



Green Building Certification System Review

U.S. General Services Administration

August 2024



Agenda

Purpose: To brief you on our statutorily-required review of green building certification systems

Today's Topics:

- Statutory requirement
- Project background
- Findings
- Draft recommendations
- Other considerations
- Public Engagement
- Next Steps



Energy Independence and Security Act of 2007



- The Energy Independence and Security Act (EISA) was a bipartisan bill signed by President George W. Bush in 2007
- Sections 433 (a) and 436 (h) require GSA to conduct the review
 - GSA provides recommendation(s) to the Secretary of Energy
 - DOE publishes a regulatory rule as to what systems federal agencies can use - should they choose to use a certification system

What is a Green Building Certification System?

- A tool used to evaluate and measure achievements in sustainable design, construction and operations.
- Certification systems cover various elements of sustainable design including siting, energy, water, materials, and indoor environmental quality.
- Rewards relative levels of compliance or building performance with specific efficiency as well as environmental goals and requirements.



Background: Roles

GSA

- To provide an objective, independent evaluation of commercial green building certification systems based on statutory and other federal requirements
- Provide recommendations to Secretary of Energy on what systems would lead to a comprehensive and environmentally sound approach to certifying green federal buildings

DOE

- Publishes a rule that defines what agencies should use, if they choose to use a certification system

Green Building Certification System Review

Findings Report



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Prepared for the U.S. General Services Administration by LMI.

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Background: DOE Rule (2014)

- Systems* **must** have:
 - Independent verification of system criteria;
 - A consensus-based development and revision process that provides an opportunity for public input;
 - National recognition within the building industry;
 - Periodic evaluation and assessment of the environmental and energy benefits; and
 - Inclusion of a post-occupancy verification system

** DOE Rule applies to systems that certify New Construction and Major Renovation projects above the GSA Prospectus level only [2024 - \$3.6 million]*

GSA's Analysis

- **Market Analysis Screening Criteria**
 - Available in the US Market;
 - Whole building performance
 - 3rd party certification
 - Measured building performance (not modeled or predicted)
- **Effectiveness Criteria**
 - technical components of the certification system that align with federal green building performance requirements in the Guiding Principles (for both new construction and existing buildings), EISA, and industry best practices.
- **Development and Conformance Criteria**
 - processes by which the system was created and by which it awards certification.



Effectiveness Criteria

Employ Integrated Design Principles

- Integrated Design and Management
- Sustainable Siting
- Stormwater Management
- Infrastructure Utilization and Optimization
- Commissioning

Optimize Energy Performance

- Energy Efficiency
- Energy Metering
- Renewable Energy
- Benchmarking

Protect and Conserve Water

- Indoor Water Use
- Water Metering
- Outdoor Water Use
- Alternative Water

Enhance the Indoor Environment

- Ventilation and Thermal Comfort
- Daylighting and Lighting Controls
- Low-emitting Materials and Products
- Radon Mitigation
- Moisture and Mold Control
- IAQ during Construction and Operations
- Environmental Smoking Control
- Integrated Pest Management
- Occupant Health and Wellness

Reduce the Environmental Impact of Materials

- Recycled Content
- Biobased Content
- Environmentally Preferable Products
- Ozone Depleting Substances
- Hazardous Waste
- Solid Waste Management













Assess and Consider Building Resilience

- Risk Assessment
- Building Adaptation and Resilience

Development and Conformance Criteria

Development and Conformance Criteria	Sub-criteria	EISA/DOE Rule Language
Process for Developing and Administering the Building Certification System	Consensus based approach	42 U.S.C. 17092(h)(2)(D): the ability of the standard to be developed and revised through a consensus-based process.
	Transparency	42 U.S.C. 17092(h)(2)(C): the ability of the applicable standard-setting organization to collect and reflect public comment.
	Usability	42 U.S.C. 17092(h)(2)(E): affordable cost of use; the building certification system organization offers product support.
	Maturity	DOE Rule 10 Code of Federal Regulations (CFR) Parts 433, 435, and 436, Green Building Certification Systems for Federal Buildings: the system under which the building is certified must be subject to periodic evaluation and assessment of the environmental and energy benefits that result under the rating system (part 433.33(b)(4)).
Conformity Assessment	Independence	42 U.S.C. 17092(h)(2)(B): the ability and availability of assessors and auditors to independently verify the criteria and measurement of metrics.
	Verification	42 U.S.C. 17092(h)(2)(B): the ability and availability of assessors and auditors to independently verify the criteria and measurement of metrics.
	Post-occupancy evaluation	DOE Rule 10 CFR Parts 433, 435 and 436: Green Building Certification Systems for Federal Buildings: The system under which the building is certified must include a verification system for post occupancy assessment of the rated buildings to demonstrate continued energy and water savings at least every four years after initial occupancy (part 433.300(b)(5)).

Three Completed Review Cycles

Review Cycle	New Construction	Existing Buildings
1 st Review completed in 2008		
2 nd review completed in 2013	 	 
3 rd review completed in 2019	 	    

Current Review Cycle

- Screened over 100 certification systems in the marketplace for:
 - Availability in U.S.
 - Whole building evaluation
 - 3rd party certification
 - Ideally, system measures actual building performance
- 6 systems cleared these screening criteria



Systems Reviewed

New Construction + Major Renovation

- Green Globes for New Construction (version 2021) (Green Globes NC)
- LEED v4.1 for Building Design and Construction (LEED BD+C)
- Living Building Challenge New Construction (v 4.0)
- Living Building Challenge Core New Construction (LBC CORE)
- Passive House Institute U.S. (PHIUS) version 2021

Existing Buildings

- BOMA Best 4.0 for Sustainable Buildings (BOMA)
- BREEAM USA In-Use Commercial version 6 (BREEAM)
- Green Globes for Existing Buildings (version 2023) (Green Globes EB)
- LEED v4.1 for Building Operations and Maintenance (LEED O+M)
- Living Building Challenge for Existing Buildings (version 4.0) (LBC EB)
- Living Building Challenge Core Existing Buildings (LBC CORE)
- Passive House Institute U.S. (PHIUS) version 2021

Findings

- No single system fully aligns with federal green building performance criteria; each certification system demonstrates alignment with the criteria in varying degrees
- General consistency among all systems on the aspects of building design, construction, operation, and maintenance that lead to high-performing buildings
- Each system recognizes the value and efficiency gained from taking a whole-building, integrated approach
- Each system offers a unique framework, but also assumes different green buildings and sustainability expertise

Findings Report available at [gsa.gov/gbcertificationreview](https://www.gsa.gov/gbcertificationreview)

Table 3-1. Effectiveness Criteria Findings for New Construction and Major Renovation Building Certification Systems

Criteria	Sub-criteria	LEED® BD+C	Green Globes® NC	LBC™ NC	LBC™ Core NC	PHIUS NC
Employ Integrated Design Principles	Integrated Design and Management	✓	✓	✓	✓	✓
	Sustainable Siting	✓	✓	✓	✓	⚠
	Stormwater Management ^c	✓	✓	✓	✓	✗
	Infrastructure Utilization and Optimization	✓	✓	✓	✓	✗
	Commissioning	✓	✓	⚠	⚠	✓
Optimize Energy Performance	Energy Efficiency	✓	⚠	✓	✓	✓
	Energy Metering ^c	✓	✓	✓	✓	⚠
	Renewable Energy ^b	✓	✓	✓	✓	✓
	Benchmarking ^a	⚠	⚠	✓	✓	✓
Protect and Conserve Water	Indoor Water Use ^c	✓	✓	✓	✓	✓
	Water Metering ^c	✓	✓	✓	✓	✗
	Outdoor Water Use ^c	✓	✓	✓	✓	✗
	Alternative Water ^b	✓	✓	✓	✗	✗

Criteria	Sub-criteria	LEED® BD+C	Green Globes® NC	LBC™ NC	LBC™ Core NC	PHIUS NC
Enhance the Indoor Environment	Ventilation and Thermal Comfort ^a	✓	✓	✓	✓	✓
	Daylighting and Lighting Controls ^b	✓	✓	✓	✓	✗
	Low-emitting Materials and Products ^c	✓	✓	✓	✓	✓
	Radon Mitigation	✗	✓	✓	✗	✓
	Moisture and Mold Control ^c	✓	✓	⚠	✗	✓
	IAQ During Construction and Operations ^c	✓	✗	✓	✓	✓
	Environmental Smoking Control ^c	✓	✓	✓	✓	✓
	Integrated Pest Management	✓	✓	✓	✓	⚠
Reduce the Environmental Impact of Materials	Occupant Health and Wellness ^c	✓	✓	✓	✓	✗
	Recycled Content	⚠	⚠	⚠	⚠	✗
	Biobased Content ^c	⚠	⚠	⚠	⚠	✗
	Environmentally Preferable Products ^c	✓	✓	✓	✓	✓
	Ozone Depleting Substances ^c	✓	⚠	✓	✗	✓
Assess and Consider Building Resilience	Hazardous Waste	✗	⚠	✓	✓	✗
	Solid Waste Management	✓	✓	✓	✓	✗
	Risk Assessment	✓	✓	⚠	⚠	✗
	Building Resilience and Adaptation	✓	✓	✓	⚠	✓

Table 3-2. Effectiveness Criteria Findings for Existing Building and Major Renovation Certification Systems

Criteria	Sub-criteria	LEED® O+M	Green Globes® EB	LBC™ EB	LBC™ Core EB	BREEAM®	BOMA	PHIUS EB
Employ Integrated Design Principles	Integrated Design and Management	⚠	✔	✔	✔	✔	⚠	✔
	Sustainable Siting	✔	✔	✔	✔	✔	✔	⚠
	Stormwater Management ^c	✔	✔	✔	✔	✔	✘	✘
	Infrastructure Utilization and Optimization	✔	✔	✔	✔	✔	✔	✘
	Commissioning	✘	✔	⚠	⚠	✘	✔	✔
Optimize Energy Performance	Energy Efficiency	⚠	✔	✔	✔	✔	⚠	✔
	Energy Metering ^c	✔	✔	✔	✔	✔	✔	⚠
	Renewable Energy ^b	✘	✔	✔	✔	✔	✔	✔
	Benchmarking ^a	✔	✔	✔	✔	✔	✔	✔
Protect and Conserve Water	Indoor Water Use ^c	✔	⚠	✔	✔	✔	⚠	✔
	Water Metering ^c	✔	✔	✔	✔	✔	✔	✘
	Outdoor Water Use ^c	✔	✔	✔	✔	⚠	⚠	✘
	Alternative Water ^b	✔	✔	✔	✘	✔	✔	✘

Criteria	Sub-criteria	LEED® O+M	Green Globes® EB	LBC™ EB	LBC™ Core EB	BREEAM®	BOMA	PHIUS EB
Enhance the Indoor Environment	Ventilation and Thermal Comfort ^c	✔	✔	✔	✔	✔	✔	✔
	Daylighting and Lighting Controls ^b	✔	✔	✔	✔	✔	✔	✘
	Low-emitting Materials and Products ^c	✔	✔	✔	✔	✔	✔	✔
	Radon Mitigation	✘	✔	✔	✘	✔	✔	✔
	Moisture and Mold Control ^c	✔	✔	⚠	✘	✔	✔	✔
	IAQ During Construction and Operations ^c	✔	✔	✔	✔	✔	✔	✔
	Environmental Smoking Control ^c	✔	✔	✔	✔	✔	✘	✔
	Integrated Pest Management	✔	✔	✔	✔	✔	✔	⚠
	Occupant Health and Wellness ^c	⚠	✔	✔	✔	✔	✘	✘
Reduce the Environmental Impact of Materials	Recycled Content	⚠	✔	⚠	⚠	⚠	✘	✘
	Biobased Content ^b	⚠	✔	⚠	⚠	⚠	✘	✘
	Environmentally Preferable Products ^c	✔	✔	✔	✔	✔	✔	✔
	Ozone Depleting Substances ^c	✔	✔	✔	✘	✔	✔	✔
	Hazardous Waste	✔	✔	✔	✔	✔	✔	✘
	Solid Waste Management	✔	✔	✔	✔	✔	✔	✘
	Risk Assessment	✘	✔	⚠	⚠	✔	✔	✘
Assess and Consider Building Resilience	Building Resilience and Adaptation	✔	✔	✔	⚠	✔	✔	✔

Findings: Development and Conformance Criteria

Table ES-2. Summary of Review Findings, Development and Conformance Criteria

Development and Conformance Criteria Findings								
Criteria	Sub-criteria	LEED ^a	Green Globes ^a	LBC™	LBC™ Core	BREEAM ^{a,c}	BOMA ^c	PHIUS
Process for Developing and Administering the Certification System	Consensus-based approach	✓	✓	✗	✗	✗	✓	✓
	Transparency	✓	✓	!	!	✓	✓	✓
	<u>Usability^b</u>	✓	✓	✓	✓	✓	✓	✓
	Maturity	✓	✓	✓	✓	✓	✓	✓
Conformity Assessment	Independence	✓	✓	✓	✓	✓	✓	✓
	<u>Verification^b</u>	✓	✓	✓	✓	✓	✓	!
	Post Occupancy evaluation	✓	!	!	!	✓	✓	✗

^a See Appendix A for more information about the cost of each system.

^b Not included in DOE rule.

^c The DOE rule does not apply to systems certifying existing buildings. The rule does apply to new construction and major renovations of projects that are above the prospectus threshold; however, these major renovations are captured in the new construction systems.

SFTool Crosswalk

	EXISTING BUILDINGS							NEW CONSTRUCTION				
	BOMA BEST	BREEAM	GREEN GLOBES EB	LBC (CORE) EB	LBC EB	LEED O+M	PHIUS EB	GREEN GLOBES NC	LBC (CORE) NC	LBC NC	LEED BD+C	PHIUS NC
	DATA DOWNLOAD											
Integrated design and management Integrated Design GP 1.1. Employ Integrated Design Principles: Integrated Design and Management												
Sustainable siting Integrated Design GP 1.2. Employ Integrated Design Principles: Sustainable Siting												
Stormwater management Integrated Design GP 1.3. Employ Integrated Design Principles: Stormwater Management												
Infrastructure utilization and optimization Integrated Design GP 1.4. Employ Integrated Design Principles: Infrastructure Utilization and Optimization												
Commissioning Integrated Design GP 1.5. Employ Integrated Design Principles: Commissioning												
Energy efficiency Energy GP 2.1. Optimize Energy Performance: Energy Efficiency												
Energy metering Energy GP 2.2. Optimize Energy Performance: Energy Metering												
Renewable energy Energy GP 2.3. Optimize Energy Performance: Renewable Energy												

<https://sftool.gov/learn/GRScrosswalk>

Draft Recommendations

Based on the our analysis within the *Findings Report*:

For new construction or major renovation projects, GSA recommends

- LEED v4.1 BD+C
- Green Globes for New Construction (2021)
 - These two systems meet the DOE rule

Agencies use the system that best meets their mission and portfolio needs and certify to a level that supports goals referenced in Executive Orders 14008 and 14057

Draft Recommendations

Based on the our analysis within the *Findings Report*:

For existing buildings, GSA recommends

- BOMA Best 4.0 for Sustainable Buildings
- BREEAM USA In-Use Commercial version 6
- Green Globes for Existing Buildings 2023
- LEED v4.1 O+M
- Living Building Challenge 4.0
- Living Building Challenge CORE
- PHIUS CORE Revive 2021

Agencies use the system that best meets their mission and portfolio needs and certify to a level that supports goals referenced in Executive Orders 14008 and 14057

Public Comment Period

GSA is holding a public comment period for stakeholders to provide feedback on its draft recommendations

Last day to submit comments is close of business
August 29, 2024.

Public Comment Period

Federal Register Notice:
2024-16664

Comments can be submitted either through
Regulations.gov or they can be submitted to
highperformancebuildings@gsa.gov

More information:

<https://www.gsa.gov/gbcertificationreview>

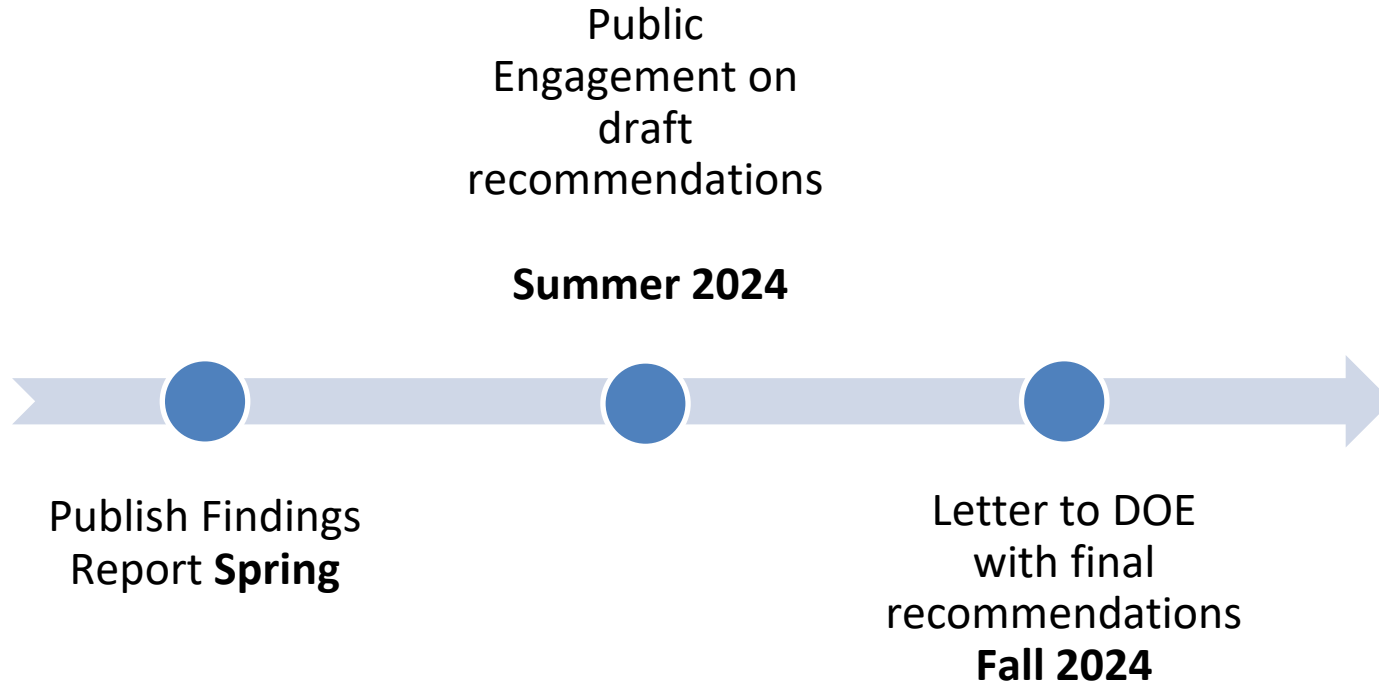


Other Considerations

- Several systems are in the midst of revisions
 - LEED v5
 - Green Globes 2024 for New Construction
 - PHIUS CORE Revive
- We will conduct similar evaluation of these new versions once they have been released to the market
- Other modules dedicated to net zero energy, carbon, waste, and water
 - Can help agencies move towards meeting the Administration’s goals contained in Executive Order 14008 and 14057

Green Building Certification Systems with Net Zero Programs: Summary				
Certification System	Certification Requirements	Getting Started	Program Overview	Offsets Allowed?
Green Building Initiative's Green Globes Journey to Net Zero	<ol style="list-style-type: none"> ENERGY STAR Certification—the building must achieve or higher (80 or higher for multifamily properties), or, Minimum 30% site EUI improvement vs ASHRAE 2016 B Further reduction with onsite/offsite renewables Certified RECs and offsets allowed Carbon reduction targets based on percentage reduction in net CO₂e relative to baseline 	To learn more and join the pilot: https://the-gbi.org/net-zero-public-input	Two options, Net Zero Energy and Net Zero Carbon. Both programs offer certification at 100% reduction of either net site EUI, or net CO ₂ e, as well as a pathway for recognition as buildings move toward certification	✓ Allows the purchase of some certified RECs and offset packages
USGBC/LEED Net Zero Carbon	<ol style="list-style-type: none"> Must be LEED certified (BD+C or O+M) Candidates must provide twelve months of performance data through LEED Online Initiate the Green Building Certification, Inc. (GBCI) review process when the project meets the requirements with performance data for a period of 12 months. Once achieved, each certification is valid for three years. 	Utilize the steps on this page	Four types of net zero ratings in carbon, water, energy, and waste	✓ Allows the purchase of carbon offset packages
ILFI Zero Energy	<ol style="list-style-type: none"> Buildings must demonstrate over a continuous 12-month performance period that net 100% of the energy use associated with the building is supplied by new onsite renewable energy (offsite is permitted in some circumstances). Combustion is not allowed, with very limited exception. 	Utilize the steps on this page	This is one of three types of net zero certifications from LBC	✓ Allows the purchase of carbon offset packages only in special circumstances
ILFI Zero Carbon	<ol style="list-style-type: none"> Buildings must reduce their operational energy use by a set % relative to comparable buildings. 	Utilize the steps on this page	This is one of three types of net zero certifications	✓

Next Steps – Timeline



Key Takeaway

GSA continuously studies the market and makes recommendations to DOE who manages the final rule.

10 CFR part 433 and 10 CFR part 435



<https://www.gsa.gov/gbcertificationreview>