Basic LEED Overview

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Green Buildings and Sustainable Materials Project

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Lecture Objectives:

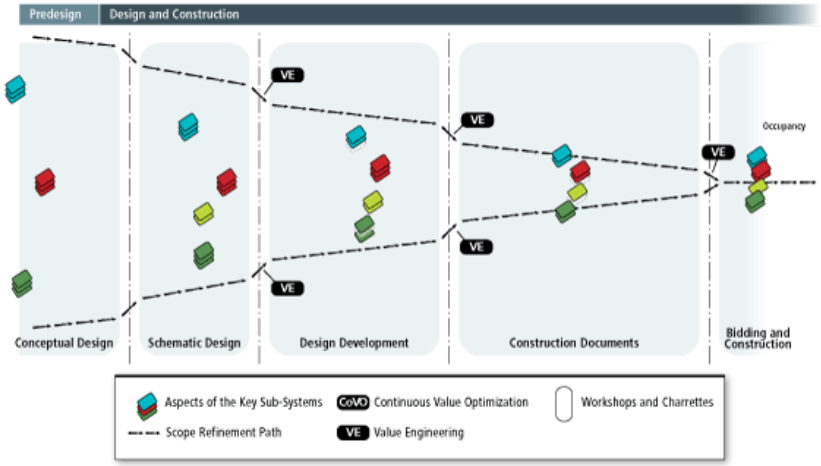
1. Identify primary categories and considerations within the LEED Rating System.
2. Describe strategies for working toward LEED Certification.
3. Explain the goals and intentions of different credits and categories within the LEED Rating Systems.

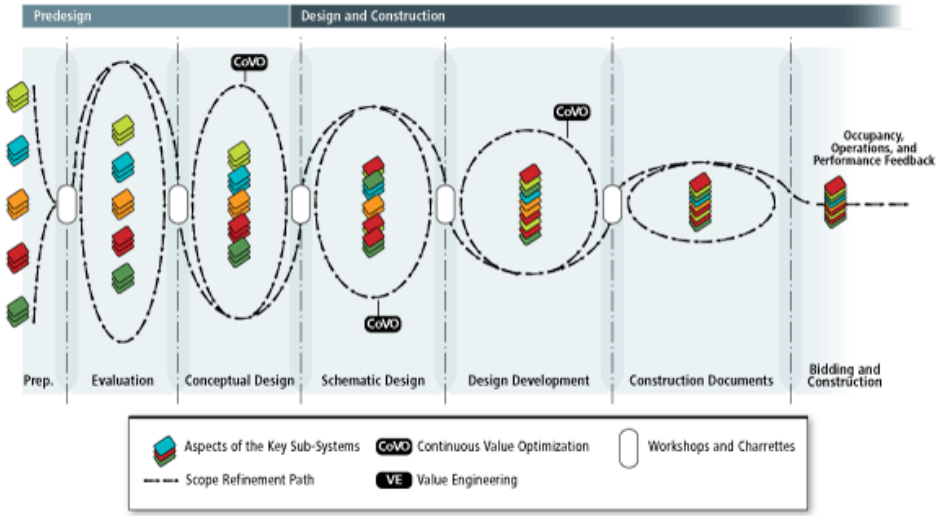
LEED v4 New Construction and Major Renovations

- Location & Transportation
- Sustainable Sites
- Water Efficiency
- Energy & Atmosphere
- Materials & Resources
- Indoor Environmental Quality
- Innovation
- Regional Priority

- **Credit 1: Integrative Process**

INTENT: To support high-performance, cost-effective project outcomes through an early analysis of the interrelationships among systems.





The Integrative Design Guide to Green Building: Redefining the Practice of Sustainability by 7Group and Bill Reed. Wiley Publishing, 2009.

LOCATION AND TRANSPORTATION

- LEED for Neighborhood Development Location
- Sensitive Land Protection
- High Priority Site
- Surrounding Density and Diverse Uses
- Access to Quality Transit
- Bicycle Facilities
- Reduced Parking Footprint
- Green Vehicles

Michael Palmer, Hands-On Networking Fundamentals / Edition 1, https://www.cengage.co.uk/books/9781418835545/

District S//Beirut, LEED for neighborhood development, https://twitter.com/districtsbeirut/status/826822859326631937

SUSTAINABLE SITES

- Prerequisite 1: Construction Activity Pollution Prevention
- Site Assessment
- Site Development – Protect or Restore Habitat
- Open Space
- Rainwater Management
- Heat Island Reduction
- Light Pollution Reduction

Tim Boyle/Staff/Getty Images, https://science.howstuffworks.com/environmental/green-science/urban-heat-island2.htm

Suzy Timm, Urban light pollution, https://www.pinterest.com/pin/9499849184375736

WATER EFFICIENCY

•Prerequisite:
Outdoor Water Use Reduction

•Prerequisite:
Indoor Water Use Reduction 20%

•Prerequisite:
Building-Level Water Metering

- Outdoor Water Use Reduction
- Indoor Water Use Reduction
- Cooling Tower Water Use
- Water Metering

Efficiency of Drip Irrigation System, http://www.omirritech.com/news/efficiency-of-drip-irrigation-system.html

LEED v4 Rating System Review: Water Efficiency/Energy & Atmosphere, https://www.eventa.us/events/greenville-sc/leed-v4-rating-system-review-water-efficiency-energy-atmosphere-

ENERGY & ATMOSPHERE

- Prereq 1: Fundamental Commissioning & Verification
- Prereq 2: Minimum Energy Performance
- Prereq 3: Building-Level Energy Metering
- Prereq 4: Fundamental Refrigeration Management (no CFCs)
- Enhanced commissioning
- Optimize energy performance
- Advanced Energy Metering
- Demand Response
- Renewable Energy Production
- Enhanced Refrigerant Management
- Green Power & Carbon Offsets

Rooftop solar panels, https://modernize.com/home-ideas/19735/should-you-buy-a-house-with-solar-panels-already-installed

ENERGY & ATMOSPHERE

Option 1. Whole building energy simulation (1-19 points)

Demonstrate a percentage improvement in the proposed building performance rating compared with the baseline building performance rating. Calculate the baseline building performance according to Appendix G of ANSI/ASHRAE/IESNA Standard 90.1-2007 (with errata but without addenda[1]) using a computer simulation model for the whole building project. Projects outside the U.S. may use a USGBC approved equivalent standard[2]. The minimum energy cost savings percentage for each point threshold is as follows:

New Buildings	Existing Building Renovations	Points
12%	8%	1
14%	10%	2
16%	12%	3
18%	14%	4
20%	16%	5
22%	18%	6
24%	20%	7

MATERIALS & RESOURCES

- Prereq 1: Storage & Collection of Recyclables
- Prereq 2: Construction & Demo Waste Management Planning
- Building Life-Cycle Impact Reduction
- Building Product Disclosure & Optimization: Environmental Product Declarations
- Building Product Disclosure & Optimization: Sourcing of Raw Materials
- Building Product Disclosure & Optimization: Material Ingredients
- Construction & Demolition Waste Management

Materials Transparency: Healthy Products in LEED v4 (EPDs & HPDs), https://www.urbangreencouncil.org/content/events/materials-transparency-healthy-products-leed-v4-epds-hpds

INDOOR ENVIRONMENTAL QUALITY

- Prereq 1: Minimum IAQ Performance
- Prereq 2: Environmental Tobacco Smoke Control
- Enhanced Indoor Air Quality Strategies
- Low-Emitting Materials
  - Adhesives and sealants
  - Paints and coatings
  - Flooring systems
  - Composite wood & agrifiber products
- Construction IAQ Management Plan

Materials Transparency: Healthy Products in LEED v4 (EPDs & HPDs), http://www.greendepot.com/greendepot/#sthash.CSVD1vgZ.dpbs

INDOOR ENVIRONMENTAL QUALITY

- Indoor Air Quality Assessment
- Thermal Comfort
  - Design
  - Verification (survey)
- Interior Lighting
- Daylight
- Quality Views
- Acoustic Performance

Advanced Daylight Design, http://www.eb7.co.uk/services/daylight-design/

Indoor Air Quality | Vaisala, https://www.vaisala.com/en/industries-innovation/hvac-construction-material-and-artifact-monitoring/indoor-air-quality

INNOVATION

Innovation in Design/ Exemplary/ Pilot *(up to 5 points)*

Credit for some element either not included in the LEED scope, or an element that the design has gone above and beyond with

- Sustainable furniture
- Natural termite prevention
- Educational signage
- Elements within the design process

LEED Accredited Professional

https://iccrc-crcic.ca/become-a-immigration-professional/

Indoor air quality procedure - alternative compliance path

EQpc68 | Required

Design for active occupants

EQpc78 | 1 point

Clean construction

SSpc75 | 1 point

Medical and process equipment efficiency

EApc3 | 1 point

Material ingredient reporting

MRpc76 | 1 point

Material ingredient optimization

MRpc77 | 1 point

Material ingredients product manufacturer supply chain optimization

MRpc79 | 1 point

Regional Priority

A project that earns a Regional Priority credit automatically earns one point in addition to any points awarded for achieving that credit.

Up to 4 extra points can be earned through this strategy.

Regional Priority Credits

Optimize energy performance
EAc1 | Up to 19 points
Options: Option 1 | Threshold/Path: 30% new/26% existing

On-site renewable energy
EAc2 | Up to 7 points
Threshold/Path: 1

Thermal comfort - design
EQc7.1 | 1 point

Alternative transportation - public transportation access
SSc4.1 | 6 points

Stormwater design - quantity control
SSc6.1 | 1 point

Water use reduction
WEc3 | Up to 4 points
Threshold/Path: 40

LEED v4 Certification

Certified	40-49 points
Silver	50-59 points
Gold	60-79 points
Platinum	80+ points

Visit Our Project Website

https://faculty.cnr.ncsu.edu/yuanyao/green-buildings-and-sustainable-materials/

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