TECHNICAL GUIDE

New Construction and Modernization
Guiding Principles for Sustainable Federal Buildings
(February 2016)

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Contents

TECHNICAL GUIDANCE

OVERVIEW

From the EPA to NASA, federal agencies work to abide by the Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings,[1] a set of policies for building, renovating, and operating optimal, efficient buildings. The Green Business Certification Inc. (GBCI) has been working with these federal agencies to offer assessments of each agency's work to meet the Guiding Principles. GBCI can help you evaluate your success and guide your efforts toward complying with the principles, using its depth and breadth of knowledge of green building certification.

This Technical Guide for Guiding Principles Assessment by GBCI for New Construction or Modernization projects, along with the Guiding Principles Assessment Handbook, will take you through the steps to show your projects' compliance with the Guiding Principles.

This Guide addresses each of the 21 Guiding Principles for New Construction or Modernization, inclusive of the requirements and suggestions for implementation and documentation. The **Requirements** included in this guide are directly quoted from the instructions published for Federal Agencies: *Determining Compliance with the Guiding Principles for Sustainable Federal Buildings*[2]. Included in the implementation section is the relevant text titled **Consider the following** which is quoted from the *Guiding Principles for Sustainable Federal Buildings and Associated Instructions, The Council on Environmental Quality February 2016*[3]. This document provides applicability guidance to help project teams determine eligibility for the New Construction or Modernization Guiding Principles Assessment.

Compliance

As stated in the Guiding Principles for Sustainable Federal Buildings and Associated Instructions dated February 2016 section III. Agency Determination of a Building's Compliance with the Guiding Principles Guiding Principles that are "Not Applicable" as defined by, "For building evaluation purposes, "not applicable" may be used where the building's inherent function, mission, safety, or designation prevents compliance with a specific guiding principle, element, or sub-element. The use of "not applicable" should be minimized. For new construction and modernization, "not applicable" is equivalent to compliance with that guiding principle, element, or sub-element."

Note, in instances where a requirement is only partially applicable, within the Project Information Form, select the documentation path that will be used to document the applicable portions of the Requirement. Not applicable should only be selected if the Requirement is not applicable in its entirety.

[1] https://obamawhitehouse.archives.gov/sites/default/files/docs/eo_13693_implementing_instructions_june_10_2015.pdf
[2] https://sftool.gov/Content/attachments/determining_compliance_with_the_guiding_principles_for_sustainable_federal_buildings_february_2016.pdf
[3] https://sftool.gov/Content/attachments/guiding_principles_for_sustainable_federal_buildings_and_associated_instructions_february_2016.pdf

Life Cycle Cost Analysis

Guiding Principles are often only required when life cycle cost-effective. The CEQ Guidance 4 offers the following: Life Cycle Cost-Effective, Section 3 of E.O. 13693 states that the Guiding Principles should be applied where life cycle cost-effective. The term "cost-effectiveness" should include the use of benefit-cost analysis in accordance with OMB Circulars A-94 as well as A-11 Part 7 Capital Programming Guide.5

I. EMPLOY INTEGRATED DESIGN PRINCIPLES

Integrated Design - Required

Requirements

Consider the environmental impact of siting decisions and use an integrated project team to: establish energy and other environmental performance goals in the design process; follow sustainable landscape design principles; evaluate electric vehicle charging needs; consider design choices that improve environmental performance, support health and wellness of building occupants and consider climate risks including wildfire; and consider all stages of the building's life cycle.

Compliance

Implement the Guiding Principle Requirements cited above

- Demonstrate compliance with LEED BD+C v4 IPc Integrative process leveraging the Integrative Process worksheet
- During this process as stated below, "consider environmental impact of siting decisions when making new facility investments and balance those concerns with cost and security. The guidance included in Implementing Instructions-Sustainable Locations for Federal Facilities highlights the need to strike the appropriate balance." When in alignment with project goals, implement the following LEED v4 BD+C credits and/or strategies from the credits as applicable:
  - LTc LEED for Neighborhood Development location
  - LTc Access to Quality Transit
  - LTc Sensitive land protection
  - LTc High priority site
  - LTc Surrounding density and diverse
  - LTc Access to quality transit
  - LTc Reduced parking footprint
  - LTc Green vehicles
  - SSp Construction activity pollution prevention
  - SSc Site assessment
  - SSc Site development - protect or restore habitat
  - SSc Open space
  - SSc Heat island reduction
  - MRc Building life cycle impact reduction
  - INc LEED Accredited Professional

Consider the following

- Sustainable Locations: Consider the environmental impact of siting decisions when making new facility investments and balance those concerns with cost and security. The guidance included in Implementing Instructions-Sustainable Locations for Federal Facilities highlights the need to strike the appropriate balance[4]. Consider site-specific long-term climate change impacts such as drought, flood, wind, and wildfire risks. Prioritize sites that offer robust transportation options, including walking, biking, and transit, and minimize the combined greenhouse gas emissions of the building and associated commuter and visitor transportation emissions over the project's life. Leverage existing infrastructure, and align, where possible, with local and regional planning goals; protect natural, historic, and cultural resources.
- Integrated Design: Use a collaborative, integrated process and team to plan, program, design, construct, commission, and transition to operation each new building project or modernization. Ensure that the process and team:
  - **i.** Integrate the use of OMB's Circular A-11, Part 7, Capital Programming Guide.[5] (This guide includes relevant information regarding the Integrated Project Team)
  - **ii.** Establish performance goals for energy, water, materials, indoor environmental quality, and daylighting along with other comprehensive design goals and ensure incorporation of these goals throughout the design and life cycle of the building.
  - **iii.** Follow sustainable landscape design principles[6] including protection and promotion of pollinator habitat.[7]
  - **iv.** Evaluate and provide appropriate electric vehicle charging infrastructure, in accordance with applicable laws and regulations.
  - **v.** Consider design choices that improve environmental performance, protect historic properties, enhance indoor environmental quality, support health and wellness of building occupants, and address climate risks, including wildfire.
  - **vi.** Consider all stages of the building's life cycle.

Documentation Requirements

Design Submittal

Path One:

- Demonstrate compliance with LEED BD+C v4 IPc Integrative process

[4] Implementing Instructions-Sustainable Locations for Federal Facilities: www.whitehouse.gov/sites/default/files/microsites/ceq/implementing_instructions_-_sustainable_locations_for_federal_facilities_9152011.pdf

[5] Capital Programming Guide https://obamawhitehouse.archives.gov/sites/default/files/omb/assets/a11_current_year/capital_programming_guide.pdf

[6] Guidance for Federal Agencies on Sustainable Practices for Designed Landscapes, October 31, 2011: www.whitehouse.gov/administration/eop/ceq/sustainability/landscaping-guidance

[7] Presidential Memorandum -- Creating a Federal Strategy to Promote the Health of Honey Bees and Other Pollinators, June 20, 2014: www.whitehouse.gov/the-press-office/2014/06/20/presidential-memorandum-creating-federal-strategy-promote-health-honey-b

9 Supporting the Health of Honey Bees and Other Pollinators, October 2014: www.whitehouse.gov/sites/default/files/docs/supporting_the_health_of_honey_bees_and_other_pollinators.pdf

- Provide a summary narrative inclusive of information about additional LEED credits attempted and/or the relevant strategies that were considered and implemented to address the following elements:
  - Use of an integrated project team, including information about team members
  - Document the energy, water, materials, indoor environmental quality, daylighting and other environmental performance goals established by the integrated project team in the design process
  - Indicate what sustainable landscape design principles were incorporated
  - Demonstrate that electric vehicle charging needs were met or evaluated
  - Specify what design choices were considered and/or implemented that improve environmental performance
  - Consider all stages of the building's life cycle Support health and wellness of building occupants (this element also addressed in the Occupant Health and Wellness GP)
  - Consider climate risks including wildfire (this element also addressed in Facility Design or Adaptation)

Path Two:

- Not applicable to project. Provide written justification that the building's inherent function, mission, safety, or designation prevents compliance.

Commissioning - Required

Requirements

Commission and recommission at least every four years to optimize building performance using commissioning agents who are independent of the design and construction or operating team. Commissioning should be consistent with the Energy Independence and Security Act (EISA) section 432 and Federal Energy Management Program (FEMP) commissioning guidance.

Compliance

Implement the Guiding Principle Requirements cited above

- Demonstrate compliance with LEED BD+C v4 EAp Fundamental commissioning and verification
- LEED BD+C v4 EAc Enhanced commissioning

Consider the following

- Employ commissioning tailored to the size and complexity of the building and its system components to optimize and verify performance of building systems. Commissioning should be led by an experienced commissioning provider who is independent of the project design and construction team and the operations team. At a minimum, commissioning should include a commissioning plan, verification of the installation and performance of systems being commissioned, and a commissioning report that confirms identified issues were appropriately

addressed. Follow EISA 2007 section 432 and associated Federal Energy Management Program (FEMP) commissioning guidance.[89]

Documentation Requirements

Construction Submittal

Path One:

- Demonstrate compliance with LEED BD+C v4 EAp Fundamental commissioning and verification
- LEED BD+C v4 EAc Enhanced commissioning

Path Two:

- Not applicable to project. Provide written justification that the building's inherent function, mission, safety, or designation prevents compliance.

[8] 42 U.S.C. § 8253(f): energy.gov/sites/prod/files/2014/07/f17/commissioning_fed_facilities.pdf

[9] Guidance for the Implementation and Follow-up of Identified Energy and Water Efficiency Measures in Covered Facilities (per 42 U.S.C. 8253(f), Use of Energy and Water Efficiency Measures in Federal Buildings), September 2012: energy.gov/sites/prod/files/2013/10/f4/eisa_project_guidance.pdf

II. OPTIMIZE ENERGY PERFORMANCE

Energy Efficiency - Required

Requirements

A. For new construction, ensure energy efficiency is 30% better than the current American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) 90.1 standard, **OR**

B. For modernization, ensure:

1) Energy use is 20% below the fiscal year (FY) 2015 energy use baseline, **OR**

2) Energy use is 30% below the FY 2003 energy use baseline, **OR**

3) The building has an ENERGY STAR® rating of 75 or higher, **OR**

4) For building types not in ENERGY STAR Portfolio Manager, where adequate benchmarking data exists, the building is in the top quartile of energy performance for its building type, **AND**

C. For new construction and modernization, use energy efficient products, as required by statute[10].

Compliance

Implement the Guiding Principle Requirements cited above

- Demonstrate compliance with LEED BD+C v4 EAp Minimum energy performance
- AND LEED BD+C v4 EAc Optimize energy performance– earning a minimum of 30% savings in Site Energy Use within the Minimum Energy Use calculator Table: Total Energy Savings (excluding receptacle and process loads).

Consider the following

- Employ strategies that minimize energy usage. Focus on reducing energy loads before considering renewable or clean and alternative energy sources. Use energy efficient products as required by statute.[10]

Documentation Requirements

Design Submittal

Path One:

- Demonstrate compliance with LEED BD+C v4 EA Minimum energy performance
- LEED BD+C v4 EA Optimize energy performance– earning a minimum of 30% savings in Site Energy Use utilizing the following calculation:

> Percentage improvement = 100 x ((Baseline building consumption - Receptacle and process loads) - (Proposed building consumption - Receptacle and process loads)) / (Baseline building consumption - Receptacle and process loads)

[10] 42 U.S.C. § 8259b and 10 C.F.R. § 436.40 *et seq*.

- Provide a narrative addressing the plan to incorporate energy efficient products, as required by statute, into the project. The narrative may include relevant purchasing policy, purchasing contracts, purchase orders, etc.
- Provide energy performance simulation input and output reports to demonstrate compliance.
- Note, if also pursuing LEED certification via ASHRAE 90.1-2013 reference LEED Interpretation 10481

Path Two:

- Not applicable to project. Provide written justification that the building's inherent function, mission, safety, or designation prevents compliance.

Renewable and Clean Energy - Required

Requirements

Evaluate and implement, where appropriate, life cycle cost-effective renewable energy projects on-site; consider long-term off-site renewable sources and Renewable Energy Certificates (RECs); and utilize clean and alternative energy where possible.

Compliance

Implement the Guiding Principle Requirements cited above

- Demonstrate compliance with LEED BD+C v4 EA Renewable energy production AND/OR
- EAc Green power and carbon offsets where appropriate and life cycle cost-effective

Consider the following

- Implement life cycle cost-effective renewable electric energy and thermal energy projects on-site. Consider long-term off-site sources of renewable power or Renewable Energy Certificates (RECs) where on-site opportunities are limited. Utilize clean and alternative energy sources where possible.[11]

Documentation Requirements

Design Submittal

Path One:

- Demonstrate compliance with LEED BD+C v4c EA Renewable energy production AND/OR
- EAc Green power and carbon offsets where appropriate and life cycle cost-effective
- For projects that determine this Guiding Principle is not life cycle cost-effective, generate a narrative inclusive of LCCE analysis.

Path Two:

- Not applicable to project. Provide written justification that the building's inherent function, mission, safety, or designation prevents compliance.

[11]E.O. 13693, section 3(b), (c), (d), and (e) and associated definitions in section 19

Metering - Required

Requirements

Install building level meters for electricity, natural gas, and steam; install advanced or standard meters as appropriate.

Compliance

Implement the Guiding Principle Requirements cited above

- Demonstrate compliance with LEED BD+C v4 EAp Building-level energy metering

Consider the following

- To track and continuously optimize energy performance, install building level meters for electricity, natural gas, and steam. Install advanced meters as required by statute. Standard meters should be used when advanced meters are not appropriate.[12]

Documentation Requirements

Design Submittal

Path One:

- Demonstrate compliance with LEED BD+C v4 EAp Building-level energy metering

Path Two:

- Not applicable to project. Provide written justification that the building's inherent function, mission, safety, or designation prevents compliance.

Benchmarking - Required

Requirements

Benchmark building performance at least annually, preferably using ENERGY STAR Portfolio Manager; regularly monitor building energy performance against historic performance data and peer buildings.[13]

Compliance

Implement the Guiding Principle Requirements cited above

Step-By-Step Implementation

Step 1. Select a benchmarking tool

- For projects whose building or space type is addressed by ENERGY STAR, use ENERGY STAR's Portfolio Manager to record and monitor energy consumption data. The Portfolio Manager Quick Start Guide (http://www.energystar.gov/sites/default/files/tools/EnergyStar_QuickStart_508.pdf) outlines the steps and information necessary to create a property account.

[12] 42 U.S.C. § 8253(e): www.energy.gov/sites/prod/files/2014/11/f19/metering_guidance.pdf
[13] 42 U.S.C. § 8253(f) (8); www.energy.gov/sites/prod/files/2014/09/f18/benchmarking_guidance08-2014.pdf

- Projects whose building or space type is not covered by ENERGY STAR should use an equivalent benchmarking tool

Step 2. Plan to track energy consumption data

- Using the meters and/or submeters installed by the owner or provided by the utility company, collect energy use data on a monthly basis and input values into the benchmarking tool.

Step 3. Evaluate Annually

- Compare the project's energy use over the first year of occupancy to the design target, if a target was set.

Consider the following

- Benchmark building performance at least annually, preferably using ENERGY STAR Portfolio Manager. Agencies should strive to benchmark unusual buildings and space types against similar facilities within their portfolios. Regularly monitor building energy performance against historic performance data and peer buildings to identify operating inefficiencies and conservation opportunities.[13]

Documentation Requirements

Construction Submittal

Path One:

- Portfolio Manager Statement of Energy Performance
  OR
- Documentation of equivalent benchmarking tool if building or space type is not addressed by ENERGY STAR Portfolio Manager
  OR
- Other agency applicable documentation

Path Two:

- Not applicable to project. Provide written justification that the building's inherent function, mission, safety, or designation prevents compliance.

III. PROTECT AND CONSERVE WATER

Indoor Water Use - Required

Requirements

A. Build to ASHRAE standard 189.1-2014 sections 6.3.2, 6.4.2, and 6.4.3, or current comparable ASHRAE standards, AND
B. Use water-efficient products, install building level water meters, optimize cooling tower operations; and eliminate single pass cooling.

Compliance

Implement the Guiding Principle Requirements cited above

- Demonstrate compliance with LEED BD+C v4 WEp Indoor water use reduction (Compliance Path 2 Usage Based Calculation)
- LEED BD+C v4 WEc Indoor water use reduction
- LEED BD+C v4 WEc Building-level water metering
- When in alignment with project goals, implement LEED BD+C v4 WEc Cooling tower water use (two points)

Consider the following

- Employ strategies that minimize water use and waste, including:
  - **Water-Efficient Products –** Purchase water conserving products, including WaterSense[14] and FEMP-designated products, as required by statute.
  - **Water Meters –** Install building level water meters to allow for the management of water use during occupancy, including detection of leaks.
  - **Cooling Towers –** Optimize cooling tower operations.
  - **Single Pass Cooling –** Eliminate single pass cooling.

Documentation Requirements

Design Submittal

Path One:

- Demonstrate compliance with LEED BD+C v4 WEp Indoor water use reduction (Compliance Path 2 Usage Based Calculation)
- LEED BD+C v4 WEc Indoor water use reduction
- LEED BD+C v4 WEp Building-level water metering
- When in alignment with project goals, implement LEED BD+C v4 WEc Cooling tower water use (two points)

Path Two:

- Not applicable to project. Provide written justification that the building's inherent function, mission, safety, or designation prevents compliance.

[14] www3.epa.gov/watersense/

Outdoor Water - Required

Requirements

A. Separately meter water for irrigation systems greater than 25,000 square feet, AND
B. Use water efficient landscapes, AND
C. Limit potable water use for irrigation to 50% or more below conventional practices using methodologies from (but not the numeric requirements contained in) ASHRAE standard 189.1-2014 section 6.5.1, or current comparable ASHRAE standards, to calculate water use of conventional practices.

Compliance

Implement the Guiding Principle Requirements cited above

- Demonstrate compliance with LEED BD+C v4 WEp Outdoor water use reduction
- LEED BD+C v4 WEc Outdoor water use reduction (minimum 1 point)
- If irrigation system covers more than 25,0000 square feet demonstrate compliance with LEED BD+C v4 WEc Water metering, including irrigation as one of the subsystems

Consider the following

As you address the Requirements noted above consider the following:

- Use water efficient landscapes that incorporate native, non-invasive, drought tolerant, and low maintenance plant species and employ water efficient irrigation strategies to reduce outdoor potable water consumption. Install water meters for irrigation systems serving more than 25,000 square feet of landscaping.[15]

Documentation Requirements

Design Submittal

Path One:

- Demonstrate compliance with LEED BD+C v4 WEp Outdoor water use reduction
- LEED BD+C v4 WEc Outdoor water use reduction credit (minimum 1 point)
- If irrigation system covers more than 25,0000 square feet demonstrate compliance with LEED BD+C v4 WE Water metering , including irrigation as one of the subsystems

Path Two:

- Not applicable to project. Provide written justification that building's inherent function, mission, safety, or designation prevents compliance.

Alternative Water - Required

Requirements

[15] DOE FEMP metering guidance: www.energy.gov/eere/femp/downloads/federal-building-metering-guidance-usc-8253e-metering-energy-use

Consider alternative sources of water where cost-effective and permitted by local laws and regulations.

Compliance

Implement the Guiding Principle Requirements cited above

Step-By-Step Implementation

Step 1. Research

- Determine if the use of alternative water is permitted by local laws and regulations
- Evaluate opportunities for using site-derived alternative water sources or treated wastewater provided by a municipal agency to offset potable water use.
- Alternative water sources include reclaimed wastewater, graywater, swimming pool backwash filter, refrigeration system condensate, captured rainwater, stormwater and foundation drain water, steam system condensate, fluid cooler discharge, food steamer discharge, combination oven discharge, industrial process water, fire pump test water, municipally supplied treated wastewater, and ice machine condensate.

Step 2. If appropriate, design use of alternative water into project

- Implement the use of alternative water sources where life-cycle cost effective

Consider the following

- Implement cost effective methods to utilize alternative sources of water such as harvested rainwater, treated wastewater, air handler condensate capture, grey water, and reclaimed water, to the extent permitted under local laws and regulations.[16]

Documentation Requirements

Design Submittal

Path One:

- Provide a narrative regarding alternative water source and calculations if applicable

Path Two:

- Not applicable to project. Provide written justification that the building's inherent function, mission, safety, or designation prevents compliance.

Stormwater Management - Required

Requirements

For new construction meet or exceed EISA section 438 stormwater management requirements.

Compliance

Implement the Guiding Principle Requirements cited above

- Demonstrate compliance with LEED BD+C v4 SSc Rainwater management (minimum 1 point 95% percentile)

[16] Industrial, Landscape, and Agricultural Implementing Instructions, July 10, 2013: www.whitehouse.gov/sites/default/files/water_implementing_instructions.pdf

Consider the following

- Employ design and construction strategies that reduce stormwater runoff and discharges of polluted water offsite to protect the natural hydrology and watershed health. For any new construction per EISA section 438,[17] use site planning, design, construction, and maintenance strategies to maintain hydrologic conditions after development, or to restore hydrologic conditions following development, to the maximum extent that is technically feasible.

Documentation Requirements

Design Submittal

Path One:

- Demonstrate compliance with LEED BD+C v4 SSc Rainwater management (minimum 1 point, 95% percentile)

Path Two:

- If full compliance with LEED BD+C v4 SSc Rainwater management (1 point, 95th percentile) cannot be met, provide a narrative detailing how the project is still meeting the Guiding Principle requirement.

Path Three:

- Not applicable to project. Provide written justification that the building's inherent function, mission, safety, or designation prevents compliance.

[17] http://www.epa.gov/greeningepa/technical-guidance-implementing-stormwater-runoff-requirements-federal-projects

IV. ENHANCE INDOOR ENVIRONMENTAL QUALITY

Ventilation and Thermal Comfort - Required

Requirements

Meet current ASHRAE standards 55 and either 62.1 or 62.2 for ventilation and thermal comfort.

Compliance

Implement the Guiding Principle Requirements cited above

- Demonstrate compliance with LEED BD+C v4 EQp Minimum indoor air quality performance
- LEED BD+C v4 EQ Thermal comfort

Documentation Requirements

Design Submittal

Path One:

- Demonstrate compliance with LEED BD+C v4 EQp Minimum indoor air quality performance
- LEED BD+C v4 EQc Thermal comfort

Path Two:

- Not applicable to project. Provide written justification that building's inherent function, mission, safety, or designation prevents compliance.

Daylighting and Lighting Controls - Required

Requirements

Maximize opportunities for daylighting in regularly occupied space; provide automatic dimming controls or accessible manual controls, task lighting, and shade and glare control.

Compliance

Implement the Guiding Principle Requirements cited above

- Demonstrate compliance with LEED BD+C v4 EQc Interior lighting
- LEED BD+C v4 EQc Daylight

Consider the following

- Maximize opportunities for daylighting in regularly occupied space, except where not appropriate because of building function, mission, or structural constraints. Maximize the use of automatic dimming controls or accessible manual lighting controls, task lighting, and appropriate shade and glare control.

Documentation Requirements

Design Submittal

Path One:

- Demonstrate compliance with LEED BD+C v4 EQc Interior lighting
- LEED BD+C v4 EQc Daylight

Path Two:

- If full compliance with LEED BD+C v4 EQc Interior lighting cannot be met, provide a narrative detailing how the project is still meeting the Guiding Principle requirement.
- If full compliance with LEED BD+C v4 EQc Daylight cannot be met, provide a narrative detailing how the project is still meeting the Guiding Principle requirement.

Path Three:

- Not applicable to project. Provide written justification that the building's inherent function, mission, safety, or designation prevents compliance.

Indoor Air Quality - Required

Requirements

Develop and implement an indoor air quality policy that considers the following: moisture control, use of low emitting materials and products with low pollutant emissions, necessary protocols to protect indoor air quality during construction and in the finished building, prohibition of smoking in any form inside and within 25 feet of all building entrances, operable windows, and building ventilation intakes, and use of integrated pest management techniques.

Compliance

Implement the Guiding Principle Requirements cited above

- LEED BD+C v4 EQp Environmental tobacco smoke control
- LEED BD+C v4 EQc Low-emitting materials credit (all categories, 3 points)
- LEED BD+C v4 EQc Construction indoor air quality management plan
- Implement design strategies that minimize moisture. Review the moisture-control strategies and guidance for site drainage, foundations, walls, roof and ceiling assemblies, plumbing systems, and HVAC systems contained in the EPA's Moisture Control Guidance for Building Design, Construction and Maintenance. Identify and eliminate potential sources of moisture, consider proper site drainage, sealing, and keeping construction materials dry and selecting materials that dry quickly and/or are resistant to mold and bacteria growth
- LEED BD+C v4 Innovation: LEED O+M Starter Kit EQc Integrated Pest Management

Consider the following

- Take actions to ensure optimal indoor air quality, including:
  i. **Radon –** Test for radon in buildings and mitigate high levels.
  ii. **Moisture Control –** Establish a policy and implement a moisture control strategy to prevent building materials damage, minimize mold growth, and reduce associated health risks.

iii. **Low-Emitting Materials –** Use low emitting materials for building construction, modifications, maintenance, and operations. Specify the following materials and products to have low pollutant emissions: composite wood products, adhesives, sealants, interior paints and finishes, solvents, carpet systems, janitorial supplies, and furnishings.

iv. **Indoor Air Quality during Construction –** Establish a policy and implement necessary protocols to protect indoor air quality during construction and in the finished building.

v. **Environmental Smoking Control –** Prohibit smoking in any form within the building and within 25 feet of all building entrances, operable windows, and building ventilation intakes.

vi. **Integrated Pest Management –** Use integrated pest management techniques as appropriate to minimize pesticide usage.

Documentation Requirements

Path One:

Design Submittal

- LEED BD+C v4 EQp Environmental tobacco smoke control

Construction Submittal

- LEED BD+C v4 EQc Low-emitting materials credit (all categories, 3 points)
- LEED BD+C v4 EQc Construction indoor air quality management plan
- Narrative detailing how the project team addressed design strategies that minimize moisture as specified within the EPA's Moisture Control Guidance for Building Design, Construction and Maintenance
  LEED BD+C v4 Innovation: LEED O+M Starter Kit EQc Integrated Pest Management

Path Two:

- Not applicable to project. Provide written justification that the building's inherent function, mission, safety, or designation prevents compliance.

Occupant Health and Wellness - Required

Requirements

Promote opportunities for voluntary increased physical movement of building occupants such as making stairwells an option for circulation, active workstations, fitness centers, and bicycle commuter facilities. Support convenient access to healthy dining options, potable water, daylight, plants, and exterior views.

Compliance

Implement the Guiding Principle Requirements cited above

Demonstrate compliance with one of the following credits at a minimum:

- LEED BD+C v4 LTc Bicycle facilities
- LEED BD+C v4 EQc Daylight

- LEED BD+C v4 EQc Quality views
- LEED BD+C v4 INc Walkable project site
- LEED BD+C v4 INc Design for active occupants
- Provide ergonomic work stations for 30% or greater for full time employees

Following are occupant health and wellness strategies to consider:

Active workstations:

Provide exercise equipment or exercise opportunities for at least 5% of FTE occupants that can be used at employee workstations to allow workers opportunities for physical activity while working at their desks. Examples of appropriate exercise equipment include but are not limited to tread-desks, desk stationary bicycles, exercise ball chairs, desk stepper and others. A checkout system can be put in place to allow employees to check out equipment.

Fitness center strategies:

Provide a dedicated or multi-use space to act as an on-site exercise room, which includes a variety of exercise equipment, for use by at least 5% of FTE occupants.

Strategies that support occupant health:

Considering options such as providing convenient access to

- healthy dining options
- ensure project provides access to potable water, conduct periodic water quality testing & filter systems as needed
- plants

Documentation Requirements

Design Submittal

Path One:

- Narrative describing project attributes that promote increased physical movement of building occupants and how the project supports convenient access to healthy dining options, potable water, daylight, plants, and exterior views **AND** demonstrate compliance with one of the following at a minimum:
- LEED BD+C v4 LTc Bicycle facilities
- LEED BD+C v4 EQc Daylight
- LEED BD+C v4 EQc Quality views
- LEED BD+C v4 INc Walkable project site
- LEED BD+C v4 INc Design for active occupants
- Calculations demonstrating that ergonomic work stations have been provided for a minimum of 30% for full time employees

Path Two:

- Not applicable to project. Provide written justification that the building's inherent function, mission, safety, or designation prevents compliance.

V. REDUCE ENVIRONMENTAL IMPACT OF MATERIALS

Material Content and Performance - Required

Requirements

Material Content and Performance: Procure products that meet the following requirements where applicable:

A. Resource Conservation and Recovery Act (RCRA) section 6002, AND
B. Farm Security and Rural Investment Act (FSRIA) section 9002, AND
C. Federally Recommended Specifications, Standards and Ecolabels or are on the Federal Green Procurement Compilation for other green products, as appropriate, AND
D. Avoid ozone depleting compounds and high global warming potential (GWP) chemicals.

Compliance

Implement the Guiding Principle Requirements cited above

- Demonstrate compliance with LEED BD+C v4 EAp Fundamental refrigerant management and when possible LEED BD+C v4 EAc Enhanced refrigerant management
- Research options, and incorporate into project design were applicable, the procurement of the Recycled Content, Biobased Content, and Other Green Products. Included below is step-by-step guidance for each product type.
- When in alignment with project team goals, if working to demonstrate compliance with the following LEED credits, look for products that meet the intent of the Material Content and Performance Guiding Principle Requirements AND:
  - LEED BD+C v4 MRc Building product disclosure and optimization – environmental product declarations
  - LEED BD+C v4 MRc Building product disclosure and optimization – sourcing of raw materials
  - LEED BD+C v4 MRc Building product disclosure and optimization – material ingredients

RECYCLED CONTENT

Step 1. Conduct background research regarding the Resource Conservation and Recovery Act (RCRA) section 6002 compliant products that meet or exceed EPA's recycled content recommendations for building construction and modifications, the Recycled Content and Comprehensive Procurement Guidelines for Construction

- Review project documents to identify all applicable products.
- Review the EPA's Comprehensive Procurement Guidelines (CPG) for recycled content (https://www.epa.gov/smm/comprehensive-procurement-guideline-cpg-program). The CPG is a good source for understanding the minimum amount of recycled content to specify for a particular building material or product.
- Research specific products by looking at product cut sheets and manufacturers' data to see if they contain recycled content. The EPA also provides a product directory listing products that meet the above minimum recycled content percentages.

- Many commonly used products are available with recycled content, including metals, concrete, masonry, gypsum wallboard, acoustic tile, carpet, ceramic tile, rubber flooring, wall base, and insulation.
- Provide report with results of background research, inclusive of print screens vetting CPG site, plus other products not on website and how addressing recycled content.

Step 2. Specify materials that meet the recycled content

- Specify materials with recycled content based on the project's overall goals and the minimum thresholds recommended by the EPA, establish a target percent recycled content for each material category included on the project with the involvement of the full project team, ideally, including the contractor. For materials not included in the CPG, set minimum thresholds as high as practicable.
- When a cost estimate for the project is available, evaluate the feasibility of meeting the recycled content targets and revise these targets as necessary. Projects are exempt from meeting the minimum percentages specified by the EPA when:
  - Cost is prohibitive
  - Products are not available in a reasonable time frame
  - Products hinder performance
  - There is little competition

Step 3. Perform construction submittal reviews to verify implementation

- During construction, coordinate a review of the construction submittals to demonstrate that the selected products meet the thresholds listed in the specifications.
- Any product substitutions must be carefully reviewed by the design team and contractor for compliance.
- Conduct a preconstruction meeting to review material and product needs in detail, to stress their importance will aid in successful procurement. Track progress towards goals on a regular basis.

BIOBASED CONTENT

Step 1. Conduct background research

- Review the required minimum thresholds for biobased content, as listed on USDA's BioPreferred website. The USDA has identified 97 product categories (e.g., carpets, cleaners, paints), each of which has an identified minimum threshold. All materials and products used on the project will meet the category-specific minimum thresholds for biobased content, where cost feasible.
- Review project documents to identify all applicable products.
- Research specific products by looking at product cut sheets and manufacturing data to see if they contain biobased content. The USDA also provides a product directory listing products that meet the above minimum biobased content percentages (http://www.biopreferred.gov/BioPreferred/faces/catalog/Catalog.xhtml) and information on BioPreferred suppliers.

  - Use screen captures print screens to document results of searches that result in decision to not include BioPreffered products. Include print screens in narrative that will be submitted for review if needing to explain why available products didn't meet project requirements.
- To quickly identify biobased products that comply with the guiding principle requirements, look for products with the USDA Certified Biobased Product label. These products have been third-party certified to verify that they meet the USDA's minimum thresholds.
- Biobased content includes plant, renewable agricultural, marine, and forestry material. It does not include food, animal feed, fuel, or leather.
- Common products with biobased content include wheatboard, wool, cotton, bamboo, soy oil, and cork.

Step 2. If back ground research does not yield positive results provide a report

- If appropriate biobased products are not discovered, provide a report detailing the results of background research, inclusive of screen shots from BioPreffered website

Step 3. If research yields positive results specify biobased products

- If research generated positive results specify the biobased products and incorporate into project.

Step 4. Perform construction submittal reviews to verify implementation

- During construction, coordinate a review of the construction submittals to verify that selected products meet the thresholds listed in the specifications.
- Any product substitutions must be carefully reviewed by the design team and contractor for compliance.
- Conduct a preconstruction meeting to review material and product needs in detail, to stress their importance will aid in successful procurement. Track progress towards goals on a regular basis.

OTHER GREEN PRODUCTS

Step 1. Review the environmental goals of the project

- Purchase products that meet Federally Recommended Specifications; Standards and Ecolabels: https://www.epa.gov/greenerproducts/epas-recommendations-specifications-standards-and-ecolabels; or are on the Federal Green Procurement Compilation: https://sftool.gov/greenprocurement
- In many instances, choosing between two or more different products will require trade-offs between different environmental impacts. Taking time to review the project context and which impacts, in particular, the project team desires to reduce will help guide environmentally preferable product selection. Environmental impacts to review include:
  - Ozone depletion
  - Global warming
  - Photochemical oxidation
  - Eutrophication

- Acidification
- Human and environmental health effects

Step 2. Conduct background research

- Refer to the EPA's Environmentally Preferable Purchasing website at www.epa.gov/epp/index.htm for information about selecting environmentally preferable products and the environmental attributes that are most relevant to each product category.
- Identify credible standards and certification programs (e.g. eco-labels) that correspond to the environmental goals of the project. These labels can save specifiers and contractors time by providing quick assurance of environmental friendliness.
- Review project documents to identify all applicable products.
- Research specific products by looking at product cut sheets, manufacturing data, and eco-labels.
- The EPA's EPP website includes a database listing popular environmentally preferable products and information on potential suppliers.
- When selecting environmentally preferable products, it is important to review not only the environmental attributes of a product but also its cost and expected performance. These three factors must guide decision making.

Step 3. Include contract clause for procuring or leasing EPEAT-certified products

- Electronic devices, products, and appliances must be EPEAT certified. Sample contract language for specifying this requirement is available at http://www.epa.gov/epeat/#3.

Step 4. Specify environmentally preferable products when lifecycle cost effective

- Specify that applicable products be environmentally preferable. See the *Federal Green Construction Guide for Specifiers* at http://www.wbdg.org/ffc/epa/federal-green-construction-guide-specifiers for sample specification language.
- LCCA analysis is required to determine reasonable cost.

Step 5. Perform construction submittal reviews to verify implementation

- During construction, coordinate a review of the construction submittals to demonstrate that selected products meet the requirements listed in the specifications.
- Any product substitutions will be carefully reviewed by the design team and contractor for compliance.
- Because meeting these requirements is not typical for all construction teams and suppliers, conducting a preconstruction meeting to review material and product needs in detail and stress their importance will aid in successful procurement.

Consider the following

- Procure construction materials and building supplies that have a lesser or reduced effect on human health and the environment over their life cycle when compared with competing products or services that serve the same purpose, including:

i. **Recycled Content and Comprehensive Procurement Guidelines –** Use Resource Conservation and Recovery Act (RCRA) section 6002 compliant products that meet or exceed EPA's recycled content recommendations for building construction, modifications, operations, and maintenance.[18]

ii. **Biobased Content –** Per section 9002 of the Farm Security and Rural Investment Act (FSRIA), for USDA-designated products, use products with the highest content level per USDA's biobased content recommendations.[19]

iii. **Other Green Products –** Purchase products that meet Federally Recommended Specifications, Standards and Ecolabels[20] or are on the Federal Green Procurement Compilation.[21]

iv. **Ozone Depleting Compounds and High Global Warming Potential (GWP) Chemicals –** When in alignment with project goals, do not use ozone depleting compounds and high GWP chemicals where EPA's Significant New Alternative Policy (SNAP) has identified acceptable substitutes or where other environmentally preferable products are available during construction, repair, or replacement at the end of life.[22]

Documentation Requirements

Path One:

Design Submittal

- Demonstrate compliance with LEED BD+C v4 EAp Fundamental refrigerant management
- LEED BD+C v4 EAc Enhanced refrigerant management
- LEED BD+C v4 MRp Storage and collection of recyclables

Construction Submittal

- Summary list and cutsheets for Recycled Content, Biobased Content, and Other Green Products included in the project if applicable.
- If appropriate biobased products are not discovered, provide a report detailing the results of background research, inclusive of screen grabs from BioPreffered website
  AND as applicable
- LEED BD+C v4 MRc Building product disclosure and optimization – environmental product declarations AND/OR
- LEED BD+C v4 MRc Building product disclosure and optimization – sourcing of raw materials
  AND/OR
- LEED BD+C v4 MRc Building product disclosure and optimization – material ingredients

[18] 42 U.S.C. 6962, EPA's Comprehensive Procurement Guidelines for Construction: www3.epa.gov/epawaste/conserve/tools/cpg/products/construction.htm
[19] 7 U.S.C. 8102, USDA's BioPreferred website: www.biopreferred.gov/BioPreferred/
[20] www2.epa.gov/greenerproducts/epas-recommendations-specifications-standards-and-ecolabels
[21] Green Procurement Compilation: sftool.gov/greenprocurement
[22] EPA SNAP website: www.epa.gov/snap

Path Two:

- Not applicable to project. Provide written justification that the building's inherent function, mission, safety, or designation prevents compliance.

Waste Diversion - Required

Requirements

Where markets exist, provide reuse and recycling services for building occupants and divert at least 50% of non-hazardous, non-construction related materials from landfills.

Compliance

Implement the Guiding Principle Requirements cited above

- Demonstrate compliance with LEED BD+C v4 MRp Storage and collection of recyclables

Consider the following

- Incorporate appropriate space, equipment, and transport accommodations for collection, storage, and staging of recyclable and, as appropriate, compostable materials in building design, construction, renovation, and operation. During construction, where markets or on-site recycling exist, divert at least 50% (by weight) of construction and demolition materials, excluding land clearing debris and material used as alternative daily cover, from landfills. Maximize reuse or recycling of building materials, products, and supplies wherever possible. Provide reuse and recycling services, including composting, for building occupants, where markets or on-site recycling exist, and divert at least 50% of non-hazardous and non-construction related materials (by weight), from landfills.

Documentation Requirements

Design Submittal

Path One:

- Provide supporting calculations demonstrating that at least 50% of non-hazardous, non-construction related materials have been diverted from landfills
- Demonstrate compliance with LEED BD+C v4 MRp Storage and collection of recyclables

Path Two:

- Not applicable to project. Provide written justification that the building's inherent function, mission, safety, or designation prevents compliance.

Materials Management - Required

Requirements

During construction, where markets exist, divert at least 50% of construction and demolition materials from landfills.

Compliance

Implement the Guiding Principle Requirements cited above

- Demonstrate compliance with LEED BD+C v4 MR Construction and demolition waste management - Option 1

Consider the following

- Incorporate appropriate space, equipment, and transport accommodations for collection, storage, and staging of recyclable and, as appropriate, compostable materials in building design, construction, renovation, and operation. During construction, where markets or on-site recycling exist, divert at least 50% (by weight) of construction and demolition materials, excluding land clearing debris and material used as alternative daily cover, from landfills. Maximize reuse or recycling of building materials, products, and supplies wherever possible. Provide reuse and recycling services, including composting, for building occupants, where markets or on-site recycling exist, and divert at least 50% of non-hazardous and non-construction related materials (by weight), from landfills.

Documentation Requirements

Construction Submittal

Path One:

- Demonstrate compliance LEED BD+C v4 MR Construction and demolition waste management - Option 1

Path Two:

- Not applicable to project. Provide written justification that the building's inherent function, mission, safety, or designation prevents compliance.

VI. ASSESS AND CONSIDER CLIMATE CHANGE RISKS

Assess potential impacts and vulnerabilities, from both acute weather events and chronic climate changes, to inform the design of new construction and modernization and facility operations to increase climate resilience, including:

Mission Criticality - Required

Requirements

Determine long-term mission criticality of the physical asset and operations to be housed in the facility to inform the design of new construction and modernization to increase climate resilience.

Compliance

Implement the Guiding Principle Requirements cited above

- During the integrated design process discuss and decide how the project team will include in the project design issues related to the, "long-term mission criticality of the physical asset and operations to be housed in the facility"

Consider the following

- Determine the long-term mission criticality of the physical asset and operations to be housed in the facility.

Documentation Requirements

Design Submittal

Path One:

- Demonstrate compliance with LEED Pilot Credit: Assessment and Planning for Resilience

Path Two:

- Provide a narrative communicating how the project team included in the project design issues related to the "long-term mission criticality of the physical asset and operations to be housed in the facility"

Path Three:

- Not applicable to project. Provide written justification that the building's inherent function, mission, safety, or designation prevents compliance.

Floodplain Considerations - Required

Requirements

For new construction, avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and avoid floodplain development whenever there is a practicable alternative.

Compliance

Implement the Guiding Principle Requirements cited above

- During the integrated design process discuss and decide how the project team will include in the project design issues related to avoiding "to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and avoid floodplain development whenever there is a practicable alternative."

Consider the following

For new construction, avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and avoid floodplain development whenever there is a practicable alternative.

Documentation Requirements

Design Submittal

Path One:

- Demonstrate compliance with LEED Pilot Credit: Assessment and Planning for Resilience

Path Two:

- Provide a narrative communicating how the project team included in the project design issues related to avoiding "to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and avoid floodplain development whenever there is a practicable alternative."

Path Three:

- Not applicable to project. Provide written justification that building's inherent function, mission, safety, or designation prevents compliance.

Facility Design - Required for New Construction

Requirements

For new construction, balance options to address predicted climate change impacts against mission criticality, cost, and security to determine design parameters; at a minimum, include low and no cost resilience measures to address predicted climate conditions.

Compliance

Implement the Guiding Principle Requirements cited above

- During the integrated design process discuss and decide how the project team will include in the project design issues related to balancing "options to address predicted climate change impacts against mission criticality, cost, and security to determine design parameters" at a minimum, include low and no cost resilience measures to address predicted climate conditions."

Consider the following

- For new construction, based on the most recent National Climate Assessment,[23] determine key potential climate change impacts for the project location, identify projected climate changes, where feasible, during the useful life of the building, and incorporate those projections as performance targets for project design. Consider fire-resistant design and construction to enhance resilience to the impacts of wildfires and reduce risks to the lives of occupants in the event of a wildfire. Balance options to address predicted climate change impacts against mission criticality, cost, and security to determine design parameters. At a minimum, include low and no cost resilience measures to address predicted climate conditions.

Documentation Requirements

Design Submittal

Path One:

- Demonstrate compliance with LEED Pilot Credit: Design for Enhanced Resilience

Path Two:

- Provide a narrative communicating how the project team include in the project design issues related to balancing "options to address predicted climate change impacts against mission criticality, cost, and security to determine design parameters" including at a minimum, low and no cost resilience measures to address predicted climate conditions.

Path Three:

Not applicable to project. Provide written justification that the building's inherent function, mission, safety, or designation prevents compliance.

Facility Adaptation - Required for Modernization

Requirements

For modernization, take action to mitigate identified risks, considering mission criticality, climate impacts, cost, and phased adaptation over time.

Compliance

Implement the Guiding Principle Requirements cited above

- For a modernization project, during the integrated design process discuss and decide how the project team will include in the project design ways "to mitigate identified risks, considering mission criticality, climate impacts, cost, and phased adaptation over time"

Consider the following

- For modernization, focusing on the resilience of the physical facility, take action to mitigate identified physical risks considering mission criticality, potential climate change impacts, security, and cost. Consider phased adaptation over time.

[23] Use Climate Science Supplement Appendix 3 of the 2014 National Climate Assessment and the NOAA Technical Report NESDIS 142-9, January 2013 Regional Climate Trends and Scenarios for the U.S. National Climate Assessment Part 9, Climate of the Contiguous United States, or most recent.

Documentation Requirements

Design Submittal

Path One:

- Demonstrate compliance with LEED Pilot Credit: Passive Survivability and Back-up Power During Disruptions

Path Two:

- Provide a narrative communicating how the project team included in the project design ways "to mitigate identified risks, considering mission criticality, climate impacts, cost, and phased adaptation over time"

Path Three:

- Not applicable to project. Provide written justification that the building's inherent function, mission, safety, or designation prevents compliance.