, well managed monitors are usually more beneficial than copious neglected monitors. Include at least one monitor per 25,000 square feet (2,500 square meters) of total occupied floor area. This density is a good entry point for getting started with indoor air quality monitoring. Additional monitors can be added as desired up to the best-practice density of one monitor per 5,000 square feet (500 square meters) of total occupied floor area.

MONITOR LOCATION

Monitors must be placed to best represent the project occupancy and function(s). This will vary depending on the purpose of the monitoring. Use the following criteria to determine representative locations for the project:

- **Multiple space types**. Consider including monitors in multiple space types. For example, in an office building, monitor the open office spaces but also consider closed offices, conference rooms, quiet spaces, and other occupied space types. In a school building, monitor classroom spaces but also consider the auditorium, administrative offices, student assembly areas, and lab spaces.
- **Different ventilation systems**. If the project has multiple ventilation systems, consider placing monitors in areas served by each ventilation system.
- **Multiple floors**. For projects with multiple floors, consider placing monitors on different floors.

- **Spaces where the highest concentrations of contaminants are likely to occur**. This could be due to the construction or fit-out of the space, a lower ventilation rate or air filtration level, the presence of combustion or operable windows, or occupant activities. For example, cafeterias may have a higher concentration of contaminants compared to classrooms, due to the presence of cooking.
- **Spaces occupied by at-risk populations or spaces designated for cleaner air**. Consider placing monitors in areas where people who are more susceptible to poor indoor air quality congregate. For example, this may include spaces with infants, children, pregnant women, acute care facilities, and assisted living facilities.
- If monitoring to support IAQ management during wildfires and prescribed burn events, review *ASHRAE Guideline 44*, Section 5.5.1.2 for considerations for monitor placement.

Monitors must be at a height corresponding to the breathing zone of a typical occupant. In most situations, the breathing zone is between three and six feet (0.9 and 1.8 meters) above finished floor height, based on the location of an occupant's head when seated or standing. Alternative mounting heights based on the anticipated occupant position in a space may be considered.

Where possible, place sensors at least three feet (0.9 meters) away from doors, windows, air filters, air supply outlets, exhaust intakes, stoves, printers, and other potential airborne contaminant sources or sinks. In areas where this is not possible, locate monitors closer to air returns than air diffusers.

Monitors located in ducts do not meet the requirements.

MONITOR SPECIFICATIONS

Use indoor air monitoring devices that measure carbon dioxide (CO2), fine particulate matter (PM2.5), and total volatile organic compounds (TVOC). Monitors must meet the building grade requirements of *RESET Grade B*[105] or *UL 2095 Grade B*. Projects can use either permanent or temporary air monitors. Both types of air monitors must meet the reporting and tracking requirements for the credit.

Hourly reporting

Monitors must report hourly PM2.5 and TVOC (or higher frequency) data and 15-minute CO2 data to a remote location that logs pollutant levels over time.

A digital display, or integration with the building management system, is not required to achieve the credit.

[105] RESET Indoor Air Quality Monitors, n.d., reset.build/directory/monitors/type/indoor.

Table 1. RESET Grade B monitor specifications

***RESET Grade B* monitor specifications**	**CO2**	**PM2.5**	**TVOC**
Data loss	10%		
Operating range for temperature	0–40℃		
Operating range for relative humidity	10–80% RH non-condensing		
Sampling type		Active airflow	
Sensor output resolution	5 ppm	1 µg/m3	4.4 ppb
Measuring range	400–5000 ppm	0-500 µg/m3	65–870 ppb
Accuracy*	400–2000 ppm: ±50 && 3% 2000–5000: ±50 && 5%	0–150: ±5 && 15% 150–500: ±5 && 20%	65–260 ppb: ±8.7 && 15% 260–870: ±8.7 && 20%
Performance check and re-calibration	Required	Required	Required

Example
If a reference monitor is reading 900 ppm, a Grade B monitor's reading must read within 50 + (0.03 x 900) = ±77. The Grade B monitor's reading must be between 823 and 977 ppm

AIR QUALITY BENCHMARKS & DATA REPORTING

Table 1 in the rating system includes benchmark levels for CO_2 and PM2.5 to provide a starting point for projects to support data-driven indoor air quality (IAQ) decisions and encourage teams to aim for cleaner indoor air. The project may want to customize targets to address unique local conditions or project goals and circumstances.

For this credit, the project is required to report continuous monitoring data for at least three months. Before providing the monitoring data to GBCI, the project must review their data and remove invalid readings. Minor data gaps/data loss are expected and acceptable. The project must also complete an air quality monitoring questionnaire to explain their monitoring approach and reported data.

The 95th percentile and daily averages are calculated separately for each sensor/location.

Option 2. Targeted One-time Air Testing and Option 3. Targeted One-time Individual Organic Compounds Testing

Targeted, one-time air testing is used to obtain a snapshot of air quality conditions in occupied spaces.

The testing process considers various contaminants, each with its impact on health and comfort. For example, monitoring particulate matter (PM) levels helps address potential respiratory concerns, while testing for TVOC may indicate issues with products used in the space.

Option 2 uses direct-read instruments that measure TVOCs rather than individual VOCs, offering a general view of air quality. This approach differs from Option 3, which includes laboratory-based methods that allow teams to examine individual VOC levels in greater detail.

Project teams cannot acquire points for targeted one-time air testing and continuous air monitoring for the same parameter (PM2.5 and TVOC).

Number of measurements

The number of measurement points required is outlined in Table 5 below. The table provides a consistent number of measurements per floor area (square feet or square meters) to help with planning for testing and the associated costs.

The floor area in Table 5 reflects the total occupied floor area for the project, including all regularly and non-regularly occupied areas. For example, corridors are non-regularly occupied and must be included in the total area for this calculation. Unoccupied areas, such as mechanical and electrical rooms, are excluded.

Projects may choose to take more measurements beyond the minimum if desired. Exceeding the minimum number of measurements does not earn additional points but will provide a more comprehensive assessment of the indoor air quality.

Table 5. Number of measurements required for Option 2 testing

Total occupied floor area, sq. ft. (sq. m.)	Number of measurements
≤5,000 (500)	1
>5,000 (500) and ≤15,000 (1500)	2
>15,000 (1500) and ≤25,000 (2500)	3
>25,000 (2500) and ≤200,000 (20,000)	Four plus one additional measurement per each 25,000 sq. ft. (2500 sq. m.) above 25,000 sq. ft.
>200,000	Ten plus one additional measurement per each 50,000 sq. ft. (500sq. m.) above 200,000 sq. ft.

Measurement locations

Measurement locations must be selected to best represent the project occupancy and function(s). Use the following criteria to determine representative locations for the project:

- **Regularly occupied spaces**. Prioritize regularly occupied spaces. Non-regularly occupied spaces must be included in the total area for determining the occupied floor area but need not be tested.
- **Multiple space types**. If more than one measurement is necessary per Table 1, test multiple space types. For example, in an office building, test open office spaces, but also consider closed offices, conference rooms, quiet space, and other occupied space types. In a school building, test the classroom spaces but also consider testing the auditorium, administrative offices, student assembly areas, and lab spaces.
- **Different ventilation systems**. If the project has multiple ventilation systems, identify a measurement location in areas served by each ventilation system, up to the required number of measurement points.
- **Multiple floors**. For projects with multiple floors, select locations on different floors.
- **Spaces where the highest concentrations of contaminants are likely to occur**. This could be due to the construction or fit-out of the space, or a lower ventilation rate. For example, private offices may have a higher concentration of contaminants compared to open offices, due to a higher density of furniture and finish materials in an enclosed space.

Include a concurrent measurement of outdoor ambient air quality within the project boundary for reference comparison. Only one measurement is needed per day of testing.

Proper placement of the testing equipment (direct-read instruments or laboratory-based sample equipment) is important to obtaining accurate results. Place testing equipment at a height corresponding to the breathing zone of a typical occupant. In most situations, the breathing zone is between three and six feet (0.9 and 1.8 meters) above finished floor height, based on the location of an occupant's head when seated or standing. Alternative placement heights based on the anticipated occupant position in a space may be considered.

Where possible, place testing equipment at least three feet (0.9 meters) away from doors, windows, air filters, air supply outlets, exhaust intakes, stoves, printers, and other potential airborne contaminant sources or sinks. In areas where this is not possible, locate equipment closer to air returns than air diffusers.

Conduct testing during regular occupancy hours to reflect the air quality under typical conditions.

Option 2. Targeted One-time Air Testing

Each location must be tested for at least two parameters in *Table 2. One-Time Air Testing* provided in the Requirements section of this credit.

Table 2 outlines the approved test methods for each contaminant. Teams can use laboratory-based testing or take measurements using direct-reading instruments. If using direct readings, all instruments must meet the minimum specifications of Table 2. Alternative laboratory-based methods may be used if the project team documents that the accuracy and resolution specifications in Table 2 are met.

Measure for a four-hour period, calculating peak concentration for carbon monoxide and average concentration for ozone, PM2.5, and PM10.

Option 3. Targeted One-time Individual Volatile Organic Compounds Testing

Targeted one-time VOC testing involves laboratory-based analysis to identify specific VOCs present in indoor air. This approach offers a more detailed understanding of indoor air quality by pinpointing particular VOCs, which is useful as a diagnostic tool when there are indications of air quality concerns, such as elevated TVOC levels detected in previous monitoring or testing (during Options 1 or 2), occupant complaints, or specific building materials that could emit high levels of VOCs.

Because VOC testing and analysis is complex, it must be performed using specific methods by a laboratory that is accredited under ISO/IEC 17025 for the test method used. When selecting a testing provider, the team should ask for these accreditation details.

A test for each individual VOC in Table 3 of the rating system must be performed at each measurement location.

Additionally, the laboratory will calculate the total, or TVOC. The TVOC calculation is intended to serve as a general indicator of the VOC levels in the building and is used to capture situations where there are higher levels of a different VOC than those targeted in Table 3 of the rating system.

If the TVOC concentration exceeds 500 ug/m3, the team must work with the laboratory to compare the individual VOC levels from the GC/MS results to associated cognizant health-based limits. If any identified VOCs exceed cognizant health-based limits, the project must take corrective actions and retest to confirm the identified VOC level is reduced to below the cognizant health-based limit.

DOCUMENTATION

Project types	Options	Path	Documentation
All	Option 1. Continuous Indoor Air Monitoring	All	Indoor air quality data for each sensor for a minimum of three consecutive months at an interval of no longer than one hour (15 minutes for carbon dioxide)
			Confirmation the air quality data provide in the data input template has been reviewed and cleaned
			Indoor air quality data input template (if applicable)
			Confirmation that the sensors are placed in the breathing zone
			Indoor air quality monitoring questionnaire
			Specifications of building grade air monitors
			Evidence of monitor locations
	Option 2. Targeted One-time Air testing	All	Evidence of testing locations
		All	Completed air quality testing report, including time, date, testing methods complying with credit requirements, results, and limits of the tested contaminants in all locations
		Projects using direct reading measurements	Documentation demonstrating direct reading instrument(s) meets the minimum specifications in *Table 2. One-time Air Testing*
	Option 3. Targeted One-time VOC Testing	All	Completed air quality testing report, including time, date, testing methods complying with credit requirements, results and limits of the tested contaminants in all locations, and lab accreditation scope for VOCs
	Option 3. Targeted One-time VOC Testing		If the TVOC levels exceeded 500 µg/m3, explain how the team investigated the issue and necessary corrective actions including re-testing.

REFERENCED STANDARDS

- ISO 4224 (iso.org/standard/32229.html)
- EPA Compendium Method IP-3 (nepis.epa.gov/Exe/ZyNET.EXE?ZyActionL=Register&User=anonymous&Password=anonymous&Client=EPA&Init=1)
- GB/T 18883-2002 (webstore.ansi.org/standards/spc/gb188832002?srsltid=AfmBOop0xQPDtRY3cz-EZdzF5K0hc05BT5AV7DcguhtsRKIOBebteMnB)
- ISO 13964 (iso.org/standard/23528.html)
- ASTM D5149-02 (store.astm.org/d5149-02r16.html)
- EPA designated methods for Ozone (epa.gov/system/files/documents/2024-12/amtic-list-december-2024_final.pdf)
- ISO.IEC 17025 (iso.org/standard/66912.html)
- CDPH Standard Method v1.2-2017 (cdph.ca.gov/Programs/cls/dehl/ehl/CDPH%20Document%20Library/CDPH-IAQ_StandardMethod_V1_2_2017_ADA.pdf)

- Reset Air Accredited Monitors (reset.build/programs/monitors)
- UL 2905 (shopulstandards.com/ProductDetail.aspx?productId=ULE2905_2_S_20230110)

Impact Area Alignment

— Decarbonization

☑ Quality of Life

— Ecological Conservation and Restoration

Indoor Environmental Quality Credit

VENTILATION PERFORMANCE

EQc2

3–5 points

INTENT

To provide increased indoor air quality to better protect the health of building occupants.

REQUIREMENTS

Achievement pathways	Points
Existing Buildings	3–5
Ventilation Performance	3–5

Ventilation per ANSI/ASHRAE Standard 62.1

Demonstrate that outdoor air ventilation rates of all occupied spaces meet or exceed *ASHRAE 62.1-2022* or later based on the measurements reported in *EQp1: Verification of Ventilation and Filtration*. Alternatively, the rates may meet or exceed the ventilation rate procedure outlined in Section 6.2 of *ASHRAE 62.1*,[106] editions 2016, 2013, 2010, or 2007. If demonstrating exceedance from the referenced standard, increased outdoor air rates shall be provided to 95% of all regularly occupied spaces.

Naturally ventilated spaces meet *ASHRAE 62.1-2022*, "Natural Ventilation Procedure," or exceed opening sizes or natural ventilation airflow rates of *ASHRAE 62.1-2022*, "Natural Ventilation Procedure."

Points are awarded according to Table 1.

Table 1. Points for ventilation

Ventilation performance	Points
Meet referenced standard	3
Exceed referenced standard by 15%	4
Exceed referenced standard by 30%	5

[106] ASHRAE, "The Standards for Ventilation and Indoor Air Quality," n.d., https://www.ashrae.org/technical-resources/bookstore/standards-62-1-62-2.

REQUIREMENTS EXPLAINED

The credit encourages projects to continuously provide acceptable indoor air quality to all occupied areas of the building and incentivizes projects to go beyond minimum ventilation. Providing additional outdoor airflow, above the minimum requirements for ventilation and building pressurization, can further dilute and reduce indoor air pollutants. Research has shown increased ventilation may improve cognitive performance and associated productivity and income, reduce absenteeism in commercial offices,[107] and increase sleep quality in residential applications.[108]

For measures that provide enhanced air quality only in specific circumstances, refer to *EQc6: Resilient Spaces* for more guidance.

This credit uses the calculations and measurements developed in *EQp1: Verification of Ventilation and Filtration*. Compliance with the Ventilation Performance threshold "meet referenced standard" can be demonstrated with the prerequisite documentation. Compliance with the other Ventilation Performance thresholds ("Exceed referenced standard by 15%," "Exceed referenced standard by 30%") requires following the increased ventilation calculation steps as outlined below.

Increased Ventilation for Mechanically Ventilated Spaces

For mechanically ventilated spaces, increased ventilation requires providing higher outdoor airflow rates than those required in *ASHRAE Standard 62.1-2022*. Most large HVAC systems can accommodate a 15% increase with minimal impacts to energy consumption. This credit includes performance thresholds at 15% and 30%.

REGULARLY OCCUPIED SPACES REQUIREMENT

At least 95% of all regularly occupied spaces must have increased ventilation. This provides flexibility for projects that cannot meet the higher thresholds in every space.

DETERMINING THE INCREASED VENTILATION REQUIREMENT

The following VRP calculations determine the increased ventilation requirement:

- **Single-zone or 100% outdoor air system**. Multiply the calculated minimum outdoor air flow intake for the system (V_{ot}) by 1.15 (or 1.30 if pursuing 30% threshold).

[107] D. Licina, P. Wargocki, C. Pyke, and S. Altomonte, "The Future of IEQ in Green Building Certifications," *Buildings and Cities* 2, no. 1 (2021): 907–927, doi.org/10.5334/bc.148.
[108] Pawel Wargocki, Mizuho Akimoto, Xiajoun Fan, Shin-ichi Tanabe, Chandra Sekhar, and Li Lan, "Ventilation and Sleep Quality," *AIVC (Air Infiltration and Ventilation Centre)*, October 4–5, 2023, aivc.org/resource/ventilation-and-sleep-quality.

- **Multiple-zone recirculating system**. Multiply the uncorrected outdoor air flow for the system (Vou) by 1.15 (or 1.30 if pursuing 30% threshold). Multiply the breathing zone outdoor airflow *for* the *critical zone* (V_{bz} for critical zone) by 1.15 (or 1.30 if pursuing 30% threshold). Calculate the new system ventilation efficiency (Ev) using the updated values for Vou and the critical zone V_{bz}, and recalculate the required outdoor air intake flow for the system (V_{ot}) using these values.

Projects designed using earlier versions of *ASHRAE 62.1 (2007-2026)* may use those VRP design calculations to comply with this credit.

Increased Ventilation for Naturally Ventilated Spaces

For naturally ventilated spaces, increased ventilation requires having larger openings than the minimum opening sizes in *ASHRAE 62.1* or having features intentionally designed to provide increased airflow.

REGULARLY OCCUPIED SPACES REQUIREMENT

At least 95% of all regularly occupied spaces must have increased ventilation. This provides flexibility for projects that cannot meet the higher thresholds in every space.

DETERMINING THE INCREASED VENTILATION REQUIREMENT

- **Prescriptive System**. Demonstrate the opening areas in each naturally ventilated space are larger than the opening sizes required in *ASHRAE 62.1* Section 6.4.2.
- **Engineered system**. Demonstrate through natural ventilation design calculations that expected airflow in the space exceeds the minimum rates outlined in *ASHRAE 62.1* by 15% or 30%.

Projects designed using earlier versions of *ASHRAE 62.1 (2007-2026)* may use those natural ventilation design calculations to comply with this credit.

DOCUMENTATION

Project types	Options/Paths	Required for upload	Documentation
All	Ventilation performance	Calculation	Calculations from *EQp1: Verification of Ventilation and Filtration*

REFERENCED STANDARDS

- None

Impact Area Alignment

— Decarbonization

☑ Quality of Life

— Ecological Conservation and Restoration

Indoor Environmental Quality Credit

OCCUPANT EXPERIENCE PERFORMANCE

EQc3

1–3 points

INTENT

To evaluate the building's performance for occupants in terms of comfort, customization, joy, and belonging and to better understand ways to achieve consistent satisfaction.

REQUIREMENTS

Achievement pathways	Points
Existing Buildings	1–3
Occupant Experience Survey	1–3

Conduct an occupant experience survey of the building occupants to assess their experience and satisfaction with the indoor environment during the 12-month reporting period.

Points are awarded according to Table 1.

Table 1. Points for occupant experience survey

Survey action	Points
> 60% of occupants are satisfied	1
> 80% of occupants are satisfied	2
> 90% of occupants are satisfied	3

Required Survey Methodology

- Regular building occupants must be surveyed. Surveying visitors is optional.
- Use the following survey question (or similar): "Indicate how satisfied you are with the indoor environment in this building." Additional questions are optional but encouraged.
- Use a seven-point response scale (e.g., very dissatisfied, dissatisfied, somewhat dissatisfied, neither satisfied nor dissatisfied, somewhat satisfied, satisfied, and very satisfied).
- Calculate the percentage of occupants that are satisfied, mean satisfaction level, and response variance.
    - When calculating the percentage of occupants that are satisfied, only include occupants that respond somewhat satisfied (5), satisfied (6), and very satisfied (7).
- Meet survey response rates in Appendix III.

REQUIREMENTS EXPLAINED

The credit requires teams to conduct an occupant experience survey during the 12-month reporting period. The survey must address occupant satisfaction related to the indoor environmental quality of the project but may include additional questions focused on sensory or emotional experience. Teams may use a survey of their own creation, the USGBC provided survey, or another standardized survey, such as Occupant Satisfaction Survey created by the Center for the Built Environment (CBE).

Survey Questions

To meet the credit requirements, regular building occupants must be surveyed using the following, or similar, question: "Indicate how satisfied you are with the indoor environment in this building." Phrasing the question differently, to gain the same outcome, is acceptable.

Though not required, projects are encouraged to include additional, more focused, survey questions to better understand occupants' experiences, preferences, and emotions related to the space. Refer to the *Center for the Built Environment*'s research and guidance on occupant surveys.[109] Additional, more focused, survey questions could center around specific elements of the indoor environment, including but not limited to acoustics, lighting, thermal comfort, connection with nature, accessibility, inclusion, and belonging, or sensory landscape. People have different thermal preferences, lighting needs, and sensory responses. Understanding this variability helps create more dynamic, adaptable, and satisfactory spaces.

Survey Response Scale

A seven-point scale must be used: very satisfied, satisfied, somewhat satisfied, neither, somewhat dissatisfied, dissatisfied, very dissatisfied. This number of options on a scale obtains more detailed responses leading to a better understanding of occupant satisfaction.

Survey Responses

Projects are responsible for determining the best approach for collecting survey responses from as many regular building occupants as possible to maximize understanding and impact. For hospitality projects, hotel or lodging guests may be excluded from the surveying. Visitors do not need to complete the survey. However, it may be beneficial for building managers to include visitors in the survey distribution for buildings aimed at the guest experience, like libraries or convention centers.

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[109] Lindsay T. Graham, Thomas Parkinson, and Stefano Schiavon, "Lessons Learned from 20 Years of CBE's Occupant Surveys". *Buildings and Cities* 2, no. 1 (2021): 166–184. doi.org/10.5334/bc.76.

Determine the required number of people that must respond to the survey using the response rate calculation in *Appendix III*. Survey results only contribute to points for this credit if enough people respond to the survey.

Analyzing the Results

Points for this credit are based on a percentage of satisfied occupants. Mean satisfaction level and response variance calculations are both required but do not inform points allocation. This information can be used by the project to understand their survey results and possible opportunities for improvement.

Calculate the percentage of occupants that are satisfied with the indoor environment (Equation 3). Only responses of "somewhat satisfied," "satisfied," and "very satisfied" constitute a satisfied response.

Equation 3. Percentage of satisfied occupants

$$\%\ satisfied = \frac{\#\ satisfied\ responses}{Total\ \#\ of\ survey\ responses}$$

Determine the mean satisfaction level or the average rating. Using a scale of 1 to 7 for "very dissatisfied" to "very satisfied," respectively, determine the mean value using Equation 4.

Equation 4. Mean satisfaction level

$$Mean\ satisfaction\ level = \frac{\Sigma\ response\ (values)}{Total\ \#\ of\ survey\ responses}$$

Determine the response variance, which will provide an indication of how the survey responses differ from the mean satisfaction level, using Equation 5.

Equation 5. Response variance

$$Sample\ variance = \frac{\Sigma\ (response\ (value) - mean\ satisfaction\ level)^2}{Total\ \#\ of\ survey\ responses - 1}$$

DOCUMENTATION

Project types	Option	Path	Documentation
All	All	All	Copy of the occupant experience survey administered to regular building occupants and visitors (if applicable)
			Dates during which the survey was conducted
			Occupant experience survey results
			Required response rate calculations
			Percentage of occupants that are satisfied (Equation 3)
			Mean satisfaction level (Equation 4)
			Response variance (Equation 5)

REFERENCED STANDARDS

- Lindsay T. Graham, Thomas Parkinson, and Stefano Schiavon, "Lessons Learned from 20 Years of CBE's Occupant Surveys," *Buildings and Cities* 2, no. 1 (2021): 166–184 (journal-buildingscities.org/articles/10.5334/bc.76, doi.org/10.5334/bc.76)

Impact Area Alignment

— Decarbonization

☑ Quality of Life

— Ecological Conservation and Restoration

Indoor Environmental Quality Credit

FACILITY STEWARDSHIP PERFORMANCE

EQc4

1–3 points

INTENT

To assess how well the building is being maintained and to gather information about paths toward increased stewardship.

REQUIREMENTS

Achievement pathways	Points
Existing Buildings	1–3
Option 1. Facility Maintenance Performance	1–2
AND/OR	
Option 2. Measure Cleaning Performance	1
Path 1. Cleaning Appearance Audit	1
OR	
Path 2. Cleaning Surface Testing Audit	1

Option 1. Facility Maintenance Performance (1–2 points)

Conduct an audit to determine the maintenance level of the facility during the 12-month reporting period. Points are awarded according to Table 1.

LEVEL 3: MANAGED MAINTENANCE

Representative of an average building. Building equipment and components are functional but occasionally break down. Response times to service and maintenance calls are inconsistent. Equipment is upgraded on an as-needed basis. Overall facility shows a basic level of care. At least 50% of maintenance activities are considered proactive (conducted before failure and malfunction).

LEVEL 2: COMPREHENSIVE MAINTENANCE

Representative of an above average building. Building equipment and components are functional and in operating condition. Response times to service and maintenance calls are consistent and timely. Equipment is upgraded regularly and meets current standards. Overall facility shows an enhanced level of care. At least 75% of maintenance activities are considered proactive (conducted before failure and malfunction).

LEVEL 1: EXEMPLARY FACILITY

Representative of an exemplary building. Building equipment and components are functional and in top condition. Response times to service and maintenance calls are prompt. Equipment is upgraded regularly. Overall facility shows a high level of care. All (100%) maintenance activities are considered proactive (conducted before failure and malfunction).

Table 1. Points for maintenance level

Maintenance level		Points
Maintenance level	Audit score level is ≤ 2.5 (between managed maintenance and comprehensive maintenance)	1
	Audit score level is ≤ 1.5 (between comprehensive maintenance and exemplary facility)	2

Audit methodology

Audit considers the entire facility, including building materials, lighting, equipment, maintenance, customer service, and facility upkeep and care.

Use five levels for scoring (e.g., limited management, critical response, managed maintenance, comprehensive maintenance, and exemplary facility).

AND/OR

Option 2. Measure Cleaning Performance (1 point)

PATH 1. CLEANING APPEARANCE AUDIT

Conduct an audit in accordance with APPA Leadership in Educational Facilities Custodial Staffing Guidelines, or equivalent, to determine the appearance level of the facility during the 12-month reporting period. The facility must score 2.5 or better.

OR

PATH 2. CLEANING SURFACE TESTING AUDIT

Conduct an audit using ATP testing to assess the level of cleanliness of the facility during the 12-month reporting period. The facility must score “needs improvement” or “effective cleaning” using the *International Sanitary Supply Association Clean Standard methodology*[110] or similar.

REQUIREMENTS EXPLAINED

Well-maintained, clean buildings directly influence occupant well-being and satisfaction, particularly for those working in the building. Providing sufficient resources for maintenance

[110] ISSA, “ISSA Clean Standards,” 2025, https://www.issa.com/education/issa-clean-standards/.

personnel enhances their daily experience, job safety, and ongoing success. As such, owners must establish comprehensive strategies for managing maintenance and cleanliness.
This credit provides teams with two options for compliance: the first is for facilities' maintenance performance and the second is for cleaning performance. Teams can pursue each option individually or combine for up to three points.

Option 1. Facility Maintenance Performance

Annual audits allow for ongoing tracking and monitoring of key performance indicators for the site related to facility maintenance procedures. The Facility Maintenance Performance audit provides an objective assessment of the building to determine the maintenance level and identify opportunities for improving the facility and the experience of the maintenance personnel.

MAINTENANCE AUDIT SCOPE

Teams must review the structural elements (walls and roofs), lighting, equipment (HVAC, plumbing, and process), general property maintenance (landscape and hardscape), customer service (response time to maintenance calls), and upkeep and care. Perform the audit during the 12-month reporting period.

The associated attributes that reflect the various levels of scoring are outlined in *Table 2*. The lowest level of performance is Level 5, Limited Management and the highest level of performance is Level 1, Exemplary Facility. Projects earn one point when the audit demonstrates performance at or above a score of 2.5 (between Level 3 Managed Maintenance and Level 2 Comprehensive Maintenance). A second point is awarded when the audit results demonstrate performance at or above a score of 1.5 (between Level 2 Comprehensive Maintenance and Level 1 Exemplary Facility).

Table 2. Attributes of maintenance levels

Maintenance level	Associated scoring value	Attributes of the maintenance level
Level 5 Limited Management	5	• No response to maintenance calls • Structural elements are deteriorating • Equipment is routinely broken or inoperable • No planned maintenance program
Level 4 Critical Response	4	• Low response rate and untimely responses to maintenance calls • Building elements and equipment are inadequate for current usage • Structural elements in poor condition • Equipment is frequently broken or inoperable
Level 3	3	• Inconsistent with maintenance calls

Maintenance level	Associated scoring value	Attributes of the maintenance level
Managed Maintenance		• Periodic upgrades that align with failed systems • Structural elements in sufficient condition • Little to no preventative maintenance
Level 2 Comprehensive Maintenance	2	• Consistent turnaround time on maintenance calls • Equipment meets current standards • Structural elements in good condition • Less structured maintenance practices but proactive and avoiding costly failures and malfunctions
Level 1 Exemplary Facility	1	• Low turnaround time on maintenance calls • Regular building and equipment upgrades • Structural elements in excellent condition • Structured preventative and predictive maintenance practices

AUDIT FORMS GUIDANCE

Include the following information in the facility maintenance audit form:

- **Equipment and building components**. Document condition of structural elements (walls and roofs), lighting, equipment (HVAC, plumbing, and process), and general property maintenance (landscape and hardscape).
- **Maintenance activity level**. Assess the preventive maintenance program, corrective and reactive maintenance, and the work order management process.
- **Service level**. Document how timely service calls are answered as well as the timeliness of issues corrected.
- **Building performance to current standard**. Does the building perform to at least the current standards required for its use today? Is there excessive deterioration of equipment and building elements beyond normal wear and tear?

SCORING

Once the audit is complete, teams must determine the average audit score level associated with the facility. Scores are subjective, however, they must use five levels of scoring and follow a logical scoring process. If there are multiple auditors, agree upon a single scoring system, and stay consistent during the walk-throughs. For example, a facility manager may determine that a score of “2” means that the spaces are clean, free of dust and debris, and have no thermal comfort issues.

Option 2. Measure Cleaning Performance

Teams that measure a facility's cleaning performance have two paths for compliance. An annual audit using the *APPA Leadership in Educational Facilities' Custodial Staffing Guidelines*[111] can determine the appearance level of the facility.[112] Alternately, projects can document compliance through a cleaning surface testing audit, following the ISSA Clean Standard methodology, or similar.

Path 1. Cleaning Appearance Audit

APPA's Custodial Staffing Guidelines provide a detailed and effective audit process. Using guidance from Chapter 7, Custodial, teams must develop audit forms, establish the audit process, and document the level of cleanliness for the facility, using a score of one to five, with one being the highest score.

Audit forms guidance

Consider including the following information in the cleaning appearance audit form:

- **Space type**. Categorize spaces in the project according to the 33 types listed in the APPA guidelines, Appendix B. Using the building floor plan, group similar spaces to reduce the number of forms needed. Closed, private offices and open offices are different space types. Mechanical rooms and parking garages do not need to be audited. If the building contains space types not listed in Appendix B, select the closest category.
- **Appearance items**. Appendix D in the APPA guidelines outlines a set of appearance items that the auditor scores. Limit each space type to no more than six appearance items per space category.
- **Time-averaged weighting factors**. The weighting factor assigns a relative importance to each appearance item. Certain spaces may be prioritized when determining a clean environment. The higher the weighting factor, the more important the item's appearance item is. Appendix D in the APPA Guidelines proves details on the suggested weighting factors.

Scoring

Once the audit is complete, teams must compile the scores and determine the raw score associated with the facility. With 1 being the highest rating, projects must score at least a 2.5 or better to comply with this credit path.

Using Equation 1, teams can calculate the raw score for each appearance item.

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[111] Association of Physical Plant Administrators (APPA), Operational Guidelines for Educational Facilities: Custodial, 4th Edition, 2023, appa.org/files/FMArticles/FM_JF2013_KB.pdf.

[112] Association of Physical Plant Administrators (APPA), "About APPA," n.d., https://www.appa.org/.

Equation 1. Raw score

$$Raw\ score\ (per\ appearance\ item) = weighting\ factor\ \times appearance\ level$$

Once all raw scores are determined, teams will use the total cumulative value of all raw scores and determine the level of achievement for the audit, using Equation 2.

Equation 2. Level of achievement

$$Level = \frac{\Sigma\ all\ raw\ scores}{100}$$

Path 2. Cleaning Surface Testing Audit

The ISSA Clean Standard provides details on the cleaning surface testing audit process. Using guidance from Section 4. Protocol for Measuring and Monitoring Cleaning Effectiveness, Custodial, teams must develop audit forms, establish the audit process, and document the level of cleanliness for the facility, using the levels "effective cleaning," "needs improvement," and "ineffective cleaning."

ATP meters

ATP, or adenosine triphosphate, is an enzyme found in living cells. ATP presence on surfaces is an indicator of bacteria and other live pathogens. Therefore, testing surfaces for the presence of ATP is an effective way to determine cleanliness.[113]

ATP testing consists of using handheld meters to determine the amount of ATP remaining on a surface after cleaning. Collect samples by swabbing multiple surfaces and using an ATP meter for the analysis. ATP meters measure hard, nonporous surfaces and cannot be used to measure surface cleanliness of surfaces such as carpeted floors and grout.

Surfaces to test

Include the following high-touch surfaces in the audit: (a) desks and similar work tables; (b) cafeteria or breakroom tables; (c) restroom stalls and stall doors; and (d) sink fixtures and sink surroundings, especially in restrooms.

Other surfaces to consider but which are not required include: floors, drinking fountains, doorknobs or handles, doors, countertops, and handrails

[113] ISSA, "A Clean Assessment," 2022, issa.com/articles/a-clean-assessment/#:~:text=ATP%20meters.,organisms%20in%20the%20camera%20footage.

ATP effectiveness levels

The project must establish ATP Luminance performance ranges (in RLU) for each surface for each level of cleaning effectiveness (effective cleaning, needs improvement, ineffective cleaning). These ranges must be specific to the ATP meter used and can be adjusted using actual performance data from the building.

Scoring

Facilities must achieve a score of "needs improvement" or "effective cleaning." If the audit results in ranking of "ineffective cleaning," teams should use the results to inform on areas of improvement. If those improvements are implemented an additional audit can be performed until the required score of needs improvement is achieved.

DOCUMENTATION

Project types	Option	Path	Documentation
All	All	All	Testing results summary
			Audit or testing date(s)
	Option 1. Facility Maintenance Performance	All	Maintenance level
			Narrative describing the audit process including the spaces audited, levels of scoring used, and how the percentage of maintenance activities considered proactive was assessed
	Option 2. Measure Cleaning Performance	Path 1. Cleaning Appearance Audit	Overall cleaning appearance audit score
			Confirmation audit conducted was in accordance with APPA Leadership in Educational Facilities' Custodial Staffing Guidelines, or equivalent
		Path 2. Cleaning Surface Testing Audit	Overall level of cleanliness testing score
			Confirmation audit conducted was in accordance with ISSA Clean Standard methodology or similar

REFERENCED STANDARDS

- APPA Leadership in Educational Facilities' Custodial Staffing Guideline (https://www1.appa.org/bookstore/store_browse.cfm?categoryid=8)
- APPA Leadership in Educational Facilities' Maintenance Standards (https://www1.appa.org/bookstore/store_browse.cfm?categoryid=8)
- ISSA (International Sanitary Supply Organization), ISSA Clean Standards (issa.com/education/issa-clean-standards/)

Impact Area Alignment

— Decarbonization

☑ Quality of Life

— Ecological Conservation and Restoration

Indoor Environmental Quality Credit

AIR FILTRATION

EQc5

1 point

INTENT

To demonstrate indoor air quality management that meets or exceeds fundamental filtration standards.

REQUIREMENTS

Achievement pathways	Points
Existing Buildings	1
Air Filters	1

Each ventilation system used to meet the *ASHRAE* ventilation rate procedure that supplies outdoor air and/or recirculated air to regularly occupied spaces must meet one of the following:

- Minimum efficiency reporting value (MERV) of 13 or higher, in accordance with *ASHRAE Standard 52.2-2017*
- Equivalent filtration media class of ePM1 50% or higher, as defined by *ISO 16890-2016*, “Particulate Air Filters for General Ventilation — Determination of the Filtration Performance

NOTE: Spaces listed in *ASHRAE Standard 62.1-2022*, Exception to 6.1.4, may be excluded from this requirement.

Filtration media must be maintained and replaced according to the manufacturer’s recommended interval.

REQUIREMENTS EXPLAINED

This credit rewards the projects for using improved system-level filtration as a component of their indoor air quality management. MERV 13 filtration (and ePM1 50%) is becoming standard practice as this level of filtration more effectively captures smaller particles, and many HVAC systems already have been or can be upgraded to accommodate this level of filtration.
For this credit, the MERV 13 filtration (and ePM1 50%) requirement applies to each ventilation system used to meet the *ASHRAE* ventilation rate procedure that supplies outdoor air, recirculated air, or outdoor and recirculated air to regularly-occupied spaces. These are sometimes called central HVAC systems. Existing filtration levels are identified during the

verification of ventilation and filtration requirement for *EQp1: Verification of Ventilation and Filtration*.
MERV 13 filtration is not required for systems that supply air to warehouses or other areas addressed in the *ASHRAE* exemption for outdoor air treatment.

> **Exemption to 6.1.4**
> Systems supplying air for enclosed parking garages, warehouses, storage rooms, janitor's closets, trash rooms, recycling areas, and shipping, receiving, or distribution areas[114]

MERV ratings are defined and tested per *ASHRAE Standard 52.2-2017*. ePM1 50% are defined and tested in *ISO 16890-1:2016*. In the U.S., MERV filtration ratings are the primary rating classification. In Europe, projects commonly use the ISO filtration ratings. Both options are available for compliance with this credit to allow for regional flexibility.

Filter maintenance
Using clean filters on HVAC systems improves system efficiencies and ensures cleaner air for building occupants by properly removing air pollutants.

Maintain and replace filters, per the manufacturer's recommended intervals or as described in the project-specific building readiness plan. Different filter types and brands often have varying maintenance requirements. More frequent replacement may be needed during or after an episodic outdoor event (see *EQc6: Resilient Spaces*).

Facility managers must document all filter replacements and any maintenance required for the filters.

Automatic notifications are not a requirement for the credit. However, having an automated process can lead to more successful maintenance programs. For projects that use a building automation system (BAS), consider installing and programming monitoring points for each outdoor air filter and/or recirculating filter. Alarms, either visual or audible, at the BAS or at the equipment can alert the facility maintenance team when they need to change the filters.

[114] ASHRAE, "ASHRAE Standard 62.1–62.2," n.d., https://www.ashrae.org/technical-resources/bookstore/standards-62-1-62-2.

DOCUMENTATION

Project types	Option	Path	Documentation
All	All	All	Filtration information from *EQp1: Verification and Ventilation*
			Confirm filters are maintained and replaced according to the manufacturer's recommended interval

REFERENCED STANDARDS

- ASHRAE Standard 52.2–2017 (store.accuristech.com/ashrae/standards/ashrae-52-2-2017?product_id=1942059)
- ISO 16890-2016, Particulate Air Filters for General Ventilation, Determination of the Filtration Performance (iso.org/standard/57864.html)

Impact Area Alignment

— Decarbonization

☑ Quality of Life

— Ecological Conservation and Restoration

Indoor Environmental Quality Credit

RESILIENT SPACES

EQc6

1 point

INTENT

To support operational features that increase occupants' capacity to adapt to changing climate conditions and protect them from events that may compromise the quality of the indoor environment and, subsequently, occupant health and well-being.

REQUIREMENTS

Achievement pathways	Points
Existing Buildings	1
Option 1. Management Mode for Episodic Outdoor Ambient Conditions	1
OR	
Option 2. Management Mode for Respiratory Diseases	1

Option 1. Management Mode for Episodic Outdoor Ambient Conditions (1 point)

Assess, plan, and implement the capability to operate an episodic outdoor event management mode as described in *ASHRAE* Guideline 44. The mode shall address varying outdoor conditions or events that could negatively influence indoor air quality, such as wildfire smoke. Include the management mode in the *IPp4: Current Facilities Requirements and O+M Plan*.

OR

Option 2. Management Mode for Respiratory Diseases (1 point)

Assess, plan, and implement the capability to operate an infection risk management mode for the building using *ASHRAE 241-2023*, Section 9, "Operations and Maintenance." Incorporate the building readiness plan in the *IPp4: Current Facilities Requirements and O+M Plan*.

REQUIREMENTS EXPLAINED

This credit addresses a building's ability to remain functional, maintain the quality of the indoor environment, and protect occupant health and well-being during major, episodic, disruptive events such as wildfires, or pandemics.

Through readiness planning, facilities build resilience by enabling operations teams to smoothly transition the building from routine operations to alternative operations that protect indoor air quality, thus increasing the adaptive capacity of both the building and the community.

Leverage information from *IPp1: Climate Resilience Assessment* and *IPp2: Human Impact Assessment* to select applicable option(s) and develop implementation strategy.

Option 1. Management Mode for Episodic Outdoor Ambient Conditions

Episodic outdoor ambient conditions can range from incidents such as the release of toxic chemicals outside a building to the widespread presence of wildfire smoke. Having an episodic outdoor event management mode facilitates the protection of building occupants from these and other outdoor pollution events.

DEVELOPING AN EVENT MANAGEMENT MODE

ASHRAE Guideline 44, Protecting Building Occupants from Smoke During Wildfire and Prescribed Burn Events, specifies enhanced modes of operation to preserve indoor air quality (IAQ) during periods of heightened outdoor air pollution.

Refer to *ASHRAE* Guideline 44 to operate HVAC systems in a smoke-ready mode or other "event management mode." Teams can leverage guidance from Standard 44 to apply similar modes of operation for any events that impact outdoor air quality including increases in nearby construction activity or chemical gas releases. The building owner and facility manager must determine when to apply this mode of operation.

IMPLEMENT BUILDING READINESS PLAN

Preparatory steps and mitigation strategies that a facility will use before, during, and after the episodic outdoor event must be documented in the *IPp4: Current Facilities Requirements and O+M plan*. In *ASHRAE* Guideline 44 this is called a smoke readiness plan.

Option 2. Management Mode for Respiratory Diseases

Following the COVID-19 pandemic, industry experts developed strategies to reduce airborne infectious disease transmission in buildings, for the protection of public health and to facilitate keeping buildings operational during periods of heightened risk. One resulting standard, *ASHRAE Standard 241-2023*, Control of Infectious Aerosols, specifies an infection risk management mode with ventilation and filtration strategies for reducing occupant exposure to airborne pathogens that cause significant personal and economic damage each year.

DEVELOPING AN INFECTION RISK MANAGEMENT MODE

Projects pursuing this option must implement the capability of the building to operate in an Infection Risk Management Mode. This mode provides minimum equivalent clean airflow rates, calculated as the equivalent clean airflow rate per person multiplied by the anticipated number of people in a space. The building owner and facility manager must determine when to apply this mode of operation.

IMPLEMENT BUILDING READINESS PLAN

Preparatory steps and mitigation strategies that a facility will use before, during, and after an infection risk event (or period) must be documented in *the IPp4: Current Facilities Requirements and O+M plan*. In *ASHRAE Standard 241-2023* this is called a building readiness plan.

DOCUMENTATION

Project types	Option	Path	Documentation
All	Option 1. Management Mode for Episodic Outdoor Ambient Conditions	All	Smoke Readiness Mode OR Documents confirming management mode design and sequence of operations
	Option 2. Management Mode for Respiratory Diseases	All	Infection Risk Management Mode OR Documents confirming management mode design and sequence of operations
			Equivalent clean airflow calculator

REFERENCED STANDARDS

- None

Impact Area Alignment

— Decarbonization

☑ Quality of Life

— Ecological Conservation and Restoration

Indoor Environmental Quality Credit

GREEN CLEANING

EQc7

1–2 points

INTENT

To foster a healthy building interior and site and to reduce the potential negative impact of cleaning, disinfecting, and maintenance products and processes on cleaning personnel, building occupants, and the environment.

REQUIREMENTS

Achievement pathways	Points
Existing Buildings	1–2
Option 1. Certified Cleaning Service	1
AND/OR	
Option 2. Cleaning Products and Materials	1

Option 1. Certified Cleaning Service (1 point)

Clean the project with a cleaning service certified and in good standing under one of the following:

- *Green Seal's Environmental Standard for Commercial Cleaning Services* (GS-42)[115]
- *ISSA*, *The Worldwide Cleaning Industry Association's Cleaning Industry Management Standard for Green Buildings* (CIMS-GB) and Sustainability[116]
- Local equivalent for projects outside the U.S.

In addition, work with the cleaning contractor to create goals and strategies for conserving energy, water, and chemicals during cleaning and integrate the goals and strategies in the green cleaning policy as addressed in *IPp3: Operations Assessment and Policy*.

AND/OR

[115] Green Seal, "Commerical and Institutional Cleaning Services," n.d., https://greenseal.org/standards/gs-42-commercial-and-institutional-cleaning-services/.
[116] CIMS, "CIMS Green Building Certification," n.d., https://cims.issa.com/green-building/.

Option 2. Cleaning Products and Materials (1 point)

At least 75% of all cleaning products and materials, by cost, must meet at least one of the following standards. Compliance may be demonstrated from a minimum of three months of purchases during the 12-month reporting period.

For projects outside the U.S., any Type 1 eco-labeling program as defined by ISO 14024:1999 or later developed by a member of the Global Ecolabelling Network is acceptable as a local equivalent to the standards below.

Cleaning and degreasing products

- *Environmental Protection Agency (EPA) Safer Choice Standard*
- *Green Seal* (GS-37 for general purpose, bathroom, glass, and carpet cleaners used for industrial and institutional purposes; GS-40 for industrial and institutional floor care products; GS-52/53 for specialty cleaning products)
- *UL ECOLOGO® 2700* (UL 2792 for cleaning and degreasing compounds; UL 2759 for hard-surface cleaners; UL 2795 for carpet and upholstery care; UL 2777 for hard-floor care; UL 2796 for odor control additives; UL 2791 for drain or grease trap additives; UL 2798 for digestion additives for cleaning and odor control)
- Cleaning product generated on-site via a cleaning device that complies with one of the above standards and uses only ionized water, stabilized aqueous ozone, or electrolyzed water

Hand soaps and hand sanitizers

- *EPA Safer Choice Standard*
- *Green Seal* (GS-41 for hand cleaners and hand sanitizers for industrial and institutional hand cleaners)
- *UL ECOLOGO®* (UL 2784 for hand cleaners and hand soaps; UL 2783 for hand sanitizers)
- No antimicrobial agents (other than as a preservative) except where required by health codes and other regulations (e.g., food service and health care requirements)

Disinfectants

- EPA-registered disinfectant product formulated with only the active ingredients identified by EPA's Design for the Environment Logo for Antimicrobial Pesticide Products[117]
- Ultraviolet-C disinfecting device manufactured in an EPA-registered establishment. These devices can be included regardless of when purchased. For cost, use the cost prorated over the life of the device.

[117] EPA, "Learn About Design for the Environment (DfE) Certification," n.d., https://www.epa.gov/pesticide-labels/learn-about-design-environment-dfe-certification.

Janitorial paper

- 40% or greater post-consumer recycled content
- *Green Seal* (GS-01 for sanitary paper products)
- *UL ECOLOGO®* (UL 175 for sanitary paper products) if product has a minimum of 30% recycled content
- Janitorial paper products derived from agricultural waste and/or tree-free fibers and certified by the Roundtable for Sustainable Biomaterials standard for advanced products, or under *ANSI/LEO-4000, "American National Standard for Sustainable Agriculture"*[118]
- FSC certification (FSC 100% or FSC Recycled), PEFC certification, or SFI Chain of Custody certification

Bags and liners for trash or compostable organic materials

- 40% or greater post-consumer recycled content for plastic trash can liners
- *ASTM D6400* and *EN 13432* standard specifications for compostable plastics
- Biodegradable Products Institute certified compostable
- *Green Seal* (GS-60 for plastic trash bags and can liners)

REQUIREMENTS EXPLAINED

This credit encourages the use of healthier and more environmentally preferrable cleaning products and materials. Option 1 encourages cleaning service providers to follow one of the cleaning industry's standards for green cleaning service. Option 2 encourages adherence to the green cleaning policy and verifies usage of greener cleaning products.

Option 1. Certified Cleaning Service

This option requires the current cleaning vendor to hold a third-party certification for their green cleaning practices. This requirement only applies to areas cleaned under building management control.

Two third-party programs are available:

- *Green Seal's Environmental Standard for Commercial Cleaning Services* (GS-42)
- *International Sanitary Supply Association* (ISSA) *Cleaning Industry Management Standard for Green Buildings* (CIMS with Green Building Certified designation)

[118] Leadership in Environmental Opportunities (LEO), "Sustainability Services: Environment, Social Equity, Economy," n.d., https://www.leosustainability.org/sustainability-services.

Documentation, such as a certification number, can be requested from the service provider to verify validity and good standing status.

Projects outside of the U.S. may demonstrate compliance by using a local equivalent program.

The project must work with the certified cleaning vendor to create goals and strategies for conserving energy, water, and chemicals during cleaning. The goals and strategies must be addressed in the *IPp3: Operations Assessment and Policy*.

Option 2. Cleaning Products and Materials

Many cleaning products contain agents that may pose risks to human health and damage interior finishes. This credit incorporates third-party standards that demand a higher level of environmental compliance than typical for commonly used cleaning products and materials. Ecolabels serve as a helpful tool for purchasers to quickly and easily identify "greener" products. Products certified by third-party standards include ingredients that are safer for both human health and the environment.

Project teams must track all cleaning products and materials purchased and demonstrate that at least 75% of purchases, by cost, meet one of the identified standards for a minimum of three months during the 12-month reporting period.

Tracking during reporting period and maintaining records

Include all purchases made by vendors, contractors, and building staff (within building management control) that are used to clean the building, demonstrate the percentage of sustainable cleaning products and materials purchased, and state which criteria the product or material meets. Manufacturer documentation or product labels typically identify any green cleaning standards the product meets. Some standards, such as *Green Seal* and *EPA Safer Choice Standard*, have online databases that can be used to verify their certification status.

Teams must document and report all cleaning products and materials purchased by the project team during a minimum three-month period. The three-month period can be any three months within the year but must fall entirely within the specified 12-month reporting.

DOCUMENTATION

Project types	Option	Path	Documentation
All	Option 1. Certified Cleaning Services	All	Copy of contract with certified vendor
			Documentation demonstrating that vendor is certified under *GS-42* or *CIMS-GB*, or local equivalent certification
			Confirmation that goals and strategies for conserving energy, water, and chemicals during cleaning have been integrated into the Green Cleaning policy
	Option 2. Cleaning Products and Materials	All	Green Cleaning Calculator
			Percent, by cost, of cleaning products and materials that meet sustainability criteria (%)

REFERENCED STANDARDS

- None

Impact Area Alignment

— Decarbonization

☑ Quality of Life

☑ Ecological Conservation and Restoration

Indoor Environmental Quality Credit

INTEGRATED PEST MANAGEMENT

EQc8

1 point

INTENT

To minimize pest problems and exposure to pesticides.

REQUIREMENTS

Achievement pathways	Points
Existing Buildings	1
Option 1. In-House Integrated Pest Management Program	1
OR	
Option 2. Certified Integrated Pest Management Service	1

Option 1. In-house Integrated Pest Management Program (1 point)

Have in place an integrated pest management (IPM) plan for the building and grounds. The IPM plan must include the following elements:

- **Identification of an IPM team**: Identify roles for building management, pest management contractors, maintenance staff, and liaisons with building occupants. Review social responsibility reports for any pest management service providers to ensure they are using a legal and properly trained workforce and addressing other social responsibility aspects.
- **Provisions for annually identifying and monitoring pests**: Specify inspections, pest population monitoring, and a reporting system that allows occupants, maintenance staff, and others to report evidence of pest infestations.
- **Pest management thresholds**: Specify thresholds to take pest management actions for all pests likely to be encountered in the building. Include a process for modifying action thresholds, as necessary, through active communication between occupants and the IPM team.
- **Pest control methods**: Identify pest management thresholds to be used when action thresholds are exceeded. For each pest, list all potential control methods considered and preferentially adopt the lowest-risk options, considering the risks to the applicator, building occupants, and the environment, as well as the risks of incomplete pest control. When pesticides must be used, first specify the use of least-risk pesticides.

- **Nonchemical pest preventative measures**: Use nonchemical pest preventative measures either designed into the structure or implemented as part of the pest management activities.
- **Identification of least-risk pesticides**: Determine least-risk pesticides based on inherent hazard and exposure potential, using a hazard review process such as the *San Francisco Pesticide Hazard Screening Protocol*.[119] If a pesticide that is not in the least-risk category is selected, document the reason.
- **Documentation protocol**: Choose a mechanism for documentation of inspection, monitoring, prevention, and control methods and for evaluation of the effectiveness of the IPM plan. Specify the metrics by which performance will be measured and describe the quality assurance process to evaluate and verify successful implementation of the plan.
- **Communication protocol**: Establish a strategy for communications between the IPM team and the building occupants (for schools, faculty and staff). This strategy must include education about the IPM plan, participation in problem-solving, feedback mechanisms (e.g., a system for recording pest complaints), tracking repairs aimed at preventing pests, and a provision for notification of pesticide applications. At a minimum, the facility manager must notify any building occupant or employee who requests the IPM plan and post a sign at the application site (with pesticide name, EPA registration number [or local equivalent], and date of application), which must remain in place for at least 24 hours prior to application and 24 hours after notification.

OR

Option 2. Certified Integrated Pest Management Service (1 point)

Use a fully licensed pest management contractor to provide IPM services for the building. The company must be certified and in good standing with *GreenPro*,[120] *EcoWise*,[121] *GreenShield*,[122] or a local equivalent, and the service provided must constitute a certified service. If chemical pesticides are under consideration for landscape areas within the project boundary, use a contractor with appropriate licensure (e.g., as a pest control advisor or qualified applicator) to manage these areas.

REQUIREMENTS EXPLAINED

This credit encourages the use of an integrated pest management (IPM) plan using in-house, trained personnel, or hiring a certified IPM provider to address pests in and around the project.

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[119] San Francisco Environment Department, "Pest Management for City Departments," n.d., https://sfenvironment.org/pest-management-for-city-departments.
[120] Quality Pro, "The Credentials: GreenPro," n.d., https://www.npmaqualitypro.org/available-credentials/greenpro/.
[121] Ecowise Certified, "Index," n.d., https://www.ecowisecertified.com/index.html.
[122] Green Shield Certified, n.d., https://greenshieldcertified.org/.

Pests are organisms that pose health, environmental, economic, or aesthetic risks to buildings and sites. Invasive species and non-native organisms can cause significant harm if not properly managed. Their control is essential for protecting occupant health. Improper chemical applications, however, can lead to adverse reactions if humans and animals are exposed to pesticides.

Integrated pest management (IPM) is a sustainable approach to pest management that combines biological, cultural, physical, and chemical tools to minimize economic, health, and environmental risks.[123] When pests are accurately identified and their activity monitored, pesticide applications can be limited to targeted species in specific locations instead of sitewide. IPMs should focus on exclusion, use pest control methods and products sparingly, and partner with qualified and licensed pest professionals.

Option 1. In-House IPM Program

For projects that create an in-house program, teams must clearly define the scope, roles and responsibilities, actions, and communication plan for program implementation across the building and site. The IPM Plan must identify all applicable areas under building management control.

The IPM Plan must guide the implementation team on how to effectively manage pests to avoid infestation. Include the following sections in the plan.

IDENTIFICATION OF AN IPM TEAM

Identify roles for key stakeholders, including the building management team, maintenance staff, and tenants (if applicable). Where pest management contractors are employed as part of the in-house program, projects must use properly trained contractors with legally employed staff.

PROVISIONS FOR ANNUALLY IDENTIFYING AND MONITORING PESTS

Regular inspections can help teams identify minor infestations before they become a major issue. The IPM must outline, at a minimum, an annual inspection process. If necessary, perform more frequent inspections (such as monthly or seasonal), depending on the types of pests and the project's location.

[123] Office of Pesticide Programs, United State Environmental Protection Agency, *Integrated Pest Management in Buildings* (2011), epa.gov/sites/default/files/2015-11/documents/ipm_in_buildings.pdf.

PEST MANAGEMENT THRESHOLDS

The IPM must clearly identify the threshold that requires action by the IPM team. Determining the action threshold will be an important aspect of the IPM. For many pests, the threshold may be low. Bed bugs, for example, are difficult to manage once there is an infestation, and require immediate action to address the pests. Similarly, rats can resist multiple extermination attempts and should have a very low action threshold to manage an infestation.

The action thresholds may vary over time. Provide flexibility in the IPM to address modifications to the action thresholds. This is critical in maintaining a pest-free environment.

Along with modifications from the IPM team, the process must include the integration of occupant reports of observed infestations or increased pest activity. Clearly identify the process for modifying action thresholds, including informed occupant reports and IPM team observations.

PEST CONTROL METHODS

Pests can cause property damage, spread diseases, and contaminate food sources. Therefore, it is critical to implement pest control methods immediately after exceeding the action threshold. For each identified pest, describe all possible control methods. In all cases, give preference to the lowest-risk option.

When determining the lowest-risk option, considerations should include the building occupant's health, the natural environment, and the risk to the applicator. Considerations for small applications of pesticides may control the population and have limited risk to the applicator, the occupants, and the environment.

NONCHEMICAL PEST PREVENTATIVE MEASURES

Nonchemical pest control measures rely on plants, herbs, natural elements, and the use of natural predators as methods of pest control. Companion planting nurtures a balanced environment and keeps many invasive pest populations away from a building or site. Providing habitats for pest predators, like owls and birds, can also naturally control pest infestations.

Additional measures, like closing gaps in the building envelope, moisture control, and protecting finishes on exposed wood, provide effective methods of control. For nonchemical measures, like the use of traps, detail the requirements for effective management within the IPM plan.

IDENTIFICATION OF LEAST-RISK PESTICIDES

Wherever possible, apply the least-risk pesticide or preventative measure. Project teams may use the *San Francisco Pesticide Hazard Screening Protocol* to classify the hazardous level of a

product using the Tier 1, Tier 2, and Tier 3 hazard tiers.[124] Other hazard screening programs may be used to determine the potential hazard categories of pesticides and to identify lowest-risk pesticides, such as the EPA risk assessment, or other screening programs from local agencies.

In some scenarios, the least-risk pesticide may not fully address the infestation. Projects must document the reason for using a non-least-risk pesticide, including the name of the species targeted, name of the pesticide used, and the amount of product used during the application.

DOCUMENTATION PROTOCOL

Provide formal documentation of all communication, inspections, monitoring, prevention measures, and control methods. Reviewing the documented control measures allows teams to evaluate and improve the IPM plan.

Projects must identify performance metrics that accurately assess the IPM plan and its effectiveness. An example of a key performance indicator may be that teams always use the least-risk pest control methods for the reporting period. If an infestation warrants the application of a higher-risk pesticide, reviewing the documentation around the specific occurrence leads to improved methods for monitoring and prevention.

COMMUNICATION PROTOCOL

Include a communication plan within the IPM Plan. The communication plan requires notification to building occupants when high hazard and medium hazard pesticide applications occur. Applications considered “low-hazard” (as determined using a hazard review process) do not require notification.

> **Rodenticides**
> While rodenticides are not considered least toxic under any circumstances, if they are dispensed in locked, anchored bait boxes they do not require notification because they are typically placed for extended periods and the risk of non-target exposure is reduced. Information on the use of rodent baits must be available by request.

The plan must also educate the building occupants on the sustainable practices used for pest management and feedback mechanisms that allow occupants to alert the facility team for any observed pest issues. Include details for clear and timely communication with building

[124] San Francisco Environment Department, Pesticide Hazard Review Process, “Guide to San Francisco’s Reduced Risk Pesticide List,” 2013, www.sfenvironment.org/media/6272.

occupants, including identification of the facility maintenance member/s responsible for communicating all relevant maintenance events and activities to occupants.

Option 2. Certified IPM Service

This option requires the current pest management service to hold a third-party certification for their integrative pest management practices. This requirement only applies to areas under building management control.

The following third-party programs are available:

- GreenPro
- EcoWise
- GreenShield
- Local equivalent

Documentation, such as a certification number, can be requested from the service provider to verify validity and good standing status.

Landscape areas

For landscaped areas, the contractor that manages these areas must have an appropriate pest management licensure, such as pest control advisor or the qualified applicator.

DOCUMENTATION

Project types	Option	Path	Documentation
All	Option 1. In-House IPM Program	All	Integrated pest management plan
	Option 2. Certified IPM Service	All	Copy of contract with certified integrated pest management vendor
			Documentation demonstrating the contractor's GreenPro, EcoWise, GreenShield, or local equivalent certification
			Confirmation that a contractor with appropriate licensure is used for landscape areas within the project boundary (e.g., Pest Control Advisor or Qualified Applicator) OR Confirmation that chemical pesticides are not used for landscape areas within the project boundary

REFERENCED STANDARDS

- San Francisco Environment Department, “Guide to San Francisco’s Reduced Risk Pesticide List” (sfenvironment.org/media/6272)

PROJECT PRIORITIES (PR)

OVERVIEW

The historical Innovation credit category has evolved in LEED v5 to become the Project Priorities (PR) credit category. The goal is greater flexibility for projects to address their unique context and priorities, including typology, culture, location, areas of innovation and individual performance objectives. Credits can be added to the library as they are developed, enabling an adaptive and agile response to rapidly evolving industry knowledge, developing technologies and emerging innovative solutions, and empowering projects to pursue improvements most meaningful to their specific goals and circumstances.

For example, the evolution of the building industry over the last 15 years has fostered a need for more sector-specific sustainability metrics. Additionally, greater adoption of reporting has prompted real estate organizations to establish targets in areas including decarbonization, occupant health, and biodiversity. The PR credit category aims to provide recognition for projects pursuing these goals outside of the established credits in LEED v5.

New metrics and strategies can be continually applied to LEED without waiting for the next version to debut, allowing for a more nimble and dynamic development of credits and compliance paths between releases of new rating system versions.

By embracing flexibility and encouraging continuous innovation, the PR credit category ensures that LEED remains a dynamic tool for advancing sustainability. It empowers project teams to align their efforts with evolving best practices, sector-specific goals, and emerging global challenges, ensuring that buildings remain resilient, forward-thinking, and impactful over time.

Impact Area Alignment

- ☑ Decarbonization
- ☑ Quality of Life
- ☑ Ecological Conservation and Restoration

Project Priorities Credit

PROJECT PRIORITIES

PRc1

1–10 points

INTENT

To promote the achievement of credits that address geographically sensitive or adaptation-specific environmental, social impact, and public health priorities. To encourage projects to think creatively to test and accelerate new sustainable building practices and strategies.

REQUIREMENTS

Achievement pathways	Points
Existing Buildings	1–10
Regional Priority	1–10
Project-Type Priorities	
Exemplary Performance	
Pilot Credits	
Innovative Strategies	
LEED Professional	

Achieve any combination of the following for a maximum of 10 points:

Regional Priority

Achieve a regional priority credit from USGBC's credit library. These credits have been identified by USGBC as having additional regional importance for the project's region.

Project-type Priorities

Achieve a project-type credit from USGBC's credit library. These credits have been identified by USGBC as addressing unique needs for the given adaptation or building application.

Exemplary Performance

Achieve an exemplary performance credit from USGBC's credit library. These credits have been identified by USGBC as going above and beyond an existing LEED v5 prerequisite or credit in the LEED v5 priority areas of scale, decarbonization, resilience, health, social impact, and/or ecosystems.

Pilot Credits

Achieve a pilot credit from USGBC's credit library.

Innovative Strategies

Achieve significant, measurable, environmental performance using a strategy not addressed in the LEED v5 green building rating system.

Identify all of the following:

- The intent of the proposed innovation strategy
- Proposed requirements for compliance
- Proposed submittals to demonstrate compliance
- The design approach or strategies used to meet the requirements

LEED AP

At least one on-site principal participant of the property team (e.g., owner, owner's representative, or facility manager) must be a LEED AP Operations + Maintenance (LEED AP O+M).

REQUIREMENTS EXPLAINED

Teams earn recognition for implementing innovative measures addressing distinct focus areas in their projects through the Project Priorities credit. This credit offers multiple pathways for projects to address their respective priorities and go beyond the requirements listed in other LEED credits. This flexibility enables teams to effectively address the distinct needs of their projects, fostering innovation and adaptability. Each project can chart its path forward based on its own goals.[125]

Projects prioritize efforts based on their unique contexts. Teams can choose the best credits for addressing their project's goals and targets. Some projects may concentrate most of their effort on a single priority area, including regional priority or exemplary performance. Other projects might choose to address different priority areas more uniformly.

For example, an existing health care facility in an arid climate might prioritize water conservation and/or heat mitigation and focus on implementing strategies that minimize water usage and/or reduce the heat island effect. Similarly, an existing school building in a rural area might have a variety of sustainable priorities to address, such as optimizing energy performance, enhancing

[125] PNNL, "Green buildings," n.d., www.pnnl.gov/explainer-articles/green-buildings.

rainwater management, providing good indoor environmental quality to students and teachers, and promoting methods for waste reduction.

To achieve the maximum 10 points available, project teams should incorporate as many credits under each pathway as they prefer, using any combination of project type credits, exemplary performance credits, regional priorities, innovation strategies, and pilot credit pathways, as well as including a LEED AP as a key member of the project team.

Project Type

Achieve a project-type credit from the USGBC's Project Priority Library. USGBC has identified these credits as addressing unique needs for the given adaptation or building application.

> **Example strategies: Project type**
> A data center project might focus on project type credits specific to data centers that address energy efficiency, advanced cooling technologies, and renewable energy integration.

Exemplary Performance

Achieve exemplary performance requirements of an existing LEED v5 credit eligible for exemplary performance, as specified in USGBC's Project Priority Library. Exemplary performance earns points by exceeding the credit requirements or achieving the next incremental percentage threshold for the credit.

Regional Priority

Identify the environmental, social impact, and/or public health priorities for the project's location and achieve LEED credits that address those regional priorities. Regional Priority credits address geographically specific environmental and/or social priorities for the project's region.

Innovation Strategies

Achieve innovation credits from the USGBC's Project Priority Library. Alternatively, achieve innovation credits by adopting new strategies not addressed in the LEED rating system that demonstrate reduced environmental impacts, increased decarbonization, and improved social impacts. Projects will need to submit documentation that identifies the intent of the proposed innovation credit, proposed requirements for compliance, proposed submittals to demonstrate compliance, and the design approach or strategies used to meet the requirements.

Pilot Credits

Achieve pilot credits from the USGBC's Project Priority Library. USGBC has identified these credits to explore new aspects of sustainable design, building, and construction and potentially include in future additions of the LEED rating system.

LEED AP

A LEED AP with an O+M specialty is an essential resource in guiding project teams through the LEED certification process. By promoting collaboration among team members, the LEED AP ensures a clear understanding of the LEED rating system and the interactions between prerequisites and credits.

The LEED AP on the project team must have their credential active during the 12-month reporting period. A key member of the on-site property team must have a LEED AP O+M professional credential. While all LEED AP credentials provide an understanding of the green building community and certification requirements, team members with this specialty have extensive knowledge and experience with the prerequisites and credits pursued for an Existing Buildings project.

LEED APs without specialty do not qualify for this credit.

DOCUMENTATION

Project types	Option	Path	Documentation
All	Project type		Project type narrative
			Project type submittals
	Exemplary performance		Exemplary performance credit and threshold are documented in the credit pursuing an EP point
	Regional priority		No additional documentation is required for Regional Priority
	Innovation strategies		Narrative describing the innovation, including details
			Any documentation, including calculations, submittals, case studies, etc. that supports the innovation strategy
	Pilot credit		Upload confirmation that the project is registered for a Pilot credit
			Complete and upload the pilot credit survey
			Complete and upload all pilot credit submittals
	LEED AP		Full name of LEED AP with specialty
			Specialty credential of the LEED AP
			GBCI Credential Number
			Confirmation that the LEED AP is an on-site principal participant of the property team

REFERENCED STANDARDS

- None

APPENDICES

APPENDIX I: LEED PLATINUM REQUIREMENTS

LEED O+M Platinum Requirements	
Highly energy efficient	*EAc2: Optimized Energy Performance*: Earn seven points or equivalent
Low operational emissions	*EAc1: Greenhouse Gas Emissions Reduction Performance*, Option 1: Earn a minimum of two points or equivalent
Energy use emissions reduction	*EAc1: Greenhouse Gas Emissions Reduction Performance*, Option 2 AND/OR Option 3: Earn a minimum of two points
Plans for further operational emissions reductions	*EAc5: Decarbonization and Efficiency Plans*: Earn two points

APPENDIX II: SITE EUI TARGETS

Targets for the project's building type(s) and climate zone are referenced to *ASHRAE 100-2024*, "Energy Efficiency in Existing Buildings," Addendum c, Appendix A, multiplying by the operating shift normalization factor (S) in *ASHRAE 100-2024*, Table 7-7. For projects with multiple building activities, targets shall be calculated using the weighted average of the targets for each building activity.

Targets are referenced to *ASHRAE 100-2024*, Table B-1 ("Alternative Building Activity Site Energy Use Intensity Targets"); *ASHRAE 100-2024*, Table B-3 ("Alternative Building Activity Electricity Site Energy Use Intensity Targets"); and/or *ASHRAE 100-2024*, Table B-4 ("Alternative Building Activity Fossil-Fuel Site Energy Use Intensity Targets").

Site energy use intensity (EUI) targets: *ASHRAE 100-2024*, Table B-1

Source EUI targets: Calculate by multiplying the site EUI targets for fuel (*ASHRAE 100-2024*, Table B-4) and electricity (*ASHRAE 100-2024*, Table B-3) by the associated source-to-site ratios for natural gas and electricity.

Greenhouse gas emissions intensity targets: Calculate by multiplying the site EUI targets for fuel (*ASHRAE 100-2024*, Table B-4) and electricity (*ASHRAE 100-2024*, Table B-3) by the associated U.S. Environmental Protection Agency (EPA) national CO_2 equivalent (CO_2eq) emissions factors published for natural gas and electricity from the most recent published year.

On-site combustion emissions intensity targets: Calculate by multiplying the site EUI targets for fuel (*ASHRAE 100-2024*, Table B-4) by the U.S. EPA national CO_2 equivalent (CO_2eq) emissions factors published for natural gas.

Table 1. Building category classifications

No.	Building activity	Building category
1	Admin/professional office	Category 1
2	Bank/other financial	Category 1
3	Government office	Category 1
4	Medical office (nondiagnostic)	Category 1
5	Mixed-use office	Category 1
6	Other office	Category 1
7	Laboratory	Category 2
8	Distribution/ship center	Category 1
9	Nonrefrigerated warehouse	Category 1
10	Convenience store	Category 2
11	Convenience store + gas	Category 2
12	Grocery/food market	Category 1
13	Other food sales	Category 1

No.	Building activity	Building category
14	Fire/police station	Category 1
15	Other public order/safety	Category 1
16	Medical office (diagnostic)	Category 1
17	Clinic/other outpatient health	Category 2
18	Refrigerated warehouse	Category 2
19	Religious worship	Category 1
20	Entertainment/culture	Category 2
21	Library	Category 1
22	Recreation	Category 1
23	Social/meeting	Category 1
24	Other public assembly	Category 1
25	College/university	Category 1
26	Elementary/middle school	Category 1
27	High school	Category 1
28	Preschool/daycare	Category 1
29	Other classroom education	Category 1
30	Fast food	Category 1
31	Restaurant/cafeteria	Category 1
32	Other food service	Category 1
33	Hospital/inpatient health	Category 2
34	Nursing home/assisted living	Category 2
35	Dormitory/fraternity/sorority	Category 2
36	Hotel	Category 2
37	Motel or inn	Category 2
38	Other lodging	Category 2
39	Vehicle dealership	Category 1
40	Retail store	Category 1
41	Other retail	Category 1
42	Post office/postal center	Category 1
43	Repair shop	Category 1
44	Vehicle service/repair shop	Category 1
45	Vehicle storage/maintenance	Category 1
46	Other service	Category 1
47	Strip shopping mall	Category 1
48	Enclosed mall	Category 1
49	Bar/pub/lounge	Category 1
50	Courthouse/probation office	Category 1
51	Mobile home	Category 1
52	Single-family (detached)	Category 2
53	Single-family (attached)	Category 2
54	Apartment building (2–4 units)	Category 2
55	Apartment building (5+ units)	Category 2

APPENDIX III: SURVEY RESPONSE REQUIREMENTS

Required response rate for survey

Equation 1.

Response rate for projects with 500 or fewer occupants = 15%
Response rate for projects with more than 500 occupants =
*100 * (0.15/square root [occupancy/500])*

Examples

For a project with 200 occupants, the required response rate = 15% of 200. At least 30 survey responses are required.

For a project with 800 occupants, the required response rate = 100 * (0.15/square root [800/500]) = 11.86% of 800. At least 95 survey responses are required.

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