LEED v4 Insights

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LEED v4 Insights

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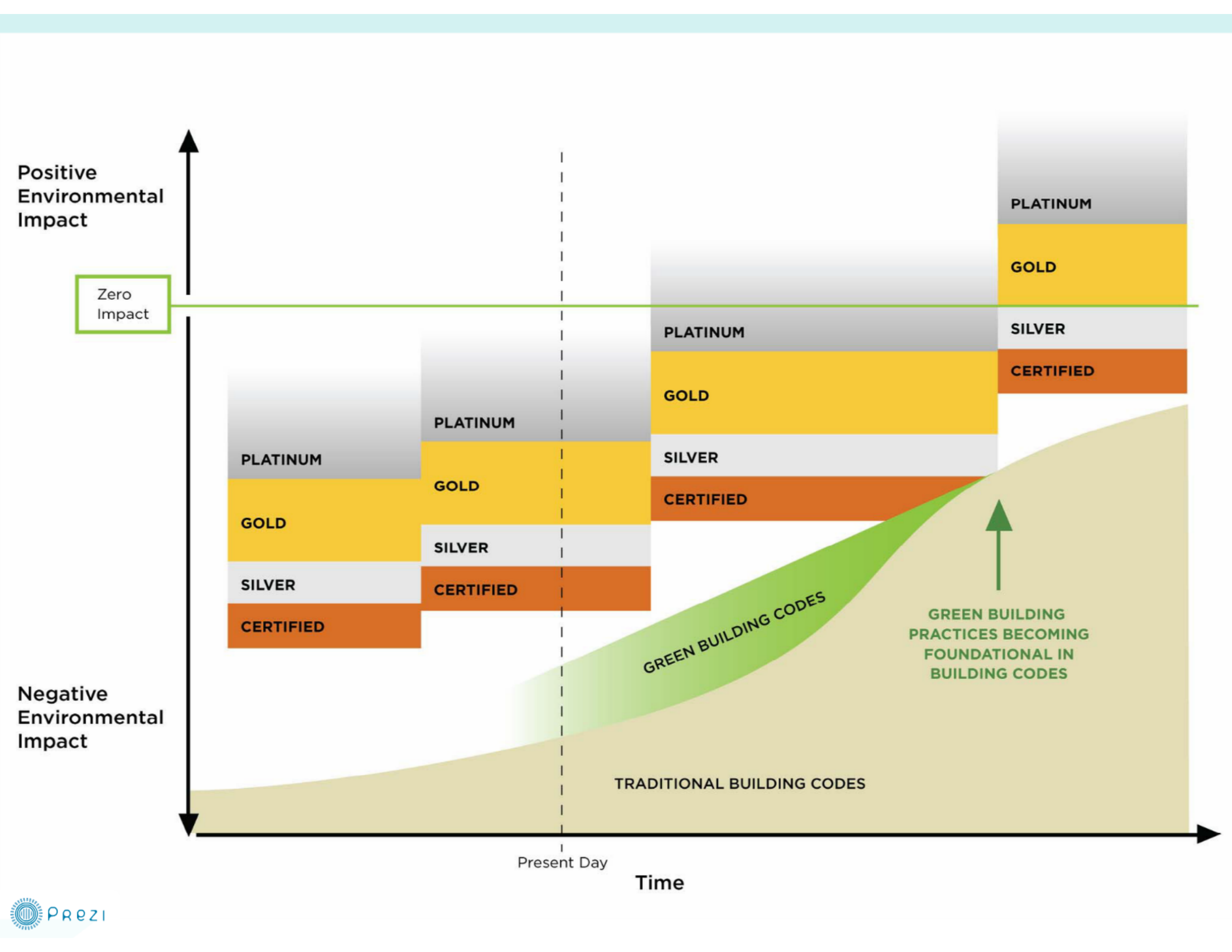
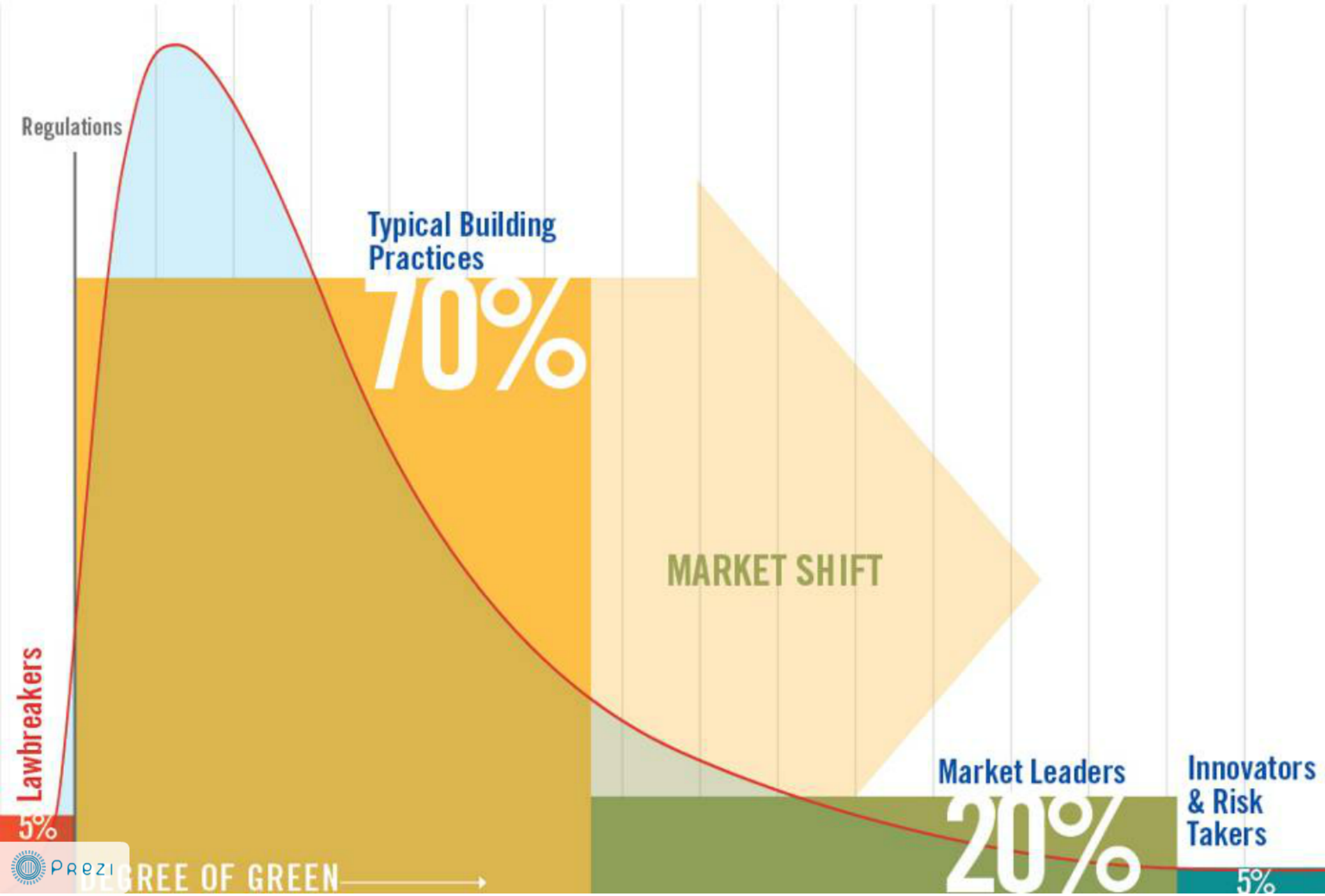
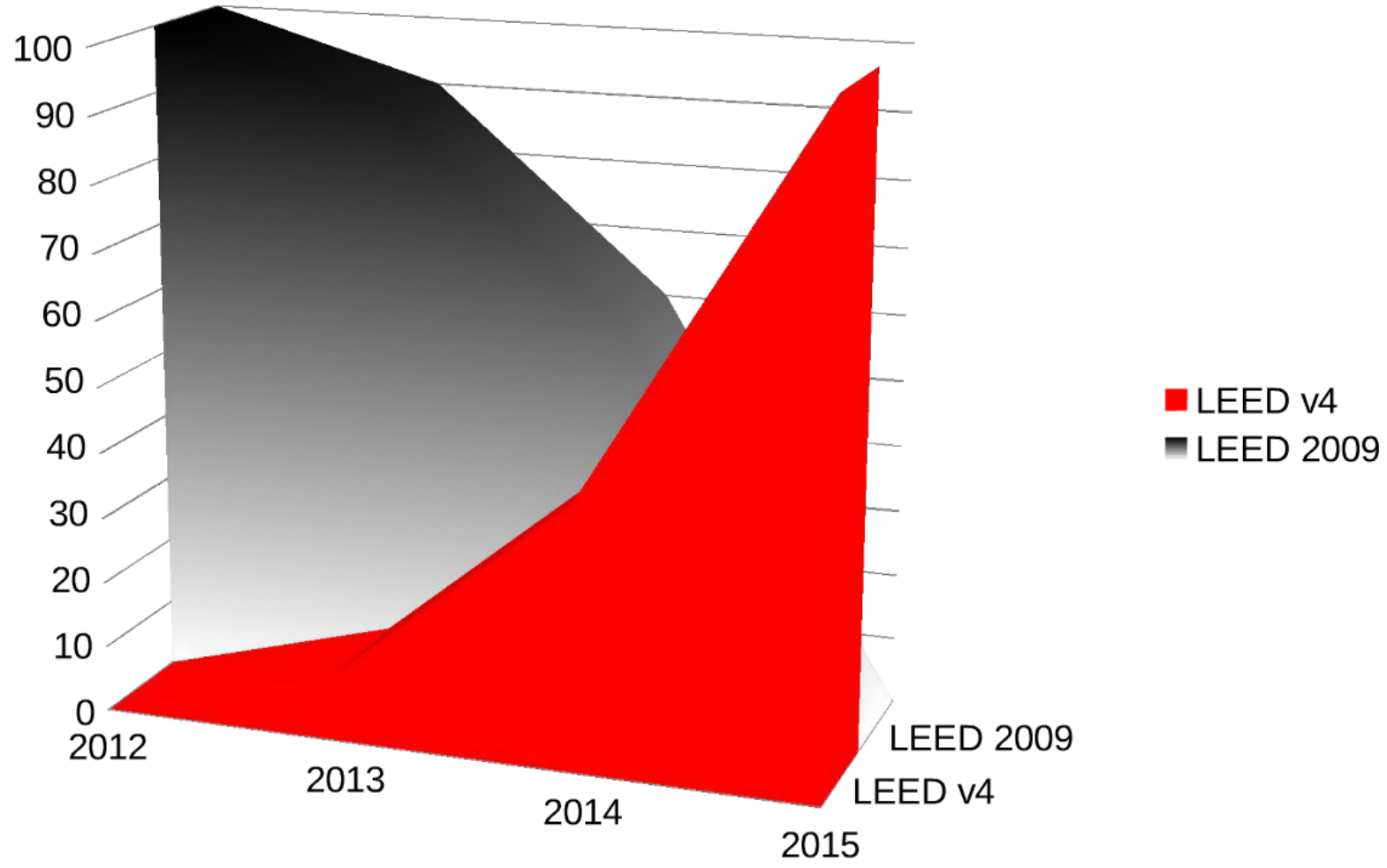
CREATIVE TENSION


Positive Environmental Impact
Zero Impact
Negative Environmental Impact
PLATINUM
GOLD
SILVER
CERTIFIED
PLATINUM
GOLD
SILVER
CERTIFIED
PLATINUM
GOLD
SILVER
CERTIFIED
PLATINUM
GOLD
SILVER
CERTIFIED
GREEN BUILDING CODES
GREEN BUILDING PRACTICES BECOMING FOUNDATIONAL IN BUILDING CODES
TRADITIONAL BUILDING CODES
Present Day
Time

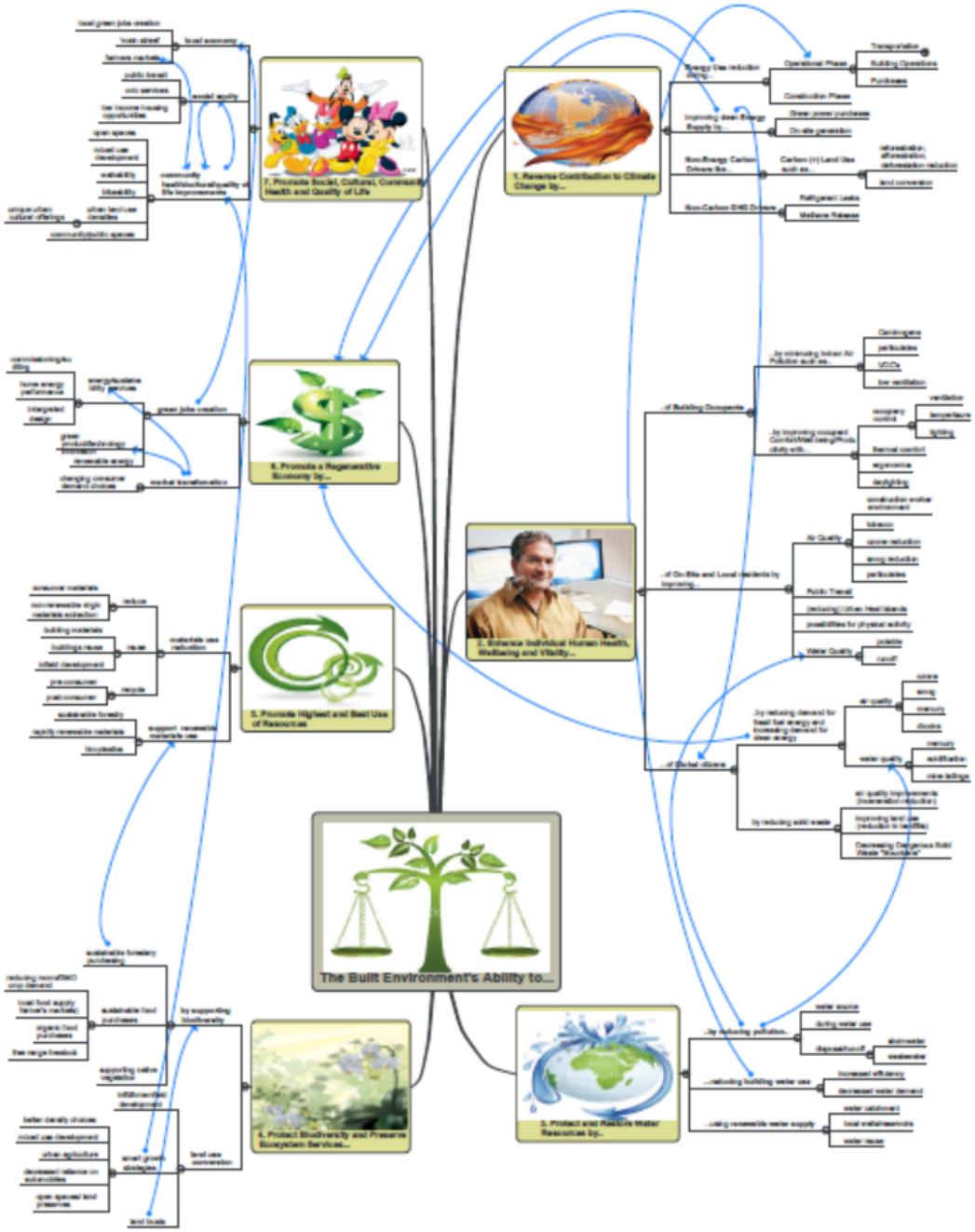
The Market



LEED versions overlap for 2 years
Can Use LEED 2009 until June 1, 2015

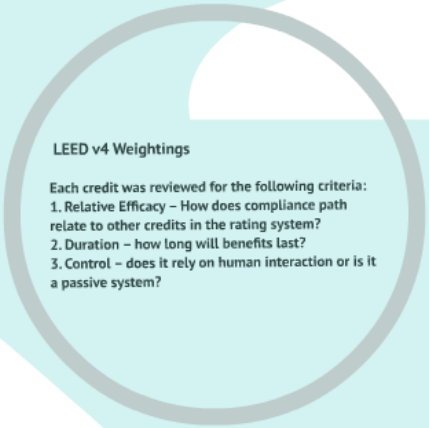


DEFINING IMPACT CATEGORIES FOR LEED 2012



LEED v4 Impact Categories

- Reverse Contribution to Global Climate Change
- Enhance Individual Human Health, Wellbeing and Vitality
- Protect and Restore Water Resources
- Protect Biodiversity and Preserve Ecosystem Services
- Promote Highest and Best Use of Resources
- Promote a Regenerative Economy
- Promote Social, Cultural, Community Health and Quality of Life



LEED v4 Weightings

Each credit was reviewed for the following criteria:

1. Relative Efficacy – How does compliance path relate to other credits in the rating system?
2. Duration – how long will benefits last?
3. Control – does it rely on human interaction or is it a passive system?

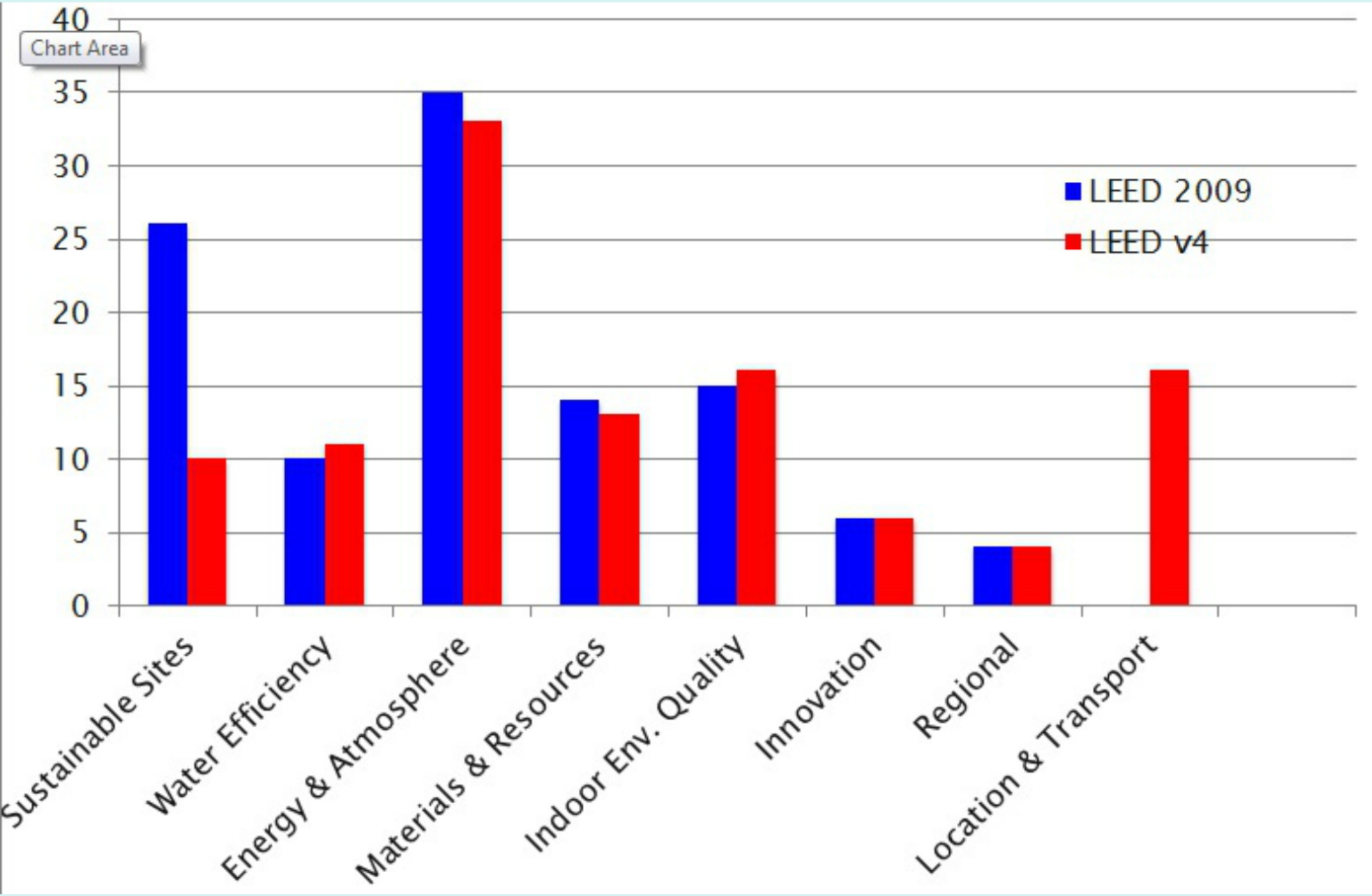


Chart Area
40
35
30
25
20
15
10
5
0
LEED 2009
LEED v4
Sustainable Sites
Water Efficiency
Energy & Atmosphere
Materials & Resources
Indoor Env. Quality
Innovation
Regional
Location & Transport

New Market Sectors

- Warehouses and Distribution Centers
- LEED for Homes Weighted to 100 points
- Homes Mid-Rise
- Hospitality
- EB for Schools
- EB for Retail
- Data Centers

LEED Globalization

...or local equivalent
Metric equivalents
REACH (Registration, Evaluation, Authorisation and Restriction of Chemical substances)
CEN (European Committee for Standardization)

LEED v4 Insights

Integrative Process Credit

New credit – stands alone Healthcare Prerequisite

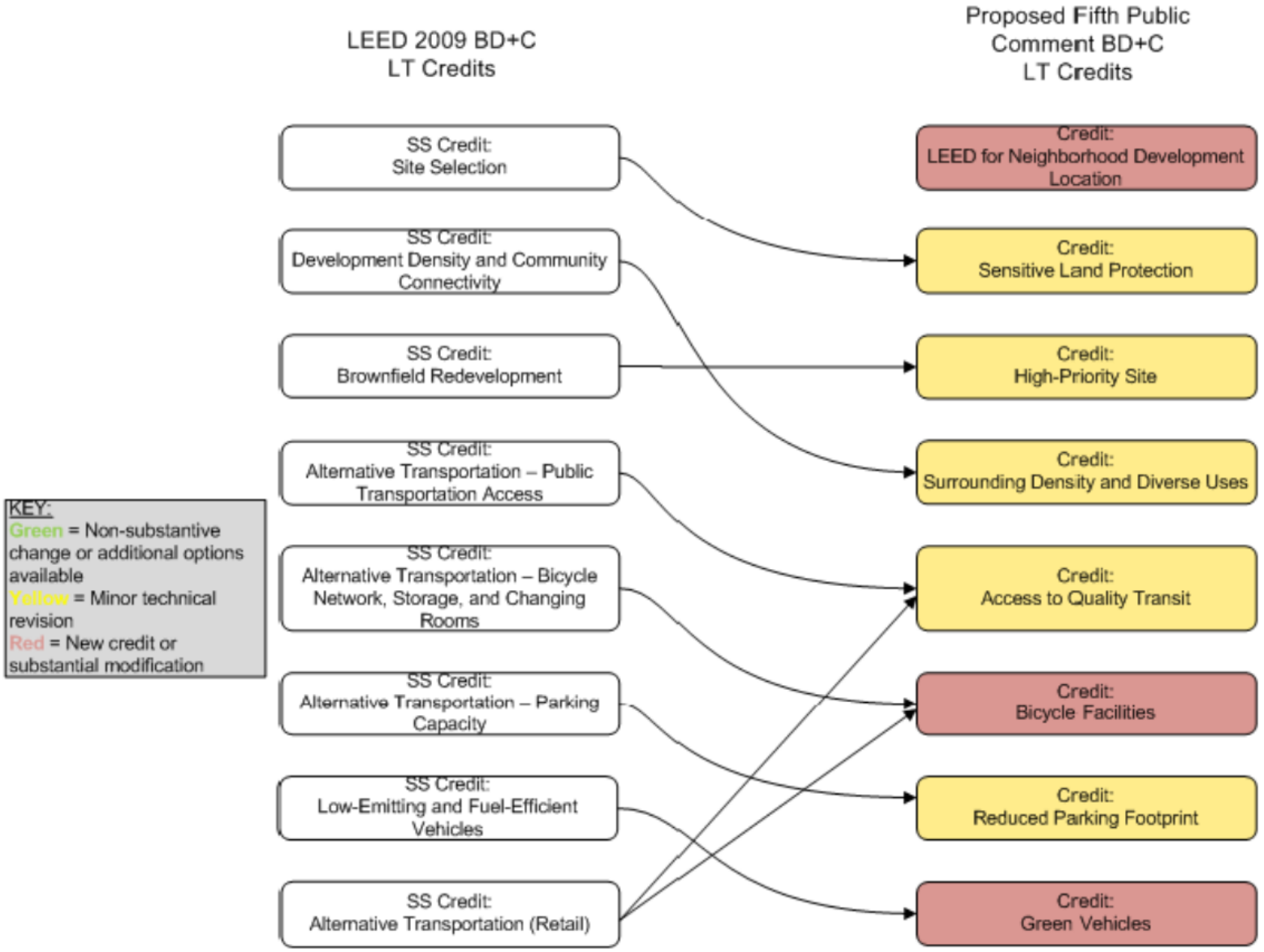
Intent: Implement an integrative process that supports high performance, cost-effective project outcomes through analyses of key systems interrelationships before decisions are made on building form and throughout the design process.

Requirements : Starting in pre-design, and continuing throughout the design phases, identify analyze, at a minimum, the following three areas:

- Energy-Related Systems (Simple Box Energy Model)
- Water-Related Systems
- Cost Analysis
- Site Selection (Interiors, retail and Hospitality only)

LEED v4 TECHNICAL IMPROVEMENTS:
LOCATION & TRANSPORTATION

- Credit 1: LEED for ND Location
- Credit 2: Sensitive Land Protection
- Credit 3: High Priority Site
- Credit 4: Surrounding Density and Diverse Uses
- Credit 5: Access to Quality Transit
- Credit 6: Bicycle Facilities
- Credit 7: Reduced Parking Footprint
- Credit 8: Green Vehicles


LEED 2009 BD+C
LT Credits
Proposed Fifth Public
Comment BD+C
LT Credits
SS Credit:
Site Selection
SS Credit:
Development Density and Community Connectivity
SS Credit:
Brownfield Redevelopment
SS Credit:
Alternative Transportation – Public Transportation Access
SS Credit:
Alternative Transportation – Bicycle Network, Storage, and Changing Rooms
SS Credit:
Alternative Transportation – Parking Capacity
SS Credit:
Low-Emitting and Fuel-Efficient Vehicles
SS Credit:
Alternative Transportation (Retail)
Credit:
LEED for Neighborhood Development Location
Credit:
Sensitive Land Protection
Credit:
High-Priority Site
Credit:
Surrounding Density and Diverse Uses
Credit:
Access to Quality Transit
Credit:
Bicycle Facilities
Credit:
Reduced Parking Footprint
Credit:
Green Vehicles
KEY:
Green = Non-substantive change or additional options available
Yellow = Minor technical revision
Red = New credit or substantial modification

LTc3: HIGH PRIORITY SITE

Intent
To encourage project location in areas with development constraints and promote the health of the surrounding area.

Requirements

Option 1. Historic district (2 points)
Locate the project on an infill location in a historic district.

OR
Option 2. Priority designation (2 points)
Locate the project on one of the following:
a site listed by the EPA National Priorities List; a Federal Empowerment Zone site; a Federal Enterprise Community site; a Federal Renewal Community site; a Department of Justice Weed and Seed Strategy Community; a Department of the Treasury Community Development Financial Institutions Fund Qualified Low-Income Community (a subset of the New Markets Tax Credit Program); a site in a U.S. Department of Housing and Urban Development's Qualified Census Tract (QCT) or Difficult Development Area (DDA); or
A local equivalent for projects outside the United States.

OR
Option 3. Brownfield remediation (3 points)
Locate on a project site where soil or groundwater contamination has been identified, and where the local, state, or national authority (whichever has jurisdiction) requires its remediation. Perform remediation to the satisfaction of that authority.

LTc4: SURROUNDING DENSITY AND DIVERSE USES

Requirements

Option 1. Surrounding density (2–3 points)
Locate on a site whose surrounding existing density within a ¼-mile radius of the project boundary meets the values in Table 1. Use either the "separate residential and nonresidential densities" or the "combined density" values.

AND/OR

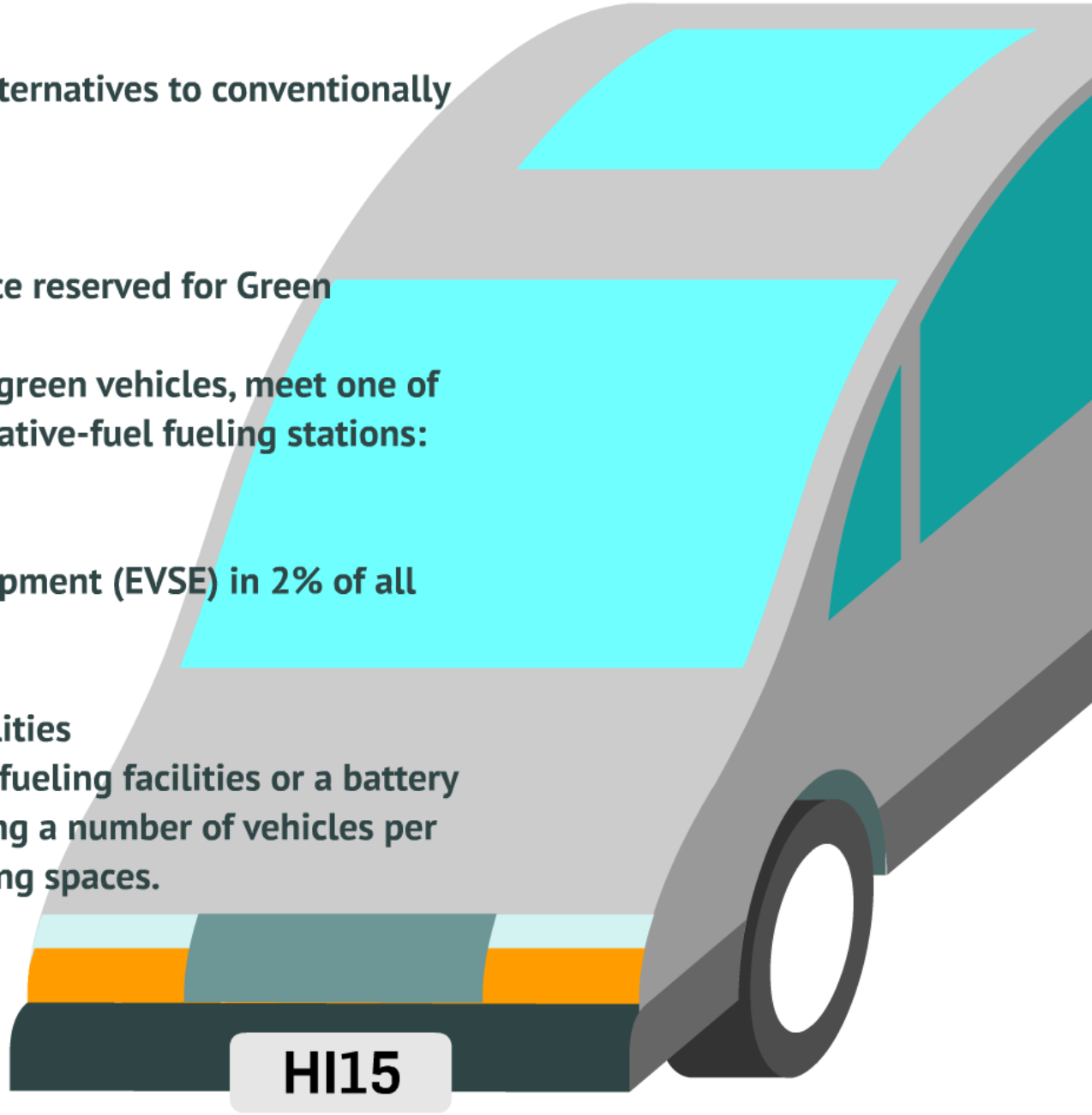
Option 2. Diversity of uses (1–2 points)
Construct or renovate a building or a space within a building such that the building's main entrance is within a ½-mile walking distance of the main entrance of four to seven (1 point) or eight or more (2 points) existing and publicly available diverse uses.

LTc8: GREEN VEHICLES

Intent
To reduce pollution by promoting alternatives to conventionally fueled automobiles

Requirements
Same as 2009: 5% of preferred space reserved for Green Vehicles
In addition to preferred parking for green vehicles, meet one of the following two options for alternative-fuel fueling stations:

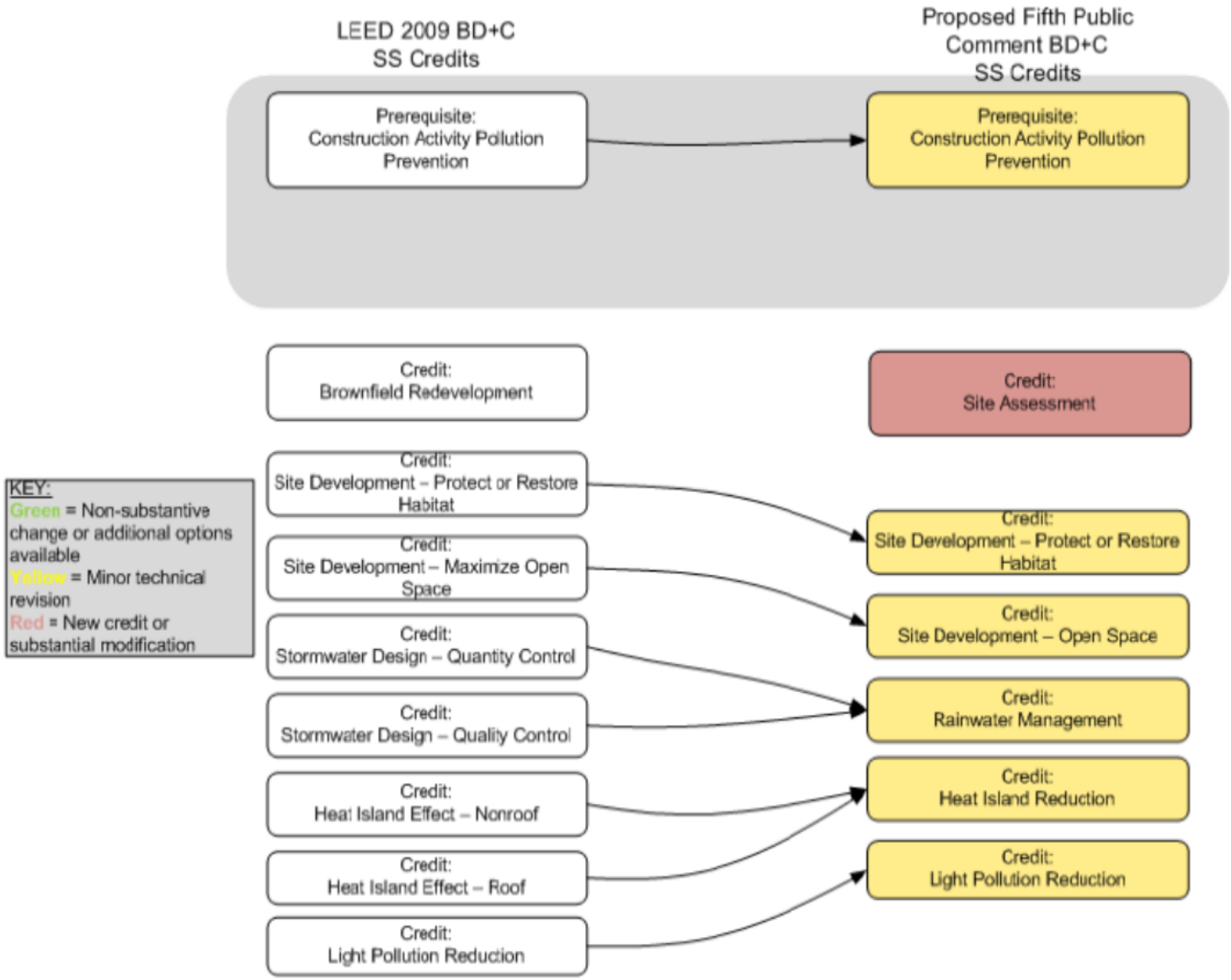
Option 1. Electric vehicle recharging
Install electrical vehicle supply equipment (EVSE) in 2% of all parking spaces used by the project.
OR
Option 2. Liquid, gas, or battery facilities
Install liquid or gas alternative fuel fueling facilities or a battery switching station capable of refueling a number of vehicles per day equal to at least 2% of all parking spaces.



LEED v4 TECHNICAL IMPROVEMENTS: SUSTAINABLE SITES

- Prerequisite 1: Construction Activity Pollution Prevention
- Credit 1: Site Assessment
- Credit 2: Site Development- Protect or Restore Habitat
- Credit 3: Site Development- Open Space
- Credit 4: Rainwater Management
- Credit 5: Heat Island Reduction
- Credit 6: Light Pollution Reduction

Prerequisite 2: Environmental Site Assessment (Healthcare and Schools Only)
Credit 7: Places of Respite (Healthcare only)
Credit 8: Direct Exterior Access (Healthcare only)


LEED 2009 BD+C
SS Credits
Proposed Fifth Public Comment BD+C
SS Credits
Prerequisite:
Construction Activity Pollution Prevention
Prerequisite:
Construction Activity Pollution Prevention
Credit:
Brownfield Redevelopment
Credit:
Site Assessment
KEY:
Green = Non-substantive change or additional options available
Yellow = Minor technical revision
Red = New credit or substantial modification
Credit:
Site Development – Protect or Restore Habitat
Credit:
Site Development – Protect or Restore Habitat
Credit:
Site Development – Maximize Open Space
Credit:
Site Development – Open Space
Credit:
Stormwater Design – Quantity Control
Credit:
Rainwater Management
Credit:
Stormwater Design – Quality Control
Credit:
Heat Island Reduction
Credit:
Heat Island Effect – Nonroof
Credit:
Heat Island Effect – Roof
Credit:
Light Pollution Reduction
Credit:
Light Pollution Reduction

SScr1: SITE ASSESSMENT

Intent
To assess site conditions before design to evaluate sustainable options and inform related decisions about site design.

Requirements
Complete and document a site survey or assessment1 that includes the following information:

Topography.
Hydrology.
Climate.
Vegetation.
Soils.
Human use.
Human health effects.

The survey or assessment should demonstrate the relationships between the site features and topics listed above and how these features influenced the project design; give the reasons for not addressing any of those topics.

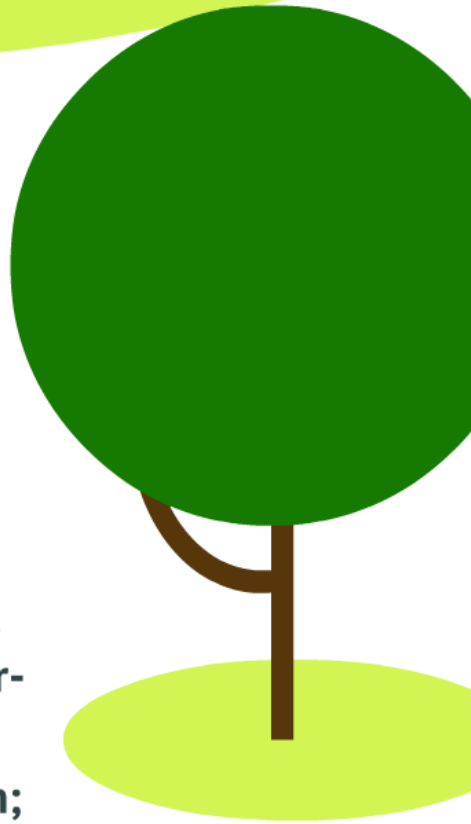
SScr3: OPEN SPACE

Intent

To create exterior open space that encourages interaction with the environment, social interaction, passive recreation, and physical activities.

Requirements

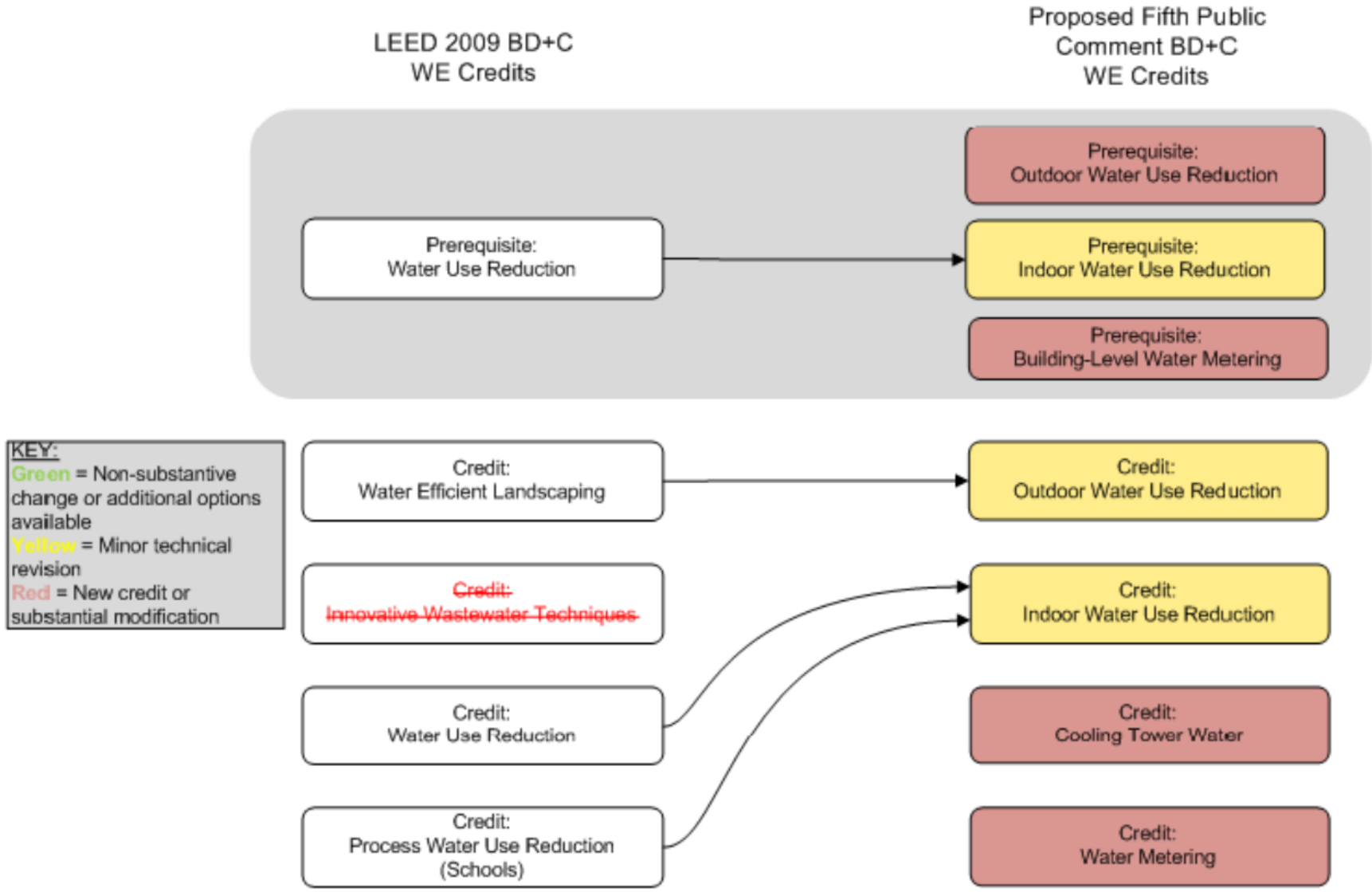
Provide outdoor space greater than or equal to 30% of the total site area (including building footprint). A minimum of 25% of that outdoor space must be vegetated (turf grass does not count as vegetation) or have overhead vegetated canopy. The outdoor space must be physically accessible and be one or more of the following:



- a pedestrian-oriented paving or turf area to accommodate outdoor social activities;
- a recreation-oriented paving or turf area that encourage physical activity;
- a garden space that provides passive recreation opportunities and/or year-round visual interest;
- a garden space dedicated to community gardens or urban food production;
- preserved or created habitat that meets the criteria of SS Credit Site Development—Protect or Restore Habitat and also includes elements of human interaction

LEED v4 TECHNICAL IMPROVEMENTS:
WATER EFFICIENCY

- Prerequisite 1: Outdoor Water Use Reduction
- Prerequisite 2: Indoor Water Use Reduction
- Prerequisite 3: Building Level Water Metering
- Credit 1: Outdoor Water Use Reduction
- Credit 2: Indoor Water Use Reduction
- Credit 3: Cooling Tower Water Use
- Credit 4: Water Metering


LEED 2009 BD+C
WE Credits
Proposed Fifth Public
Comment BD+C
WE Credits
Prerequisite:
Water Use Reduction
Prerequisite:
Outdoor Water Use Reduction
Prerequisite:
Indoor Water Use Reduction
Prerequisite:
Building-Level Water Metering
KEY:
Green = Non-substantive change or additional options available
Yellow = Minor technical revision
Red = New credit or substantial modification
Credit:
Water Efficient Landscaping
Credit:
Outdoor Water Use Reduction
Credit:
Innovative Wastewater Techniques
Credit:
Indoor Water Use Reduction
Credit:
Water Use Reduction
Credit:
Cooling Tower Water
Credit:
Process Water Use Reduction
(Schools)
Credit:
Water Metering

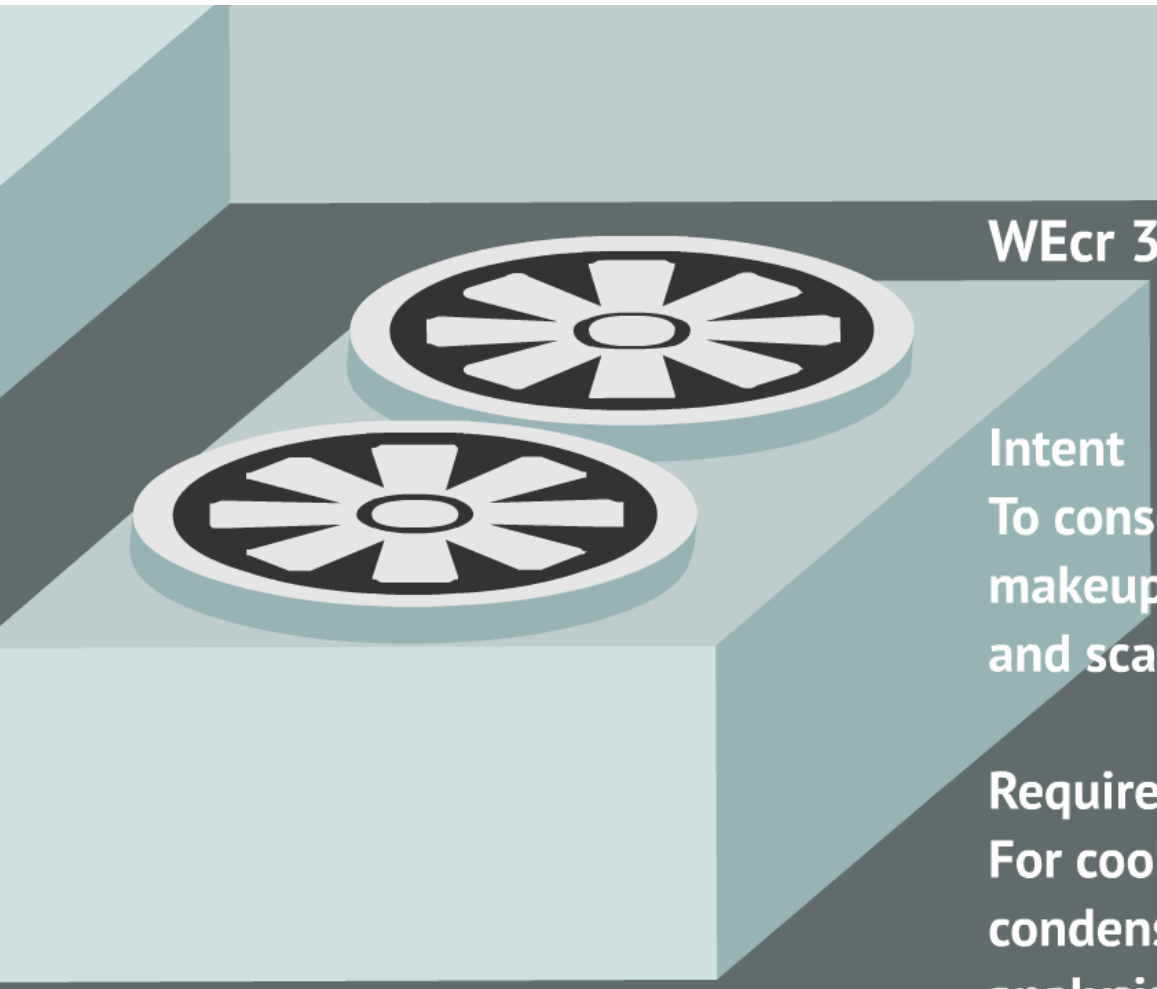
WaterSense, a partnership program by the U.S. Environmental Protection Agency, seeks to protect the future of our nation's water supply by offering people a simple way to use less water with water-efficient products, new homes, and services. Products and services that have earned the WaterSense label have been certified to be at least 20 percent more efficient without sacrificing performance.

WEcr2: INDOOR WATER USE REDUCTION

No FTE calculations now, just flow rates.

Table 1. Points for reducing water use

Percentage reduction	Points (BD&C)	Points (Schools, Retail, Hospitality, Healthcare)	Points (ID&C)	Points (CI Retail)	Points (CI Hospitality)
25%	1	1	2	2	2
30%	2	2	4	4	4
35%	3	3	6	6	6
40%	4	4	8	8	8
45%	5	5	10	10	10
50%	6	--	12	--	11



WEcr 3: COOLING TOWER WATER USE

Intent

To conserve water used for cooling tower makeup while controlling microbes, corrosion, and scale in the condenser water system.

Requirements

For cooling towers and evaporative condensers, conduct a one-time potable water analysis, in order to optimize cooling tower cycles.

Limit cooling tower cycles to avoid exceeding maximum values for any of these parameters. No more than 10 cycles.

WEcr 4: WATER METERING

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

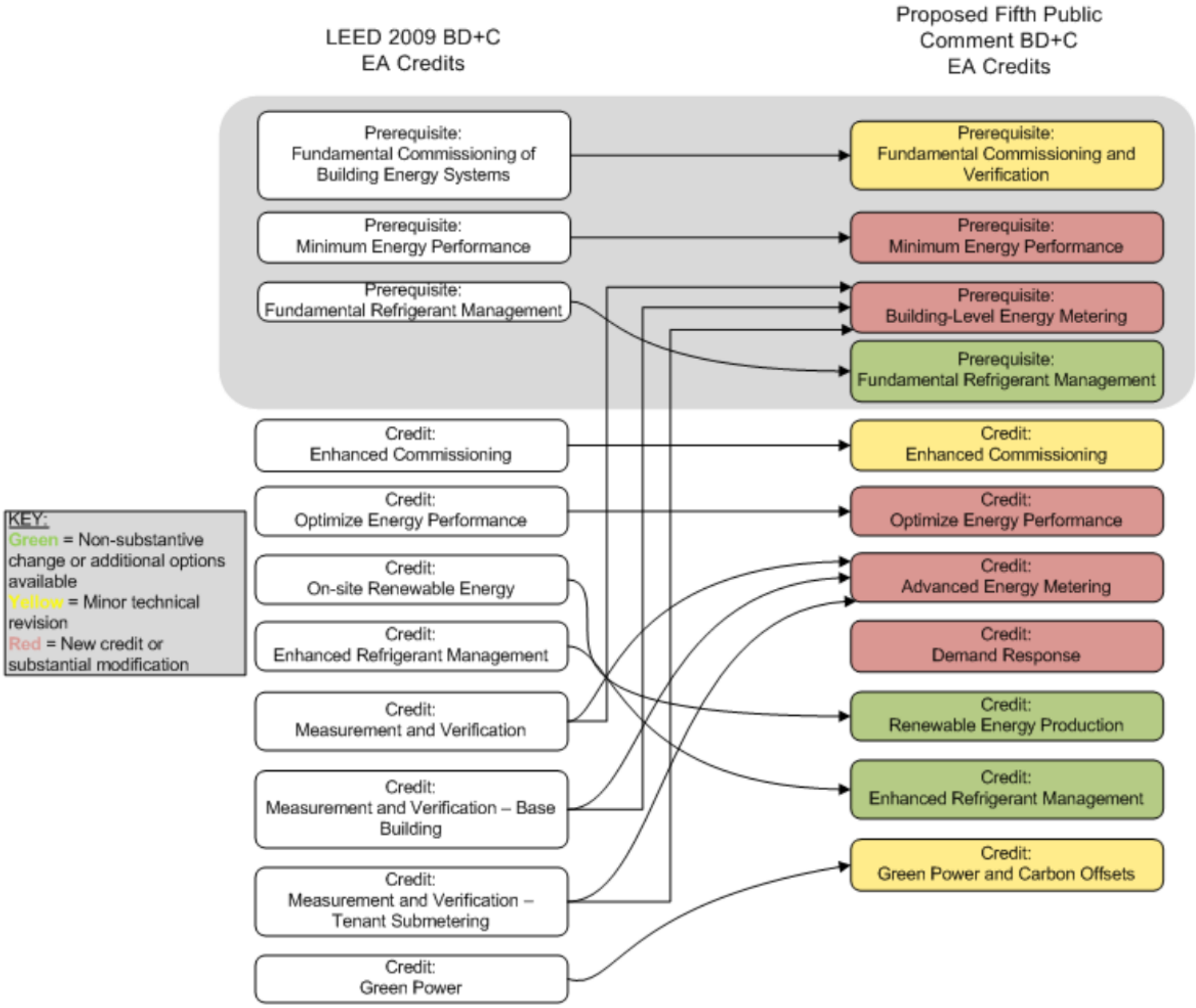
Requirements
Install permanent water meters for two or more of the following water subsystems, as applicable to the project:

Irrigation.
Indoor plumbing fixtures and fittings.
Domestic hot water.
Boilers.
Reclaimed water.
Other process water such as humidification systems, dishwashers, clothes washers, pools, and other subsystems using process water

HEALTHCARE ONLY: Install water meters in any of the following five: Purified water systems; filtered backwash water; dietary; laundry; laboratory; central sterile; hydrotherapy; surgical suite; hydronic system makeup; cold-water makeup for domestic hot water systems.

LEED v4 TECHNICAL IMPROVEMENTS: ENERGY & ATMOSPHERE

- Prerequisite 1: Fundamental Commissioning and Verification
- Prerequisite 2: Minimum Energy Performance
- Prerequisite 3: Building-Level Energy Metering
- Prerequisite 4: Fundamental Refrigerant Management
- Credit 1: Enhanced Commissioning
- Credit 2: Optimize Energy Performance
- Credit 3: Advanced Energy Metering
- Credit 4: Demand Response
- Credit 5: Renewable Energy Production
- Credit 6: Enhanced Refrigerant Management
- Credit 7: Green Power and Carbon Offsets


LEED 2009 BD+C
EA Credits
Proposed Fifth Public
Comment BD+C
EA Credits
Prerequisite:
Fundamental Commissioning of
Building Energy Systems
Prerequisite:
Minimum Energy Performance
Prerequisite:
Fundamental Refrigerant Management
Credit:
Enhanced Commissioning
Credit:
Optimize Energy Performance
Credit:
On-site Renewable Energy
Credit:
Enhanced Refrigerant Management
Credit:
Measurement and Verification
Credit:
Measurement and Verification – Base
Building
Credit:
Measurement and Verification –
Tenant Submetering
Credit:
Green Power
KEY:
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substantial modification
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Fundamental Commissioning and
Verification
Prerequisite:
Minimum Energy Performance
Prerequisite:
Building-Level Energy Metering
Prerequisite:
Fundamental Refrigerant Management
Credit:
Enhanced Commissioning
Credit:
Optimize Energy Performance
Credit:
Advanced Energy Metering
Credit:
Demand Response
Credit:
Renewable Energy Production
Credit:
Enhanced Refrigerant Management
Credit:
Green Power and Carbon Offsets

PREREQUISITE 1: FUNDAMENTAL COMMISSIONING AND VERIFICATION

Intent

To support the design, construction, and eventual operation of a project that meets the owner's project requirements for energy, water, indoor environmental quality, and durability.

Requirements

Commissioning Process Scope

Complete the following commissioning (Cx) process activities for mechanical, electrical, plumbing, and renewable energy systems and assemblies, in accordance with ASHRAE Guideline 0-2005 and ASHRAE Guideline 1.1–2007 for HVAC&R Systems, as they relate to energy, water, indoor environmental quality, and durability.

Requirements for exterior enclosures are limited to inclusion in the owner's project requirements (OPR) and basis of design (BOD), as well as the review of the OPR

The review of the exterior enclosure design may be performed by a qualified member of the design or construction team (or an employee of that firm) who is not directly responsible for design of the building envelope.

Project teams that intend to pursue EA Credit Enhanced Commissioning should note a difference in the CxA qualifications: for the credit, the CxA may not be an employee of the design or construction firm nor a subcontractor to the construction firm.

EA CREDIT 1: ENHANCED COMMISSIONING

Intent
To further support the design, construction, and eventual operation of a project that meets the OPR for energy, water, indoor environmental quality, and durability.

Requirements (up to 6 points)
Commissioning authority
The CxA must have documented commissioning process experience and may be a qualified employee of the owner, an independent consultant, or a disinterested subcontractor of the design team.
Option 1. Enhanced systems commissioning (3-4 points)
Path 1: Enhanced commissioning (3 points)
Complete the following commissioning process (CxP) per ASHRAE Guideline 0-2005 and ASHRAE Guideline 1.1-2007
OR Path 2: Enhanced and monitoring-based commissioning (4 points)
Fulfill Path 1, plus add meter tracking, processes for correction and maintenance
AND/OR Option 2. Envelope commissioning (2 points)
Per NIBS Guideline 3-2012

PREREQUISITE 2: MINIMUM ENERGY PERFORMANCE

IRequirements

Option 1. Whole-building energy simulation
Demonstrate an improvement of 5% for new construction, 3% for major renovations, or 2% for core and shell projects in the proposed building performance rating compared with the baseline building performance rating based on ANSI/ASHRAE/IESNA Standard 90.1–2010....

Option 2. Prescriptive compliance: ASHRAE 50% Advanced Energy Design Guide

Option 3. Prescriptive compliance: Advanced Buildings™ Core Performance™ Guide

EA CREDIT 4: DEMAND RESPONSE

Intent: To increase participation in demand response technologies and programs that make energy generation and distribution systems more efficient and increase grid reliability.

Requirement: Evaluate building systems and equipment for participation in a demand response program. On-site electricity generation does not meet the intent of this credit.

Case 1: DR program is available: Enroll in a one-year commitment for at least a 10% annual peak demand reduction of 20kW whichever is greater.

Case 2: DR program is not available: Have infrastructure in place, develop a plan for 10% shed of annual peak demand and participate in at least on full test of the DR plan.

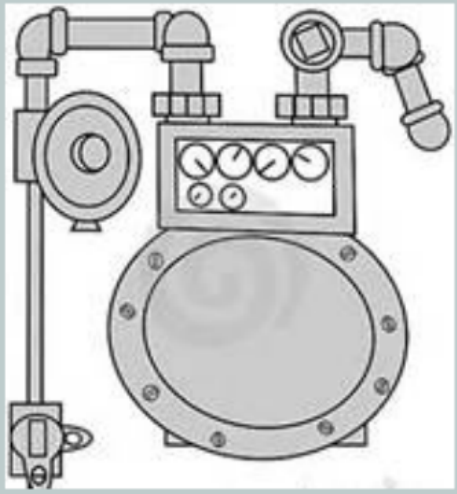
PREREQUISITE 3: BUILDING-LEVEL ENERGY METERING

Intent

To support energy management and identify opportunities for additional energy savings by tracking building-level energy use

Requirements

Install new or use existing building-level energy meters, or submeters that can be aggregated to provide building-level data representing total building energy consumption (electricity, natural gas, chilled water, steam, fuel oil, propane, biomass, etc). Utility-owned meters capable of aggregating building-level resource use are acceptable.



Commit to sharing with USGBC the resulting energy consumption data and electrical demand data (if metered) for a five-year period beginning on the date the project accepts LEED certification or typical occupancy , whichever comes first. At a minimum, energy consumption must be tracked at one-month intervals.

CREDIT 7: GREEN POWER AND CARBON OFFSETS

Requirements

Engage in a contract for qualified resources that have come online since January 1, 2005, for a minimum of five years, to be delivered at least annually. The contract must specify the provision of at least 50% or 100% of the project's energy from green power, carbon offsets, or renewable energy certificates (RECs).

Green power and RECs must be Green-e Energy certified or the equivalent. RECs can only be used to mitigate the effects of Scope 2, electricity use.

Carbon offsets may be used to mitigate Scope 1 or Scope 2 emissions on a metric ton of carbon dioxide–equivalent basis and must be Green-e Climate certified, or the equivalent.

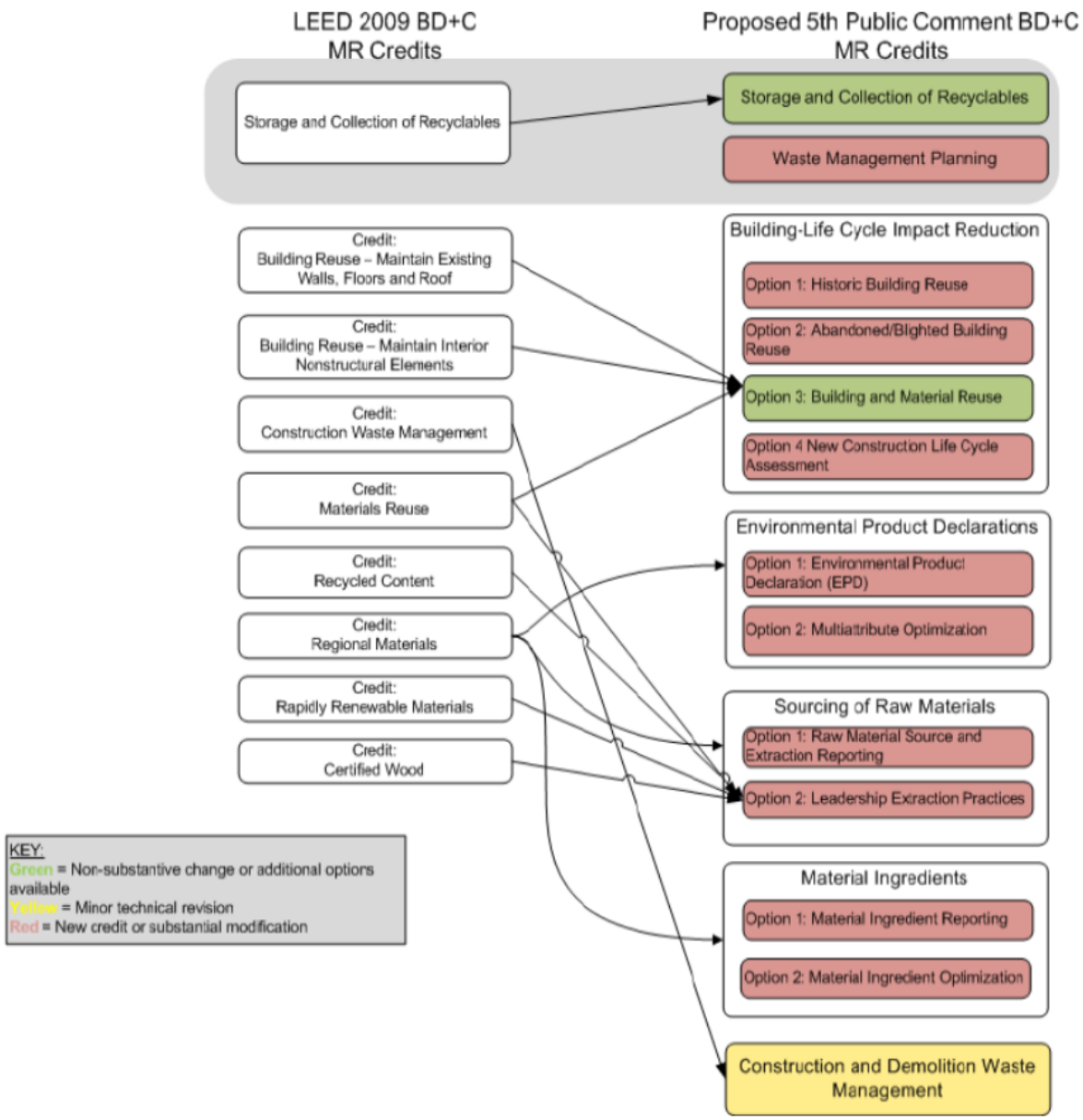
For U.S. projects, the offsets must be from greenhouse gas emissions reduction projects within the United States.

Determine the percentage of green power or offsets based on the quantity of energy consumed, not the cost.

LEED v4 TECHNICAL IMPROVEMENTS:
MATERIALS & RESOURCES

- Prerequisite 1: Storage and Collection of Recyclables
- Prerequisite 2: C&D Waste Management Planning
- Credit 1: Building Life-Cycle Impact Reduction
- Credit 2: Environmental Product Declarations
- Credit 3: Sourcing of Raw Materials
- Credit 4: Material Ingredients
- Credit 5: C&D Waste Management

- Prerequisite. 3: PBT source reduction - mercury (Healthcare)
- Credit 5: PBT source reduction–mercury (Healthcare)
- Credit 6: PBT source reduction-lead, cadmium, copper (Healthcare)
- Credit 7: Furniture and medical furnishings (Healthcare)
- Credit 8: Design for flexibility (Healthcare)


LEED 2009 BD+C
MR Credits
Proposed 5th Public Comment BD+C
MR Credits
Storage and Collection of Recyclables
Storage and Collection of Recyclables
Waste Management Planning
Credit:
Building Reuse – Maintain Existing Walls, Floors and Roof
Credit:
Building Reuse – Maintain Interior Nonstructural Elements
Credit:
Construction Waste Management
Credit:
Materials Reuse
Credit:
Recycled Content
Credit:
Regional Materials
Credit:
Rapidly Renewable Materials
Credit:
Certified Wood
Building-Life Cycle Impact Reduction
Option 1: Historic Building Reuse
Option 2: Abandoned/Blighted Building Reuse
Option 3: Building and Material Reuse
Option 4 New Construction Life Cycle Assessment
Environmental Product Declarations
Option 1: Environmental Product Declaration (EPD)
Option 2: Multiattribute Optimization
Sourcing of Raw Materials
Option 1: Raw Material Source and Extraction Reporting
Option 2: Leadership Extraction Practices
Material Ingredients
Option 1: Material Ingredient Reporting
Option 2: Material Ingredient Optimization
Construction and Demolition Waste Management
KEY:
Green = Non-substantive change or additional options available
Yellow = Minor technical revision
Red = New credit or substantial modification

PREREQUISITE 2: C&D WASTE MANAGEMENT PLANNING

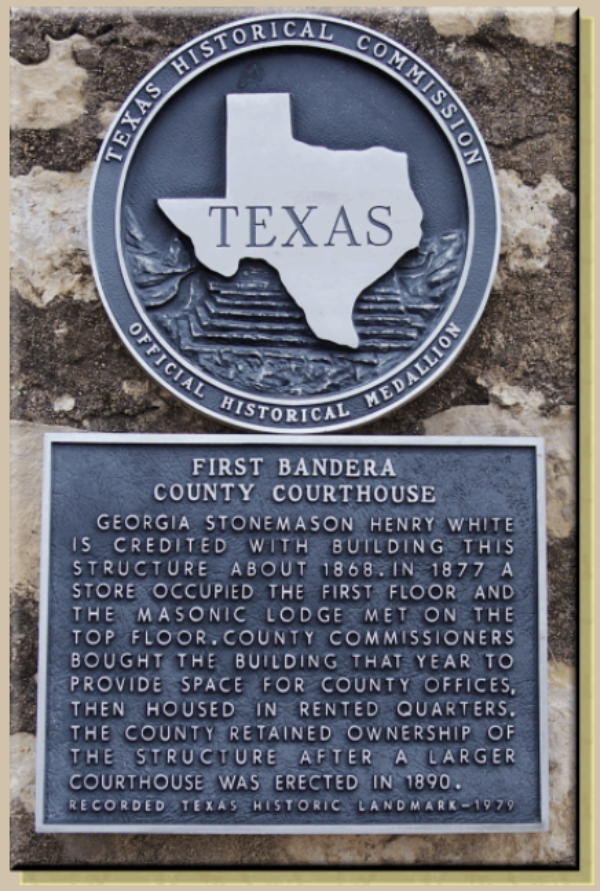
Intent
To reduce construction and demolition waste disposed of in landfills and incineration facilities by recovering, reusing, and recycling materials.

Requirements
Develop and implement a construction and demolition waste management plan:
Establish waste diversion goals for the project by identifying at least five materials (both structural and nonstructural) targeted for diversion. Approximate a percentage of the overall project waste that these materials represent.
Specify whether materials will be separated or commingled and describe the diversion strategies planned for the project.

Provide a final report detailing all major waste streams generated, including disposal and diversion rates.

Alternative daily cover (ADC) does not qualify as material diverted from disposal. Land-clearing debris is not considered construction, demolition, or renovation waste that can contribute to waste diversion.

MR CREDIT 1: BUILDING LIFE-CYCLE IMPACT REDUCTION



Intent

To encourage adaptive reuse and optimize the environmental performance of products and materials.

Requirements:

Option 1. historic building reuse (5 points)
Option 2. renovation of abandoned or blighted building (5 points)
Option 3. building and material reuse (1–4 points) 25%=2 pts; 50%=3pts; 75%=4 pts
Option 4. whole-building life-cycle assessment (3 points) conduct a life-cycle assessment of the project that demonstrates a minimum of 10% reduction in at least three of the six impact measures listed below, one of which must be global warming potential.

- **global warming potential (greenhouse gases)**
- **depletion of the stratospheric ozone layer**
- **acidification of land and water sources**
- **eutrophication**
- **formation of tropospheric ozone**
- **depletion of nonrenewable energy resources**

MR Credit 2: Building product disclosure and optimization -environmental product declarations

Intent

To encourage the use of products and materials for which life-cycle information is available and that have environmentally, economically, and socially preferable life-cycle impacts. To reward project teams for selecting products from manufacturers who have verified improved environmental life-cycle impacts

Requirements

Achieve one or more of the options below, for a maximum of 2 points:
Option 1. environmental product declaration (EPD) (1 point)Use at least 20 different permanently installed products that meet one of the disclosure criteria below:

- Product-specific declaration
- Industry-wide (generic) EPD
- Product-specific Type III EPD
- USGBC approved program

Product-specific declaration.
Products with a publicly available, critically reviewed life-cycle assessment conforming to ISO 14044 that have at least a cradle to gate scope.
Products with a product-specific declaration are valued as one quarter (1/4) of a product for the purposes of calculation.

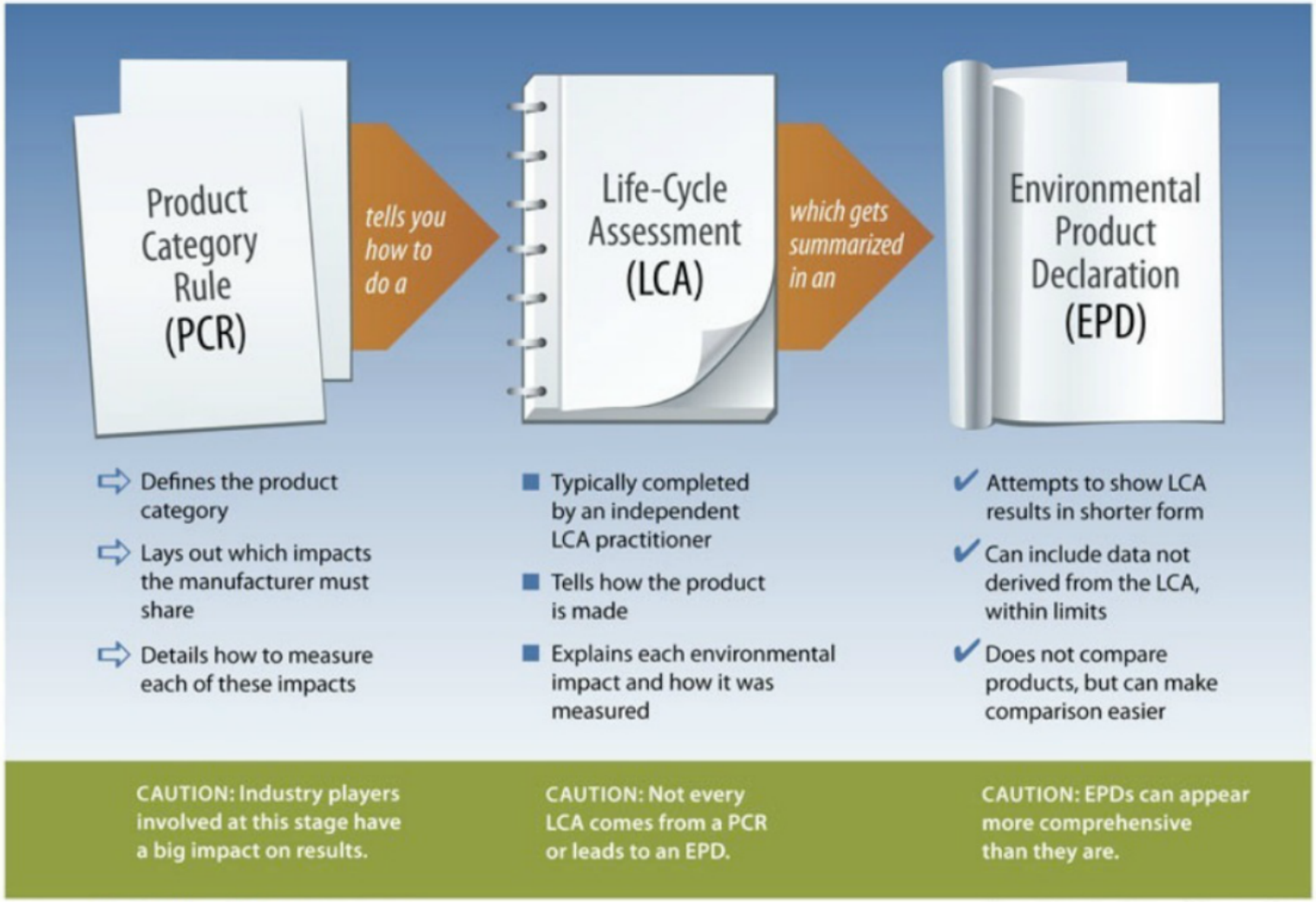
Industry-wide (generic) EPD.
Products with third-party certification (Type III), including external verification, in which the manufacturer is explicitly recognized as a participant by the program operator.
EPD must conform to ISO 14025, 14040, 14044, and EN 15804 or ISO 21930 and have at least a cradle to gate scope.
Products with industry-wide EPDs are valued as one half (1/2) of a product for purposes of calculation.

Product-specific Type III EPD.
Products with third-party certification (Type III), including external verification.
EPD must conform to ISO 14025, 14040, 14044, and EN 15804 or ISO 21930 and have at least a cradle to gate scope.
Products with Product-specific Type III EPDs are valued as one whole product for purposes of calculation.

What's in an Environmental Product Declaration?

- Product description: Manufacturer has free rein to describe the product and the company.
- Material content: List of ingredients that tells you what is in the product and where the materials come from.
- Product manufacturing: Description of how the product is put together.
- Delivery and Installation: Describes how the product is meant to be installed, toxicity risks for installers.
- Use stage: Information about environmental impacts from maintenance; it may cover indoor emissions.
- Singular effects: Information on how fire, water and other damage may affect durability and service life.
- End of Life: How the product is typically dis[posed of, but this depends on local recycling resources available.
- Life-Cycle Assessment results: Explains how the LCA was conducted and summarizes the result.
- Product Category Review verification: Relevant PCR for data collection.
- References: Relevant standards, laws, literature for creating the EPD.

Where Environmental Product Declarations Come From



www.BuildingGreen.com

Graphic: BuildingGreen, Inc.

AND/OR

Option 2. Multi-attribute optimization (1 point)

Use products that meet at least one of the attributes below for 50%, by cost, of the total value of permanently install products in the project. Products will be valued as below:

USGBC approved program

Certifications that verify impact reduction below industry average in at least three of the following:
global warming potential (greenhouse gases); depletion of the stratospheric ozone layer; acidification of land and water sources; eutrophication; formation of tropospheric ozone; and depletion of nonrenewable energy resources.
Products sourced within 100 miles (160 km) of the project site are valued at 200% of cost.
Structure and enclosure materials may not constitute more than 30% of the value of compliant building products.
For the scope of this credit, furniture, piping, pipe insulation, ducts, duct insulation, conduit, plumbing fixtures, faucets, showerheads, and lamp housing may be included.

MR Credit 3: Building product disclosure and optimization –sourcing of raw materials

Intent
To encourage the use of products and materials for which life cycle information is available and that have environmentally, economically, and socially preferable life cycle impacts. To reward project teams for selecting products verified to have been extracted or sourced in a responsible manner.

Requirements:
Option 1. raw material source and extraction reporting (1 point)

AND/OR

Option 2. leadership extraction practices (1 point)

Requirements
Option 1. raw material source and extraction reporting (1 point)

Use at least 20 different permanently installed products from manufacturers that have publicly released a report from their raw material suppliers including the following:
Raw material supplier extraction locations

- **A commitment to long-term ecologically responsible land use**
- **A commitment to reducing environmental harms from extraction and/or manufacturing processes**
- **A commitment to meeting applicable standards or programs voluntarily that address responsible sourcing criteria**

Products must be sourced from at least 5 different manufacturers.

Products will be valued as follows:
Manufacturer declared reports are valued as one half (1/2) of a product.
Third-party verified corporate sustainability reports (CSR) including environmental impacts of extraction operations and activities associated with the manufacturer's product and the product's supply chain, are valued as one whole product for purposes of calculation.

Acceptable frameworks for the CSR include the following:

Global Reporting Initiative (GRI) Sustainability Report; Organisation for Economic Co-operation and Development (OECD) Guidelines for Multinational Enterprises; U.N. Global Compact; ISO 26000; USGBC approved program

Option 2. leadership extraction practices (1 point)

Use products that meet at least one of the responsible extraction criteria below for at least 25% of the total value of permanently installed building products in the project:

- Extended producer responsibility. Products purchased from a manufacturer that participates in an extended producer responsibility program or is directly responsible for extended producer responsibility. Products valued at 50% of their cost.
- Bio-based materials. Bio-based products must meet the Sustainable Agriculture Network's Sustainable Agriculture Standard. Bio-based raw materials must be tested using ASTM Test Method D6866 and be legally harvested, as defined by the exporting and receiving country.
- Wood products. Wood products must be certified by the Forest Stewardship Council or USGBC-approved equivalent.
- Materials reuse. Reuse includes salvaged, refurbished, or reused products.
- Recycled content. Recycled content is the sum of postconsumer recycled content plus one-half the preconsumer recycled content, based on cost.
- USGBC approved program.

Products sourced within 100 miles of the project site are valued at 200% of their cost. Structure and enclosure materials may not constitute more than 30% of the value of compliant building products. An individual product may be counted in more than one attribute category.

For the scope of this credit, furniture, piping, pipe insulation, ducts, duct insulation, conduit, plumbing fixtures, faucets, showerheads, and lamp housing may be included.

What are the arguments against FSC only?

- 90% of FSC forests are outside U.S.
- USGBC Australia, Spain and Italy accept other certification standards
- BREEAM, CASBEE, IgCC accept other standards
- FSC does not support research funding or training.

MR Credit 4: Building product disclosure and optimization – material ingredients

Intent

To encourage the use of products and materials for which life-cycle information is available and that have environmentally preferable life-cycle impacts. To reward project teams for selecting products for which the chemical ingredients in the product are inventoried using an accepted methodology and for selecting products that minimize the use and generation of harmful substances. To reward raw material manufacturers who produce products verified to have improved life-cycle impacts.

Requirements:

Option 1. material ingredient reporting
Option 2: material ingredient optimization
Option 3: Product Manufacturer Supply Chain Optimization

Option 1. material ingredient reporting

Use at least 20 different permanently installed products from manufacturers that use any of the following programs to demonstrate the chemical inventory of the product:

- Manufacturer Inventory. The manufacturer has published complete content inventory for the product following these guidelines:
- A publicly available inventory of all ingredients identified by name and Chemical Abstract Service Registration Number (CASRN)
- Materials defined as trade secret or intellectual property may withhold the name and/or CASRN but must disclose role, amount and GreenScreen benchmark as defined in GreenScreen v1.2.
- Health Product Declaration. The end use product has a published, complete Health Product Declaration with full disclosure of known hazards in compliance with the Health Product Declaration open Standard.
- Cradle to Cradle. The end use product has been certified at the Cradle to Cradle V2 Basic level or Cradle to Cradle v3 Bronze level.
- USGBC approved program.

Compliant products must have chemicals inventoried to at least 0.1% (1000 ppm)

Products must be sourced from at least 5 different manufacturers.

Option 2: material ingredient optimization

Use products that document their material ingredient optimization using the paths below for at least 25%, by cost, of the total value of permanently installed products in the project:

USGBC approved program.

GreenScreen v1.2 Benchmark. Products that have fully inventoried chemical ingredients to 100 ppm that have no Benchmark 1 hazards:
If any ingredients are assessed with the GreenScreen List Translator, value these products at 100%
If all ingredients are have undergone a full GreenScreen Assessment, value these products at 150%

Cradle to Cradle v2 Certified. End use products are certified Cradle to Cradle. Products will be valued as follows:
Cradle to Cradle Gold: 100% of cost
Cradle to Cradle Platinum: 150% of cost

Cradle to Cradle v3 Certified. End use products are certified Cradle to Cradle. Products will be valued as follows:
Cradle to Cradle Silver: 100% of cost
Cradle to Cradle Gold or Platinum: 150% of cost

International Alternative Compliance Path – REACH Optimization. End use products and materials that do not contain substances that meet REACH criteria for substances of very high concern. If the product contains no ingredients listed on the REACH Authorization1 or Candidate2 list, value at 100% of cost

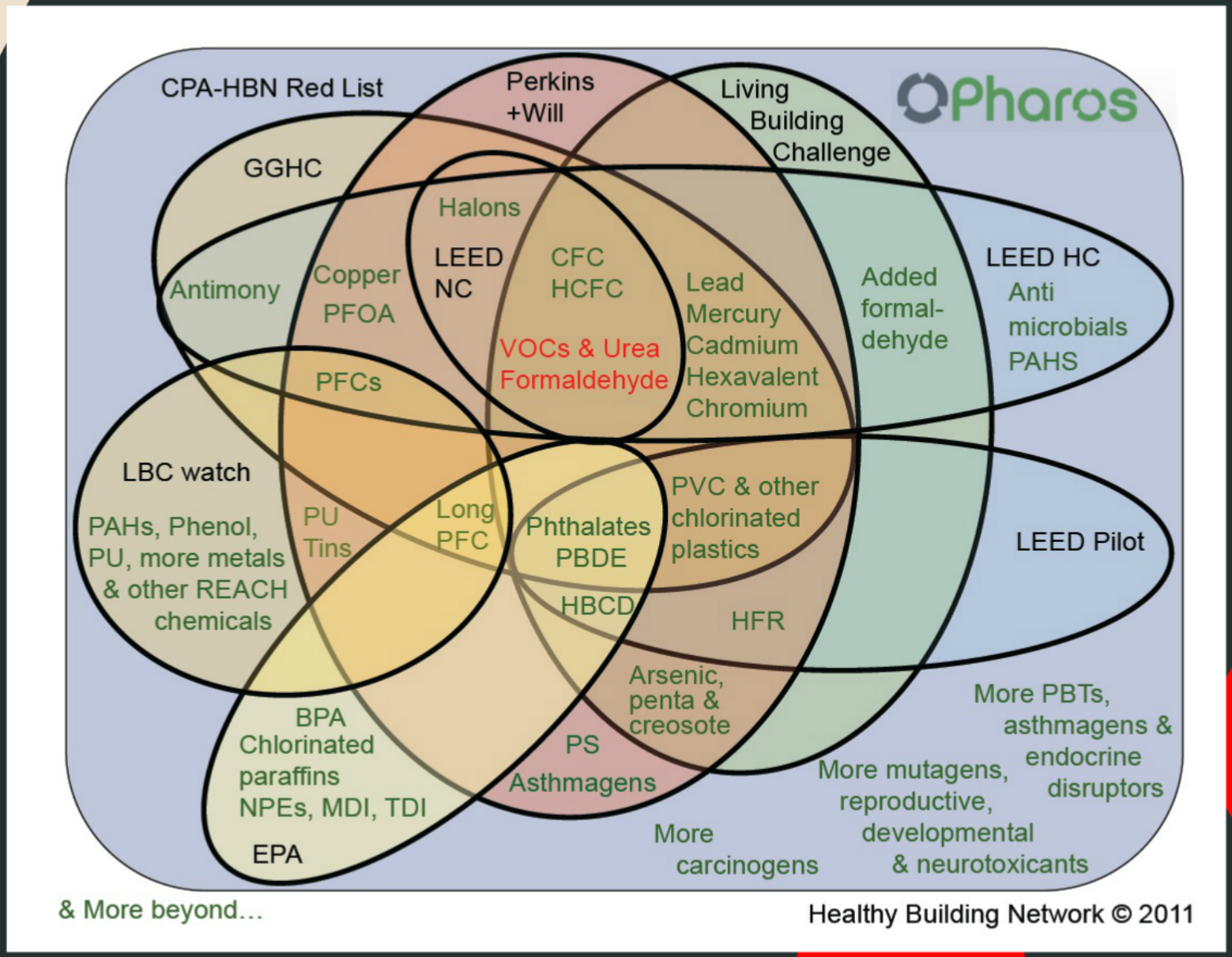
Option 3: Product Manufacturer Supply Chain Optimization

Project Team: Use building products that are sourced from product manufacturers who procure raw materials from suppliers meeting criteria below for at least 25%, by cost, of the total value of permanently installed products in the project.

Manufacturers: Engage in validated and robust safety, health, hazard, and risk programs. Document at least 99% by weight of the ingredients used to make the building product or building material are sourced from companies with independent third party verification of the following along the manufacturer supply chain:

-
- Processes are in place to communicate and transparently prioritize chemical ingredients along the supply chain according to available hazard, exposure and use information to identify those that require more detailed evaluation
- Processes are in place to identify, document, and communicate information on health, safety and environmental characteristics of chemical ingredients
- Processes are in place to implement measures to manage the health, safety and environmental hazard and risk of chemical ingredients
- Processes are in place to optimize health, safety and environmental impacts when designing and improving chemical ingredients
- Processes are in place to communicate, receive and evaluate chemical ingredient safety and stewardship information along the supply chain
- Safety and stewardship information about the chemical ingredients is publicly available from all points along the supply chain

Same location and material availability as other MR credits.

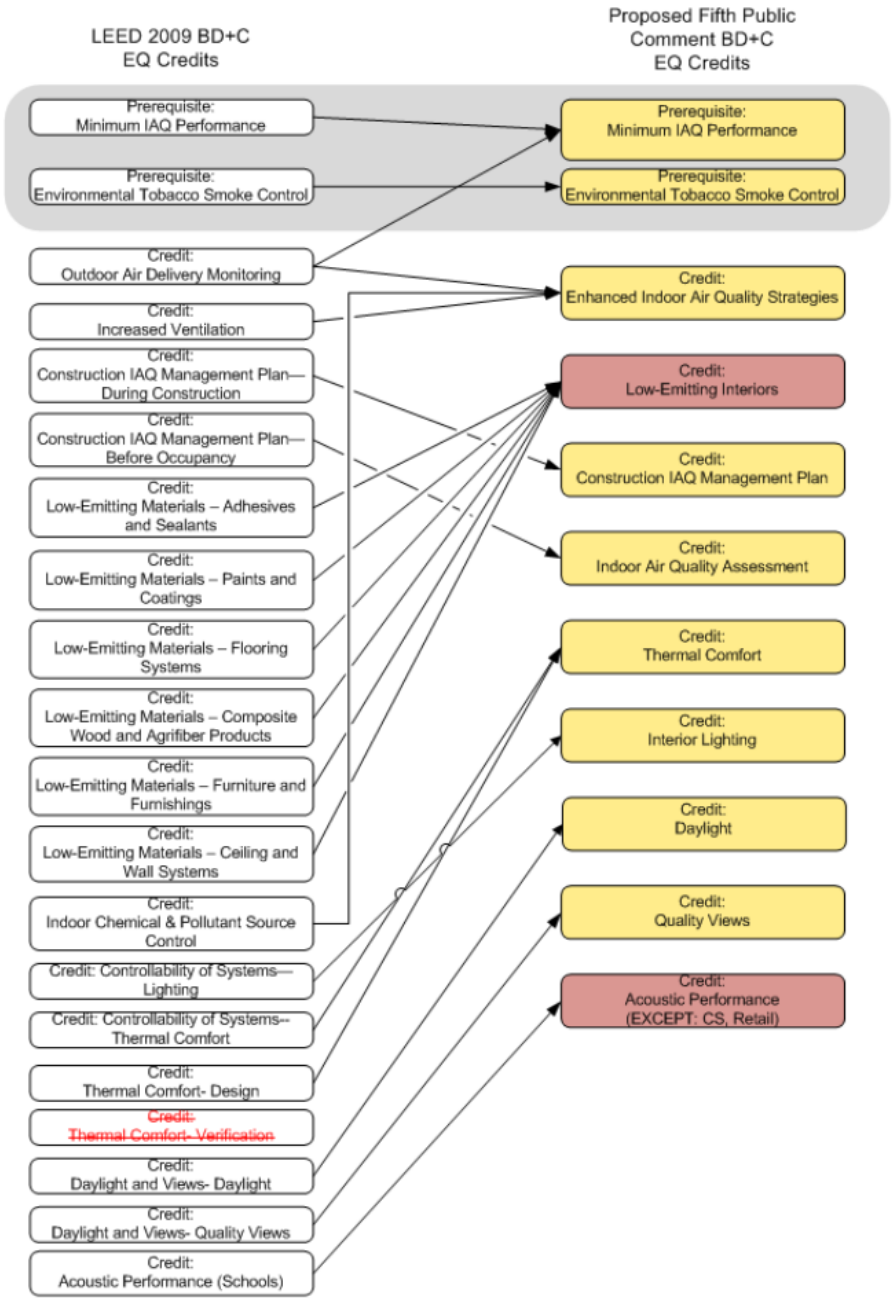

CPA-HBN Red List
Perkins +Will
Living Building Challenge
Pharos
GGHC
Halons
LEED NC
CFC
HCFC
Antimony
Copper
PFOA
Lead
Mercury
Cadmium
Hexavalent Chromium
Added formal-dehyde
LEED HC
Anti microbials
PAHS
VOCs & Urea Formaldehyde
PFCs
LBC watch
PAHs, Phenol, PU, more metals & other REACH chemicals
PU
Tins
Long PFC
Phthalates
PBDE
PVC & other chlorinated plastics
LEED Pilot
HBCD
HFR
Arsenic, penta & creosote
More PBTs, asthmagens & endocrine disruptors
BPA
Chlorinated paraffins
NPEs, MDI, TDI
PS
Asthmagens
More mutagens, reproductive, developmental & neurotoxicants
EPA
More carcinogens
& More beyond…
Healthy Building Network © 2011

The Lacey Act

The Lacey Act was amended with the 2008 Farm Bill for the purpose of combating illegal logging. The Lacey Act makes it unlawful to import, export, transport, sell, receive, acquire, or purchase in interstate or foreign commerce any plant, taken in violation of the laws of a U.S. State, or any foreign law that protects plants. Anyone who imports into the United States, or exports out of the United States, illegally harvested plants or products made from illegally harvested plants, including timber, as well as anyone who exports, transports, sells, receives, acquires or purchases such products in the United States, may be prosecuted. In any prosecution under the Lacey Act, the burden of proof of a violation rests on the government.

LEED v4 TECHNICAL IMPROVEMENTS:
INDOOR ENVIRONMENTAL QUALITY

- Prerequisite 1: Minimum Indoor Air Quality Performance
- Prerequisite 2: Environmental Tobacco Smoke Control
- **Credit 1: Enhanced Indoor Air Quality Strategies**
- Credit 2: Low-Emitting Interiors
- Credit 3: Construction IAQ Management Plan
- Credit 4: Indoor Air Quality Assessment
- Credit 5: Thermal Comfort
- Credit 6: Interior Lighting
- Credit 7: Daylight
- Credit 8: Quality Views
- Credit 9: Acoustic Performance


LEED 2009 BD+C
EQ Credits
Proposed Fifth Public
Comment BD+C
EQ Credits
Prerequisite:
Minimum IAQ Performance
Prerequisite:
Environmental Tobacco Smoke Control
Credit:
Outdoor Air Delivery Monitoring
Credit:
Increased Ventilation
Credit:
Construction IAQ Management Plan—
During Construction
Credit:
Construction IAQ Management Plan—
Before Occupancy
Credit:
Low-Emitting Materials – Adhesives
and Sealants
Credit:
Low-Emitting Materials – Paints and
Coatings
Credit:
Low-Emitting Materials – Flooring
Systems
Credit:
Low-Emitting Materials – Composite
Wood and Agrifiber Products
Credit:
Low-Emitting Materials – Furniture and
Furnishings
Credit:
Low-Emitting Materials – Ceiling and
Wall Systems
Credit:
Indoor Chemical & Pollutant Source
Control
Credit: Controllability of Systems—
Lighting
Credit: Controllability of Systems--
Thermal Comfort
Credit:
Thermal Comfort- Design
Credit:
Thermal Comfort- Verification
Credit:
Daylight and Views- Daylight
Credit:
Daylight and Views- Quality Views
Credit:
Acoustic Performance (Schools)
Prerequisite:
Minimum IAQ Performance
Prerequisite:
Environmental Tobacco Smoke Control
Credit:
Enhanced Indoor Air Quality Strategies
Credit:
Low-Emitting Interiors
Credit:
Construction IAQ Management Plan
Credit:
Indoor Air Quality Assessment
Credit:
Thermal Comfort
Credit:
Interior Lighting
Credit:
Daylight
Credit:
Quality Views
Credit:
Acoustic Performance
(EXCEPT: CS, Retail)

PREREQ 1: MINIMUM INDOOR AIR QUALITY PERFORMANCE

Intent
To contribute to the comfort and well-being of building occupants by establishing minimum standards for indoor air quality (IAQ).

Requirements
Meet the min. requirements of ASHRAE Standard 62.1–2010, Sec. 4–7

Monitoring
Mechanically ventilated spaces For mechanically ventilated spaces monitor outdoor air intake flow: provide a direct outdoor airflow measurement device measuring the minimum outdoor air intake flow.

Naturally ventilated spaces For naturally ventilated spaces comply with at least one of the following strategies: Provide a direct exhaust airflow measurement device capable of measuring the exhaust airflow; Provide alarms on all required openings; monitor CO2 concentrations.

Residential only In addition to the requirements above, each dwelling unit must meet the following requirements: Unvented combustion appliances not allowed; CO2 monitors in each unit; All fireplaces and stoves must have glass enclosures and pass a backdraft potential test; space and water heating must be enclosed or remote; Radon monitors if applicable.

IEQ credit 2: LOW-EMITTING INTERIORS

Intent

To reduce concentrations of chemical contaminants that can damage air quality, human health, productivity, and the environment

Requirements

Interior paints and coatings applied on site	General Emissions Evaluation: CDPH Method v1.1-2010 and VOC content requirements for wet applied products: SCAQMD Rules 1113 and 1168
Interior adhesives and sealants applied on site (including flooring adhesive)	General Emissions Evaluation, VOC content requirements for wet applied products
Flooring	General Emissions Evaluation
Composite wood	Composite Wood Evaluation CARB rules for ULEF and NAF.
Ceilings, walls, thermal, and acoustic insulation	General Emissions Evaluation
Furniture (include in calculations if part of scope of work)	Furniture Evaluation ANSI/M7.1–2011 and ANSI/BIFMA e3-2011
Healthcare and Schools Projects only: Exterior applied products	Exterior Applied Products: No formaldehyde in insulation, SCAQMD, and no hot-mopped asphalt roofs or paving coal tar sealants

IEQ credit 6: INTERIOR LIGHTING

Intent
To promote occupants' productivity, comfort, and well-being by providing high-quality lighting

Requirements
Option 1. Lighting control (1 point)
For at least 90% of individual occupant spaces, provide individual lighting controls that enable occupants to adjust the lighting to suit their individual tasks and preferences, with at least three lighting levels or scenes (on, off, midlevel). Midlevel is 30% to 70% of the maximum illumination level (not including daylight contributions).

For all shared multi-occupant spaces, meet all of the following requirements:

- Have in place multi-zone control systems that enable occupants to adjust the lighting to meet group needs and preferences, with at least three lighting levels or scenes (on, off, midlevel).
- Lighting for any presentation or projection wall must be separately controlled.
- Switches or manual controls must be located in the same space as the controlled luminaires. A person operating the controls must have a direct line of sight to the controlled luminaires.

IEQ credit 6: INTERIOR LIGHTING (cont.)

Requirements

Option 2. Lighting quality (1 point)

Choose four of the following strategies:

- For all regularly occupied spaces, use fixtures with a luminance of less than 2,500cd/m2 between 45 and 90 degrees from nadir.
- For the entire project, use light sources with a CRI of 80 or higher.
- For 75% of the total connected lighting load, use light sources that have a rated life (or L70 for LED sources) of at least 24,000 hours
- Use direct-only overhead lighting for 25% or less of the total connected lighting load for all regularly occupied spaces.
- For 90% of the regularly occupied floor area, meet the following thresholds for area-weighted average surface reflectance: 85% for ceilings, 60% for walls, and 25% for floors.
- If furniture is included, select furniture finishes to meet the following thresholds for area-weighted average surface reflectance: 45% for work surfaces, and 50% for movable partitions.
- For 75% of the regularly occupied floor area, meet an avg. ratio of wall surface or ceiling illuminance (excluding fenestration) to avg. work plane (or surface) illuminance that does not exceed 1:10.

IEQ credit 8: QUALITY VIEWS

Intent

To give building occupants a connection to the natural outdoor environment by providing quality views

Requirements

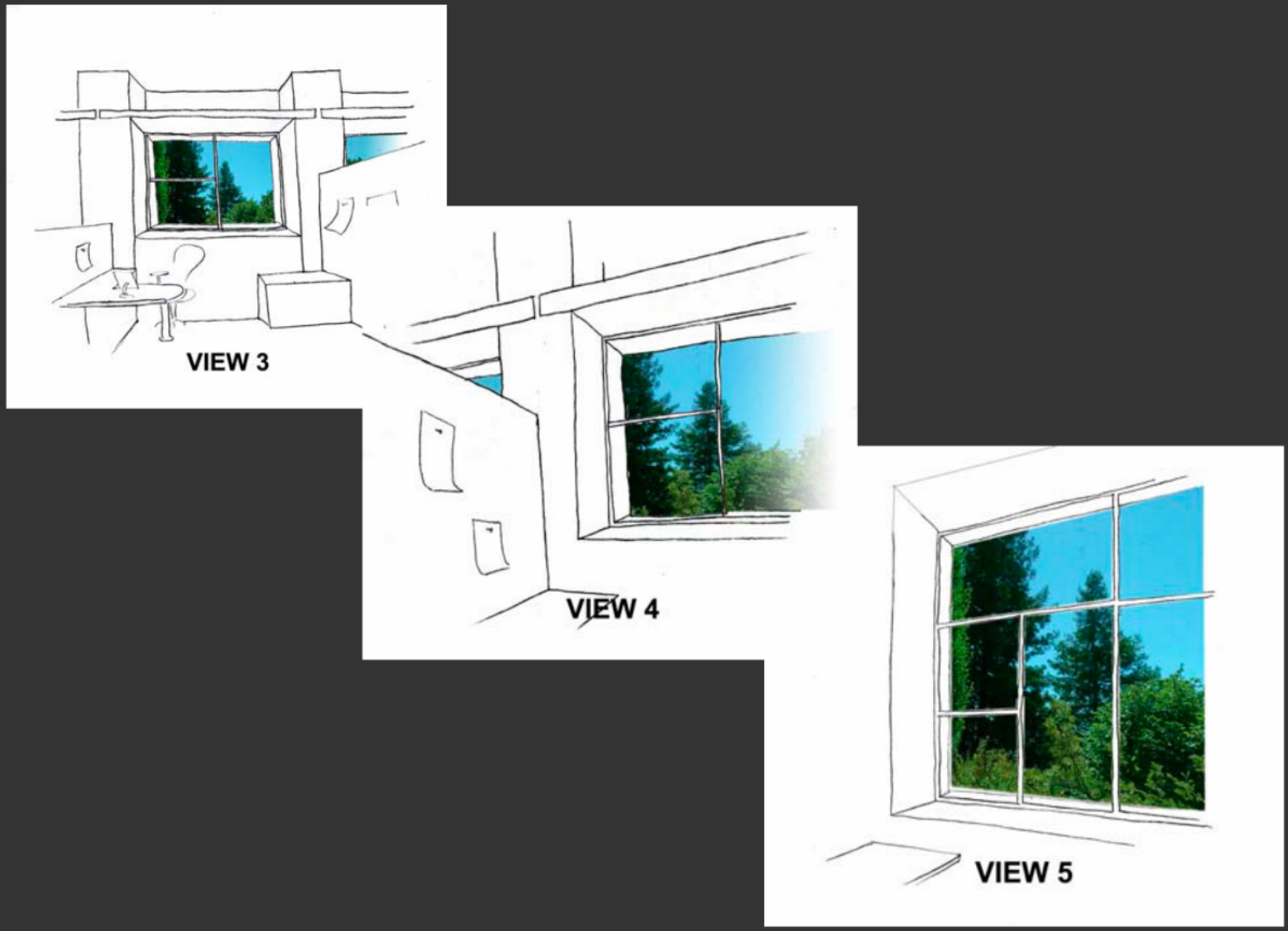
Achieve a direct line of sight to the outdoors via vision glazing for 75% of all regularly occupied floor area. View glazing in the contributing area must provide a clear image of the exterior, not obstructed by frits, fibers, patterned glazing, or added tints that distort color balance.

To comply, views must have at least two of the following four criteria:

- multiple lines of sight to vision glazing in different directions at least 90 degrees apart;
- views that include at least two of the following: (1) flora, fauna, or sky; (2) movement; and (3) objects at least 25 feet away;
- unobstructed views located within the distance of three times the head height of the vision glazing; and
- views with a view factor of 3 or greater, as defined in "Windows and Offices; A Study of Office Worker Performance and the Indoor Environment."

Views into interior atria may be used to meet up to 30% of the required area.

Views with a factor of 3 or more as defined by the Heschong Mahone Group



IEQ credit 9: ACOUSTIC PERFORMANCE

Intent
To provide workspaces and classrooms that promote occupants' well-being, productivity, and communications through effective acoustic design.

Requirements
For all occupied spaces, meet the following requirements, as applicable, for HVAC background noise levels, sound isolation performance, reverberation time and reverberant noise buildup, and paging, masking, and sound reinforcement systems.

HVAC Background Noise
Achieve maximum background noise levels from HVAC systems per 2011 ASHRAE Handbook, HVAC Applications, Chapter 48, Table 1; AHRI Standard 885-2008, Table 15; or local equivalent. Calculate or measure sound levels.

Sound Isolation
Meet the composite sound transmission class (STCC) ratings listed in Table 1, or local building code, whichever is more stringent.
Example: Office: STCC=45

Reverberation Time
Meet the reverberation time requirements in Table 3.
Example: Private Office <0.6 secs

INNOVATION CREDITS

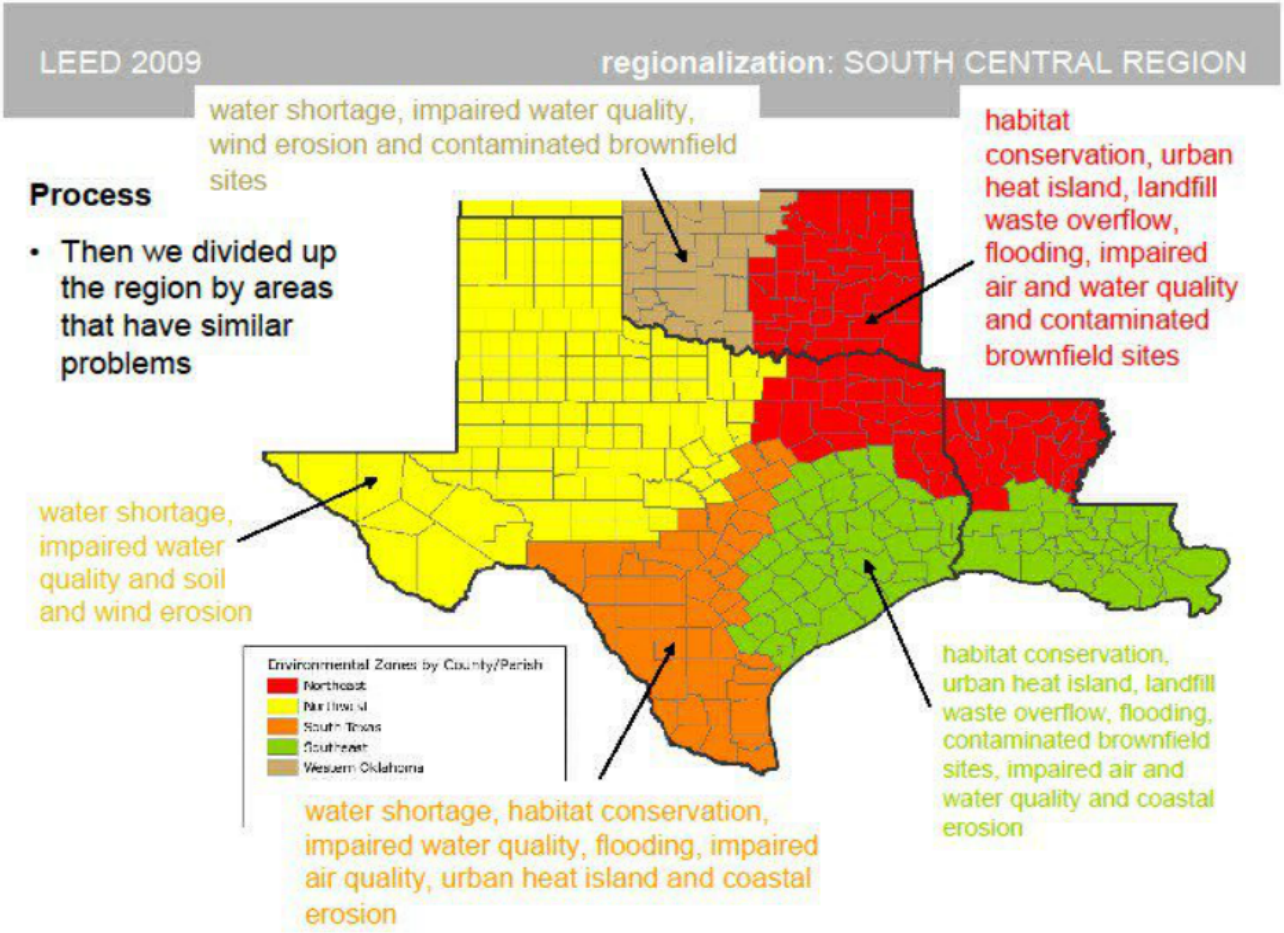
Still available for:

- -Exemplary Performance (being developed)
- -Pilot Credits (always changing)
- -Above and Beyond Ideas

Deleted the Documenting Sustainable Cost Impact Credit

REGIONAL PRIORITY

Committees still developing criteria based on new credits



LEED-CS Project Comparison: 2009 vs. v4

Certified 40 to 49 points
Silver 50 to 59 points
Gold 60 to 79 points
Platinum 80 to 110

Hypothetical Non-CBD 100,000 square foot Office Building
LEED 2009 = 60 points (barely Gold)
LEED v4 = 46 points (certified)

Why?:
More stringent Energy Efficiency levels (lose 4-6 points)
Green Vehicle credit requires alternative fueling stations
Rainwater and Heat Island credits are combined.
Fewer building materials have EPDs available.

DOCUMENTATION *SIMPLIFIED*

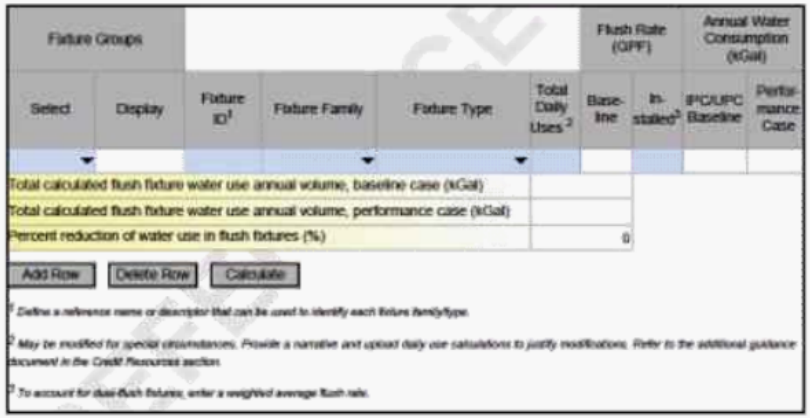
Fewer Forms. Reduced forms by 80% compared to LEED 2009 to improve system performance and consistency.

Alignment across rating systems
Includes campus, multiple building, recertification, global projects

Fewer fields to document. Removed low-value documentation requirements.

Removed required signatories
Removed duplication of content

Example: Excel Calculators



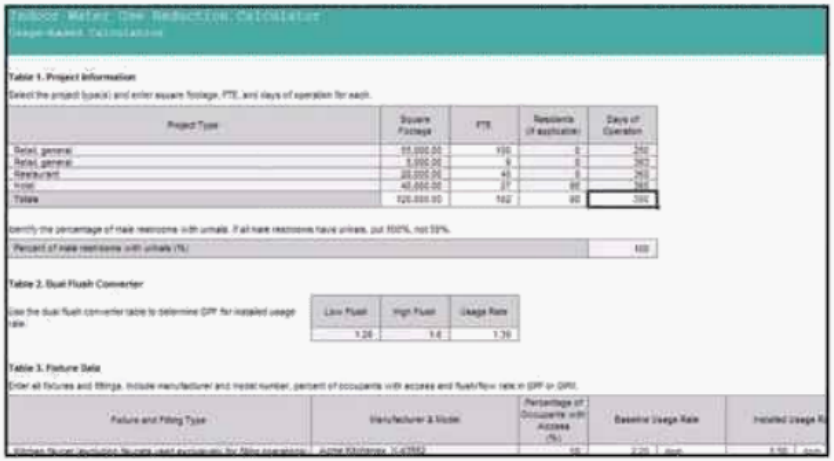
Fixture Groups						Flush Rate (GPF)		Annual Water Consumption (kGal)	
Select	Display	Fixture ID[1]	Fixture Family	Fixture Type	Total Daily Uses[2]	Base-line	In-stalled[3]	IPC/UPC Baseline	Perfor-mance Case
Total calculated flush fixture water use annual volume, baseline case (kGal)									
Total calculated flush fixture water use annual volume, performance case (kGal)									
Percent reduction of water use in flush fixtures (%)					0				

Add Row | Delete Row | Calculate

[1] Define a reference name or descriptor that can be used to identify each fixture family/type.

[2] May be modified for special circumstances. Provide a narrative and upload daily use calculations to justify modifications. Refer to the additional guidance document in the Credit Resources section.

[3] To account for dual-flush fixtures, enter a weighted average flush rate.



Indoor Water Use Reduction Calculator

Usage-Based Calculator

Table 1. Project Information

Select the project type(s) and enter square footage, FTE, and days of operation for each.

Project Type	Square Footage	FTE	Residents (if applicable)	Days of Operation
Retail, general	55,000.00	100	0	260
Retail, general	5,000.00	9	0	365
Restaurant	20,000.00	40	0	260
Hotel	40,000.00	37	60	365
Totals	120,000.00	102	60	350

Identify the percentage of male restrooms with urinals. If all male restrooms have urinals, put 100%, not 33%.

Percent of male restrooms with urinals (%)	100

Table 2. Dual Flush Converter

Use the dual flush converter table to determine GPF for installed usage rate.

Low Flush	High Flush	Usage Rate
1.28	1.6	1.70

Table 3. Fixture Data

Enter all fixtures and fittings. Include manufacturer and model number, percent of occupants with access and flush/flow rate in GPF or GPM.

Fixture and Fitting Type	Manufacturer & Model	Percentage of Occupants with Access (%)	Baseline Usage Rate		Installed Usage R
Kitchen Faucet (Applicable faucets used exclusively for filling operations)	Acme Kitchenware, TL-67892	10	2.20	gpm	1.50

LEED 2009
Water Efficiency prerequisite:
Water Use Reduction

LEED v4 Improvement:
Water Efficiency prerequisite: Indoor Water Use Reduction

Example: Provide Information in a Format You Have Already Created

LEED 2009

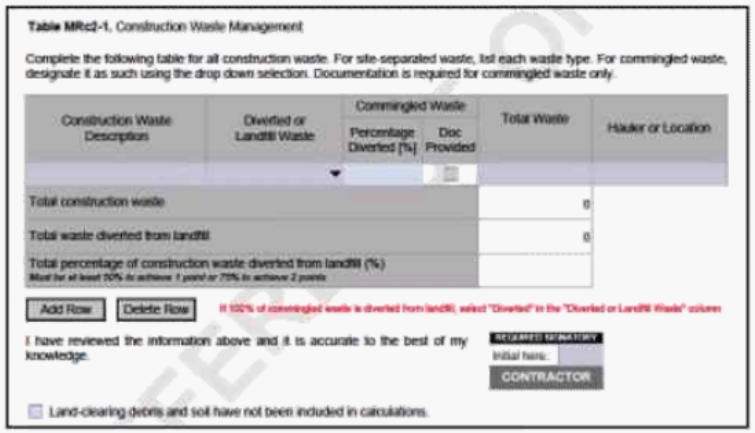


Table MRc2-1, Construction Waste Management

Complete the following table for all construction waste. For site-separated waste, list each waste type. For commingled waste, designate it as such using the drop down selection. Documentation is required for commingled waste only.

Construction Waste Description	Diverted or Landfill Waste	Commingled Waste: Percentage Diverted [%]	Commingled Waste: Doc Provided	Total Waste	Hauler or Location
Total construction waste				0	
Total waste diverted from landfill				0	
Total percentage of construction waste diverted from landfill (%)					

Must be at least 50% to achieve 1 point or 75% to achieve 2 points

Add Row | Delete Row | If 100% of commingled waste is diverted from landfill, select "Diverted" in the "Diverted or Landfill Waste" column

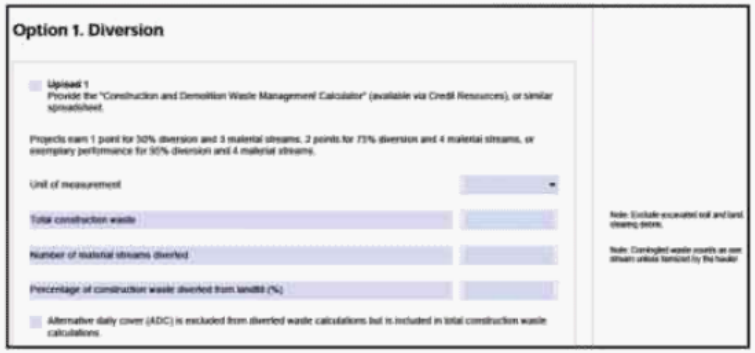
I have reviewed the information above and it is accurate to the best of my knowledge.

REQUIRED SIGNATORY
Initial here:
CONTRACTOR

Land-clearing debris and soil have not been included in calculations.

LEED v4 Improvement:

Upload a spreadhseet in Materials and Resources Construction and Demolition



Option 1. Diversion

Upload 1
Provide the "Construction and Demolition Waste Management Calculator" (available via Credit Resources), or similar spreadsheet.

Projects earn 1 point for 50% diversion and 3 material streams, 2 points for 75% diversion and 4 material streams, or exemplary performance for 90% diversion and 4 material streams.

Unit of measurement

Total construction waste

Number of material streams diverted

Percentage of construction waste diverted from landfill (%)

Alternative daily cover (ADC) is excluded from diverted waste calculations but is included in total construction waste calculations.

Note: Exclude excavated soil and land clearing debris.

Note: Commingled waste counts as one stream unless itemized by the hauler

Special Circumstances

Special Circumstances

Describe the circumstances limiting the project team's ability to provide the submittals required in this form. Be sure to reference what additional documentation has been provided, if any. Non-standard documentation will be considered upon its merits.

Upload Special Circumstances
Provide any additional documentation that supports the claim to special circumstances. (Optional)

Note: If any information is entered in the Special Circumstances section, the "Check Compliance" button will only check for information in this section.

Building Water Use

☐ All eligible newly installed fixtures and fittings are WaterSense labeled (or equivalent for projects outside the United States).

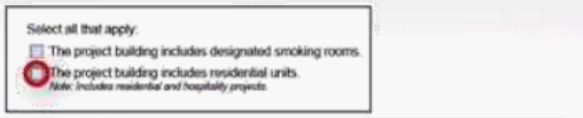
For projects using an equivalent to WaterSense

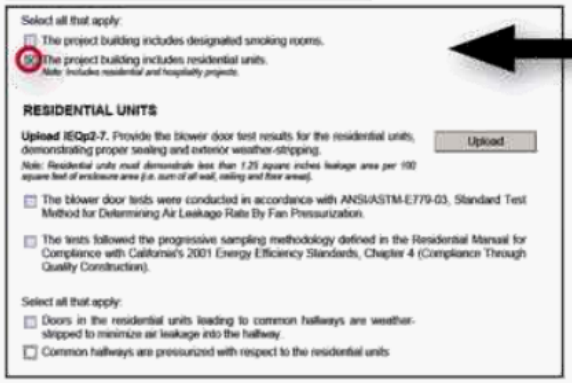
Describe what WaterSense equivalent was used for each of the eligible fixture and/or fitting types.

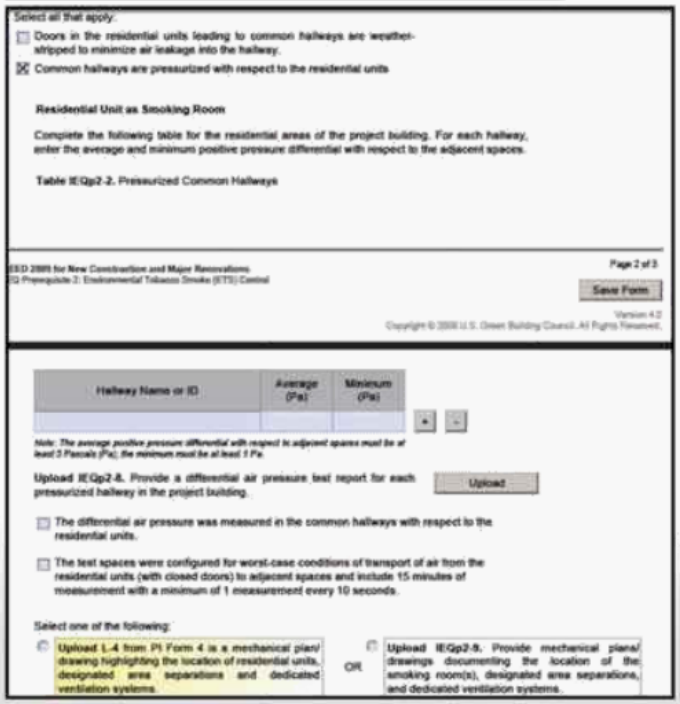
☐ **Upload 1**
Provide the "Fixture and Fitting Water Use Calculator" (available via "Credit Resources").

Must be consistent with WE Credit: Indoor Water Use Reduction.

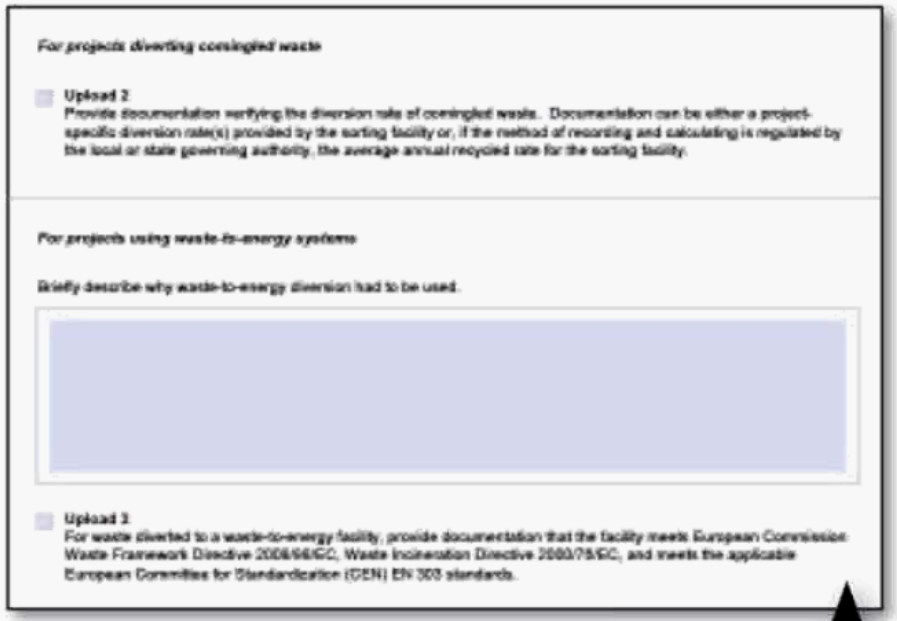
Example: Progressive Disclosure





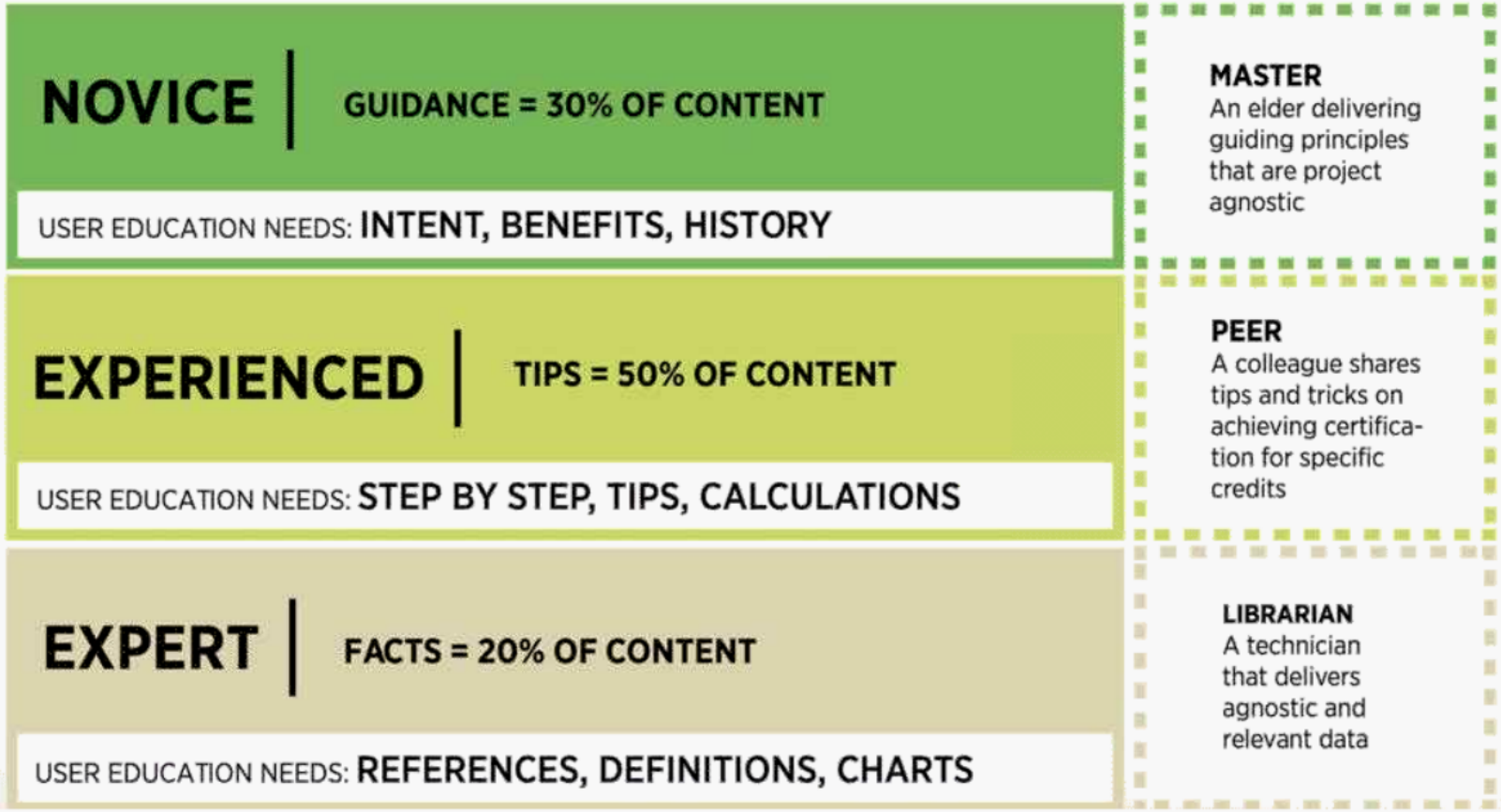


LEED 2009
IEQ prerequisite 2: Environmental Tobacco Smoke Control

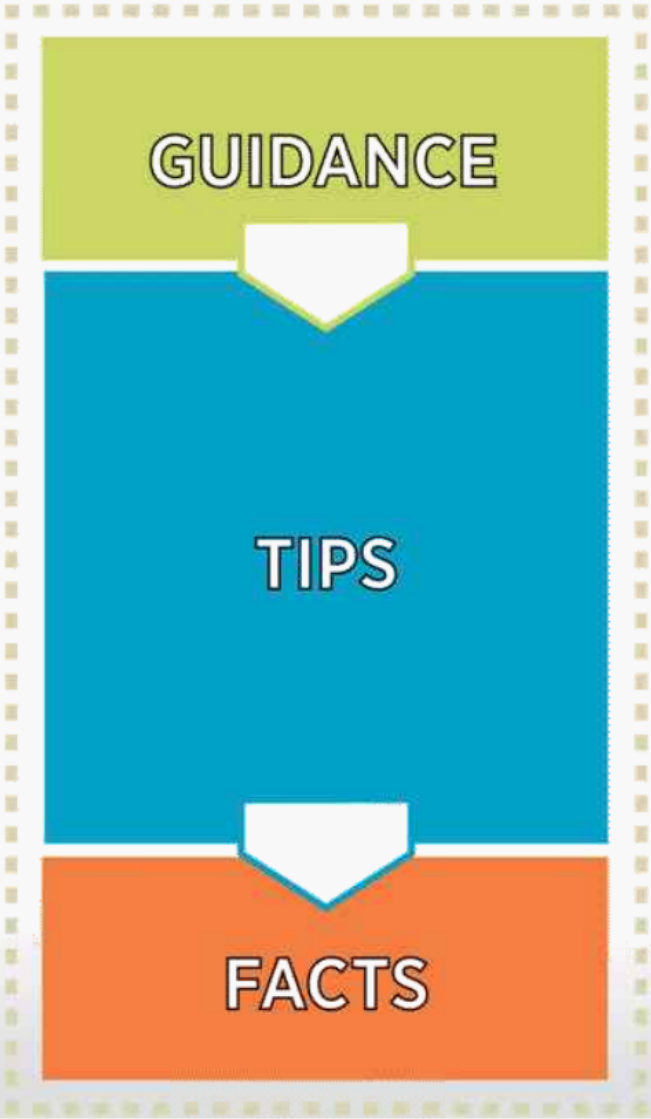


LEED v4 Improvement:
Materials and Resources credit: Construction and Demolition Waste Management

Reference Guide Audiences



Reference Guide Content



- Behind the Intent

- Step-by-Step Guidance
- Further Explanation
- Related Credit Tips
- Changes from LEED 2009

- Referenced Standards
- Exemplary Performance
- Definitions

View guide

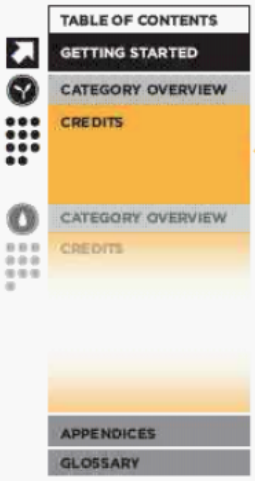
REFERENCE GUIDE OVERVIEW

GUIDE STRUCTURE

GETTING STARTED
Provides those new to the guide an overview of what LEED is intended to address and offers an overview of the LEED certification process. It also addresses issues that cut across the entire rating system or that touch two or more credit categories.

CATEGORY OVERVIEWS
Emphasize sustainability topics, market factors, and credit relationships that are specific to a single credit category and information that is applicable to multiple credits within that category.

CREDITS
Contain content that is only specific to the achievement of that credit.



CREDIT STRUCTURE

BEHIND THE INTENT
Connects LEED achievement with larger sustainability issues that the credit specifically addresses and provides general information on development of credit requirements.

STEP-BY-STEP
Provides suggested implementation and documentation steps that will be used by most projects as well as generally applicable tips and examples.

FURTHER EXPLANATION
Provides additional guidance for lengthy calculations or for topics that may only be applicable to special project situations, such as tips for non-standard project types or credit approaches.

RELATED CREDIT TIPS
Help teams identify important relationships to other credits that will impact decisions/strategies for the credit in question.

REFERENCED STANDARDS
Lists all standards related to the credit and offers weblinks to find them.

CREDIT CATEGORIES

REPLACE WITH CORRECT CREDIT CATEGORY ICONS

Getting Started

HOW TO USE THIS REFERENCE GUIDE

The intent of this Reference Guide is to work in conjunction with the Rating System, though both documents serve different purposes. The rating system contains all credit requirements that serve as the foundation for LEED certification. It describes the minimum thresholds that must be met to be awarded prerequisite achievement and credit points. The reference guide serves as a best practice roadmap that was written by expert users of LEED. As such, it contains many steps that may not be specifically tied to achievement of a requirement in the RS, though if followed, the step provides a clear path to credit achievement and allows teams to maximize the impact of the strategies employed to achieve them.

The LEED version 4 reference guides focus on content that supports LEED achievement through the design process. Within each section, information is organized to flow from general guidance, to more specific tips, to reference facts. Sections have been designed with a parallel structure to support way finding and minimize repetition across the guide.

Table E.3 — Activity level: 69,6 W/m² (1,2 met)

Clothing		Operative temperature	Relative air velocity							
clo	m² · K/W	°C	< 0,10	0,10	0,15	0,20	0,30	0,40	0,50	1,00
0	0	25	−1,33	−1,33	−1,59	−1,92				
		26	−0,93	−0,93	−1,11	−1,40				
		27	−0,33	−0,33	−0,63	−0,88				
		28	0,15	0,12	−0,14	−0,36				
		29	0,63	0,56	0,35	0,17				
		30	1,10	1,01	0,84	0,69				
		31	1,57	1,47	1,34	1,24				
		32	2,03	1,93	1,85	1,78				
0,25	0,039	23	−1,16	−1,16	−1,39	−1,61	−1,97	−2,25		
		24	−0,76	−0,76	−0,93	−1,23	−1,54	−1,80	−2,01	
		25	−0,42	−0,48	−0,64	−0,93	−1,11	−1,34	−1,54	−2,21
		26	−0,04	−0,07	−0,27	−0,43	−0,68	−0,89	−1,06	−1,65
		27	0,33	0,29	0,11	−0,03	−0,25	−0,43	−0,58	−1,09
		28	0,71	0,64	0,49	0,37	0,18	0,03	−0,10	−0,54
		29	1,07	0,99	0,87	0,77	0,61	0,49	0,39	0,03
		30	1,43	1,35	1,25	1,17	1,05	0,95	0,87	0,58
0,50	0,078	18	−2,01	−2,01	−2,17	−2,38	−2,70			
		20	−1,41	−1,41	−1,58	−1,76	−2,04	−2,25	−2,42	
		22	−0,79	−0,79	−0,97	−1,13	−1,36	−1,54	−1,69	−2,17
		24	−0,17	−0,20	−0,36	−0,48	−0,68	−0,83	−0,95	−1,35
		26	0,44	0,39	0,26	0,16	−0,01	−0,11	−0,21	−0,52
		28	1,05	0,98	0,88	0,81	0,70	0,61	0,54	−0,31
		30	1,64	1,57	1,51	1,46	1,39	1,33	1,29	1,14
		32	2,25	2,20	2,17	2,15	2,11	2,09	2,07	1,99

UPDATE GRAPH STYLE

6. Use EN 15251 Annex A.2 to identify the comfort zone for buildings without mechanical cooling systems (naturally conditioned spaces).
   - In naturally conditioned spaces, acceptable comfort conditions are a function of outdoor temperatures only; humidity, air speed and clothing levels are not included in the comfort zone calculation. The comfort zone boundaries for naturally conditioned spaces are illustrated in Figure A1 of EN 15251. The project team should first calculate running mean outdoor temperatures for the project location as described in EN 15251 Section 3.2.1 for times of the year when natural conditioning is used. Then, use Figure A1 or the equations provided in Section A.2 to establish the associated upper and lower operative temperature limits.

RATING SYSTEM MODIFICATIONS

Hospitality

- Guest rooms are assumed to have individual thermal comfort controls and are excluded from the controls requirements of this credit.
- All other spaces must comply with the thermal comfort control requirements in Step-by-Step above.

Data centers

- The thermal comfort design and thermal comfort control requirements only apply to regularly occupied spaces, such as network operations centers, security offices and administrative spaces.
- All other spaces, such as areas that house data center equipment or mechanical equipment, are excluded.

PROJECT TYPE MODIFICATIONS

Some occupancy types present unique challenges for demonstrating compliance with the reference standards for this credit. The below list, while not all-inclusive, provides some examples of unique challenges:

- Gymnasiums, fitness areas, and other spaces with high metabolic rates: ASHRAE 55-2010 Normative Appendix A permits use of a time-weighted average metabolic rate over a period of an hour or less. The appendix goes on to state that most applications have time-weighted metabolic rates that are 2.0 met or less. Any space with a rate of 2.0 met or less must be addressed using standard compliance methods. Although the ASHRAE standard does not apply where the time-averaged metabolic rate is above 2.0 met, thermal comfort in these spaces must still be addressed. Project teams that use Option 1 and include such spaces should provide a narrative to address how the intent of the credit was met. Alternatively, project teams may wish to use Option 2 since ISO 7730 permits metabolic rates up to 4.0 met.
- Kitchens: Many kitchens are either not conditioned, not cooled, or are only indirectly cooled, and may have difficulties achieving the requirements of ASHRAE 55-2010 or ISO 7730. If a kitchen cannot meet the requirements of the Standards, the project team should provide a detailed narrative on how the intent of the credit has been met.
- Apparatus Bays in Fire Stations: Typically, these spaces are not designed for human occupancy, and thus would not be required to meet the credit requirements. However, if these spaces are designed for human occupancy, then the space must be addressed.
- Vehicle Repair Facility: This space type would also apply to military buildings where vehicles, including but not limited to trucks, tanks, aircraft, etc., are being serviced, which are not typically cooled. For this specialty space type, the requirements for Warehouses & Distribution Centers must be applied to meet the credit requirements.
- Residential: *PLACEHOLDER*

RELATED CREDIT TIPS

- EQp1: Minimum Indoor Air Quality Performance: Requirements for natural ventilation in the ASHRAE ventilation standard (62.1-2010) are different from the requirements for natural conditioning in the ASHRAE comfort standard (55-2010). Naturally ventilated and/or conditioned projects should review the requirements of both ASHRAE 62.1-2010 and ASHRAE 55-2010.
- EQc1: Enhanced Indoor Air Quality Strategies: Project teams should consider the monitoring requirements of both credits when specifying or upgrading building monitoring systems.
- EQc1: Occupant Comfort Survey: Occupant comfort surveys may detect thermal comfort issues not evident from continuous or periodic monitoring. When used together, survey data and environmental measurements can improve management of the indoor environment and facilitate continuous improvement of building operating processes and parameters

CHANGES FROM LEED 2009

- The ASHRAE reference standard has been updated to ASHRAE 55-2010. Refer to ASHRAE Journal (June 2011) for an explanation of changes from the 2004 version of the standard: http://www.ashrae.org/resources--publications/periodicals/ashrae-journal/

LEED

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FILTER CREDITS | New Construction | v2009

SMART FILTERS

- All
- Sustainable sites
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- Energy & atmosphere
- Material & resources
- Indoor environmental quality
- Innovation
- Regional priority
- Minimum program requirements
- Pilot credits

Search credits

Match **all** results | Match **any** results

Name | contains

Clear filters | SAVE | APPLY

New

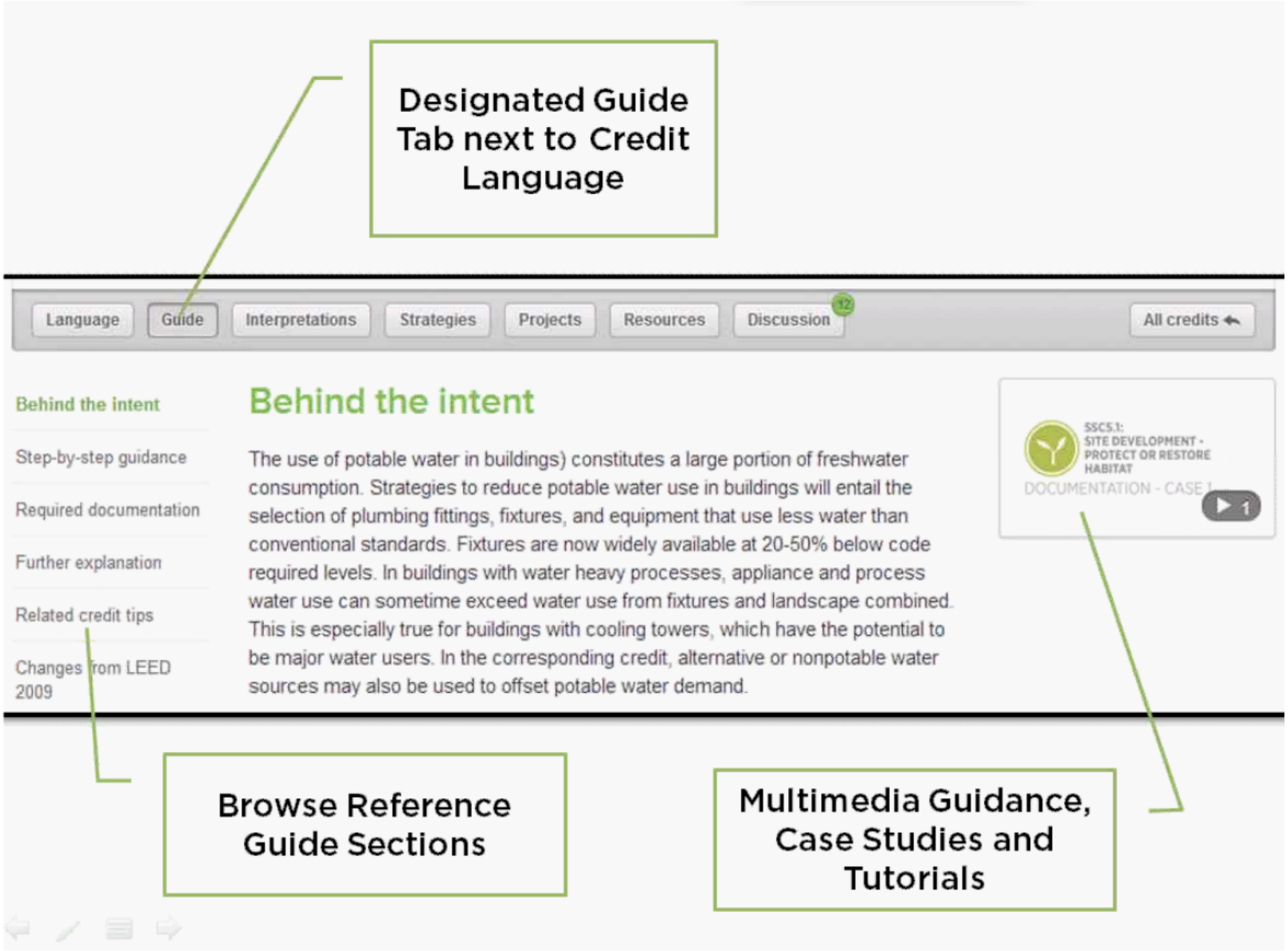
Construction activity pollution prevention

SSp1 | Required

Site selection

SSc1 | 1 point

Development density and community connectivity


Designated Guide Tab next to Credit Language
Language
Guide
Interpretations
Strategies
Projects
Resources
Discussion
12
All credits
Behind the intent
Step-by-step guidance
Required documentation
Further explanation
Related credit tips
Changes from LEED 2009
Behind the intent
The use of potable water in buildings) constitutes a large portion of freshwater consumption. Strategies to reduce potable water use in buildings will entail the selection of plumbing fittings, fixtures, and equipment that use less water than conventional standards. Fixtures are now widely available at 20-50% below code required levels. In buildings with water heavy processes, appliance and process water use can sometime exceed water use from fixtures and landscape combined. This is especially true for buildings with cooling towers, which have the potential to be major water users. In the corresponding credit, alternative or nonpotable water sources may also be used to offset potable water demand.
SSC5.1:
SITE DEVELOPMENT - PROTECT OR RESTORE HABITAT
DOCUMENTATION - CASE 1
1
Browse Reference Guide Sections
Multimedia Guidance, Case Studies and Tutorials

Resources

We've created some helpful documents for each rating system family

Summary
Summary of changes from 5th public comment

BD&C | ID&C | O&M | ND | HOMES

Clean
Full rating system language

BD&C | ID&C | O&M | ND | HOMES

Tracked
Full rating system language with changes from 4th public comment

BD&C | ID&C | O&M | ND | HOMES

Scorecards
Checklist of credits and associated points

BD&C | ID&C | O&M | ND | HOMES

View all LEED v4 resources

LEED v4 Insights

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