

LEED v4

User Guide

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WELCOME TO LEED v4

[play video]

Demanding more from our buildings



Rick Fedrizzi
CEO and Founding Chair
U.S. Green Building Council

To the green building community:

By now, you've heard that the newest update to LEED, LEED v4, went live in November 2013 at USGBC's annual Greenbuild International Conference and Expo in Philadelphia. Voted on and passed by USGBC's membership, the changes to LEED herald the next era for the built environment in which we're collectively scaling up and demanding more from the places where we live, work and play. We're demanding stronger energy performance, better materials, increased water efficiency, and accounting for human experience. That spirit is captured in LEED v4.

When LEED launched 13 years ago, we knew it couldn't be a static rating system. It would need to change and evolve, become more stringent and push project teams further. What amazed us was how quickly—and how significantly—we were able to increase LEED's rigor. The green building industry is one of impacts and innovation. It moves fast, with new technologies and strategies emerging in nearly every green building project. LEED v4 is as much a testament to the achievements of LEED project teams around the world as it is to USGBC's own ambition to create significant global and local change through resource-efficient, cost-effective green buildings. It's an opportunity to recalibrate our expectations for green buildings, providing a new "normal" and a new "extraordinary."

LEED v4 features new market sectors that address the unique needs of specific building types, from data centers to existing school buildings, and revamped credits that call for higher achievement and performance in regard to resource-savings and emissions abatement. Designed to challenge project teams and reward exceptional performance, LEED v4 wasn't created to be "easy." However, it was created to be achievable—and to make sure that the rating system's tools and processes didn't stand in the way of a project team's success. To make sure of that, we opened up a "beta" period for interested projects to test-drive the tools and new rating system features in LEED v4. We've had 112 projects participate, ranging from elementary schools to corporate headquarters.

In the pages that follow, you'll read highlights on LEED v4 that will help you gear up to apply it to your projects. There are a number of other resources that can assist

you, from our webinar series (usgbc.org/articles/available-now-leed-v4-education), to freshly designed reference guides, to a suite of up-to-the-minute articles on usgbc.org.

Whether you're a builder, owner, architect, consultant, advocate, project team member or just someone who thinks where you spend most of your time should be a healthier, more sustainable place, we thank you for the important role you've played in advancing the green building movement. I hope you'll join us as we move forward with a new benchmark for sustainability— and that you shape it and grow it in ways that only you can. LEED v4 raises the bar on our buildings and on leadership, but that wouldn't be the case without you. I like to say that every story about a green building is about people, and that holds true for LEED v4, too. Your incredible projects, innovations and products have made LEED v4 possible. I can't wait to see how you bring it to life.

Better buildings are our legacy



A building is a collection of systems that creates a whole. It is an organism. Similar to the human body, each system has a different role, but they all must work together so that the body can perform. One system cannot operate properly without the other. By honoring these interconnections, buildings can be built and operated in a more sustainable and efficient way. By bringing the right people to the table, decisions can be made that position the building for excellence in operational performance.

LEED v4 is a sophisticated way of looking at buildings' systems and finding the synergies that not only help us do less bad on a scale unmatched by any previous versions of the rating system, but do so in manner that makes things more efficient for the teams implementing these projects.

LEED v4 leverages integrative process to help project teams better understand the interconnectivity that exists throughout building systems and the phases of building design and construction. From that point, the LEED credits work with one another to push for greater transformation throughout the built environment, from the buildings themselves to the products and materials that are used to build them, from designing new buildings to operating those that already exist.

Transformation on a larger scale

The mission of LEED remains the beneficial transformation of design, construction, operations and maintenance of buildings, not just for some, but for all. To that end, a critical part of LEED v4 has been making sure that it is flexible enough to be applicable on a wide scale that is not limited by location or building type.

One global LEED

LEED has become a common language of best practices in buildings around the world. In the new rating system, project teams will find greater recognition of regional context with the incorporation of regional and local equivalent standards or programs usable to achieve the same credit intent. Project teams will also see that metric units have been included in all tools and resources.

Today, LEED projects can be found in over 140 countries and territories.

New market sectors

The building industry now uses the LEED rating system on a wider variety of project types than ever before. From stadiums to convention centers, commercial offices to hospitals, each space type has unique needs and challenges when using LEED. LEED v4 addresses 21 different market sector adaptations - each reviewed by market leaders either owning or designing or operating those space types - to identify and address the unique needs of each market. LEED v4 provides new solutions for the following sectors:

- o existing schools
- o existing retail
- o data centers (new and existing)
- o warehouses and distribution centers (new and existing)
- o hospitality
- o mid-rise residential

Using LEED v4

Building a better LEED user experience means a new approach to documentation, reference guides and education. LEED v4 builds documentation requirements based on lessons learned from previous versions of the system that are designed to save project teams time while creating tools and resources that focus on the needs of those who use them. It also means testing the new program to ensure that it functions as it was designed to. Think of it as a commissioning process for LEED itself. USGBC has worked with over 100 projects testing LEED v4 through the LEED v4 Beta Program to refine the program tools and resources. When LEED v4 launches, the building community will notice several key updates.

Documentation

For most, paperwork is necessary but not relished. With this in mind, USGBC focused on simplifying the work for project teams so they can focus on achieving credits rather than documenting them. The documentation forms have gone through over a year of development and several rounds of review to ensure that the documentation process does not create unnecessary burden for project teams. Fields within forms have been minimized wherever possible, and are more focused on industry standard documentation, reducing the need to create documents simply for LEED certification.

1. **Combined forms for prerequisites and credits.** Reduces the amount of overlap and duplicative work.
2. **Downloadable calculators.** Increased transparency to provide LEED users a better understanding of the equations behind the calculations.
3. **Less documentation needed.** There are many instances where industry standard documentation provides all of the information needed to confirm credit compliance and submittal documents have been modified to reflect that.

Reference guides

When project teams have a question about LEED requirements, they reach for the reference guide. Completely redesigned for LEED v4, the reference guides have been restructured to focus on the most useful information for project teams. First the guides were evaluated to determine ways to make them function better as full guides, instead of a collection of separate credit-specific explanations. To support this, USGBC added the following:

Getting Started section: This new segment at the beginning of each guide goes beyond what's found in the introduction and includes a work-plan framework that guides project teams through the steps leading up to certification.

Navigation tools: Information is only helpful if you can find it. Throughout the guides, we've identified connections—so when there is one credit that connects to another, we let you know. If a credit references information in the *Getting Started* section, we let you know that too. Using icons and other wayfinders, we point out relationships so that project teams can benefit from the full picture.

At the credit level, the focus is on clarity, making sure project teams can quickly and easily see what each credit requires and how to achieve it. Supporting that goal are several new sections within each credit.

In addition to the traditional digital and hard copy versions, a web-based version of the LEED v4 reference guides that is built into the credit library will be available for purchase. This new format combines all of the information that's available in the

traditional versions of the guides with all of the benefits of the fully searchable credit library. It will also give project teams access to a new set of modules developed specifically to supplement the reference guide content, including interactive videos, tutorials, presentations and documents. Over time, USGBC will continue to add content to the web-based reference guides, creating a continually growing body of knowledge in one convenient location.

LEED has become a marketplace standard of best practice in designing, building, operating and maintaining buildings around the world. v4 is the LEED of the future, where we challenge the marketplace of shelter to go further, to make the next great leap toward better, cleaner, healthier buildings.

Improved environmental outcomes

What do we want LEED projects to accomplish? That is the central question that has driven our technical development for LEED v4. As a market transformation tool, LEED engages building project teams in a way that connects strategies to a defined set of goals – or the things we ultimately want LEED projects to accomplish. LEED’s goals are referred to as “impact categories.” Seven impact categories have been selected to provide the framework for the technical development of LEED version 4, as well as future versions of the system. USGBC wants LEED projects to do the following:

- Reverse Contribution to **Global Climate Change**
- Enhance Individual **Human Health** and Well-Being
- Protect and Restore **Water Resources**
- Protect, Enhance, and Restore **Biodiversity** and Ecosystem Services
- Promote Sustainable and Regenerative **Material Resources** Cycles
- Build a **Greener Economy**
- Enhance Social Equity, Environmental Justice, and **Community Quality of Life**

The impact categories provide an ambitious agenda for the buildings industry that is readily actionable when presented in the simple LEED framework: prerequisites, credits and points. Projects earning a higher number of points are positioned to deliver a set of performance outcomes that span the impact categories in an integrated way. The LEED certification structure is designed to incentivize progressively higher credit achievement and, in turn, progressively higher compliance with credits whose outcomes accomplish the system goals.

The development of LEED v4 has spanned more than three years, engaged hundreds of volunteers and thousands of stakeholders around the world. LEED v4 has the potential to drive the reduction of building carbon emissions and take a stronger stand on human health, more so than any previous version of LEED. This guide provides an in depth overview of the program and its changes from previous

versions of the rating system. We invite you to explore this guide and get to know LEED v4.

If you have any questions about LEED v4, [just ask!](#)

LEED CERTIFICATION PROCESS

Certification begins with rating system selection and project registration. The project team then prepares documentation for all prerequisites and for the credits the team has chosen to pursue. When submitted for certification, a project goes through preliminary and final reviews. The preliminary review provides the project team with technical advice on credits that require additional work for their achievement, and the final review contains the project's final score and certification level. The latter can be accepted or appealed in cases where the team believes additional consideration is warranted.

There are four possible levels of certification that can be achieved by exceeding the following point thresholds:

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

PREPARING FOR LEED CERTIFICATION

Approaching certification using an integrative process gives the project team the greatest chance of success. The process includes three phases:

- *Discovery*: This is the most important phase of the integrative process; it can be thought of as an extensive expansion of what is conventionally called “Pre-Design.” It is unlikely that a project’s environmental goals will be achieved cost-effectively if this phase is not rigorously engaged as a discreet phase of the design process. Discovery work needs to be accomplished before “putting pencil to paper” . . . in other words, before schematic design begins.
- *Design and Construction (Implementation)*: This phase begins with what is conventionally called “Schematic Design”. It resembles conventional practice in its structure, but integrates all of the work and collective understanding of system interactions reached during the Discovery Phase.

- *Occupancy, Operations, and Performance Feedback*: This third stage focuses on implementing performance measurement and creating performance feedback mechanisms. Such feedback is critical for informing building operations, so the degree to which established performance targets have been met can be assessed and so corrective actions can be taken.

Achieving the greatest effectiveness in cost and environmental performance requires that every issue and every team member be brought into the project at the earliest point, before anything is yet designed. The structure to manage this flow of people, information, and analysis is fairly simple:

- All project team disciplines gather information and data relevant to the project;
- This information is analyzed;
- The people on the project team who hold this information (clients, designers, engineers, constructors, operators) gather together in workshops to compare notes and identify opportunities for synergy.

This process of research, analysis, and meeting is done in a repeating cycle that progressively approximates and refines the design solution iteratively. In the best scenario, this cycling of research and workshops continues until the project systems are optimized, all reasonable synergies are identified, and the related strategies associated with all LEED credits are documented and implemented.

MINIMUM PROGRAM REQUIREMENTS

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.

1. Must be in a permanent location on existing land

Intent

The LEED rating system is designed to evaluate buildings, spaces, and neighborhoods 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.

Additional guidance

Permanent location

- Movable buildings are not eligible for LEED. This includes boats and mobile homes.
- Prefabricated or modular structures and building elements may be certified once permanently installed as part of the LEED project.

Existing land

- Buildings located on previously constructed docks, piers, jetties, infill, and other manufactured structures in or above water are permissible, provided that the artificial land is previously developed, such that the land once supported another building or hardscape constructed for a purpose other than the LEED project.

2. Must use reasonable LEED boundaries

Intent

The LEED rating system is designed to evaluate buildings, spaces, or neighborhoods, and all environmental impacts associated with those projects. Defining a reasonable LEED boundary ensures that 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.

Additional guidance

Site

- Non-contiguous parcels of land may be included within the LEED project boundary if the parcels directly support or are associated with normal building operations of the LEED project and are accessible to the LEED project's occupants.
- Facilities (such as parking lots, bicycle storage, shower/changing facilities, and/or on-site renewable energy) that are outside of the LEED project boundary may be included in certain prerequisites and credits if they directly serve the LEED project and are not double-counted for other LEED projects. The project team must also have permission to use these facilities.
- The LEED project boundary may include other buildings.
 - If another building or structure within the LEED project boundary is ineligible for LEED certification, it may be included in the certification of the LEED project. It may also be excluded,
 - If another building within the LEED project boundary is eligible for LEED certification, it may be either included or not included in the certification as outlined in USGBC's campus guidance.
- Projects that are phased sites with a master plan for multiple buildings must designate a LEED project boundary for each building or follow USGBC's master site guidance.
- The gross floor area of the LEED project should be no less than 2% of the gross land area within the LEED project boundary.

Building

- *The LEED project should include the entire building and complete scope of work*
- Buildings or structures primarily dedicated to parking are not eligible for LEED certification. Parking that serves an eligible LEED project should be included in the certification.
- Buildings that are physically connected by programmable space are considered one building for LEED purposes unless they are physically distinct and have distinct identities as separate buildings or if they are a newly constructed addition. If separated, the projects should also have separate air distribution systems and water and energy meters (including thermal energy meters).
- Buildings that have no physical connection or are physically connected only by circulation, parking, or mechanical/storage rooms are considered separate buildings and individual projects for LEED purposes, with the following exceptions:
 - Primary and secondary school projects, hospitals (general medical and surgical), hotels, resorts, and resort properties, as defined by ENERGY STAR building rating purposes, may include more than one physically distinct building in a single LEED project. For new construction projects, each building in the application must be less than 25,000 sq. ft. Please contact USGBC if with any questions.
 - For other cases such as buildings that have programmatic dependency (spaces – not personnel – within the building cannot function independently without the other building) or architectural cohesiveness

(the building was designed to appear as one building), project teams are encouraged to contact USGBC to discuss their project prior to proceeding.

Interiors

- *The LEED project should be defined by a clear boundary such that the LEED project is physically distinct from other interior spaces within the building.*

Neighborhood

- The LEED neighborhood includes the land, water, and construction within the LEED project boundary.
- The LEED boundary is usually defined by the platted property line of the project, including all land and water within it.
 - Projects located on publicly owned campuses that do not have internal property lines must delineate a sphere-of-influence line to be used instead.
 - Projects may have enclaves of non-project properties that are not subject to the rating system, but cannot exceed 2% of the total project area and cannot be described as certified.
 - Projects must not contain non-contiguous parcels, but parcels can be separated by public rights-of-way.
- The project developer, which can include several property owners, should control a majority of the buildable land within the boundary, but does not have to control the entire area.

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 EB: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.

LEED Neighborhood Development Rating Systems

The LEED project should contain at least two habitable buildings and be no larger than 1500 acres.

LEED for Homes Rating Systems

The LEED project must be defined as a “dwelling unit” by all applicable codes. This requirement includes, but is not limited to, the International Residential Code stipulation that a dwelling unit must include “permanent provisions for living, sleeping, eating, cooking, and sanitation.”

RATING SYSTEM SELECTION

USGBC provides general guidance to help project teams select a LEED rating system. Projects are required to use the rating system that is most appropriate. However, when the decision is not clear, it is the responsibility of the project team to make a reasonable decision in selecting a rating system before registering their project.

The project teams should first identify an appropriate rating system, and then determine the best adaptation. Occasionally, USGBC recognizes that an entirely inappropriate rating system has been chosen. In this case, the project team will be asked to change the designated rating system for their registered project. Please review this guidance carefully and contact USGBC if it is not clear which rating system to use.

Rating system descriptions

LEED for Building Design and Construction. Buildings that are new construction or major renovation. At least 60% of the project’s *gross floor area* must be *complete* by the time of certification (except for LEED BD+C: Core and Shell). Must include the entire building’s gross floor area in the project.

- **LEED BD+C: New Construction and Major Renovation.** New construction or major renovation of buildings that do not primarily serve K-12 educational, retail, data centers, warehouses and distribution centers, hospitality, or healthcare uses. New construction also includes high-rise residential buildings 9 stories or more.
- **LEED BD+C: Core and Shell Development.** Buildings that are new construction or major renovation for the *exterior shell* and core mechanical,

electrical, and plumbing units, but not a *complete interior fit-out*. LEED BD+C: Core and Shell is the appropriate rating system to use if more than 40% of the gross floor area is incomplete at the time of certification.

- **LEED BD+C: Schools.** Buildings made up of *core* and *ancillary learning spaces* on K-12 school grounds. LEED BD+C: Schools may optionally be used for higher education and non-academic buildings on school campuses.
- **LEED BD+C: Retail.** Buildings used to conduct the retail sale of consumer product goods. Includes both direct customer service areas (showroom) and preparation or storage areas that support customer service.
- **LEED BD+C: Data Centers.** Buildings specifically designed and equipped to meet the needs of high density computing equipment such as server racks, used for data storage and processing. LEED BD+C: Data Centers only addresses whole building data centers (greater than 60%).
- **LEED BD+C: Warehouses and Distribution Centers.** Buildings used to store goods, manufactured products, merchandise, raw materials, or personal belongings, such as self-storage.
- **LEED BD+C: Hospitality.** Buildings dedicated to hotels, motels, inns, or other businesses within the service industry that provide transitional or short-term lodging with or without food.
- **LEED BD+C: Healthcare.** Hospitals that operate twenty-four hours a day, seven days a week and provide inpatient medical treatment, including acute and long-term care.
- **LEED BD+C: Homes and Multifamily Lowrise.** Single-family homes and multi-family residential buildings of 1 to 3 stories. Projects 3 to 5 stories may choose the Homes rating system that corresponds to the ENERGY STAR program in which they are participating.
- **LEED BD+C: Multifamily Midrise.** Multi-family residential buildings of 4 to 8 occupiable stories above grade. The building must have 50% or more residential space. Buildings near 8 stories can inquire with USGBC about using Midrise or New Construction, if appropriate.

LEED for Interior Design and Construction. Interior spaces that are a complete interior fit-out. In addition, at least 60% of the project's gross floor area must be complete by the time of certification.

- **LEED ID+C: Commercial Interiors.** Interior spaces dedicated to functions other than retail or hospitality.
- **LEED ID+C: Retail.** Interior spaces used to conduct the retail sale of consumer product goods. Includes both direct customer service areas (showroom) and preparation or storage areas that support customer service.
- **LEED ID+C: Hospitality.** Interior spaces dedicated to hotels, motels, inns, or other businesses within the service industry that provide transitional or short-term lodging with or without food.

LEED for Building Operations and Maintenance. Buildings that are fully operational and occupied for at least one year. Project may be undergoing improvement work or little to no construction. Must include the entire building's gross floor area in the project.

- **LEED O+M: Existing Buildings.** Existing buildings that do not primarily serve K-12 educational, retail, data centers, warehouses and distribution centers, or hospitality uses.
- **LEED O+M: Retail.** Existing buildings used to conduct the retail sale of consumer product goods. Includes both direct customer service areas (showroom) and preparation or storage areas that support customer service.
- **LEED O+M: Schools.** Existing buildings made up of core and ancillary learning spaces on K-12 school grounds. May also be used for higher education and non-academic buildings on school campuses.
- **LEED O+M: Hospitality.** Existing buildings dedicated to hotels, motels, inns, or other businesses within the service industry that provide transitional or short-term lodging with or without food.
- **LEED O+M: Data Centers.** Existing buildings specifically designed and equipped to meet the needs of high density computing equipment such as server racks, used for data storage and processing. LEED O+M: Data Centers only addresses whole building data centers.
- **LEED O+M: Warehouses & Distribution Centers.** Existing buildings used to store goods, manufactured products, merchandise, raw materials, or personal belongings (such as self-storage).

LEED for Neighborhood Development. New land development projects or redevelopment projects containing residential uses, nonresidential uses, or a mix. Projects may be at any stage of the development process, from conceptual planning through construction. It is recommended that at least 50% of total building floor area be new construction or major renovation. Buildings within the project and features in the public realm are evaluated.

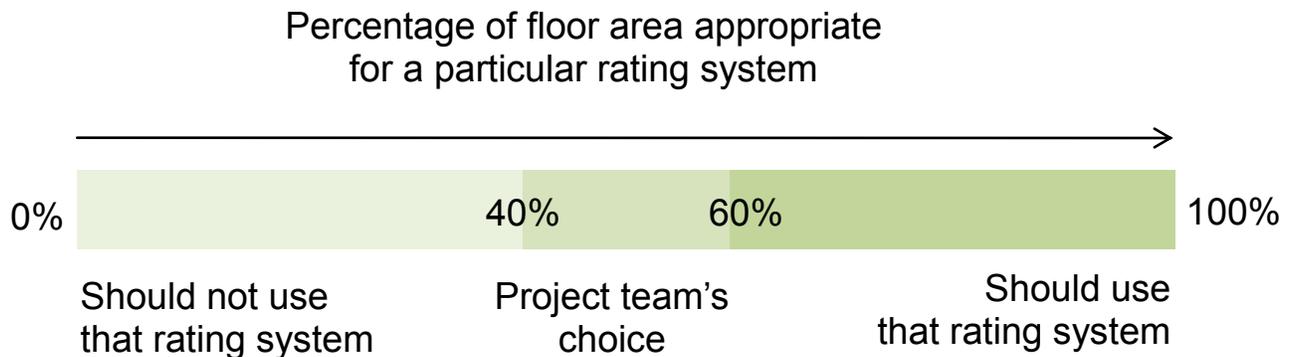
- **LEED ND: Plan.** Projects in conceptual planning or master planning phases, or under construction.
- **LEED ND: Project.** Completed development projects.

Choosing between rating systems

The following 40/60 rule provides guidance for making a decision when several rating systems appear to be appropriate for a project. To use this rule, first assign a

rating system to each square foot or square meter of the building. Then, choose the most appropriate rating system based on the resulting percentages.

The entire gross floor area of a LEED project must be certified under a single rating system and is subject to all prerequisites and attempted credits in that rating system, regardless of mixed construction or space usage type.



- If a rating system is appropriate for less than 40% of the gross floor area of a LEED project building or space, then that rating system should not be used.
- If a rating system is appropriate for more than 60% of the gross floor area of a LEED project building or space, then that rating system should be used.
- If an appropriate rating system falls between 40% and 60% of the gross floor area, project teams must independently assess their situation and decide which rating system is most applicable.

LEED 2009 TO LEED v4 COMPARISON CHARTS

Building Design and Construction: New Construction



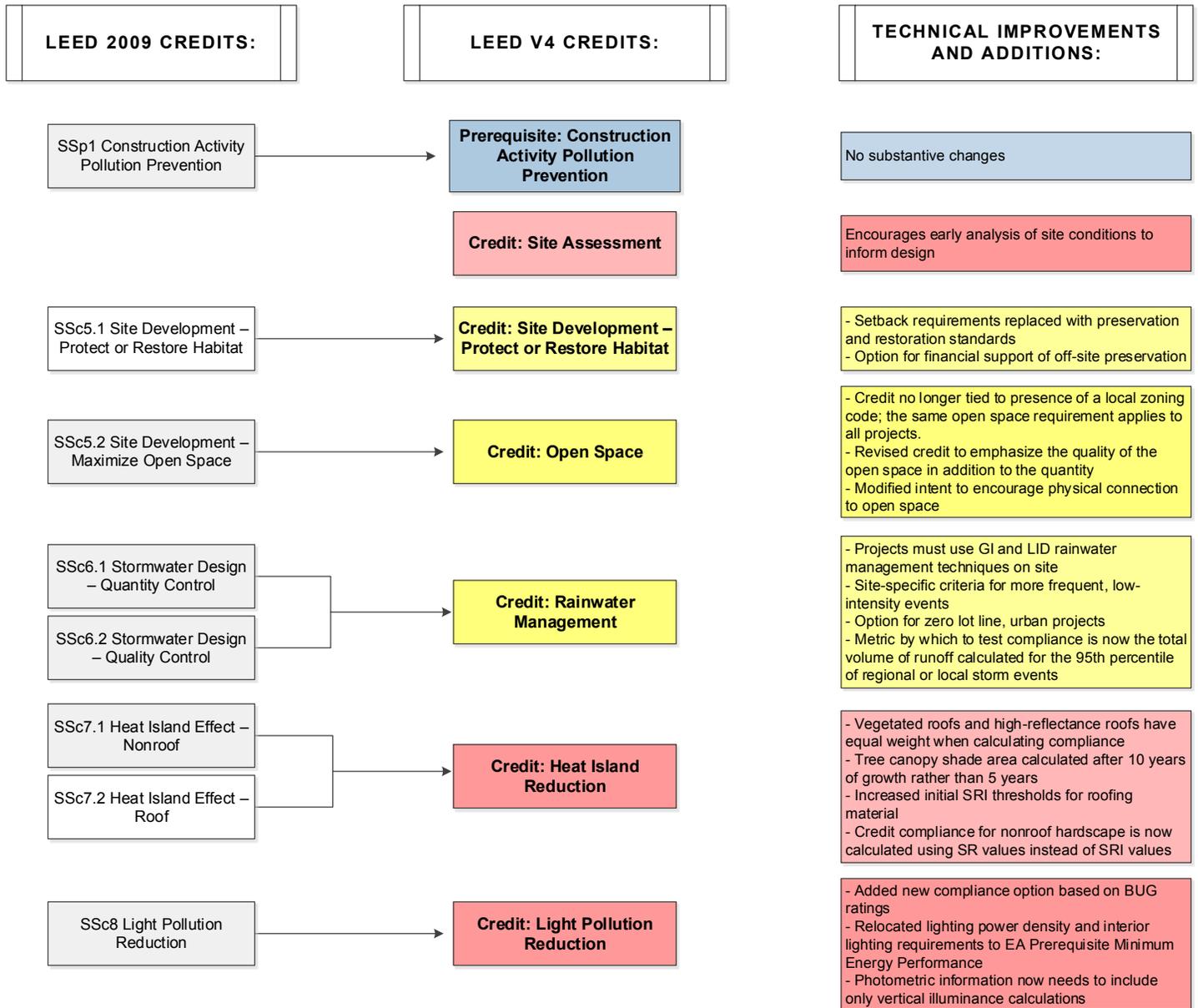
LEED v4 TECHNICAL IMPROVEMENTS: LOCATION & TRANSPORTATION

LEED 2009 CREDITS:	LEED V4 CREDITS:	TECHNICAL IMPROVEMENTS AND ADDITIONS:
	Credit: LEED for Neighborhood Development Location	<ul style="list-style-type: none"> - Encourages selection of a LEED ND certified site - Streamlined path to earn LT points
SSc1 Site Selection	Credit: Sensitive Land Protection	<ul style="list-style-type: none"> - Floodplain requirements now refer to "flood hazard area shown on a legally adopted flood hazard map" - Expanded sensitive habitat requirements to include species or ecological communities listed by NatureServe - Changed water body buffer and wetland buffer requirements
SSc3 Brownfield Redevelopment	Credit: High Priority Site	Added options for infill location in a historic district and for locating in a priority redevelopment area
SSc2 Development Density and Community Connectivity	Credit: Surrounding Density and Diverse Uses	<ul style="list-style-type: none"> - Multiple thresholds to reward different density levels and diverse uses - Added specific requirements for warehouses and distribution centers - Radius for building density calculation specified as ¼ mile (400 meters) from the project boundary - Proximity to the diverse uses based on walking distance instead of a radius
SSc4.1 Alternative Transportation – Public Transportation Access	Credit: Access to Quality Transit	<ul style="list-style-type: none"> - Addresses both weekday and weekend availability - Point thresholds based on the number of transit trips available within the required walking distance - Modes of transportation include ferry, streetcar, rapid transit, and rideshare
SSc4.2 Alternative Transportation – Bicycle Storage and Changing Rooms	Credit: Bicycle Facilities	<ul style="list-style-type: none"> - Requirement for projects to be located at a bicycle-accessible site or bicycle network - Changed shower room calculation method
SSc4.4 Alternative Transportation – Parking Capacity	Credit: Reduced Parking Footprint	Minimum parking requirements reference the ITE <i>Transportation Planning Handbook</i>
SSc4.3 Low-Emitting and Fuel-Efficient Vehicles	Credit: Green Vehicles	<ul style="list-style-type: none"> - Minimum ACEEE green score raised to 45 - 5% of parking spaces reserved for green vehicles - Additional 2% of parking spaces must have refueling stations: electric vehicle charging; liquid, gas, or battery facilities - Added requirements for electrical connectors

BLUE = NO CHANGE. YELLOW = MINOR CHANGE. RED = SUBSTANTIAL MODIFICATION OR NEW CREDIT.



LEED v4 TECHNICAL IMPROVEMENTS: SUSTAINABLE SITES



BLUE = NO CHANGE. YELLOW = MINOR CHANGE. RED = SUBSTANTIAL MODIFICATION OR NEW CREDIT.



LEED v4 TECHNICAL IMPROVEMENTS: WATER EFFICIENCY

LEED 2009 CREDITS:	LEED V4 CREDITS:	TECHNICAL IMPROVEMENTS AND ADDITIONS:
	Prerequisite: Outdoor Water Use Reduction	<ul style="list-style-type: none"> - Modified calculator used - Moved alternative water source credit and smart sensor irrigation to the prerequisite
WEp1 Water Use Reduction	Prerequisite: Indoor Water Use Reduction	<ul style="list-style-type: none"> - Requirements for water-using appliances and processes, as well as cooling towers and evaporative condensers - WaterSense label requirements mandatory in the U.S., with local equivalents allowed outside the U.S. - New prescriptive compliance path based on demonstrating that all fixtures are 20% below baseline - Duration-based savings from autocontrol faucets with automatic fixture sensors or metering controls are no longer allowed in the design case
	Prerequisite: Building-Level Water Metering	Requires each project to be capable of measuring whole building water use
WEc1 Water Efficient Landscaping	Credit: Outdoor Water Use Reduction	Requires at least a 50% reduction in landscape water using EPA's WaterSense Budget Tool or no irrigation
WEc3 Water Use Reduction	Credit: Indoor Water Use Reduction	<ul style="list-style-type: none"> - Appliance and process water savings can earn credit under the Retail, Healthcare, Hospitality, and Schools rating systems - WaterSense label requirements are now mandatory in the U.S., with local equivalencies allowed elsewhere - Duration-based savings from autocontrol faucets with automatic fixture sensors or metering controls are no longer allowed in the design case
WEc2 Water Use Reduction	Credit: Cooling Tower Water Use	Encourages projects to analyze water source and maximize water cycles
	Credit: Water Metering	Rewards projects for submetering at least two water end uses

BLUE = NO CHANGE. YELLOW = MINOR CHANGE. RED = SUBSTANTIAL MODIFICATION OR NEW CREDIT.



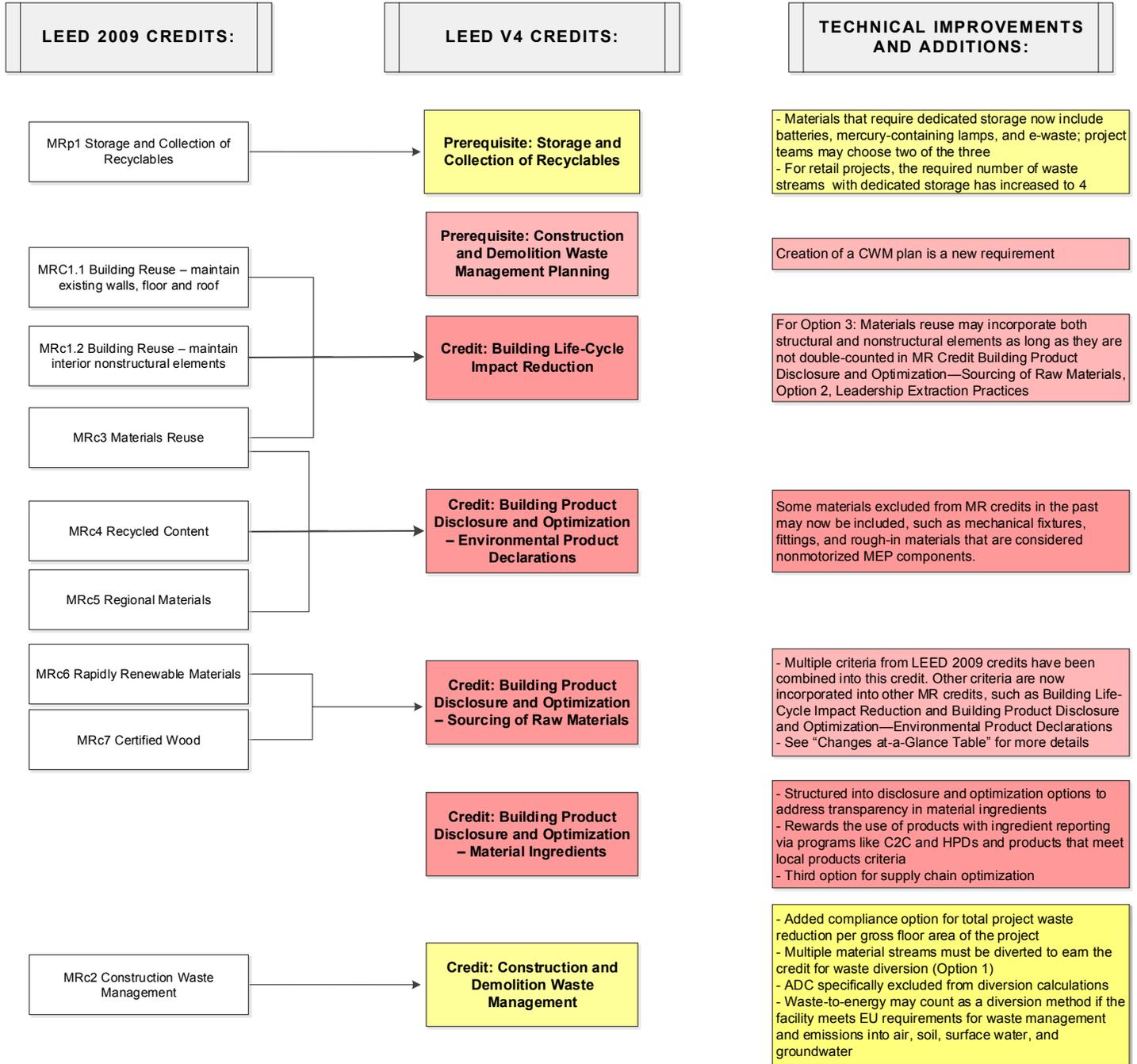
LEED v4 TECHNICAL IMPROVEMENTS: ENERGY & ATMOSPHERE

LEED 2009 CREDITS:	LEED V4 CREDITS:	TECHNICAL IMPROVEMENTS AND ADDITIONS:
EAp1 Fundamental Commissioning of Building Energy Systems	Prerequisite: Fundamental Commissioning and Verification	<ul style="list-style-type: none"> - Requirements to prepare an O+M plan and to engage CxA by the end of design development phase - Expanded electrical and plumbing scopes - Elements of envelope commissioning are now incorporated in the OPR and BOD
EAp2 Minimum Energy Performance	Prerequisite: Minimum Energy Performance	<ul style="list-style-type: none"> - Updated reference standard to ASHRAE 90.1-2010 - Updated Advanced Energy Design Guides prescriptive option to 50% AEDG - Updated Core Performance Guide prescriptive option to meeting core requirements + 6 additional strategies
EAp3 Fundamental Refrigerant Management	Prerequisite: Building-Level Energy Metering	Requires each project to be capable of measuring whole building energy use
EAc3 Enhanced Commissioning	Prerequisite: Fundamental Refrigerant Management	No substantive changes
EAc3 Enhanced Commissioning	Credit: Enhanced Commissioning	Added options for monitoring-based commissioning and building envelope commissioning
EAc1 Optimize Energy Performance	Credit: Optimize Energy Performance	See improvements for v4 EAp Minimum Energy Performance
	Credit: Advanced Energy Metering	<ul style="list-style-type: none"> - Requires metering of all energy end-uses representing 10% or more of total building energy consumption - Meters must be connected to BAS and log data regularly
	Credit: Demand Response	Encourages projects to design and install systems necessary to participate in a demand response program
EAc2 On-Site Renewable Energy	Credit: Renewable Energy Production	Credit now allows solar gardens and community-scale renewable energy systems
EAc4 Enhanced Refrigerant Management	Credit: Enhanced Refrigerant Management	Added sector-specific requirements for commercial refrigeration equipment
EAc5 Measurement and Verification		<ul style="list-style-type: none"> - In addition to including electricity, credit now requires nonelectric energy use to be offset using carbon offsets - Credit now requires a five-year contract and specifies that resources must have come online after January 1, 2005, and be delivered at least annually - Increased percentage thresholds to 50% for 1 point and 100% for 2 points
EAc6 Green Power	Credit: Green Power and Carbon Offsets	

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LEED v4 TECHNICAL IMPROVEMENTS: MATERIALS & RESOURCES



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LEED v4 TECHNICAL IMPROVEMENTS: INDOOR ENVIRONMENTAL QUALITY

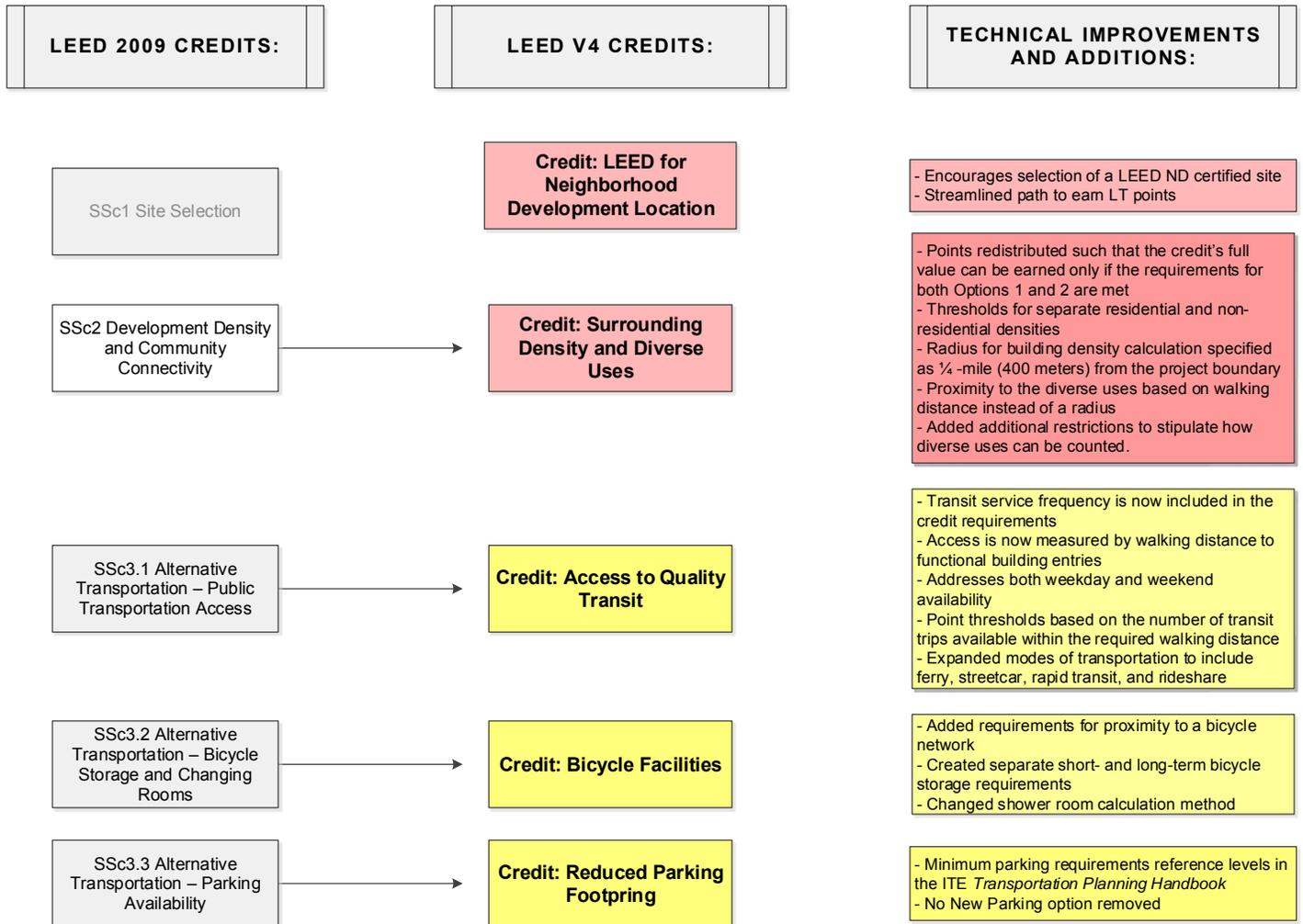
LEED 2009 CREDITS:	LEED V4 CREDITS:	TECHNICAL IMPROVEMENTS AND ADDITIONS:
IEQp1 Minimum IAQ Performance	Prerequisite: Minimum Indoor Air Quality Performance	<ul style="list-style-type: none"> - ASHRAE Standard 62.1 updated to version 2010 - Projects outside the U.S. may demonstrate achievement via CEN requirements (rather than ASHRAE 62.1-2010) - Includes specific requirements for residential projects
IEQp2 Environmental Tobacco Smoke Control	Prerequisite: Environmental Tobacco Smoke Control	<ul style="list-style-type: none"> - No designated smoking areas indoors - Expanded no-smoking policy - Added requirement for location of exterior posted signs - Expanded acceptable procedure for air leakage requirements in residential projects
IEQc1 Outdoor Delivery Monitoring	Credit: Enhanced Indoor Air Quality Strategies	<ul style="list-style-type: none"> - Meeting the requirements of interior cross-contamination prevention no longer requires a calculation of a minimum pressure differential - Added options regarding naturally ventilated spaces. - Additional guidance for warehouses, distribution centers, health care facilities, data centers, and residential projects. - Added option for filtration media requirements
IEQc2 Increased Ventilation		
IEQc5 Indoor Chemical and Pollutant Source Control		
IEQc4.1 Low-Emitting Materials – adhesives and sealants	Credit: Low-Emitting Materials	<ul style="list-style-type: none"> - Compliance of interior finishes may be demonstrated in assemblies with multiple layers in combination, or in each system individually - Included consideration of furniture emissions - New referenced standards to address international projects and new product requirements - Ceilings are now included in the requirements - Emissions from insulation are now included. - Emissions requirements for on-site, wet-applied, full-spread products measured via chamber tests in air are now included. VOC content limits for on-site, wet-applied products are still required
IEQc4.2 Low-Emitting Materials – paints and coatings		
IEQc4.3 Low-Emitting Materials – flooring systems		
IEQc4.4 Low-Emitting Materials – composite wood and agrifiber products		
IEQc3.1 Construction Indoor Air Quality Management Plan – During Construction	Credit: Construction Indoor Air Quality Management Plan	No substantive changes
IEQc3.2 Construction Indoor Air Quality Management Plan – Before Occupancy	Credit: Indoor Air Quality Assessment	<ul style="list-style-type: none"> - Installation of movable furnishings (such as workstations and partitions) before testing or flush-out is now required - Options can no longer be combined
IEQc7.1 Thermal Comfort – Design	Credit: Thermal Comfort	<ul style="list-style-type: none"> - Updated reference standard to ASHRAE 55-2010 - Included international standards - New compliance paths for data centers and warehouses
IEQc7.2 Thermal Comfort – Verification		
IEQc6.1 Controllability of Systems - Lighting	Credit: Interior Lighting	<ul style="list-style-type: none"> - Added option addresses lighting quality - At least three levels required for lighting control: on, off, and a midlevel
IEQc6.2 Controllability of Systems – Thermal Comfort		
IEQc8.1 Daylight and Views - Daylight	Credit: Daylight	<ul style="list-style-type: none"> - Changed number of points available and thresholds for achievement - Added simulation option that incorporates 2 new metrics
IEQc8.2 Daylight and Views – Views	Credit: Quality Views	<ul style="list-style-type: none"> - Added requirement for quality view defined by LEED 2009 exemplary performance criteria - Glazing must provide clear view to the outdoors - Atriums now qualify for up to 30% of the total area
	Credit: Acoustic Performance	<ul style="list-style-type: none"> - New credit except in Schools and Healthcare - Updated standards for Schools

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Interior Design and Construction: Commercial Interiors



LEED v4 TECHNICAL IMPROVEMENTS: LOCATION & TRANSPORTATION



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LEED v4 TECHNICAL IMPROVEMENTS: WATER EFFICIENCY

LEED 2009 CREDITS:

LEED V4 CREDITS:

TECHNICAL IMPROVEMENTS AND ADDITIONS:

WEp1 Water Use
Reduction

**Prerequisite: Indoor
Water Use Reduction**

WEc1 Water Use
Reduction

**Credit: Indoor Water
Use Reduction**

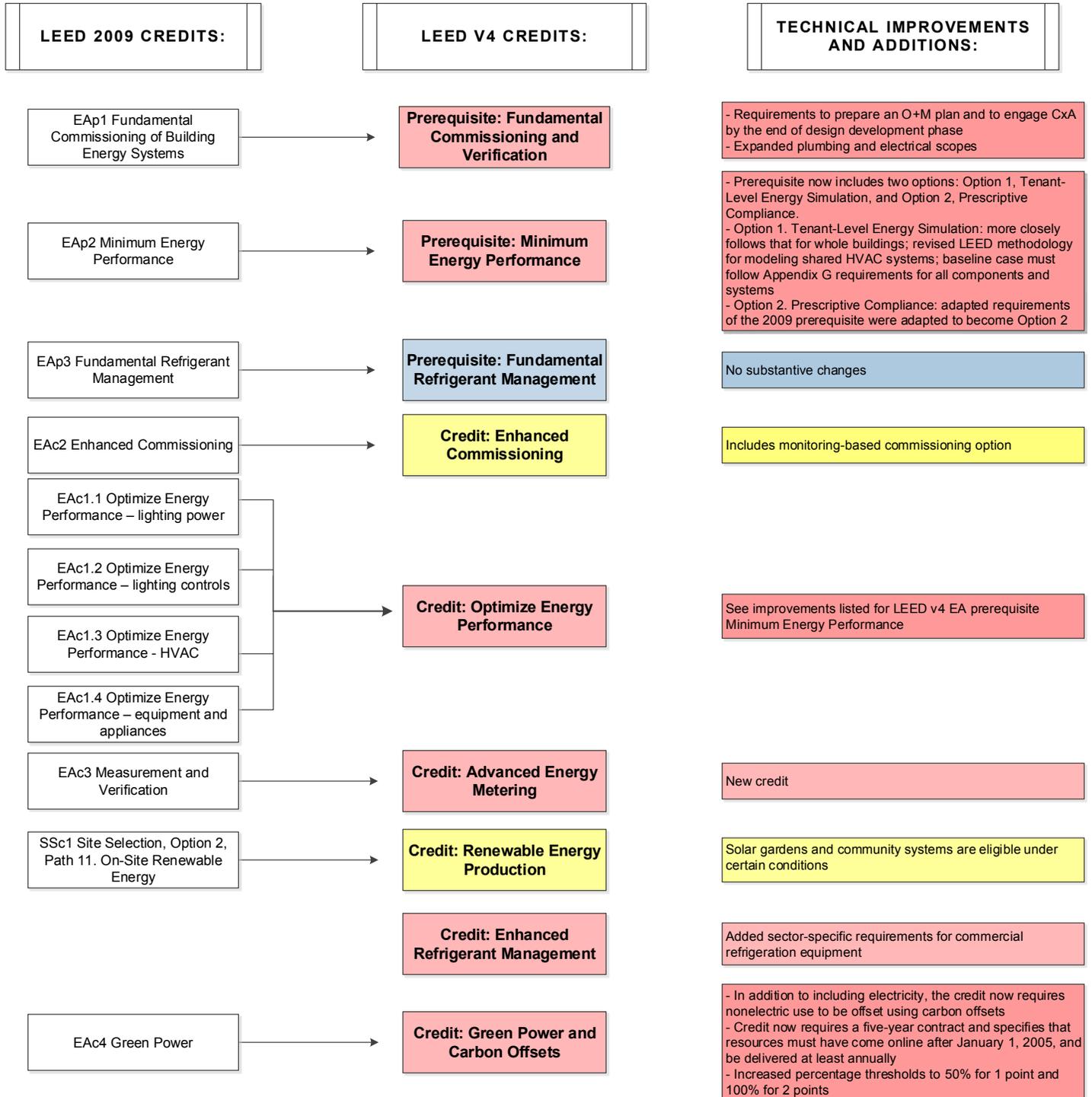
- Includes requirements for water-using appliances and processes, as well as cooling towers and evaporative condensers
- WaterSense label requirements are now mandatory in the U.S.
- New prescriptive compliance path (based on demonstrating that all fixtures are 20% below baseline)

- Appliance and process water savings can earn credit under the Retail and Hospitality rating systems
- WaterSense label requirements are now mandatory in the U.S.
- To earn points, project teams must include fixtures necessary to meet occupants' needs. When no facilities are available within project boundaries, the closest available restrooms must be included in credit calculations. These additional restrooms can be excluded from prerequisite compliance requirements.

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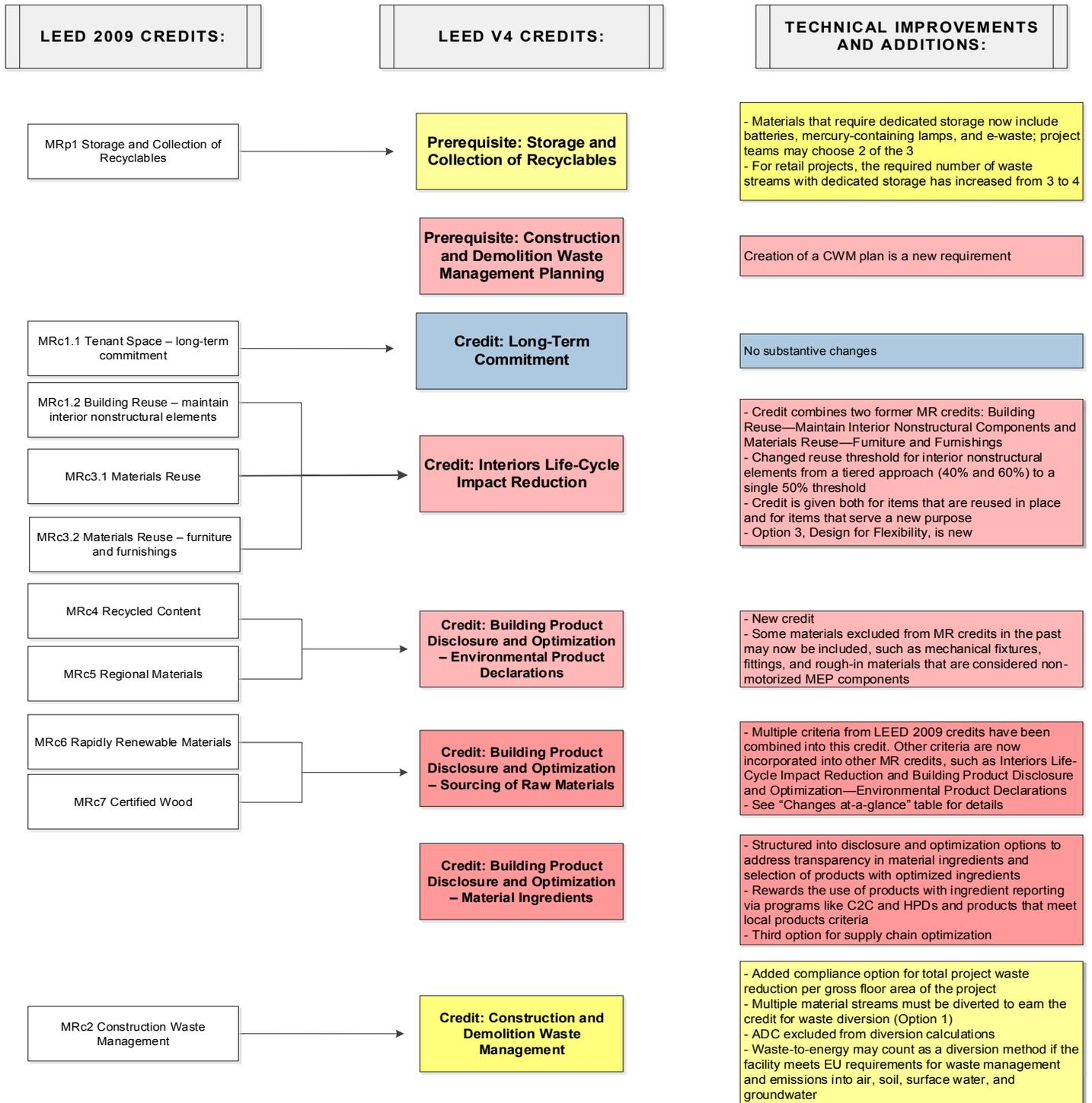
LEED v4 TECHNICAL IMPROVEMENTS: ENERGY & ATMOSPHERE



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LEED v4 TECHNICAL IMPROVEMENTS: MATERIALS & RESOURCES



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LEED v4 TECHNICAL IMPROVEMENTS: INDOOR ENVIRONMENTAL QUALITY

LEED 2009 CREDITS:	LEED V4 CREDITS:	TECHNICAL IMPROVEMENTS AND ADDITIONS:
IEQp1 Minimum IAQ Performance	Prerequisite: Minimum Indoor Air Quality Performance	<ul style="list-style-type: none"> - Updated ASHRAE Standard 62.1 to version 2010- Project teams are required to confirm the appropriate application of natural ventilation through CIBSE AM10, Figure 2.8 (flow chart) - Projects outside U.S. can use CEN requirements
IEQp2 Environmental Tobacco Smoke Control	Prerequisite: Environmental Tobacco Smoke Control	<ul style="list-style-type: none"> - No designated smoking areas indoors - Expanded no-smoking policy - Added requirement for location of exterior posted signs
IEQc1 Outdoor Delivery Monitoring	Credit: Enhanced Indoor Air Quality Strategies	<ul style="list-style-type: none"> - Meeting the requirements of interior cross-contamination prevention no longer requires a calculation of a minimum pressure differential - Additional options for naturally ventilated spaces - Added an option for filtration media requirements, CEN Standard EN 779-2002, Particulate Air Filters for General Ventilation, Determination of the Filtration Performance
IEQc2 Increased Ventilation		
IEQc5 Indoor Chemical and Pollutant Source Control		
IEQc4.1 Low-Emitting Materials – adhesives and sealants	Credit: Low-Emitting Materials	<ul style="list-style-type: none"> - Compliance of interior finishes may be demonstrated in assemblies with multiple layers in combination, or in each system individually - All rating systems now consider furniture emissions - New referenced standards address non-U.S. projects and new product requirements - Ceilings are now included in the requirements. - Emissions from insulation are now included. - Emissions requirements for on-site wet-applied, full-spread products measured via chamber tests in air are now included. VOC content limits for on-site, wet-applied products are still required
IEQc4.2 Low-Emitting Materials – paints and coatings		
IEQc4.3 Low-Emitting Materials – flooring systems		
IEQc4.4 Low-Emitting Materials – composite wood and agnifiber products		
IEQc3.1 Construction Indoor Air Quality Management Plan – During Construction	Credit: Construction Indoor Air Quality Management Plan	No substantive changes
IEQc3.2 Construction Indoor Air Quality Management Plan – Before Occupancy	Credit: Indoor Air Quality Assessment	<ul style="list-style-type: none"> - Options can no longer be combined - Upper interior temperature limit is now identified in Option 1 - Testing now required for an expanded list of contaminants in Option 2
IEQc7.1 Thermal Comfort – Design	Credit: Thermal Comfort	<ul style="list-style-type: none"> - Updated referenced standard to ASHRAE 55-2010. - Included international standards to provide more relevant compliance options for non-U.S. projects
IEQc7.2 Thermal Comfort – Verification		
IEQc6.1 Controllability of Systems - Lighting	Credit: Interior Lighting	<ul style="list-style-type: none"> - Added an additional point and option for lighting quality to the previous lighting control requirements - Revised requirements for lighting control to require at least 3 lighting levels to meet the controllability criteria
IEQc6.2 Controllability of Systems – Thermal Comfort		<ul style="list-style-type: none"> - Eliminated prescriptive compliance path - Additional simulation option with 2 new metrics - Option 2: illuminance simulation now relies on local weather data and uses a calculated illuminance intensity - Option 3: measurements required at 2 times of the year - Changed available points and achievement thresholds
IEQc8.1 Daylight and Views - Daylight	Credit: Daylight	
IEQc8.2 Daylight and Views – Views	Credit: Quality Views	<ul style="list-style-type: none"> - Exemplary performance requirements from LEED 2009 are now the basis for the credit requirements - Glazing must provide a clear image of the outdoors - Atriums now qualify for up to 30% of the total area
	Credit: Acoustic Performance	New credit

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Building Operations and Maintenance: Existing Buildings



LEED v4 TECHNICAL IMPROVEMENTS: LOCATION & TRANSPORTATION

LEED 2009 CREDITS:

LEED V4 CREDITS:

TECHNICAL IMPROVEMENTS
AND ADDITIONS:

SSc4 Alternative
Commuting Transportation

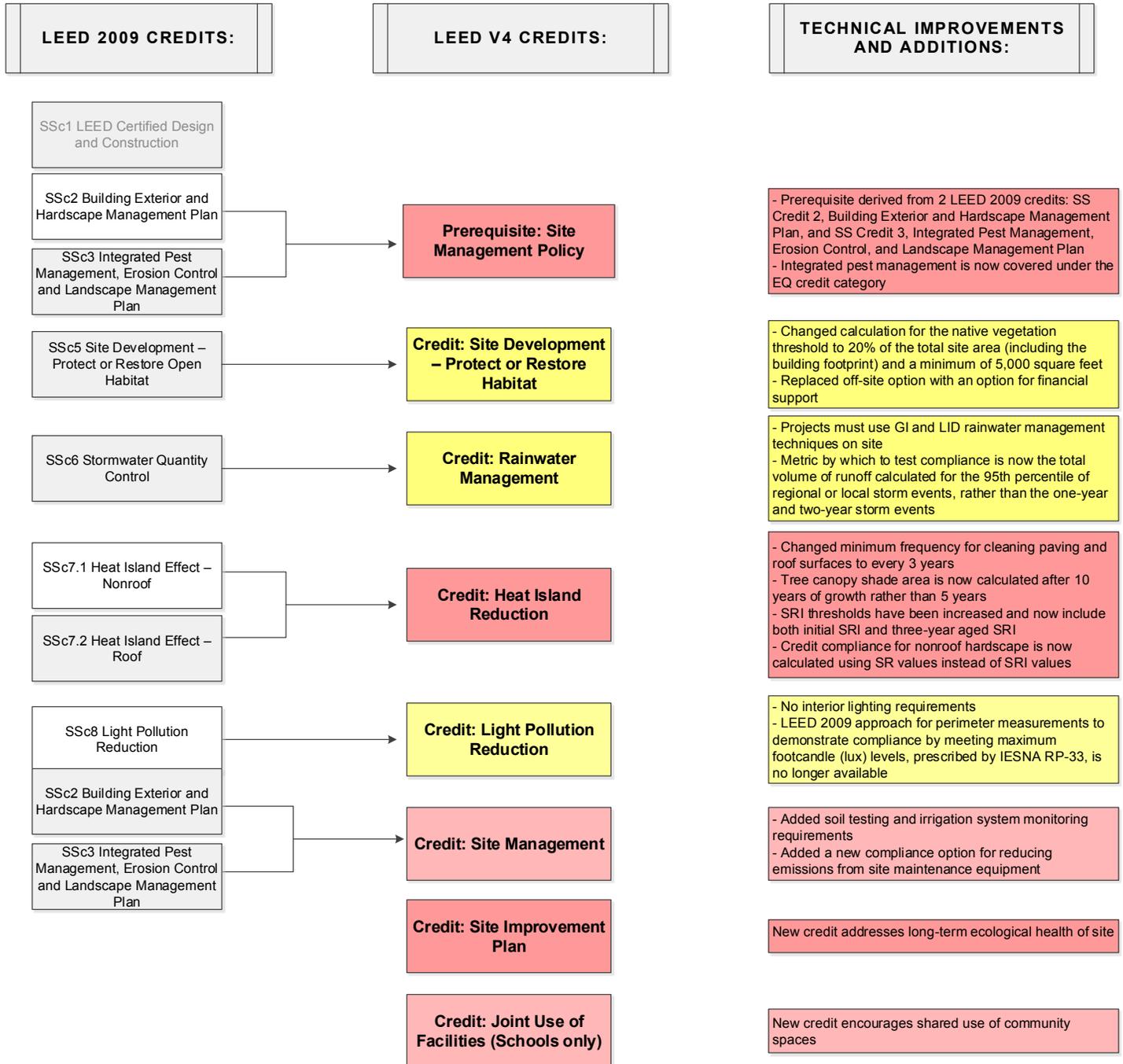
**Credit: Alternative
Transportation**

- Added Option 1 to allow projects to earn 1 point for simply surveying their building occupants and submitting the survey results
- Decreased performance threshold for Option 2 to allow for a linear increase from threshold to threshold
- Added Option 3 to reward projects for implementing a comprehensive alternative transportation program
- Projects are now required to survey visitors if the daily average number of visitors or typical peak is greater than regular building occupants
- New ongoing performance standards require teams to conduct a survey every 5 years

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LEED v4 TECHNICAL IMPROVEMENTS: SUSTAINABLE SITES



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LEED v4 TECHNICAL IMPROVEMENTS: WATER EFFICIENCY

LEED 2009 CREDITS:	LEED V4 CREDITS:	TECHNICAL IMPROVEMENTS AND ADDITIONS:
WEp1 Minimum Indoor Plumbing Fixture and Fitting Efficiency	Prerequisite: Indoor Water Use Reduction	<ul style="list-style-type: none"> - Changed baseline multiplier cutoff year from 1994 to 1995 - Multiplier for projects built and occupied before 1995 has changed from 160% to 150% of UPC/IPC - Duration-based savings from autocontrol faucets with automatic fixture sensors or metering controls are no longer allowed in the design case - Applying nonpotable water is no longer allowed as an ACP in the prerequisite
WEc1 Water Performance Measurement	Prerequisite: Building-Level Water Metering	Prerequisite requires permanently installed whole building water meter and water usage data shared with USGBC
WEc3 Water Efficient Landscaping	Credit: Outdoor Water Use Reduction	<ul style="list-style-type: none"> - New credit. - WaterSense Water Budget Tool is now listed as the referenced calculation tool
WEc2 Additional Indoor Plumbing Fixture and Fitting Efficiency	Credit: Indoor Water Use Reduction	Added second option for metered water use
WEc4 Cooling Tower Water Management	Credit: Cooling Tower Water Use	Modified the cooling tower credit structure to highlight appropriate cycling based on the concentrations of dissolved solids on the project site
WEc1 Water Performance Measurement	Credit: Water Metering	<ul style="list-style-type: none"> - Moved Option 1, Whole Building Metering, from LEED 2009 to the prerequisite level - Credit is now comparable to Option 2, Submetering, in LEED 2009

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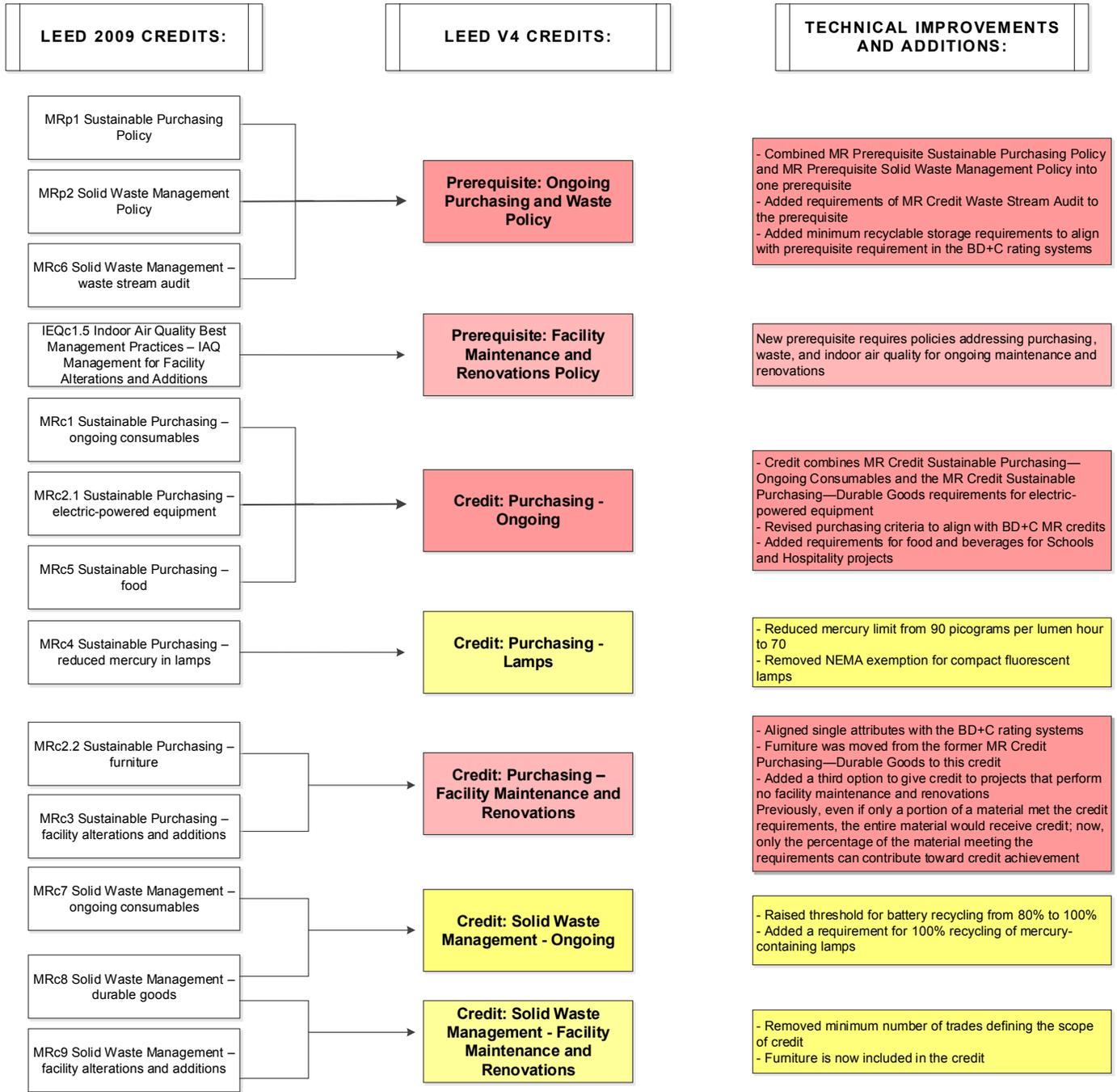
LEED v4 TECHNICAL IMPROVEMENTS: ENERGY & ATMOSPHERE

LEED 2009 CREDITS:	LEED V4 CREDITS:	TECHNICAL IMPROVEMENTS AND ADDITIONS:
EAp1 Energy Efficiency Best Management Practices – planning, documentation, and opportunity assessment	Prerequisite: Energy Efficiency Best Management Practices	Includes specific requirements for data centers
EAp2 Minimum Energy Performance	Prerequisite: Minimum Energy Performance	Increased minimum required ENERGY STAR rating from 69 to 75 in Option 1
	Prerequisite: Building-Level Energy Metering	Requires energy meters capable of providing whole building energy use data and energy usage data shared with USGBC
EAp3 Fundamental Refrigerant Management	Prerequisite: Fundamental Refrigerant Management	No substantive changes
EAc2.1 Existing Building Commissioning – investigation and analysis	Credit: Existing Building Commissioning - Analysis	For DES, building-owned systems are treated the same as third-party systems
EAc2.2 Existing Building Commissioning – implementation	Credit: Existing Building Commissioning - Implementation	<ul style="list-style-type: none"> - Capital plan required for major retrofits and upgrades is now specified as a 5 year plan - Formal tracking and verification plan is now required for the implemented energy conservation measures
EAc2.3 Existing Building Commissioning – ongoing commissioning	Credit: Ongoing Commissioning	No substantive changes
EAc1 Optimize Energy Efficiency Performance	Credit: Optimize Energy Performance	Increased minimum ENERGY STAR score to 75
EAc3.1 Performance Measurement – building automation system	Credit: Advanced Energy Metering	System-level metering and building automation systems were included in LEED 2009 as minimum program requirement 6 and as EA Credit Performance Measurement—Building Automation System. Both topics are combined into this credit.
EAc3.2 Performance Measurement – system-level metering		
	Credit: Demand Response	<ul style="list-style-type: none"> - New credit - Option 1 requires necessary infrastructure and/or participation in a demand response program - Option 2 requires 10% of peak loads shifted to off-peak hours
EAc4 On-Site and Off-Site Renewable Energy	Credit: Renewable Energy and Carbon Offsets	Aligned performance thresholds with LEED BD+C rating systems
EAc5 Enhanced Refrigerant Management	Credit: Enhanced Refrigerant Management	<ul style="list-style-type: none"> - Added sector-specific requirements for commercial refrigeration equipment - Default leakage rate, rather than a measured rate, must be used in the calculations
EAc6 Emissions Reduction Reporting		

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LEED v4 TECHNICAL IMPROVEMENTS: MATERIALS & RESOURCES



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LEED v4 TECHNICAL IMPROVEMENTS: INDOOR ENVIRONMENTAL QUALITY

LEED 2009 CREDITS:	LEED V4 CREDITS:	TECHNICAL IMPROVEMENTS AND ADDITIONS:
IEQp1 Minimum IAQ Performance	Prerequisite: Minimum Indoor Air Quality Performance	- Updated ASHRAE Standard 62.1 to version 2010 from 2007 - Updated standards for prerequisite compliance. See "Changes at-a-glance" Table for details.
IEQp2 Environmental Tobacco Smoke (ETS) Control	Prerequisite: Environmental Tobacco Smoke Control	- Designated interior smoking rooms are no longer permitted - Expanded no-smoking policy and added requirement for the location of exterior posted signs - Expanded acceptable procedure for demonstrating compliance with air leakage requirements in residential projects
IEQp3 Green Cleaning Policy	Prerequisite: Green Cleaning Policy	Added requirement to implement policy and option to contract third party certified cleaning contractors
IEQc3.1 Green Cleaning – high-performance cleaning program		
IEQc1.1 Indoor Air Quality Best Management Practices – IAQ Management Program	Credit: Indoor Air Quality Management Program	- All preventive maintenance and periodic inspection procedures are included in one document, the O&M plan - Only an audit was previously required; the credit now requires developing an IAQ management program as well
IEQc1.2 Indoor Air Quality Best Management Practices – outdoor air delivery monitoring	Credit: Enhanced Indoor Air Quality Strategies	- Credit combines portions of IEQ Credit 1.2 Indoor Air Quality Best Management Practices—Outdoor Air Delivery Monitoring, IEQ Credit 1.4 Indoor Air Quality Best Management Practices—Reduce Particulates in Air Distribution, and IEQ Credit 3.5 Green Cleaning—Indoor Chemical and Pollutant Source - Additional options for naturally ventilated spaces - Additional guidance for warehouses, distribution centers, data centers, and residential projects - Added option for filtration media requirements, CEN Standard EN 779–2002, Particulate Air Filters for General Ventilation, Determination of the Filtration Performance
IEQc1.3 Indoor Air Quality Best Management Practices – increased ventilation		
IEQc1.4 Indoor Air Quality Best Management Practices – reduce particulates in air distribution		
IEQc3.5 Green Cleaning – indoor chemical and pollutant source control		
IEQc2.3 Occupant Comfort – thermal comfort monitoring	Credit: Thermal Comfort	- Updated reference standard to ASHRAE 55-2010 - Added international standards for non-U.S. projects - Humidity monitoring is required at the humidity zone level - New compliance path for data centers
IEQc2.2 Controllability of Systems - lighting	Credit: Interior Lighting	- Additional point and option for lighting quality - Requirement for 3 controllable lighting levels: on, off, and midlevel
IEQc2.4 Daylight and Views	Credit: Daylight and Quality Views	- No simulation and prescriptive options for daylighting compliance - Glazing must provide a clear view to the outdoors - Atriums now qualify for up to 30% of the total area for views - View quality is now a component of the credit requirements
IEQc3.2 Green Cleaning – custodial effectiveness assessment	Credit: Green Cleaning – custodial effectiveness assessment	- Credit directly links implementation of the Green Cleaning Policy to the audit process - Tightened credit achievement threshold of the audit score from 3 to 2.5
IEQc3.3 Green Cleaning – purchase of sustainable cleaning products and materials	Credit: Green Cleaning – products and materials	- Raised performance threshold for purchases from 30% to 75% - Added a provision for nonchemical and ionized water cleaning - Added Design for the Environment as an acceptable standard
IEQc3.4 Green Cleaning – sustainable cleaning equipment	Credit: Green Cleaning - equipment	- Raised performance threshold for achievement from 20% to 40%. - A phase-out plan can now be used in lieu of discarding equipment that has useful life remaining
IEQc3.6 Green Cleaning – indoor integrated pest management	Credit: Integrated Pest Management	- Contains SS Credit 3 exterior pest management requirements and IEQ Credit 3.7 interior pest management requirements - Shortened 72-hour window for alerting building occupants that a non-least-risk pesticide application was going to occur to 24 hours - Expanded required log to include pest population tracking
IEQc2.1 Occupant Comfort – occupant survey	Credit: Occupant Comfort Survey	Corrective action for any area with a dissatisfaction rate higher than 20% is now required

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CHANGES AT-A-GLANCE

LEED v4 for Building Design and Construction

Summary of changes from LEED 2009

Prerequisite	Integrative Project Planning and Design (Healthcare Only)	<ul style="list-style-type: none"> • Changed required charrette duration from a full day to four hours. • Added disciplines to list of eligible professions on the integrative design team.
Credit	Integrative Process	<ul style="list-style-type: none"> • New credit.
LOCATION AND TRANSPORTATION		
Credit	LEED for Neighborhood Development Location	<ul style="list-style-type: none"> • New credit.
Credit	Sensitive Land Protection	<ul style="list-style-type: none"> • Floodplain requirements now refer to “flood hazard area shown on a legally adopted flood hazard map” instead of specifically referencing the 100-year floodplain. Projects must now avoid the flood hazard instead of being at least 5 feet (1.5 meters) above the 100-year floodplain. • Expanded sensitive habitat requirements to include species or ecological communities listed by NatureServe (in addition to local equivalents for projects outside the U.S. or outside areas covered by NatureServe). • The water body buffer has been changed from 50 feet (15 meters) to 100 feet (30 meters). • The wetland buffer has been changed from 100 feet (30 meters) to 50 feet (15 meters). • A list of allowable minor improvements in wetland or water body buffers has been added.
Credit	High Priority Site	<ul style="list-style-type: none"> • Adapts many of the concepts formerly found in SS Credit 3 Brownfield Redevelopment. • Projects now have options for infill location in a historic district and for locating in a priority redevelopment area. • Projects no longer limited to officially designated brownfields. Contaminated sites requiring remediation, as deemed by the authority having jurisdiction, can qualify a project for this credit.
Credit	Surrounding Density and Diverse Uses	<ul style="list-style-type: none"> • Points have been redistributed such that the credit’s full value can be earned only if the requirements for both Options 1 and 2 are met. • For all rating systems except Healthcare, there are now two thresholds for each option. • There are now thresholds for separate residential and nonresidential densities. • Added specific requirements for warehouses and distribution centers. • The radius for building density calculation is now specified

		<p>as ¼ mile (400 meters) from the project boundary.</p> <ul style="list-style-type: none"> • Proximity to the diverse uses is now based on walking distance instead of a radius. • Additional restrictions have been added to stipulate how diverse uses can be counted.
Credit	Access to Quality Transit	<ul style="list-style-type: none"> • Transit service frequency included in the credit requirements. • Access measured by walking distance to functional building entries. • Addresses both weekday and weekend availability. • Point thresholds based on the number of transit trips available within the required walking distance. • Expanded modes of transportation to include ferry, streetcar, rapid transit, and rideshare. • For Schools projects, Option 2 Pedestrian Access now includes a tiered point system based on the percentage of students within the walkable attendance area. • Private shuttles cannot be used to comply with the requirement.
Credit	Bicycle Facilities	<ul style="list-style-type: none"> • Added requirements for proximity to a bicycle network. • Created separate short- and long-term bicycle storage requirements. • Changed shower room calculation method.
Credit	Reduced Parking Footprint	<ul style="list-style-type: none"> • Requirements now the same for nonresidential and residential, and for New Construction and Core and Shell. • Added baseline reference to a third-party standard (ITE Transportation Planning Handbook, 3rd edition, Tables 18-2 through 18-4). • Credit no longer awarded for providing no new parking. If there is existing parking that will continue to be used by the project, it must also comply with credit requirements.
Credit	Green Vehicles	<p>New Construction, Core and Shell, Data Centers, Hospitality, Retail, Healthcare:</p> <ul style="list-style-type: none"> • Changed term “low-emitting and fuel-efficient vehicles” to “green vehicles.” • Reorganized Options 1 and 2 such that all projects must provide preferred parking for green vehicles and alternative-fuel fueling stations. • Raised minimum ACEEE green score to 45. • Lowered requirement for alternative-fuel stations to 2% of total parking capacity. • Electrical connectors must comply with SAE Surface Vehicle Recommended Practice J1772, SAE Electric Vehicle Conductive Charge Coupler (or a regional or local equivalent standard) and must also be capable of dynamic interaction with the utility grid. • Credit can no longer be earned by providing green vehicles or a car-sharing program for building occupants. <p>Schools:</p> <ul style="list-style-type: none"> • See section above for changes in Option 1. • Designated carpool drop-off area for green vehicles (formerly “low-emitting and fuel-efficient vehicles”) is no longer required. • Option 2 now requires an implementation plan to meet NOx and particulate emissions standards for school buses

		<p>and green vehicle designation for vehicles other than buses.</p> <p>Warehouses and Distribution Centers:</p> <ul style="list-style-type: none"> • Added credit requirements specific to these two project types.
SUSTAINABLE SITES		
Prerequisite	Construction Activity Pollution Prevention	<ul style="list-style-type: none"> • Updated the EPA Construction General Permit version from 2003 to 2012.
Prerequisite	Environmental Site Assessment	<ul style="list-style-type: none"> • Removed blanket exclusion of former landfill sites. • Local equivalent assessments are available to all project teams as an alternative to Phase I and II ESAs. • Projects are no longer allowed to achieve the prerequisite based on an asbestos sampling plan and remediation report.
Credit	Site Assessment	<ul style="list-style-type: none"> • New credit.
Credit	Site Development - Protect or Restore Habitat	<ul style="list-style-type: none"> • Replaced setback requirements with preservation and restoration requirements. • Modified soil requirements to include disturbed or compacted soils. • Replaced off-site option with an option for financial support.
Credit	Open Space	<ul style="list-style-type: none"> • Credit no longer tied to presence of a local zoning code; the same open space requirement applies to all projects. • Revised credit to emphasize the quality of the open space in addition to the quantity. • Modified intent of credit to encourage physical connection to open space and to reduce the focus on biodiversity (which is covered in SS Credit Site Development—Protect or Restore Habitat).
Credit	Rainwater Management	<ul style="list-style-type: none"> • Combined stormwater quality and quantity management credits into a single Rainwater Management credit. • Projects must use GI and LID rainwater management techniques on site. • Created specific path to accommodate reduced rainwater management opportunities in zero lot line urban projects. • Expanded multitenant complex path to all projects types in addition to retail projects. • Metric by which to test compliance is now the total volume of runoff calculated for the 95th percentile of regional or local storm events, rather than the one-year and two-year storm events.
Credit	Heat Island Reduction	<ul style="list-style-type: none"> • Credit combines the roof and nonroof heat island credits from LEED 2009. • Vegetated roofs and high-reflectance roofs now have equal weight when calculating compliance. • Tree canopy shade area is now calculated after 10 years of growth rather than five years. • Increased initial SRI thresholds for roofing material. • Credit compliance for nonroof hardscape is now calculated using SR values instead of SRI values. • Credit now takes into account the three-year aged SRI values for roofing material.

Credit	Light Pollution Reduction	<ul style="list-style-type: none"> • Added new compliance option based on BUG ratings. • Relocated lighting power density requirements to EA Prerequisite Minimum Energy Performance. • Relocated interior lighting requirements to EA Prerequisite Minimum Energy Performance. • Photometric information now needs to include only vertical illuminance calculations. Also, point-by-point calculation output documentation needs to be provided only for the worst-case vertical plane, not all site lighting.
Credit	Site Master Plan (Schools)	<ul style="list-style-type: none"> • No substantive changes.
Credit	Tenant Design and Construction Guidelines (Core and Shell)	<ul style="list-style-type: none"> • Tenant guidelines no longer required to include information on LEED for Commercial Interiors or explain how the core and shell building contributes to achieving these credits.
Credit	Places of Respite (Healthcare)	<ul style="list-style-type: none"> • Added requirement that 25% of all qualifying outdoor space be vegetated at the ground plane or with overhead vegetated canopy (trees and shrubs only) to ensure that vegetation is present to provide additional benefits.
Credit	Direct Exterior Access (Healthcare)	<ul style="list-style-type: none"> • No substantive changes.
Credit	Joint Use of Facilities (Schools)	<ul style="list-style-type: none"> • No substantive changes.
WATER EFFICIENCY		
Prerequisite	Outdoor Water Use Reduction	<ul style="list-style-type: none"> • New prerequisite. • Modified calculator used. • Moved alternative water source credit and smart sensor irrigation to the prerequisite.
Prerequisite	Indoor Water Use Reduction	<ul style="list-style-type: none"> • Prerequisite now includes requirements for water-using appliances and processes, as well as cooling towers and evaporative condensers. • WaterSense label requirements were recommended in LEED 2009; they are now mandatory in the U.S., with local equivalents allowed outside the U.S. • New prescriptive compliance path based on demonstrating that all fixtures are 20% below baseline. • Duration-based savings from autocontrol faucets with automatic fixture sensors or metering controls are no longer allowed in the design case. • Applying nonpotable water is no longer allowed as an alternative compliance path in the prerequisite. Alternative water sources can, however, earn points in the corresponding credit.
Prerequisite	Building-Level Water Metering	<ul style="list-style-type: none"> • New prerequisite. The ongoing tracking and reporting components were previously required under Minimum Program Requirement 6 for all LEED 2009 projects.
Credit	Outdoor Water Use Reduction	<ul style="list-style-type: none"> • New credit. • WaterSense Water Budget Tool now listed as the referenced calculation tool.
Credit	Indoor Water Use Reduction	<ul style="list-style-type: none"> • Appliance and process water savings can earn credit under the Retail, Healthcare, Hospitality, and Schools rating systems. • WaterSense label requirements, recommended in LEED

		<p>2009, are now mandatory in the U.S., with local equivalencies allowed elsewhere.</p> <ul style="list-style-type: none"> • Duration-based savings from autocontrol faucets with automatic fixture sensors or metering controls are no longer allowed in the design case. • To earn points, project teams must include fixtures necessary to meet the occupants' needs. When no facilities are available within project boundaries, the closest available restrooms must be included in credit calculations. These additional restrooms can be excluded from prerequisite compliance requirements.
Credit	Cooling Tower Water Use	<ul style="list-style-type: none"> • New credit.
Credit	Water Metering	<ul style="list-style-type: none"> • New credit.
ENERGY AND ATMOSPHERE		
Prerequisite	Fundamental Commissioning and Verification	<ul style="list-style-type: none"> • Requires the CxA to be engaged before the design development phase is complete. • Expanded electrical and plumbing scopes. • Elements of envelope commissioning are now incorporated in the OPR and BOD. • One design review and one operations and maintenance plan are now required.
Prerequisite	Minimum Energy Performance	<p>Option 1 Whole Building Energy Simulation</p> <ul style="list-style-type: none"> • ASHRAE 90.1–2010 replaces ASHRAE 90.1–2007. • Process energy is no longer required to make up 25% of overall building energy for the baseline and proposed models. • Prerequisite compliance must now be achieved without accounting for the cost offset by site-generated renewable energy. • For data centers, 2% of the required 5% energy cost reductions must come from building power and cooling infrastructure energy use. <p>Option 2 ASHRAE 50% Advanced Energy Design Guide, and Option 3 Advanced Buildings Core Performance Guide</p> <ul style="list-style-type: none"> • For Option 2, the standard for compliance with the prerequisite has been changed from the 30% savings version of the AEDG to the 50% savings version. This represents 50% expected savings over ASHRAE 90.1–2004. • For Options 2 and 3, the project must now comply with mandatory and prescriptive requirements of ASHRAE 90.1–2010 to achieve the prerequisite.
Prerequisite	Building-Level Energy Metering	<ul style="list-style-type: none"> • New prerequisite. • Minimum program requirements: The ongoing energy tracking and reporting components were previously required under MPR 6 for all LEED 2009 projects.
Prerequisite	Fundamental Refrigerant Management	<ul style="list-style-type: none"> • No substantive changes.
Credit	Enhanced Commissioning	<ul style="list-style-type: none"> • Credit now includes monitoring-based commissioning and building envelope commissioning options.

Credit	Optimize Energy Performance	<ul style="list-style-type: none"> • See <i>Changes from LEED 2009</i> in EA Prerequisite Minimum Energy Performance.
Credit	Advanced Energy Metering	<ul style="list-style-type: none"> • New credit.
Credit	Demand Response	<ul style="list-style-type: none"> • New credit.
Credit	Renewable Energy Production	<ul style="list-style-type: none"> • Credit now allows solar gardens and community systems.
Credit	Enhanced Refrigerant Management	<ul style="list-style-type: none"> • Added sector-specific requirements for commercial refrigeration equipment.
Credit	Green Power and Carbon Offsets	<ul style="list-style-type: none"> • In addition to including electricity, credit now requires nonelectric energy use to be offset using carbon offsets. • Credit now requires a five-year contract and specifies that resources must have come online after January 1, 2005, and be delivered at least annually. • Increased percentage thresholds to 50% for 1 point and 100% for 2 points.
MATERIALS AND RESOURCES		
Prerequisite	Storage and Collection of Recyclables	<ul style="list-style-type: none"> • Materials that require dedicated storage now include batteries, mercury-containing lamps, and e-waste; project teams may choose two of the three. • For retail projects, the required number of waste streams with dedicated storage has increased from three to four.
Prerequisite	Construction and Demolition Waste Management Planning	<ul style="list-style-type: none"> • The creation of a CWM plan is a new requirement.
Prerequisite	PBT Source Reduction—Mercury	<ul style="list-style-type: none"> • No substantive changes.
Credit	Building Life Cycle Impact Reduction	<ul style="list-style-type: none"> • Building reuse is a combination of two LEED 2009 credits: MR Credit Building Reuse—Maintain Walls, Floor and MR Credit Roof and Building Reuse—Maintain Interior Nonstructural Elements. • MR Credit Building Life-Cycle Impact Reduction, Option 3. Materials reuse may incorporate both structural and nonstructural elements as long as they are not double-counted in MR Credit Building Product Disclosure and Optimization—Sourcing of Raw Materials, Option 2, Leadership Extraction Practices.
Credit	Building Product Disclosure and Optimization—Environmental Product Declarations	<ul style="list-style-type: none"> • New credit. • Some materials excluded from MR credits in the past may now be included, such as mechanical fixtures, fittings, and rough-in materials that are considered nonmotorized MEP components.
Credit	Building Product Disclosure and Optimization—Sourcing of Raw Materials	<p>Multiple criteria from the following LEED 2009 credits have been combined into this credit. Except as noted, the criteria are unchanged from LEED 2009. Other criteria are now incorporated into other MR credits, such as Building Life-Cycle Impact Reduction and Building Product Disclosure and Optimization—Environmental Product Declarations:</p> <ul style="list-style-type: none"> • MR Credit Resource Reuse. Materials that are reused on-site are no longer required to be repurposed. • MR Credit Recycled Content. The requirements for recycled content have not changed; however, this criterion is now combined with other criteria in a single

		<p>option.</p> <ul style="list-style-type: none"> • MR Credit Regional Materials. The 500-mile (805-km) radius requirement was decreased to 100 miles (160 km). The definition of regional has been expanded to include the distribution and purchase location and now includes all points of manufacture. • MR Credit Rapidly Renewable Materials. Biobased materials are no longer defined by the harvest cycle of the raw materials; instead, products must meet the Sustainable Agriculture Standard to count toward this credit. • MR Credit Certified Wood. The requirements for certified wood have not changed; however, this criterion is not combined with other criteria in a single option.
Credit	Building Product Disclosure and Optimization—Material Ingredients	<ul style="list-style-type: none"> • New credit.
Credit	PBT Source Reduction-Mercury (Healthcare)	<ul style="list-style-type: none"> • No substantive changes.
Credit	PBT Source Reduction-Lead, Cadmium, Copper (Healthcare)	<ul style="list-style-type: none"> • No substantive changes.
Credit	Furniture and Medical Furnishings (Healthcare)	<ul style="list-style-type: none"> • Updated air testing protocols for Option 2 to reflect leadership standards. • Modified requirements in Option 3 to reflect changes to related Materials and Resources credits.
Credit	Resource Use-Design for Flexibility (Healthcare)	<ul style="list-style-type: none"> • No longer a minimum requirement for interstitial space.
Credit	Construction and Demolition Waste Management	<ul style="list-style-type: none"> • Added compliance option for total project waste reduction per gross floor area of the project. • Multiple material streams must be diverted to earn the credit for waste diversion (Option 1). • ADC specifically excluded from diversion calculations. In LEED 2009, it was allowed to count as diverted waste. • Waste-to-energy may count as a diversion method if the facility meets European Union requirements for waste management and emissions into air, soil, surface water, and groundwater.
INDOOR ENVIRONMENTAL QUALITY		
Prerequisite	Minimum Indoor Air Quality Performance	<ul style="list-style-type: none"> • ASHRAE Standard 62.1 updated to version 2010 from version 2007. • ASHRAE 62.1–2010 natural ventilation calculations now consider window configuration and ceiling height. • ASHRAE 62.1–2010 now requires supplementary mechanical ventilation systems for naturally ventilated spaces in some cases. • Project teams are required to confirm the appropriate application of natural ventilation through CIBSE AM10, Figure 2.8 (flow chart). • Projects outside the U.S. allowed to demonstrate achievement via CEN requirements (rather than ASHRAE 62.1–2010). • Prerequisite now includes the monitoring requirements

		<p>previously included in Indoor Environmental Quality Credit 1, Outdoor Air Delivery Monitoring. Additionally, the monitoring requirements now distinguish between variable air volume and constant volume systems.</p> <ul style="list-style-type: none"> • Prerequisite now includes specific requirements for residential projects, which are mostly taken from LEED for Homes, Indoor Environmental Quality Credit 2, Combustion Venting.
Prerequisite	Environmental Tobacco Smoke Control	<ul style="list-style-type: none"> • Designated interior smoking rooms are no longer permitted, with the exception of residential spaces. • Expanded no-smoking policy to apply to spaces outside the property line if the space is used for business purposes and is within 25 feet (7.5 meters) of building openings or outdoor air intakes. • Added specific requirement for the location of exterior posted signs. • Expanded acceptable procedure for demonstrating compliance with air leakage requirements in residential projects. This change allows teams to use testing procedures other than blower door testing.
Prerequisite	Minimum Acoustic Performance (Schools)	<ul style="list-style-type: none"> • Revised maximum allowable background noise from 45 dBA to 40 dBA. • Added an exterior noise requirement to minimize exterior noise intrusion into classrooms and core learning spaces. • Updated ANSI referenced standard to ANSI S12.60–2010. • Updated ASHRAE referenced standard to 2011 HVAC Applications ASHRAE Handbook, Chapter 48, Noise and Vibration Control. • For spaces 20,000 cubic feet (566 cubic meters) or larger, the referenced standard for reverberation time has changed to NRC-CNRC Construction Technology Update No. 51. This standard specifies variable reverberation time and total sound absorption values depending on the size of the space. • Added exceptions for projects with limited renovation scopes or strict historic preservation requirements.
Credit	Enhanced Indoor Air Quality Strategies	<ul style="list-style-type: none"> • Combined portions of IEQ Credit 1 Outdoor Air Delivery Monitoring, IEQ Credit 2 Increased Ventilation, and IEQ Credit 5 Indoor Chemical and Pollutant Source Control into a single credit. • Meeting the requirements of interior cross-contamination prevention no longer requires a calculation of a minimum pressure differential. However, the exhaust rates from the ventilation standard in EQ Prerequisite Minimum Indoor Air Quality Performance must be used. For spaces that do not have a requirement from this standard, a minimum exhaust rate of 0.5 cubic feet per minute per square foot (2.54 liters per second per square meter) must be used. • Added options regarding naturally ventilated spaces. • Additional guidance for warehouses, distribution centers, health care facilities, data centers, and residential projects. • Added option for filtration media requirements, CEN Standard EN 779–2002, Particulate Air Filters for General Ventilation, Determination of the Filtration Performance.
Credit	Low-Emitting Materials	<ul style="list-style-type: none"> • Combined former individual credit paths into one credit, with a scaled point system for each path earned.

		<ul style="list-style-type: none"> • Compliance of interior finishes may be demonstrated in assemblies with multiple layers in combination, or in each system individually. • Included consideration of furniture emissions for all rating systems. • Added new referenced standards to address international projects and new product requirements. • Ceilings are now included in the requirements. • Emissions from insulation are now included. • Emissions requirements for on-site, wet-applied, full-spread products measured via chamber tests in air are now included. VOC content limits for on-site, wet-applied products are still required.
Credit	Construction Indoor Air Quality Management Plan	<ul style="list-style-type: none"> • The use of tobacco products during construction is now explicitly prohibited inside the building and within 25 feet (7.5 meters) (or greater, if required by the local jurisdiction) of the building entrance.
Credit	Indoor Air Quality Assessment	<ul style="list-style-type: none"> • Installation of movable furnishings (such as workstations and partitions) before testing or flush-out is now required. • Options can no longer be combined. • An upper interior temperature limit is now identified in Option 1. • Testing is now required for an expanded list of contaminants in Option 2.
Credit	Thermal Comfort	<ul style="list-style-type: none"> • Combines the LEED 2009 credits Controllability of Systems: Thermal Comfort (IEQ Credit 6.2, IEQ Credit 6) and Thermal Comfort: Design (IEQ Credit 7.1, IEQ Credit 7) into a single credit. • Updated referenced standard to ASHRAE 55–2010. • Included international standards to provide more relevant compliance options for non-U.S. projects. • Requirements for natatoriums are now applicable to all rating systems. • Established new compliance paths for data centers and warehouses.
Credit	Interior Lighting	<ul style="list-style-type: none"> • Added additional point and option for lighting quality. • Revised requirements for lighting control to require at least three lighting levels: on, off, and a midlevel.
Credit	Daylight	<ul style="list-style-type: none"> • Eliminated prescriptive compliance path. • Additional simulation option that incorporates two new metrics, spatial daylight autonomy and annual sunlight exposure, based on annual daylight computer simulation models. • For Option 2, the illuminance simulation now relies on local weather data and uses a calculated illuminance intensity. • For Option 3, measurements are required at two times of the year. • Changed number of points available and thresholds for achievement. • Schools is no longer broken out by classroom and core learning spaces vs. other regularly occupied spaces.
Credit	Quality Views	<ul style="list-style-type: none"> • Exemplary performance requirements from LEED 2009 are now the basis for the credit requirements. • Glazing must provide a clear view to the outdoors. The

		<p>glazing does not have to be located between 30 and 90 inches (750 and 2300 millimeters) above the finished floor.</p> <ul style="list-style-type: none"> • Atriums now qualify for up to 30% of the total area. • For Healthcare projects, the inpatient unit requirements now include nonperimeter area. The requirements for direct lines of sight in the perimeter area have been modified to align with other rating systems.
Credit	Acoustic Performance	<ul style="list-style-type: none"> • New credit except in Schools and Healthcare. <p>Schools:</p> <ul style="list-style-type: none"> • Decreased background noise level limit from 40 dBA to 35 dBA. • Updated referenced ANSI S12.60 standard from 2002 to 2010. • Added AHRI Standard 885–2008 as a referenced standard for background noise. • Equivalent local codes may now be used in place of the national codes specified in the credit requirements. <p>Healthcare:</p> <ul style="list-style-type: none"> • Changed credit name from Acoustic Environment.

LEED v4 for Interior Design and Construction

Summary of changes from LEED 2009

	Credit – Integrative Process	<ul style="list-style-type: none"> • New credit.
LOCATION AND TRANSPORTATION		
Credit	LEED for Neighborhood Development Location	<ul style="list-style-type: none"> • New credit.
Credit	Surrounding Density and Diverse Uses	<ul style="list-style-type: none"> • Points redistributed such that the credit's full value can be earned only if the requirements for both Options 1 and 2 are met. • Now thresholds for separate residential and non-residential densities. • The radius for building density calculation is now specified as ¼ -mile (400 meters) from the project boundary. • Proximity to the diverse uses based on walking distance instead of a radius. • Added additional restrictions to stipulate how diverse uses can be counted.
Credit	Access to Quality Transit	<ul style="list-style-type: none"> • Transit service frequency is now included in the credit requirements. • Access is now measured by walking distance to functional building entries. • Credit now addresses both weekday and weekend availability.

		<ul style="list-style-type: none"> • Point thresholds now based on the number of transit trips available within the required walking distance. • Expanded modes of transportation to include ferry, streetcar, rapid transit, and rideshare. • Private shuttles cannot be used to comply with the requirement.
Credit	Bicycle Facilities	<ul style="list-style-type: none"> • Added requirements for proximity to a bicycle network. • Created separate short- and long-term bicycle storage requirements. • Changed shower room calculation method.
Credit	Reduced Parking Footprint	<ul style="list-style-type: none"> • Added a baseline reference to a third-party standard (ITE Transportation Planning Handbook, 3rd edition, Tables 18-2 through 18-4). • Credit is no longer awarded for providing no new parking. If there is existing parking that will continue to be used by the project, it must also comply with credit requirements.
WATER EFFICIENCY		
Prerequisite	Indoor Water Use Reduction	<ul style="list-style-type: none"> • Prerequisite now includes requirements for water-using appliances and processes, as well as cooling towers and evaporative condensers. • WaterSense label requirements recommended in LEED 2009 are now mandatory in the U.S. • New prescriptive compliance path (based on demonstrating that all fixtures are 20% below baseline).
Credit	Indoor Water Use Reduction	<ul style="list-style-type: none"> • Appliance and process water savings can earn credit under the Retail and Hospitality rating systems. • WaterSense label requirements recommended in LEED 2009 are now mandatory in the U.S. • To earn points, project teams must include fixtures necessary to meet occupants' needs. When no facilities are available within project boundaries, the closest available restrooms must be included in credit calculations. These additional restrooms can be excluded from prerequisite compliance requirements.
ENERGY AND ATMOSPHERE		
Prerequisite	Fundamental Commissioning and Verification	<ul style="list-style-type: none"> • LEED v4 now requires the CxA to be engaged before the design development phase is complete. • Expanded electrical and plumbing scopes. • One design review and one operations and maintenance plan are now required.
Prerequisite	Minimum Energy Performance	<ul style="list-style-type: none"> • Prerequisite now includes two options: Option 1, Tenant-Level Energy Simulation, and Option 2, Prescriptive Compliance. <p>Option 1. Tenant-Level Energy Simulation:</p> <ul style="list-style-type: none"> • Tenant-level modeling now more closely follows that for whole buildings. • Revised LEED methodology for modeling shared HVAC systems to allocating a percentage of the shared systems to the LEED project. • Baseline case must follow Appendix G requirements for all components and systems, including the building envelope. Existing conditions are not permitted to be modeled for the baseline case.

		Option 2. Prescriptive Compliance: <ul style="list-style-type: none"> Requirements of the 2009 prerequisite were adapted to become Option 2 in LEED v4.
Prerequisite	Fundamental Refrigerant Management	<ul style="list-style-type: none"> No substantive changes.
Credit	Enhanced Commissioning	<ul style="list-style-type: none"> A monitoring-based commissioning option is now included.
Credit	Optimize Energy Performance	<ul style="list-style-type: none"> See EA Prerequisite Minimum Energy Performance.
Credit	Advanced Energy Metering	<ul style="list-style-type: none"> New credit.
Credit	Renewable Energy Production	<ul style="list-style-type: none"> Solar gardens and community systems are eligible under certain conditions.
Credit	Enhanced Refrigerant Management	<ul style="list-style-type: none"> Added sector-specific requirements for commercial refrigeration equipment.
Credit	Green Power and Carbon Offsets	<ul style="list-style-type: none"> In addition to including electricity, the credit now requires nonelectric use to be offset using carbon offsets. Credit now requires a five-year contract and specifies that resources must have come online after January 1, 2005, and be delivered at least annually. Increased percentage thresholds to 50% for 1 point and 100% for 2 points.
MATERIALS AND RESOURCES		
Prerequisite	Storage and Collection of Recyclables	<ul style="list-style-type: none"> Materials that require dedicated storage now include batteries, mercury-containing lamps, and e-waste; project teams may choose two of the three. For retail projects, the required number of waste streams with dedicated storage has increased from three to four.
Prerequisite	Construction and Demolition Waste Management Planning	<ul style="list-style-type: none"> Creation of a CWM plan is a new requirement.
Credit	Long Term Commitment	<ul style="list-style-type: none"> No substantive changes.
Credit	Interiors Life Cycle Impact Reduction	<ul style="list-style-type: none"> Combined two former MR credits, Building Reuse—Maintain Interior Nonstructural Components and Materials Reuse—Furniture and Furnishings into this credit. Changed reuse threshold for interior nonstructural elements from a tiered approach (40% and 60%) to a single 50% threshold. Credit is given both for items that are reused in place and for items that serve a new purpose. Option 3, Design for Flexibility, is new.
Credit	Building Product Disclosure and Optimization—Environmental Product Declarations	<ul style="list-style-type: none"> New credit. Some materials excluded from MR credits in the past may now be included, such as mechanical fixtures, fittings, and rough-in materials that are considered non-motorized MEP components.
Credit	Building Product Disclosure and Optimization—Sourcing of Raw Materials	Multiple criteria from the following LEED 2009 credits have been combined into this credit. Except as noted, the criteria are unchanged from LEED 2009. Other criteria are now incorporated into other MR credits, such as Interiors Life-Cycle Impact Reduction and Building Product Disclosure and Optimization—Environmental Product Declarations:

		<ul style="list-style-type: none"> • MR Credit Resource Reuse. Materials that are reused on-site are no longer required to be repurposed. • MR Credit Recycled Content. Requirements for recycled content have not changed; however, this criterion is now combined with other criteria in a single option. • MR Credit Regional Materials. Decreased 500-mile (805-km) radius requirement to 100 miles (160 km). Expanded definition of regional to include the distribution and purchase location and now includes all points of manufacture. • MR Credit Rapidly Renewable Materials. Biobased materials are no longer defined by the harvest cycle of the raw materials; instead, products must meet the Sustainable Agriculture Standard to count toward this credit.
Credit	Building Product Disclosure and Optimization—Material Ingredients	<ul style="list-style-type: none"> • New credit.
Credit	Construction and Demolition Waste Management	<ul style="list-style-type: none"> • Added a compliance option for total project waste reduction per gross floor area of the project. • Multiple material streams must be diverted to earn the credit for waste diversion (Option 1). • ADC has been specifically excluded from diversion calculations. In LEED 2009 it could count as diverted waste. • Waste-to-energy may count as a diversion method if the facility meets European Union requirements for waste management and emissions into air, soil, surface water, and groundwater.
INDOOR ENVIRONMENTAL QUALITY		
Prerequisite	Minimum Indoor Air Quality Performance	<ul style="list-style-type: none"> • Updated ASHRAE Standard 62.1 to version 2010 from version 2007. • ASHRAE 62.1–2010 natural ventilation calculations now consider window configuration and ceiling height. • ASHRAE 62.1–2010 now requires supplementary mechanical ventilation systems for naturally ventilated spaces in some cases. • Project teams are required to confirm the appropriate application of natural ventilation through CIBSE AM10, Figure 2.8 (flow chart). • Projects outside the U.S. are now allowed to demonstrate achievement via CEN requirements (rather than ASHRAE 62.1–2010). • Prerequisite now includes the monitoring requirements previously included in Indoor Environmental Quality Credit 1, Outdoor Air Delivery Monitoring. Additionally, the monitoring requirements now distinguish between variable air volume and constant volume systems.
Prerequisite	Environmental Tobacco Smoke Control	<ul style="list-style-type: none"> • Designated interior smoking rooms are no longer permitted, with the exception of residential projects. • Expanded no-smoking policy to apply to spaces outside the property line if the space is used for business purposes and is within 25 feet (7.5 meters) of building openings or outdoor air intakes.

		<ul style="list-style-type: none"> • Projects must prohibit smoking by all occupants and users throughout the entire building. This expands on the previous requirement to prohibit smoking in the tenant space and common areas only. • Added a specific requirement for the location of exterior posted signs.
Credit	Enhanced Indoor Air Quality Strategies	<ul style="list-style-type: none"> • Combined portions of IEQ Credit 1 Outdoor Air Delivery Monitoring, IEQ Credit 2 Increased Ventilation, and IEQ Credit 5 Indoor Chemical and Pollutant Source Control into a single credit. • Meeting the requirements of interior cross-contamination prevention no longer requires a calculation of a minimum pressure differential. However, the exhaust rates from the ventilation standard in EQ Prerequisite Minimum Indoor Air Quality Performance must be used. For spaces that do not have a requirement from this standard, a minimum exhaust rate of 0.5 cubic feet per minute per square foot (2.54 liters per second per square meter) must be used. • Additional options regarding naturally ventilated spaces have been included. • Added an option for filtration media requirements, CEN Standard EN 779–2002, Particulate Air Filters for General Ventilation, Determination of the Filtration Performance.
Credit	Low-Emitting Materials	<ul style="list-style-type: none"> • Combined former individual credit paths into one credit, with a scaled point system for each path earned. • Compliance of interior finishes may be demonstrated in assemblies with multiple layers in combination, or in each system individually. • Included consideration of furniture emissions for all rating systems. • Added new referenced standards to address non-U.S. projects and new product requirements. • Ceilings are now included in the requirements. • Emissions from insulation are now included. • Emissions requirements for on-site wet-applied, full-spread products measured via chamber tests in air are now included. VOC content limits for on-site, wet-applied products are still required.
Credit	Construction Indoor Air Quality Management Plan	<ul style="list-style-type: none"> • Use of tobacco products during construction is now explicitly prohibited inside the building and within 25 feet (7.5 meters) (or greater, if required by the local jurisdiction) of the building entrance.
Credit	Indoor Air Quality Assessment	<ul style="list-style-type: none"> • Options can no longer be combined. • Upper interior temperature limit is now identified in Option 1. • Testing now required for an expanded list of contaminants in Option 2.
Credit	Thermal Comfort	<ul style="list-style-type: none"> • Credit combines the LEED 2009 credits Controllability of Systems: Thermal Comfort (IEQ Credit 6.2, IEQ Credit 6) and Thermal Comfort: Design (IEQ Credit 7.1, IEQ Credit 7) into a single credit. • Updated referenced standard to ASHRAE 55–2010. • Included international standards to provide more relevant compliance options for non-U.S. projects. • Requirements for natatoriums are now applicable to all

		rating systems, not just Schools.
Credit	Interior Lighting	<ul style="list-style-type: none"> • Added an additional point and option for lighting quality to the previous lighting control requirements. • Revised requirements for lighting control to require at least three lighting levels to meet the controllability criteria.
Credit	Daylight	<ul style="list-style-type: none"> • Eliminated prescriptive compliance path. • Additional simulation option that incorporates two new metrics, spatial daylight autonomy and annual sunlight exposure, based on computer simulations run over an entire year. • For Option 2, the illuminance simulation now relies on local weather data and uses a calculated illuminance intensity. • For Option 3, measurements are required at two times of the year. • Changed number of points available and thresholds for achievement.
Credit	Quality Views	<ul style="list-style-type: none"> • Exemplary performance requirements from LEED 2009 are now the basis for the credit requirements. • Glazing must provide a clear image of the outdoors. The glazing does not have to be located between 30 and 90 inches (750 and 2300 millimeters) above the finished floor. • Atriums now qualify for up to 30% of the total area.
Credit	Acoustic Performance	<ul style="list-style-type: none"> • New credit.

LEED v4 for Building Operations and Maintenance

Summary of changes from LEED 2009

LOCATION AND TRANSPORTATION		
Credit	Alternative Transportation	<ul style="list-style-type: none"> • Added Option 1 to allow projects to earn 1 point for simply surveying their building occupants and submitting the survey results. • Decreased performance threshold for Option 2 to allow for a linear increase from threshold to threshold. • Added Option 3 to reward projects for implementing a comprehensive alternative transportation program. • Projects are now required to survey visitors if the daily average number of visitors or typical peak is greater than regular building occupants. • New ongoing performance standards require teams to conduct a survey every five years.
SUSTAINABLE SITES		
Prerequisite	Site Management Policy	<ul style="list-style-type: none"> • New prerequisite. • Prerequisite derived from two LEED 2009 credits: SS Credit 2, Building Exterior and Hardscape Management Plan, and SS Credit 3, Integrated Pest Management, Erosion Control, and Landscape Management Plan. • Integrated pest management is now covered under the

		EQ credit category.
Credit	Site Development—Protect or Restore Habitat	<ul style="list-style-type: none"> • Changed calculation for the native vegetation threshold to 20% of the total site area (including the building footprint) and a minimum of 5,000 square feet (465 square meters). • Replaced off-site option with an option for financial support.
Credit	Rainwater Management	<ul style="list-style-type: none"> • Projects must use GI and LID rainwater management techniques on site. • Metric by which to test compliance is now the total volume of runoff calculated for the 95th percentile of regional or local storm events, rather than the one-year and two-year storm events.
Credit	Heat Island Reduction	<ul style="list-style-type: none"> • Credit combines the roof and nonroof heat island credits from LEED 2009. • Changed minimum frequency for cleaning paving and roof surfaces to every three years. • Tree canopy shade area is now calculated after 10 years of growth rather than five years. • SRI thresholds have been increased and now include both initial SRI and three-year aged SRI. • Credit compliance for nonroof hardscape is now calculated using SR values instead of SRI values.
Credit	Light Pollution Reduction	<ul style="list-style-type: none"> • There are no longer interior lighting requirements associated with the credit. • The previously available approach for perimeter measurements to demonstrate compliance by meeting maximum footcandle (lux) levels, prescribed by IESNA RP-33, is no longer available.
Credit	Site Management	<ul style="list-style-type: none"> • Credit is derived from two LEED 2009 credits: SS Credit 2 Building Exterior and Hardscape Management Plan, and SS Credit 3 Integrated Pest Management, Erosion Control, and Landscape Management Plan. • Added soil testing and irrigation system monitoring requirements. • Added a new compliance option for reducing emissions from site maintenance equipment.
Credit	Site Improvement Plan	<ul style="list-style-type: none"> • New credit that addresses the long term ecological health of the site.
Credit	Joint Use of Facilities (Schools)	<ul style="list-style-type: none"> • New credit.
WATER EFFICIENCY		
Prerequisite	Indoor Water Use Reduction	<ul style="list-style-type: none"> • Changed the year for the baseline multiplier cutoff from 1994 to 1995. • Multiplier for projects built and occupied before 1995 has changed from 160% to 150% of UPC/IPC. • Duration-based savings from autocontrol faucets with automatic fixture sensors or metering controls are no longer allowed in the design case. • Applying nonpotable water is no longer allowed as an alternative compliance path in the prerequisite. An alternative water source can, however, earn points in the corresponding credit.
Prerequisite	Building-Level Water Metering	<ul style="list-style-type: none"> • New prerequisite.

Credit	Outdoor Water Use Reduction	<ul style="list-style-type: none"> • New credit. • WaterSense Water Budget Tool is now listed as the referenced calculation tool.
Credit	Indoor Water Use Reduction	<ul style="list-style-type: none"> • Added second option for metered water use.
Credit	Cooling Tower Water Use	<ul style="list-style-type: none"> • Modified the cooling tower credit structure to highlight appropriate cycling based on the concentrations of dissolved solids on the project site.
Credit	Water Metering	<ul style="list-style-type: none"> • Moved Option 1, Whole Building Metering, from LEED 2009 to the prerequisite level. • Credit is now comparable to Option 2, Submetering, in LEED 2009.
ENERGY AND ATMOSPHERE		
Prerequisite	Energy Efficiency Best Management Practices	<ul style="list-style-type: none"> • Specific requirements for Data Center projects are now included.
Prerequisite	Minimum Energy Performance	<ul style="list-style-type: none"> • Increased minimum ENERGY STAR score to 75.
Prerequisite	Building-Level Energy Metering	<ul style="list-style-type: none"> • New prerequisite. • Ongoing energy tracking and reporting components were previously required under Minimum Program Requirement #6 for LEED 2009 projects.
Prerequisite	Fundamental Refrigerant Management	<ul style="list-style-type: none"> • No substantive changes.
Credit	Existing Building Commissioning—Analysis	<ul style="list-style-type: none"> • For DES, building-owned systems are treated the same as third-party systems.
Credit	Existing Building Commissioning – Implementation	<ul style="list-style-type: none"> • Capital plan required for major retrofits and upgrades is now specified as a five-year plan. • Formal tracking and verification plan is now required for the implemented energy conservation measures.
Credit	Ongoing Commissioning	<ul style="list-style-type: none"> • No substantive changes.
Credit	Optimize Energy Performance	<ul style="list-style-type: none"> • Increased minimum ENERGY STAR score to 75.
Credit	Advanced Energy Metering	<ul style="list-style-type: none"> • System-level metering and building automation systems were included in LEED 2009 as minimum program requirement 6 and as EA Credit Performance Measurement—Building Automation System. Both topics are combined into this credit.
Credit	Demand Response	<ul style="list-style-type: none"> • New credit
Credit	Renewable Energy and Carbon Offsets	<ul style="list-style-type: none"> • This credit was formerly titled On-Site and Off-Site Renewable Energy. • Aligned performance thresholds with LEED Building Design & Construction rating systems.
Credit	Enhanced Refrigerant Management	<ul style="list-style-type: none"> • Added sector-specific requirements for commercial refrigeration equipment. • Default leakage rate, rather than a measured rate, must be used in the calculations.
MATERIALS AND RESOURCES		
Prerequisite	Ongoing Purchasing and Waste Policy	<ul style="list-style-type: none"> • Combined MR Prerequisite Sustainable Purchasing Policy and MR Prerequisite Solid Waste Management Policy into one prerequisite.

		<ul style="list-style-type: none"> • Added requirements of MR Credit Waste Stream Audit to the prerequisite. • Added minimum recyclable storage requirements to align with the prerequisite requirement in the Building Design and Construction rating systems.
Prerequisite	Facility Maintenance and Renovation Policy	<ul style="list-style-type: none"> • New prerequisite.
Credit	Purchasing—Ongoing	<ul style="list-style-type: none"> • Combined MR Credit Sustainable Purchasing—Ongoing Consumables and the MR Credit Sustainable Purchasing—Durable Goods requirements for electric-powered equipment into one credit. • Revised purchasing criteria to align with the Building Design and Construction MR credits. • Added requirements for food and beverages for Schools and Hospitality projects.
Credit	Purchasing—Lamps	<ul style="list-style-type: none"> • Reduced mercury limit from 90 picograms per lumen hour to 70. • Removed NEMA exemption for compact fluorescent lamps.
Credit	Purchasing—Facility Maintenance and Renovation	<ul style="list-style-type: none"> • Aligned single attributes with the Building Design and Construction rating systems. • Furniture was moved from the former MR Credit Purchasing—Durable Goods to this credit. • Added a third option to give credit to projects that perform no facility maintenance and renovations. • Previously, even if only a portion of a material met the credit requirements, the entire material would receive credit; now, only the percentage of the material meeting the requirements can contribute toward credit achievement, unless otherwise noted.
Credit	Solid Waste Management—Ongoing	<ul style="list-style-type: none"> • Credit combines two LEED 2009 credits: MR Credit Solid Waste Management—Ongoing Consumables and MR Credit Solid Waste Management—Durable Goods. • Excluded furniture and furnishings from this credit; they are now covered under MR Credit Solid Waste Management—Facility Maintenance and Renovations. • Raised threshold for battery recycling from 80% to 100%. • Added a requirement for 100% recycling of mercury-containing lamps.
Credit	Solid Waste Management—Facility Maintenance and Renovation	<ul style="list-style-type: none"> • Removed minimum number of trades defining the scope of credit. • Furniture is now included in the credit.
INDOOR ENVIRONMENTAL QUALITY		
Prerequisite	Minimum Indoor Air Quality Performance	<ul style="list-style-type: none"> • Updated ASHRAE Standard 62.1 to version 2010 from version 2007. • Prerequisite now requires compliance with the minimum requirements of ASHRAE Standard 62.1–2010, Sections 4–7 (for mechanically ventilated spaces, Option 1); the requirements of CEN Standard EN 13779–2007, Ventilation for nonresidential buildings, Performance requirements for ventilation and room conditioning systems, excluding Sections 7.3 (Thermal environment), 7.6 (Acoustic environment), A.16, and A.17 (for mechanically ventilated spaces, Option 2); or the minimum requirements of ASHRAE Standard 62.1–2010, Section 4 (for naturally

		<ul style="list-style-type: none"> ventilated spaces). ASHRAE 62.1–2010 natural ventilation calculations now consider window configuration and ceiling height. ASHRAE 62.1–2010 now requires supplementary mechanical ventilation systems for naturally ventilated spaces in some cases. Project teams are required to confirm the appropriate application of natural ventilation through CIBSE AM10, Figure 2.8 (flow chart). Projects outside the U.S. are now allowed to demonstrate achievement via CEN requirements (rather than ASHRAE 62.1–2010). The maintenance program must comply with the requirements of ASHRAE 62.1–2010, Section 8.
Prerequisite	Environmental Tobacco Smoke Control	<ul style="list-style-type: none"> Designated interior smoking rooms are no longer permitted, with the exception of residential spaces. Expanded no-smoking policy to apply to spaces outside the property line if the space is used for business purposes and is within 25 feet (7.5 meters) of building openings or outdoor air intakes. Added specific requirement for the location of exterior posted signs. Expanded acceptable procedure for demonstrating compliance with air leakage requirements in residential projects. This change allows teams to use testing procedures other than blower door testing. Residential EBOM projects not able to meet the leakage requirements may demonstrate compliance through the 30% improvement option.
Prerequisite	Green Cleaning Policy	<ul style="list-style-type: none"> Incorporated former Green Cleaning Policy prerequisite and High Performance Green Cleaning Program credit into this prerequisite. Second option now available for projects using a certified green cleaning vendor.
Credit	Indoor Air Quality Management Program	<ul style="list-style-type: none"> All preventive maintenance and periodic inspection procedures are included in one document, the O&M plan. Only an audit was previously required; the credit now requires developing an IAQ management program as well.
Credit	Enhanced Indoor Air Quality Strategies	<ul style="list-style-type: none"> Combined portions of IEQ Credit 1.2 Indoor Air Quality Best Management Practices—Outdoor Air Delivery Monitoring, IEQ Credit 1.4 Indoor Air Quality Best Management Practices—Reduce Particulates in Air Distribution, and IEQ Credit 3.5 Green Cleaning—Indoor Chemical and Pollutant Source into a single credit. Additional options for naturally ventilated spaces. Additional guidance for warehouses, distribution centers, data centers, and residential projects. Added an option for filtration media requirements, CEN Standard EN 779–2002, Particulate Air Filters for General Ventilation, Determination of the Filtration Performance.
Credit	Thermal Comfort	<ul style="list-style-type: none"> Updated ASHRAE referenced standard to 2010. Added international standards to provide more relevant compliance options for non-U.S. projects. Humidity monitoring is required at the humidity zone level (e.g., for each air-handling system) rather than in each

		<p>occupied space.</p> <ul style="list-style-type: none"> Established a new compliance path for data centers, which are required to meet the credit requirements in regularly occupied spaces only.
Credit	Interior Lighting	<ul style="list-style-type: none"> Added an additional point and option for lighting quality. Revised requirements for lighting control to require at least three lighting levels: on, off, and a midlevel.
Credit	Daylight and Quality Views	<ul style="list-style-type: none"> Eliminated simulation and prescriptive options for daylighting compliance. Option 1 now requires daylight measurements at two times of the year. Glazing must provide a clear view to the outdoors. The glazing does not have to be located between 30 and 90 inches (750 mm and 2 300 mm). Atriums now qualify for up to 30% of the total area for views. View quality is now a component of the credit requirements.
Credit	Green Cleaning—Custodial Effectiveness Assessment	<ul style="list-style-type: none"> Credit directly links implementation of the Green Cleaning Policy to the audit process. Tightened credit achievement threshold of the audit score from 3 to 2.5.
Credit	Green Cleaning—Products and Materials	<ul style="list-style-type: none"> Raised performance threshold for purchases from 30% to 75%. Added a provision for nonchemical and ionized water cleaning. Added Design for the Environment as an acceptable standard.
Credit	Green Cleaning—Equipment	<ul style="list-style-type: none"> Raised performance threshold for credit achievement from 20% to 40%. A phase-out plan can now be used in lieu of discarding equipment that has useful life remaining.
Credit	Integrated Pest Management	<ul style="list-style-type: none"> Combined exterior pest management requirements from SS Credit 3 and the interior pest management requirements from IEQ Credit 3.7 into one credit. Shortened 72-hour window for alerting building occupants that a non-least-risk pesticide application was going to occur to 24 hours. Expanded required log to include pest population tracking. Teams must now conduct a pest inventory and establish pest population thresholds.
Credit	Occupant Comfort Survey	<ul style="list-style-type: none"> Corrective action for any area with a dissatisfaction rate higher than 20% is now required.

LEED v4 for Neighborhood Development

Summary of changes from LEED 2009

SMART LOCATION AND LINKAGE		
Prerequisite	Smart Location	<ul style="list-style-type: none"> Option 2, Adjacent Sites with Connectivity, no longer counts intersections inside the project; it evaluates intersections only on adjacent land. The restrictions for counting neighborhood uses eligible

		for Option 4, Sites with Nearby Neighborhood Assets, have been revised.
Prerequisite	Imperiled Species and Ecological Communities	<ul style="list-style-type: none"> No substantive changes.
Prerequisite	Wetland and Water Body Conservation	<ul style="list-style-type: none"> No substantive changes.
Prerequisite	Agricultural Land Conservation	<ul style="list-style-type: none"> No substantive changes.
Prerequisite	Floodplain Avoidance	<ul style="list-style-type: none"> Revised floodplain terminology to align with industry standards. American Society of Civil Engineers Standard 24-05 added as a referenced standard.
Credit	Preferred Locations	<ul style="list-style-type: none"> Circulation network used in place of street network in connectivity calculation.
Credit	Brownfield Remediation	<ul style="list-style-type: none"> Projects are no longer limited to officially designated brownfields. Any on-site soil or groundwater contamination requiring remediation, as deemed by the authority having jurisdiction, can qualify a project for this credit. A Phase II environmental site assessment is no longer required. Asbestos no longer qualifies as contamination for the purposes of this credit. Building materials left on site from past construction demolition also do not qualify as contamination.
Credit	Access to Quality Transit	<ul style="list-style-type: none"> Credit title changed. The option for reduced vehicle distance traveled has been eliminated. Approach is now the same for all projects, regardless of size.
Credit	Bicycle Facilities	<ul style="list-style-type: none"> Bicycle network requirements have been organized into two options. Option 1 rewards connection to an existing bicycle network close to the project boundary. Option 2 rewards connection to a planned or existing bicycle network that can be inside the project. The maximum bicycling distance to eligible destinations along a bicycle network has been reduced to 3 miles (4800 meters). Bicycle storage requirements have been revised to include both short- and long-term storage.
Credit	Housing and Jobs Proximity	<ul style="list-style-type: none"> No substantive changes.
Credit	Steep Slope Protection	<ul style="list-style-type: none"> A single set of requirements replaces three options. The exempted slope requirements are removed. Projects that locate on a site without existing slopes greater than 15% may not earn the credit.
Credit	Site Design for Habitat or Wetland and Water Body Conservation	<ul style="list-style-type: none"> No substantive changes.
Credit	Restoration of Habitat or Wetlands and Water Bodies	<ul style="list-style-type: none"> No substantive changes.

Credit	Long-Term Conservation Management of Habitat or Wetlands and Water Bodies	<ul style="list-style-type: none"> No substantive changes.
NEIGHBORHOOD PATTERN AND DESIGN		
Prerequisite	Walkable Streets	<ul style="list-style-type: none"> <i>Street</i> has been changed to <i>circulation network</i>. Ratio is now building-height-to-centerline instead of building-height-to-street-width. Removed separate building-height-to-centerline ratio for nonmotorized streets. Building-height-to-centerline width, sidewalk length, and garage opening length are all now calculated as a percentage of block length instead of street frontage.
Prerequisite	Compact Development	<ul style="list-style-type: none"> No substantive changes.
Prerequisite	Connected and Open Community	<ul style="list-style-type: none"> Specifies a maximum area that can be gated. Refers to the circulation network, not just streets.
Credit	Walkable Streets	<ul style="list-style-type: none"> <i>Street</i> has been changed to <i>circulation network</i>. Building-height-to-street-width ratio is now building-height-to-centerline ratio.
Credit	Compact Development	<ul style="list-style-type: none"> No substantive changes.
Credit	Mixed-Use Neighborhoods	<ul style="list-style-type: none"> Credit name revised from “Mixed-Use Neighborhood Centers” Removed separate requirements for projects larger than 40 acres (16 hectares). Removed restrictions on uses that share the same building entrance. Food retail is no longer required as one of the two minimum categories of diverse uses. Removed minimum project occupancy thresholds for planned uses from Table 1. All planned uses must be in place by the time of 50% occupancy, regardless of the point threshold attempted.
Credit	Housing Types and Affordability	<ul style="list-style-type: none"> No substantive changes.
Credit	Reduced Parking Footprint	<ul style="list-style-type: none"> Moved bicycle storage requirements to SLL Credit Bicycle Facilities.
Credit	Connected and Open Community	<ul style="list-style-type: none"> <i>Street</i> has been changed to <i>circulation network</i>.
Credit	Transit Facilities	<ul style="list-style-type: none"> Requirement to identify shelters that will be installed no later than 50% construction replaced with a requirement to identify shelters where transit service will be warranted within two years of project completion. Removed bicycle storage requirements.
Credit	Transportation Demand Management	<ul style="list-style-type: none"> For transit passes, the required subsidy has increased, from 50% to 100% of transit costs. For unbundling of parking and parking fees, minimum fee thresholds for off-street parking rates, based on local transit costs, have been added. The option for a transportation demand management program has been eliminated. Options for a guaranteed ride home program and flexible work arrangements have been added.

Credit	Access to Civic and Public Space	<ul style="list-style-type: none"> Increased size threshold for a large project (triggering a calculation of the median size of public spaces within walking distance) from 7 to 10 acres (2.8 to 4 hectares). Increased minimum median public space required for large projects from ½ to 1 acre (0.2 to 0.4 hectare). The median public space calculation now excludes any space smaller than ½ acre (0.2 hectare).
Credit	Access to Recreation Facilities	<ul style="list-style-type: none"> No substantive changes.
Credit	Visitability and Universal Design	<ul style="list-style-type: none"> Reorganized credit requirements for clarity.
Credit	Community Outreach and Involvement	<ul style="list-style-type: none"> In Option 1, the credit now explicitly states that the development team must lead the community outreach and that the meetings must be directly related to the LEED ND project. In Option 1, the credit requirements have been reorganized to specify predesign, preliminary design, and ongoing communication requirements.
Credit	Local Food Production	<ul style="list-style-type: none"> No substantive changes.
Credit	Tree-Lined and Shaded Streets	<ul style="list-style-type: none"> In Option 1, the tree spacing requirement has been changed from an average 40-foot (12-meter) interval to a maximum 50-foot (15-meter) interval.
Credit	Neighborhood Schools	<ul style="list-style-type: none"> The maximum size for school campuses is now limited to new schools inside the project boundary and no longer applies to schools outside the project boundary.
GREEN INFRASTRUCTURE AND BUILDINGS		
Prerequisite	Certified Green Building	<ul style="list-style-type: none"> Certifying bodies must be accredited. ISO/IEC 17021 is no longer included as an acceptable accreditation standard.
Prerequisite	Minimum Building Energy Performance	<ul style="list-style-type: none"> Credit name revised Updated reference standard to ASHRAE 90.1-2010 Each of the buildings counted for prerequisite compliance can comply with any one of the applicable efficiency options. Aggregated proposed building cost and the aggregated baseline building cost determined by the energy model are used to calculate the performance improvement for subgroups or for all the buildings in Option 1. Option 1 thresholds revised, process energy no longer required to make up 25% of overall building energy for the baseline and proposed models, and compliance must now be achieved without accounting for the cost offset by site-generated renewable energy. Option 2 standard for compliance has been changed from the 30% savings version of the AEDG to the 50% savings version.
Prerequisite	Indoor Water Use Reduction	<ul style="list-style-type: none"> WaterSense label now mandatory for fixtures in U.S. projects. New prescriptive compliance path. Duration-based savings for autocontrol faucets with automatic fixture sensors or metering controls are no longer allowed in the design case.

		<ul style="list-style-type: none"> Applying nonpotable water is no longer allowed as an alternative compliance path in the prerequisite.
Prerequisite	Construction Activity Pollution Prevention	<ul style="list-style-type: none"> Western Washington Stormwater Manual replaced with a reference to the US EPA's Site Runoff Menu of BMPs.
Credit	Certified Green Buildings	<ul style="list-style-type: none"> See GIB Prerequisite Certified Green Building.
Credit	Optimize Building Energy Performance	<ul style="list-style-type: none"> See GIB Prerequisite Minimum Building Energy Performance.
Credit	Indoor Water Use Reduction	<ul style="list-style-type: none"> Credit name revised. WaterSense label now mandatory for fixtures in U.S. projects. Duration-based savings for autocontrol faucets with automatic fixture sensors or metering controls are no longer allowed in the design case.
Credit	Outdoor Water Use Reduction	<ul style="list-style-type: none"> Credit name revised The WaterSense Water Budget Tool is now the referenced calculation tool.
Credit	Building Reuse	<ul style="list-style-type: none"> Credit's scope now covers only buildings undergoing major renovation, rather than all existing habitable building stock.
Credit	Historic Resource Preservation and Adaptive Use	<ul style="list-style-type: none"> No substantive changes.
Credit	Minimized Site Disturbance	<ul style="list-style-type: none"> Threshold values for project area in Table 1 changed to align with NPD Credit Compact Development.
Credit	Rainwater Management	<ul style="list-style-type: none"> Projects must use GI and LID rainwater management techniques on site. U.S. EPA technical guidance replaced Washington State's Stormwater Management Manual for Western Washington.
Credit	Heat Island	<ul style="list-style-type: none"> Vegetated roofs and high-reflectance roofs now have equal weight for calculating compliance. Increased initial SRI thresholds for roofing material. Credit compliance for nonroof hardscape is now calculated using SR values instead of SRI values. Credit takes into account the three-year aged SRI values for roofing material.
Credit	Solar Orientation	<ul style="list-style-type: none"> No substantive changes.
Credit	Renewable Energy Production	<ul style="list-style-type: none"> No substantive changes.
Credit	District Heating and Cooling	<ul style="list-style-type: none"> Referenced standard updated from ASHRAE 90.1-2007 to 90.1-2010
Credit	Infrastructure Energy Efficiency	<ul style="list-style-type: none"> No substantive changes.
Credit	Wastewater management	<ul style="list-style-type: none"> No substantive changes.
Credit	Recycled and Reused Infrastructure	<ul style="list-style-type: none"> No substantive changes.
Credit	Solid Waste Management	<ul style="list-style-type: none"> Credit name revised. Alternative daily cover (ADC) now excluded from the diversion calculations.
Credit	Light Pollution Reduction	<ul style="list-style-type: none"> Automatic controls are no longer required. BUG rating method is now a compliance option. Separated requirements for unique lighting. Concept of lighting boundaries has been added to account for

		varied conditions.
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LEED v4 for Building Design and Construction: Homes and Midrise

Summary of changes from LEED 2008

Integrative Process		<ul style="list-style-type: none"> Option 1 Integrative Project Team and Option 2 Design Charette are taken from the Integrated Project Planning credit Option 3 Trades Training is new.
LOCATION AND TRANSPORTATION		
Prerequisite	Floodplain Avoidance	<ul style="list-style-type: none"> A portion of the former LL 2 Site Selection was used as the basis for this new prerequisite.
Credit	LEED for Neighborhood Development	<ul style="list-style-type: none"> Credit now specifically identifies the types of certification eligible to earn points in this credit.
Credit	Site Selection	<ul style="list-style-type: none"> Street Network and Bicycle Network are new options. All other options are taken from credits in Location and Linkages and Sustainable Sites. Infill development has a new definition for projects outside small towns.
Credit	Compact Development	<ul style="list-style-type: none"> Credit is based on SS 6 Compact Development. Increased housing density threshold from 10 dwelling units per acre (25 DU/hectare) to 12 DU/acre (30 DU/hectare) for single-family and low-rise multifamily development.
Credit	Community Resources	<ul style="list-style-type: none"> All credits formerly in the Location and Linkages category are now in the Location and Transportation category. Credit based on LL 5 Community Resources/Transit, which provided points for meeting thresholds for community resources or transit and points for the number of amenities within ¼ mile and ½ mile (400 and 800 meters). This new credit includes only community resources, since access to transit is now in a separate credit (LT credit Access to Transit). All walking distances are now ½ mile (800 meters).
Credit	Access to Transit	<ul style="list-style-type: none"> All credits formerly in the Location and Linkages category are now in the Location and Transportation category. Added weekend trip requirements and changed the required number of trips and walk distances. In LEED for Homes 2008, LL5.1 rewarded 1 point for locating the project within ½ mile (800 meters) of transit services that offered 30 or more transit rides per weekday, 2 points for 60 or more transit rides per weekday, and 3 points for 125 or more transit rides per weekday.

SUSTAINABLE SITES		
Prerequisite	Construction Activity Pollution Prevention	<ul style="list-style-type: none"> Prerequisite is based on SS1.1 in LEED for Homes 2008. Two requirements have been added: Prevent air pollution from dust and particulate matter. Construction sites larger than 1 acre (0.4 hectare) must conform to the erosion and sedimentation requirements of the 2012 Construction General Permit or a local equivalent, whichever is more stringent.
Prerequisite	No Invasive Plants	<ul style="list-style-type: none"> No substantive technical changes
Credit	Heat Island Reduction	<ul style="list-style-type: none"> Expanded credit scope to include roof strategies. SR is now used instead of SRI for hardscapes, and an option to use a three-year aged SR value has been added. For multifamily buildings, credit is no longer awarded to a project that places at least 50% of paving (i.e., parking garage) underneath the building.
Credit	Rainwater Management	<ul style="list-style-type: none"> Combined all SS 4 options into a single calculation. Added Case 2 from LEED for New Construction. Added Option 2 to reward projects that have minimal hardscapes but are also on extremely small lots.
Credit	Non-Toxic Pest Control	<p>Removed the following items:</p> <ul style="list-style-type: none"> Keep all wood at least 12 inches (300 mm) above soil. Include no wood-to-concrete connections or separate any exterior wood-to-concrete connection with metal or plastic fasters or dividers; this measure is mostly covered in the ENERGY STAR Version 3 water management checklist. Differentiation of termite zones. <p>Modified the following items:</p> <ul style="list-style-type: none"> Landscape distance from the house has been changed from 24 inches (600 mm) to 18 inches (450 mm). For the treated cellulosic material option, all wood must now be treated (not just the first 3 feet [900 mm] above the foundation), and the borate product must be a registered pesticide. Installation of a sand or diatomaceous earth barrier has been changed to installation of a physical termite barrier system approved by code (e.g., basaltic rock). Use of noncellulosic material for the wall structure has been changed to include all structural elements. <p>Added the following items:</p> <ul style="list-style-type: none"> Install post-tension slab. Install inspection ports or openings for all plumbing elements that penetrate the slab which allow access for treatment of pest infestations. Design discharge points for rain gutters, air-conditioning condensation lines, steam vent lines, or any other moisture source so that the discharge is at least 24 inches (600 mm) from the foundation. Design a minimum 6-inch (150-mm) inspection space between surface of planned landscape grade and nonmasonry siding.

WATER EFFICIENCY		
Prerequisite	Water Metering	<ul style="list-style-type: none"> New prerequisite.
Credit	Total Water Use	<ul style="list-style-type: none"> New credit.
Credit	Indoor Water Use	<p>Added requirements for the following:</p> <ul style="list-style-type: none"> a pressure testing requirement for Case 1 single-family projects testing requirement to inspect for water leaks <p>Increased the stringency of the following requirements:</p> <ul style="list-style-type: none"> Faucets: increased stringency from 1.5 and 2.0 gpm (5.6 and 7.6 lpm) to 1.0 and 1.5 gpm (3.8 and 5.6 lpm) for very high efficiency and high efficiency, respectively. Both levels must be WaterSense-qualified faucets or aerators, rather than just very high efficiency products. Showers: increased stringency from 1.75 and 2.0 gpm (6.6 and 7.6 lpm) to 1.5 and 1.75 gpm (3.8 and 6.6 lpm) for very high efficiency and high efficiency, respectively. Both levels must be WaterSense-qualified showerheads. Removed the 1.3 gpf option for toilets. All toilets are now required to be WaterSense qualified. Added requirements for clothes washers to this credit.
Credit	Outdoor Water Use	<ul style="list-style-type: none"> Credit combines the former SS2 Landscaping: 2.3 Limit Conventional Turf and 2.4 Drought-Tolerant Plants.
ENERGY AND ATMOSPHERE		
Prerequisite	Minimum Energy Performance	<p>Homes:</p> <ul style="list-style-type: none"> Updated referenced ENERGY STAR standard from version 2 to version 3, which substantially increased energy efficiency, comfort and durability performance

		<ul style="list-style-type: none"> of the home. Included additional prescriptive requirements, such as requiring that at least one ENERGY STAR–qualified refrigerator, dishwasher or clothes washer be installed in each dwelling unit, and that all duct runs must be fully ducted. <p>Multifamily Midrise:</p> <ul style="list-style-type: none"> Changed standard from 15% above ASHRAE 90.1–2007 to 5% above ASHRAE 90.1–2010, a roughly 10% increase in stringency.
Prerequisite	Energy Metering	<ul style="list-style-type: none"> New prerequisite.
Prerequisite	Education of Homeowner, Tenant, or Building Manager	<ul style="list-style-type: none"> Moved content for this prerequisite from the Awareness and Education section, combining the education of the owner or tenant (AE Credit 1) with education of building manager (AE Credit 2). Added requirements for including information on irrigation, rain water harvesting, and or graywater systems; integrative pest management; and sharing data with USGBC.
Prerequisite	Home Size	<ul style="list-style-type: none"> Updated reference home to align with ENERGY STAR, version 3. Points are now awarded and subtracted (previously, award thresholds were adjusted). This credit is applicable only for projects using the EA prescriptive pathway.
Credit	Annual Energy Use	<ul style="list-style-type: none"> Option 1. This is a new compliance pathway. Option 2. The HERS index threshold for earning points starts at 70, rather than 84 or 79.
Credit	Efficient Hot Water Distribution System	<ul style="list-style-type: none"> Added option for performance testing using EPA WaterSense testing procedures.
Credit	Advanced Utility Tracking	<ul style="list-style-type: none"> New credit.
Credit	Active Solar-Ready Design	<ul style="list-style-type: none"> New credit.
Credit	HVAC Start-up Credentialing	<ul style="list-style-type: none"> New credit.
Credit	Building Orientation for Passive Solar	<ul style="list-style-type: none"> Credit modifies ID 1.5 Building Orientation for Solar Design, removing part (c), “the roof has a minimum of 450 square feet (42 square meters) of south-facing area that is orientated properly for solar applications.”
Credit	Air Infiltration	<ul style="list-style-type: none"> Air leakage requirements are more stringent than LEED for Homes 2008.
Credit	Envelope Insulation	<ul style="list-style-type: none"> Raised required percentage for exceeding IECC insulation thresholds from 5% to 10% or 20%. Installation quality must now be Grade 1. Grade 2 no longer meets the credit requirements.
Credit	Windows	<ul style="list-style-type: none"> Updated performance requirements to reflect the requirements of ENERGY STAR for Homes, version 3, prescriptive pathway.

Credit	Space Heating and Cooling Equipment	<ul style="list-style-type: none"> Increased equipment efficiency requirements. Added pipe insulation requirements.
Credit	Heating and Cooling Distribution Systems	<ul style="list-style-type: none"> Requirements of this credit were formerly in two credits: EA 5.2 Heating and Cooling Distribution System (greatly reduced distribution losses). The duct leakage testing standard has been relaxed from 3 cfm25 to 4 cfm25 for small homes. EA 5.3 Heating and Cooling Distribution System (minimal distribution losses). Credit for duct leakage of less than 1 cfm25 has been removed.
Credit	Efficient Domestic Hot Water Equipment	<ul style="list-style-type: none"> Added an ENERGY-STAR qualified water heater requirement.
Credit	Lighting	<ul style="list-style-type: none"> Credit now addresses efficient design instead of only efficient fixtures.
Credit	High-Efficiency Appliances	<ul style="list-style-type: none"> Installation of ENERGY STAR-qualified clothes washers was in EA credit 9: Appliances, but has moved to the WE section.
Credit	Renewable Energy	<ul style="list-style-type: none"> Each 3% of the annual reference electrical load met by the renewable energy system earned 1 point; now the credit is based on kWh.

MATERIALS AND RESOURCES		
Prerequisite	Certified Tropical Wood	<ul style="list-style-type: none"> Formerly titled FSC-Certified Tropical Wood, this credit no longer requires that projects provide wood product suppliers with a notice.
Prerequisite	Durability Management	<ul style="list-style-type: none"> Moved durability requirements from ID 2. Durability Management Process to this MR prerequisite. The ENERGY STAR, version 3, water management system builder checklist replaces the project-specific ID 2.1 Durability Planning and ID 2.2 Durability Management checklist requirement found in LEED for Homes 2008. Made changes to moisture control measures.
Credit	Durability Management Verification	<ul style="list-style-type: none"> Moved durability requirements from ID 2. Durability Management Process to this MR credit. The ENERGY STAR, version 3, water management system builder checklist replaces the project-specific ID 2.1 Durability Planning and ID 2.2 Durability Management checklist requirement.
Credit	Environmentally Preferable Products	<ul style="list-style-type: none"> Added compliance path for bio-based products and added a requirement for local production. Reduced list of eligible products to major components.
Credit	Construction Waste Management	<ul style="list-style-type: none"> Calculation used to determine the percent of waste reduction has changed substantially from the analogous 2008 credit, MR 3.2.
Credit	Material-Efficient Framing	<ul style="list-style-type: none"> Credit requirements are a limited subset of the former MR 1.4.

INDOOR ENVIRONMENTAL QUALITY

Prerequisite	Ventilation	<ul style="list-style-type: none"> • Combined EQ 4 Outdoor Air Ventilation and EQ 5 Local Exhaust into a single prerequisite. • Updated reference to ASHRAE 62.2–2007 to ASHRAE 62.2–2010, but there are no significant differences for new construction between the two versions. • Added a new requirement for kitchen exhaust hood systems larger than 400 cfm (188 lps) to include make-up air. • For each unit in multifamily projects, outside air must be provided directly from the outdoors, and exhaust-only ventilation must include a direct make-up air source (not uncontrolled infiltration) from outside.
Prerequisite	Combustion Venting	<ul style="list-style-type: none"> • New prerequisite based on EQ credit 2 Combustion Venting.
Prerequisite	Garage Pollutant Protection	<ul style="list-style-type: none"> • Combines former EQ prerequisite 10.1 No HVAC in Garage with EQ Credit 10.2 Minimize Pollutants from Garage.
Prerequisite	Radon Resistant Construction	<ul style="list-style-type: none"> • Prerequisite is based on EQ 9: Radon Protection. • Prerequisite now specifies that non-residential spaces on/below grade are exempt from the prerequisite, and that building over a garage is an appropriate way to elevate the building to meet requirements. • Added a pathway for existing buildings.
Prerequisite	Air Filtering	<ul style="list-style-type: none"> • Added requirement for the installation of air filters (rated MERV 6 or higher) for mechanically supplied outdoor air for systems with 10 feet (3 meters) of ductwork or more, per ASHRAE 62.2–2010, Section 6.7. • Added requirement that the filter housing be airtight to prevent airflow bypass.
Prerequisite	Environmental Tobacco Smoke	<ul style="list-style-type: none"> • New prerequisite.
Prerequisite	Compartmentalization	<ul style="list-style-type: none"> • New prerequisite, which requires multifamily and attached single family project to air seal to neighboring units, not just outdoors.
Credit	Enhanced Ventilation	<ul style="list-style-type: none"> • Credit combines elements of EQ 4.2 Enhanced Outdoor Air Ventilation and EQ 5.2 Enhanced Local Exhaust. • EQ 4.2 required using an ERV or HRV (except in mild climates) for balanced systems. EQ 5.2 Enhanced Local Exhaust did not require a 20-minute minimum run time on the timer.
Credit	Contaminant Control	<ul style="list-style-type: none"> • Added a requirement for a 10-foot (3 meter) long walk off mat at common exterior entries in multifamily buildings. • Combined duct sealing and pre-occupancy flush into a single requirement. • Added an option for post construction air quality testing.
Credit	Balancing of Heating and Cooling Distribution	<p>Credit is based on EQ Credit 6 Distribution of Space Heating and Cooling. For radiative systems, the credit is the same. For forced-air systems, the following changes</p>

	Systems	<p>have been made:</p> <ul style="list-style-type: none"> • The allowed pressure difference between the bedrooms and the main body of the home has been relaxed from 2.5 Pa to 3 Pa. In addition, the return air opening sizing option for return air flow was removed, but is still a recommendation. • The stringency of supply air flow testing has been relaxed from +/- 15% (or 10 CFM [5 LPS]) to +/- 20% (or +/- 25 CFM [11 LPS]). • A new compliance path for multiple zones of forced-air systems has been added.
Credit	Enhanced Compartmentalization	<ul style="list-style-type: none"> • New credit.
Credit	Enhanced Combustion Venting	<ul style="list-style-type: none"> • Updated language from EQ 2.2. • Incorporated best practices for conducting backdraft potential tests.
Credit	Enhanced Garage Pollutant Prevention	<ul style="list-style-type: none"> • Added requirements for multifamily buildings.
Credit	Low-Emitting Products	<ul style="list-style-type: none"> • Added requirements that were formerly in MR 2.2. Composite wood products, and updated the testing standard for all other components to California's standard, 01350.
Credit	No Environmental Tobacco Smoke (Mid-Rise only)	<ul style="list-style-type: none"> • New credit.

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