

LEED 2.1 – 2.2 Comparison and Overview



OHSU River Campus Building One: LEED 2.1 Platinum-target



LEED-NC

Green Building Rating System
For New Construction &
Major Renovations

Version 2.2

For Public Use and Display

October 2005

LEED for New Construction Version 2.2
October 2005

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intelligent strategies for sustainability

Fee Summary

2.1

		<75,000 sf	75,000 - 300,000sf	>300,000 sf
Registration	Members	\$750.00	\$0.01/sf	\$3,000.00
	Non-Members	\$950.00	\$.0125/sf	\$3,750.00
Certification	Members	\$1,500.00	\$0.02/sf	\$6,000.00
	Non-Members	\$1,875.00	\$0.025/sf	\$7,500.00

2.2

Registration		Rates		Total Certification	
		Design	Construction	Min. (<50,000 sf)	Max. (>500,000 sf)
Members	\$450.00	\$0.025/sf	\$0.010/sf	\$1,750.00	\$17,500.00
Non-Members	\$600.00	\$0.030/sf	\$0.015/sf	\$2,250.00	\$22,500.00

SSc1: Site Selection

2.1 Credit Requirements:

Do not develop on the following:

- Prime Farmland
- Elevation is lower than 5 feet above the elevation of the 100-year FEMA floodplain
- Land identified as habitat for threatened or endangered species
- Within 100 feet of any wetlands
- Public parkland

2.2 Credit Requirements:

All of the previous, AND:

- Previously undeveloped land within 50 feet of any water body which support or could support fish, recreation or industrial use consistent with the terminology of the Clean Water Act.



SSc2: Development Density and Community Connectivity

2.1 Credit Requirements:

(formerly Development Density)

Option 1: Development Density

Construct or renovate building on a previously developed site AND in a community with a minimum density of 60,000 sf per acre net.

2.2 Credit Requirements:

Option 1, or Option 2: Community Connectivity

Construct or renovate building on a previously developed site AND within ½ mile of a residential zone or neighborhood and with an average density of 10 units per acre net AND within ½ mile of at least 10 Basic Services AND with pedestrian access between the building and the services.

Basic Services include but are not limited to: 1. Bank 2. Place of Worship 3. Convenience Grocery 4. Day Care 5. Cleaners 6. Fire Station 7. Beauty 8. Hardware 9. Laundry 10. Library 11. Medical/Dental 12. Senior Care Facility 13. Park 14. Pharmacy 15. Post Office 16. Restaurant 17. School 18. Supermarket 19. Theater 20. Community Center 21. Fitness Center 22. Museum

SSc4.3: Alternative Transportation: Low-Emitting and Fuel-Efficient Vehicles

2.1 Credit Requirements:

(formerly Alternative Fuel Vehicles)

- Provide low-emitting and fuel-efficient (alternative fuel) vehicles for 3% of FTE occupants AND provide preferred parking for these vehicles.

- Install alternative-fuel refuelling stations for 3% of the total vehicle parking capacity of the site (liquid or gaseous fuelling facilities must be separately ventilated or located outdoors).

2.2 Credit Requirements:

The previous options, OR

- Provide preferred parking for low-emitting and fuel-efficient vehicles for 5% of the total vehicle parking capacity of the site.

SSc4.4: Alternative Transportation: Parking Capacity

2.1 Credit Requirements:

Option 1:
Size parking capacity to meet, but not exceed local minimum, and provide preferred parking for carpools or vanpools for 5% of the total provided parking spaces

Option 2:
For projects that provide parking for less than 5% of FTE building occupants, provide preferred parking for carpools or vanpools, marked as such, for 5% of total provided parking spaces.

Option 3:
Provide no new parking and provide preferred carpools or vanpools capable of serving 5% of the building occupants.

2.2 Credit Requirements:

Options 1 or 2 for non-residential projects, Option 3 for any project type, OR

Option 4: Residential: Do not exceed the local minimum parking requirement AND provide infrastructure and support programs to facilitate shared vehicle usage.

SSc5.2: Site Development: Maximize Open Space

2.1 Credit Requirements:

(formerly SSc5.2: Reduced Site Disturbance: Development Footprint)

This credit requires either

- reducing the development footprint by 25%
- providing open space which exceeds the zoning requirement by 25%
- for projects with no zoning requirements, providing open space adjacent to the building which is equal to the building footprint
- for projects which have a zoning ordinance but no open space requirement, provide a vegetated space equal to 20% of the building footprint

2.2 Credit Requirements:

New stipulation: If the building gets SSc2, pedestrian-oriented hardscaped areas can contribute to the credit compliance, but 25% of the open area has to be vegetated .

SSc6.1: Stormwater Design: Quantity Control

2.1 Credit Requirements:

(formerly Stormwater Management: Rate and Quantity)

- If existing imperviousness is less than or equal to 50%, then implement a plan which prevents the 1.5 year, 24-hour peak discharge rate from exceeding the pre-development rate

OR

- If the existing imperviousness is greater than 50%, reduce stormwater rate and quantity by 25%.

2.2 Credit Requirements:

- If existing imperviousness is less than or equal to 50%, then implement a plan which prevents the post-development peak discharge rate from exceeding the pre-development rate for one- and two- year, 24-hour design storms.

OR

Implement a stormwater management plan that protects receiving stream channels from excessive erosion by implementing a stream channel protection strategy and quantity control strategies.

OR

- If the existing imperviousness is greater than 50%, implement a stormwater management plan that results in a 25% decrease in the volume of stormwater runoff from the 2-year, 24-hour design storm.



SSc6.2: Stormwater Design: Quality Control

2.1 Credit Requirements:

(formerly Stormwater Management: Treatment)

Construct site stormwater treatment systems designed to remove 80% of TSS and 40% of the TP based on average annual loadings all storms less than or equal to the 2-year 24-hour storm.

2.2 Credit Requirements:

Implement a stormwater management plan that reduces impervious cover, promotes infiltration, and captures and treats stormwater from 90% of the the average annual rainfall using best management practices.

BMP's used to treat runoff must be capable of removing 80% of the TSS load based on existing monitoring reports.

Humid Watersheds
Semi-Arid Watersheds
Arid Watersheds



SSc7.1: Heat Island, Non-Roof

2.1 Credit Requirements:

Indicate that:

- A minimum of 30% of non-roof impervious surface areas are constructed with high-albedo materials and/or open grid pavement and/or will be shaded in five years

OR

- a minimum of 50% of parking spaces have been placed underground or are covered by structured parking

OR

- an open-grid pavement system (less than 50% impervious) has been used for a minimum of 50% of the parking area.

2.2 Credit Requirements:

OPTION 1:

- Provide any combination of the following strategies for 50% of the site hardscape (including roads, sidewalks, courtyards and parking lots

- Shade (within five years of occupancy)
- Paving materials with a solar reflectance of at least 29*
- Open Grid paving system

OR

OPTION 2

- Place a minimum of 50% of parking spaces under cover (which must have an SRI of at least 29.)

*Typical new gray concrete: SRI = 35
Typical weathered concrete: SRI = 19
Typical new white concrete: SRI = 86

SSc7.2: Heat Island Effect, Roof

2.1 Credit Requirements:

Use Energy Star compliant (highly reflective) AND high emissivity roofing (emissivity of at least .9 when tested in accordance with ASTM 408) for a minimum of 75% of the roof surface

OR

Install a “green” roof for at least 50% of the roof area. Combinations of high albedo and green roof can be used if they cover 75% of the roof area.

2.2 Credit Requirements:

1. Use roofing materials that have an SRI of greater than 78 for a low-sloped* roof and greater than 29 for a steep-sloped roof for a minimum of 75% of the roof area or

2. a vegetated roof for at least 50% of the roof area or

3. or combine a green roof and high-albedo roof for 75% of the roof area that meets the equation:

$(\text{Area of SRI Roof}/.75) + (\text{Area of vegetated roof}/.5) \geq \text{Total Roof area.}$

*defined as less than 2:12

SSc8: Light Pollution Reduction

2.1 Credit Requirements:

- Meet or provide lower light levels and uniformity ratios than those recommended by IESNA; all exterior luminaires with more than 1000 initial lamp lumens are shielded and all with more than 3500 met the full cutoff IESNA classification.

2.2 Credit Requirements:

- **Interior lighting:**
 - the angle of maximum candela from each interior luminaire as located in the building shall intersect opaque bldg interior surfaces OR
 - all non-emergency interior lighting shall be automatically controlled to turn off during non-business hours (provide manual override).
- **Exterior lighting:**
 - do not exceed 80% of the lighting power densities for exterior areas and 50% for building facades as defined by IESNA Standard 90.1 -2004.
- New Zones: LZ1- LZ4 for every project. Each zone has specific requirements.



WEc1.1-1.2: 50% Water Use Reduction or No Potable Use for Irrigation

2.1 Credit Requirements:

Use high-efficiency irrigation technology OR use captured rain or recycled site water to reduce potable water consumption for irrigation by 50% over conventional means

OR use only captured rain or recycled site water to irrigate

OR do not install permanent landscape irrigation systems.

2.2 Credit Requirements:

Use of municipally treated and conveyed water is now acceptable for this credit.



WEc2: Innovative Wastewater Technologies

2.1 Credit Requirements:

Reduce the use of municipally provided potable water for building sewage conveyance by a minimum of 50%,

OR

treat 100% of wastewater on site to tertiary standards.

2.2 Credit Requirements:

Reduce the use of municipally provided potable water for building sewage conveyance by a minimum of 50%

OR

treat **50%** of wastewater on site to tertiary standards.

EA Prereq 1: Fundamental Building Systems Commissioning

2.1 Credit Requirements:

- Engage a commissioning team that has no individuals responsible for the project design or construction management
- Review the design intent and basis of design.
- Incorporate into construction docs.
- Develop and utilize a commissioning plan.
- Verify installation and performance, training and operation.
- Complete a commissioning report.

2.2 Credit Requirements:

The CxA must:

- have experience in at least two bldg projects
- shall report findings directly to the owner
- for projects <50,000 gsf, the CxA may be people on the design/construction team. For larger projects they may be employees of the design or construction firm, but not on the project team.

More specific language about the particular systems to be commissioned:

- HVAC
- Lighting and Daylighting
- Domestic hot water systems
- Renewable energy systems
- The owner shall document the Owner's Project Requirements while the design team develops the Basis of Design.
- Commissioning requirements shall be incorporated in CDs.

*Reference guide provides the standards expected of the OPR, BOD, Commissioning Plan, Commissioning Specification, Performance Verification Documentation, and the Commissioning Report.

EAc3: Enhanced Commissioning

2.1 Credit Requirements:

(formerly Additional Commissioning)

- A commissioning authority independent of the design team shall conduct a review of the design prior to the construction documents phase.
- An independent commissioning authority shall conduct a review of the construction documents near completion of the construction document development and prior to issuing the contract documents for construction.
- An independent commissioning authority shall review the contractor submittals relative to systems being commissioned.
- Provide the owner with a single manual that contains the information required for re-commissioning building systems.
- Have a contract in place to review building operation with O&M staff, including a plan for resolution of outstanding commissioning-related issues within one year after construction completion date.

2.2 Credit Requirements:

The CxA must:

- have experience in at least two bldg projects
- shall report findings directly to the owner
- not a member of the design or construction team (regardless of project size)
- CxA must conduct a review of the OPR, BOD and DD documents, and then backcheck.
- CxA must also review contractor submittals relating to above documents, and submit to Owner.
- Develop a systems manual for the commissioned systems.
- Verify that the requirements for training personnel are completed.
- Review building operation within 10 months after substantial completion.

EA Prereq 2: Minimum Energy Performance

2.1 Credit Requirements:

- Design the building to comply with ASHRAE/IESNA Standard 90.1-1999 (without amendments) or the local energy code (whichever is more stringent.)

2.2 Credit Requirements:

- Design the building project to comply with both
- the mandatory provisions of ASHRAE/IESNA **Standard 90.1-2004** AND
- the prescriptive requirements or performance requirements of ASHRAE/IESNA Standard 2004.*

*The Energy Cost Budget Method is no longer required to claim EA Credit 1: Optimize Energy Performance. The Performance Rating Method is required and may be substituted for documentation of the performance requirements of this EA Prereq 2.



EAc1: Optimize Energy Performance

2.1 Credit Requirements:

- Reduce design energy case compared to the energy cost budget indicated by ASHRAE/IESNA 90.1-1999, using the Energy Cost Budget Method.

15% = 1 point
20% = 2 points
25% = 3 points
30% = 4 points etc. (for new construction)

Non-regulated energy systems include plug loads, exterior lighting, garage ventilation, elevators.

2.2 Credit Requirements:

- Stricter performance criteria- referenced standard is ASHRAE 90.1-2004.

Revised thresholds for **Option 1**, using the Building Performance rating method:

10.5% = 1 point
14.0% = 2 points
17.5% = 3 points
21.0% = 4 points etc. (for new construction)

- Calculations now include all unregulated and process loads.

$$\frac{75-50}{75} = 33\% \qquad \frac{100-75}{100} = 25\%$$

- **Option 2:** For small office bldgs < 20,000 sf
 - Can follow ASHRAE Advanced Energy Design Guide for Small Office Bldgs (4 points)
- **Option 3:** Comply with the Advanced Building Benchmark (New Building Institute-provides a method for exceeding national codes.) (1 point)



EAc1: Optimize Energy Performance—ASHRAE 90.1-2004 and Appendix G

2.1 Credit Requirements:

2.2 Credit Requirements:

- Building Envelope
 - Building Orientation
 - Window Size and Area
- Lighting
 - Reductions in Lighting Power
 - Lighting Controls Credit Changed
- HVAC
 - New Selection of Baseline Systems
 - Baseline Sizing Independent of Design
 - Baseline Fan Power Reduction
 - Fan Control at 15 hp not 30 hp
- Service Water Heating
 - Heat Recovery from Condenser Loop—
May be Required for Design not just
Baseline



EAc2: On-Site Renewable Energy

2.1 Credit Requirements:

(formerly Renewable Energy)

- Supply at least 5% of the building's total energy use (as expressed as a fraction of annual energy cost) through the use of on-site renewable energy use.

2.2 Credit Requirements:

- Use the on-site renewable energy systems to offset building energy cost. Calculate project performance by expressing the energy produced by the renewable systems as a percentage of the building annual energy cost:

% Renewable Energy	Points
2.5%	1
7.5%	2
12.5%	3

EAc4: Enhanced Refrigeration Management

2.1 Credit Requirements:

(formerly Ozone Depletion)

- No HCFCs or Halons in base building level HVAC and refrigerators.

2.2 Credit Requirements:

Option 1:

Don't use refrigerants AT ALL or

Option 2:

Use this formula, which provides the maximum threshold for the combined contributions to ozone depletion and global warming.

$$\text{LCGWP} + \text{LCODP} \times 105 < 100$$

Note: the ODP of HCFCs is much less than that of CFCs, but Halons, which have negligible ODP, have very high GWP.

Info required: Refrigerant charge, refrigerant type, equipment type.

EAc6: Green Power

2.1 Credit Requirements:

Provide at least 50% of the buildings' electricity from renewable sources by engaging in at least a 2-year renewable energy contract. Energy use is calculated using the DEC" value from EAc1.

2.2 Credit Requirements:

Alternative compliance path: Electricity use may be calculated using the DOE Commercial Buildings Energy Consumption Survey if the energy model from EA Credit 1 was not performed.

MRc4: Recycled Content

2.1 Credit Requirements:

Use materials with recycled content such that the sum of the post-consumer recycled content plus one-half of the post industrial content constitutes at least 5% of the total value of the materials of the project.

2.2 Credit Requirements:

Thresholds have doubled for this credit to 10% and 20% (post-consumer + ½ pre-consumer) recycled content. The referenced Standard (ISO 14201) has been updated.

MRc5: Regional Materials

2.1 Credit Requirements:

- 5.1: 20% manufactured within 500 miles of the project site
- 5.2: of those, 50% extracted regionally

2.2 Credit Requirements:

- 5.1: 10% manufactured AND harvested or extracted within 500 miles of the project site.
- 5.2: 20% manufactured AND harvested or extracted within 500 miles of the project site.

EQ Prereq 1: Minimum IAQ Performance

2.1 Credit Requirements:

Meet the minimum requirements of voluntary consensus standard ASHRAE 62-1999, Ventilation for Acceptable Indoor Air quality, and approved Addenda using the Ventilation Rate Procedure.

2.2 Credit Requirements:

The reference standard for this credit has been updated (ASHRAE 62.1-2004).

EQc1: Outdoor Air Delivery Monitoring

2.1 Credit Requirements:

- Install a permanent carbon dioxide monitoring system that provides feedback on space ventilation performance to allow environmental adjustments.

2.2 Credit Requirements:

- for MECHANICALLY ventilated spaces:

Monitor carbon dioxide concentration in all densely occupied spaces (>25 people per 1000 sf). Also, provide air flow meters capable of measuring the minimum outdoor airflow rate to compare it with the design minimum outdoor air rate.

- for NATURALLY VENTILATED SPACES:

Monitor carbon dioxide concentrations. One sensor may be used for several spaces if they are linked by airflow.

EQc2: Increased Ventilation

2.1 Credit Requirements:

(formerly Ventilation Effectiveness)

- Option 1: Achieve an air-change effectiveness of .9 or greater.
- Option 2: Comply with ASHRAE 2001 Fundamentals Handbook Chapter 32, Space Air Diffusion.
- Option 3: Provide effective ventilation in at least 90% of each room or zone area for 95% of the hours of occupancy.

2.2 Credit Requirements:

- for MECHANICALLY ventilated spaces:

Increase breathing zone outdoor air ventilation rates to all occupied spaces by at least 30% above the minimum rates required by ASHRAE Standard 62.1-2004.

- for NATURALLY VENTILATED SPACES:

Design in accordance with the Carbon Trust "Good Practice Guide".

1. Develop Design Reqs
2. Plan airflow paths
3. Identify building uses
4. Determine ventilation requirements
5. Estimate external driving pressures
6. Select Ventilation devices
7. Size them
8. Analyze the design.

EQc3: Construction IAQ Management Plan

2.1 Credit Requirements:

During Construction:

- Meet SMACNA guidelines.
- Protect onsite or installed absorptive materials.
- Air Handlers need MERV 8 filters if used during construction; MERV 13s required for media installed at the end of construction.

Before Occupancy:

- After construction, use MERV 13s for 2-week flush-out OR conduct a baseline IAQ testing procedure based on EPA's Baseline IAQ guidelines.

2.2 Credit Requirements:

During Construction:

- Meet SMACNA guidelines.
- Protect on-site or installed absorptive materials.
- MERV 8 filters used at every return air grill.

Before Occupancy:

- Option 1: Flush-Out
Either provide 14,000 cubic feet of outdoor air/sf of floor area at at least 60 °F OR 3,500 cubic feet of outdoor air/sf plus ventilation after the space is occupied. This solution is best if the space must be occupied prior to the completion of the flush-out period.
- Option 2: Air Quality Testing
Baseline IAQ testing following EPA guidelines; certain contaminants not to exceed said maximums.

EQ4.3: Low-Emitting Materials, Carpet

2.1 Credit Requirements:

Carpet systems must meet or exceed the requirements of the Carpet and Rug Institute's Green Label Indoor Air Quality Test Program.

2.2 Credit Requirements:

The referenced standard for this credit has been updated (Green Label Plus).



EQ4.4: Low Emitting Materials, Composite Wood

2.1 Credit Requirements:

Composite wood and agrifiber products must contain no added urea-formaldehyde resins.

2.2 Credit Requirements:

More specific definition: laminating adhesives used to fabricate on-site and shop-applied composite wood and agrifiber assemblies shall contain no urea-formaldehyde resins.

EQc5: Indoor Chemical and Pollutant Source Control

2.1 Credit Requirements:

Provide the following:

- Permanent entryway systems to capture potentially hazardous dust/particulate matter required at all major building entrances.
- Provide deck-deck partitions with separate outside exhaust for all rooms in which chemicals are mixed; maintain a pressure of negative 7PA relative to surroundings.
- Drains plumbed for disposal of liquid waste.

2.2 Credit Requirements:

- Roll-out mats accepted only if cleaned by a contracted service organization.
- Hard lid ceiling is ok instead of deck-deck partitions; -5 PA necessary pressure.
- MERV 13 filters used at every return grill and outside air grill that is to be used for supply air.

EQc6: Controllability of Systems: Lighting and Thermal Comfort

2.1 Credit Requirements:

(formerly Perimeter and Non-Perimeter spaces)

- **6.1: Perimeter spaces:** Provide one operable window and one lighting control per 200 sf within 15 feet of a perimeter wall.
- **6.2: Non-perimeter spaces:** Provide controls for each individual for airflow, temperature and lighting for 50% of the occupants in the regularly occupied spaces (non-perimeter).

2.2 Credit Requirements:

- **6.1: Lighting:** Provide lighting controls for 90% of the bldg occupants and lighting system controllability for all shared multi-occupant spaces.
- **6.2: Thermal Comfort:** Provide individual comfort controls for 50% of FTE AND provide comfort system controls for all shared multi-occupant spaces.

Operable windows can be used instead of comfort controls for occupants of areas that are 20 feet inside of and 10 feet to either side of the operable part of the window.

EQc7.2: Thermal Comfort Verification

2.1 Credit Requirements:

(formerly Permanent Monitoring System)

- Install a permanent temperature and humidity monitoring system configured to provide operators control over the comfort performance.
- Additional to 7.1- compliance with ASHRAE- 55- 1992.

2.2 Credit Requirements:

- Agree to implement a thermal comfort survey of the building occupants 6-18 months after occupancy. Develop a plan for corrective action if the survey results indicate that more than 20% of occupants are dissatisfied with thermal comfort in the building.



BRIGHTWORKS™

Thank You

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