LEED v4: A Preview

Sarah Andrews
CSI CDT LEED AP BD+C
USGBC Faculty Member
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Course Outline

• Course Objectives
• Review development process
• LEED BD+C v4 Highlights
• Comparison of BD+C 2009 vs. BD+C v4
• Review of prerequisites, credits, and strategies
• Pilot Credit Library
• USGBC Policy Priorities

Course Objectives

• Outline the changes brought about by rating system development
• Discuss major trends in v4
• Describe the value of the Pilot Credit Library
LEED address the complete lifecycle of buildings:

- HOMES
- NEIGHBORHOOD DEVELOPMENT
- COMMERCIAL INTERIORS
- CORE AND SHELL
- NEW CONSTRUCTION & MAJOR RENOVATIONS
- SCHOOLS
- RETAIL
- HEALTHCARE

BUILDING LIFE CYCLE
- DESIGN
- CONSTRUCTION
- OPERATIONS

Rating System Development

LEED v4 Timetable:
- Approved following ballot June, 2013
- Current ballot version available at www.usgbc.org
- To be released at GreenBuild in November
- Sunset for project registration under LEED 2009 is June 1, 2015
Rating System Development

Why are rating systems being updated?

- Continuous improvement cycle
- Increase scope and stringency
- New technologies become available

Rating System Development

LEED for Neighborhood Development:
- Updated to align credits
- Modify credits to match BD+C
- Points reweighted

LEED for Homes:
- Technical update
- Category alignment
- Points reweighted

LEED BD+C v4 Highlights
LEED v4 Highlights

- Technical rigor
- Expanding market sectors
- Striving for simplicity
- Credit weights
- Integrative design
- Life cycle assessment

LEED v4 Highlights

- Measurement and performance
- Improved user experience
- Efficiency of documentation process

Materials and Resources in LEED v4
Materials and Resources

- Increased focus on Life Cycle Assessment
- Environmental impacts
  - Extraction
  - Manufacture
  - Use
  - Reuse
  - Disposal

Materials and Resources

LCA measures environmental impacts:
- Global warming
- Ozone depletion
- Acidification
- Eutrophication
- Formation of ground-level ozone
- Depletion of non-renewable energy resources

Materials and Resources

- Specify materials that have been sourced responsibly
- Environmental Product Declarations (EPDs)
  - EPDs = disclosure activities leading to increased transparency
Materials and Resources

- Structure/enclosure materials ≤ 30% of compliant materials
- May be included if used consistently in cost-based MR credits: furniture, piping, pipe insulation, ducts, duct insulation, conduit, plumbing fixtures, faucets, shower heads, and lamp housing

Documentation Changes in LEED v4

- Fewer forms – reduced by 80%
- Alignment across rating systems and includes campuses
- Removed:
  - Low value documentation requirements
  - Required signatories
  - Duplication of content

In Comparison to 2009

- Fewer forms – reduced by 80%
- Alignment across rating systems and includes campuses
- Removed:
  - Low value documentation requirements
  - Required signatories
  - Duplication of content
Guiding Principles for Documentation

- Intuitive – easily understood; reduce progressive disclosure
- Transparent – offline Excel calculators
- Simple – only critical information
- Flexible – provide information in format you have already created
- Industry-specific – created during typical construction process

Reference Guide Revisions

- Guidance
- Behind the intent
- Tips
  - Step-by-step guidance
  - Further explanation
  - Related credit tips
  - Changes from 2009

Reference Guide Revisions

- Facts
- Referenced standards
- Exemplary performance
- Definitions
- Web-based reference guide
- Manage updates
- Embed video and audio
Credit Library
- Smart filters
- Saved searches
- Download addenda
- Currently available on USGBC website
- Interpretations
- Discussion forums linked to LEEDUser
- Sample forms
- Access to Reference Guide upcoming

Comparison of LEED BD+C 2009 vs. LEED BD+C v4

LEED 2009 vs. V4
- New credit categories
- Changes to technical content
- Revised point distribution
LEED 2009 vs. V4

New prerequisites?
- Yes
- Available for testing through Pilot Credit Library

New credits?
- Yes
- Available for testing through Pilot Credit Library

LEED 2009 vs. V4

New credit categories:
- Integrative Process
- Location and Transportation

LEED 2009 vs. V4

Point values changed?
- Yes, through weightings process
LEED 2009 vs. V4

More market sectors and space types?
- New and existing data centers
- New and existing hospitality projects
- New warehouses and distribution centers
- Existing schools
- Existing retail
- LEED for Homes Mid-Rise

LEED 2009 vs. V4
New LEED Online?
- No, only refinement
- Paperwork reduction
- More automatic calculations

New professional credentials?
- No
- Exam materials to change to v4 (est. 2014)
- Automatic reporting for GBCI approved courses

LEED v4 Point Allocations (New Construction)
- LEED 2009
  - SS = 26
  - WE = 10
  - EA = 35
  - MR = 14
  - EQ = 35
  - ID = 6
  - RP = 4
- LEED v4
  - IP = 11 (+1)
  - LT = 16
  - SS = 10
  - WE = 11 (+1)
  - EA = 33 (-3)
  - MR = 23 (-2)
  - EQ = 16 (+2)
  - ID = 6
  - RP = 4
Point Weighting Comparison

LEED 2009 vs v4

LEED v4 Prerequisites, Credits, and Strategies
For New Construction – applies to NC, CS, Schools, Data Centers, Warehouses & Distribution Centers, Hospitality NC, Healthcare, Retail NC

Prerequisites vs. Credits
- Prerequisites are mandatory
- Credits are optional strategies
**Integrative Process**

- Maximize integration of cost-effective green strategies
- Utilize innovative approaches and techniques
- Use cross-discipline design and decision-making approach
- Support high performance through early analysis of systems

**The Team – Conventional Process**

This is how we currently function, and have for the last 100 years. The diagram shows a typical organizational chart for a conventional design process in which the client’s primary contact is the architect, who coordinates with other team members in a hierarchical structure. General contractors are rarely involved in the early stages.

*Source: Roadmap to the Integrated Design Process, Image © Busby, Perkins & Will*
Conventional Building Process

Integrative Design Guide to Green Building © | Design 6.0.0 Final

Integrated Project Team

- Owner and representatives
- Architect
- Engineers
- Energy modeler
- Acoustical consultant
- Telecoms designer
- Controls designer
- Food service consultant
- Infectious control staff
- Land planner
- Construction manager or contractor
- Life cycle cost analyst

- End users
- Sustainable design consultant
- Facility green teams
- Facility managers
- Environmental services staff
- Functional and space planners
- Commissioning team
- Community
- Landscape architect
- Ecologist
- Lighting designer
- Interior designer

Integrated Process

- CR
- Points: 1

NEW!

Perform preliminary modeling and analysis for energy- and water-related systems
c1 – Integrative Process

Run analyses on 2 or more options for:
- massing and orientation
- envelope parameters (insulation levels, window-to-wall ratios, glazing specifications, etc.)
- lighting levels
- assess impact on HVAC sizing, energy use, and occupant performance

Integrative Process – Additional Prerequisites and Credits

P1 – Integrative Project Planning and Design (Healthcare)
Location and Transportation

NEW!

LT Intents
- Avoid development on inappropriate sites
- Reduce vehicle miles traveled
- Enhance livability and improve human health by encouraging daily physical activity
- Avoid development of environmentally sensitive lands
- Reduce environmental impact from location of building on site
- Encourage project location in areas with development constraints and promote health of surrounding areas

LT Intents
- Conserve land, protect farmland and wildlife habitat
- Promote walkability and transportation efficiency
- Encourage development in locations with multimodal transportation choices
- Promote bicycling
- Minimize environmental harms associated with parking facilities, including auto dependence, land consumption, and rainwater runoff
- Reduce pollution by promoting alternatives to conventionally fueled vehicles
Location and Transportation

- Addresses larger-scale land use issues
- Allows Sustainable Sites category to focus on project-specific issues
- Improved ties to anticipated outcome

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c1 – LEED for Neighborhood Development Location

- CR
- Points: 5-16
- Locate project in certified Neighborhood Development; points based upon certification level (skip credits 2-8)

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c2 – Sensitive Land Protection

- CR
- Points: 3
- Utilize previously developed site or area
- Avoid farmland, floodplains, habitat, water bodies, wetlands
c3 - High-Priority Site
- CR
- Points: 1-3
- Historic District = 1
- Priority Sites = 1
- EPA National Priorities List
- Federal Renewal Community Site
- HUD Difficult Development Area, etc.
- Brownfield Remediation = 2

c4 - Surrounding Density and Diverse Uses
- CR
- Points: 1-6
- Previously developed and meets density = 2-3 and/or
- Diversity of uses = 1-2

c5 - Access to Quality Transit
- CR
- Points: 1-6
- Walking distance to alternative transportation
  - Bus, streetcar, rideshare
  - Rapid transit, light/heavy rail
  - Commuter rail or ferry
- Points based upon trips
c6 – Bicycle Facilities
• CR
• Points: 1
• Connect to bike network
• Bike storage (long and short term)
• Showers/changing rooms
• Bike parking within 100' of entrance

• CR
• Points: 1
• Do not exceed minimum local code requirements

c7 – Reduced Parking Footprint
• CR
• Points: 1
• Without LTc4 – 20% reduction from ITE
• With LTc4 – 40% reduction from ITE

• CR
• Points: 1
• 5% of total parking is preferred and enforced
• And 2% of total parking spaces have electrical vehicle supply equipment
• Or 2% of total parking spaces have liquid or gas fueling or battery switching stations

• CR
• Points: 1
• Reduced Parking Footprint

• CR
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Sustainable Sites

SS Intents
- Reduce pollution from construction activities
- Protect health of vulnerable populations by ensuring environmental contamination has been remediated
- Assess site conditions before design to evaluate sustainable options and inform related decisions
- Conserve existing natural areas and restore damaged areas to provide habitat and promote biodiversity

SS Intents
- Create exterior open space that encourages interaction with environment, social interaction, passive recreation, and physical activities
- Reduce runoff volume and improve water quality by replicating natural hydrology
- Minimize effects on microclimates and human and wildlife habitats by reducing heat islands
- Increase night sky access, improve nighttime visibility, reduce consequences of development on wildlife and people
SS Intents

- Ensure sustainable site benefits achieved continue, regardless of future changes in programs or demographics
- Educate tenants in implementing sustainable features in their tenant improvement build-outs
- Provide patients, staff, and visitors with health benefits of natural environment via direct access
- Integrate school with community by sharing building and playing fields for non-school events and functions

p1 – Construction Activity Pollution Prevention

- Prerequisite
- Points: none
- SWPPP and erosion and sedimentation control plan
- EPA CGP 2012

C1 – Site Assessment

- CR
- Points: 3
- Perform site survey/assessment
  - Topography
  - Hydrology
  - Climate
  - Vegetation
  - Soils
  - Human use
  - Human health effects

NEW!
c2 – Site
Development – Protect/Restore Habitat
• CR
• Points: 1-2
• Preserve 40% greenfield area onsite and
• Restore 30% of all previously developed = 2
• Or contribute $0.40/sf financial support to land trust = 1

c3 – Open Space
• CR
• Points: 1
• Outdoor space must be ≥ 30% of total site area including building footprint
• Minimum 25% of that space must be vegetated at ground level (landscaped) or have overhead vegetated canopy and be physically accessible

c4 – Rainwater Management
• Rainwater as a resource
• Low impact development
• Requires more engineering expertise
EISA Section 438

Energy Independence and Security Act

Benefits to Water Resources
- Cleaner water
- Clean and adequate water supplies
- Source water protection

Other Benefits
- Cleaner air
- Moderate the impacts of climate change
- Increased energy efficiency
- Community benefits
Low Impact Development

• Innovative storm water management approach with a basic principle modeled after nature: manage rainfall at the source using uniformly distributed decentralized micro-scale controls.

• Goal is to mimic a site’s predevelopment hydrology by using design techniques that infiltrate, filter, store, evaporate, and detain runoff close to its source.

Low Impact Development

• Techniques are based on the premise that storm water management should not be seen as storm water disposal.

Instead of conveying and managing/treating storm water in large, costly end-of-pipe facilities located at the bottom of drainage areas, LID addresses storm water through small, cost-effective landscape features located at the lot level.

Low Impact Development

• These landscape features, known as Integrated Management Practices (IMPs), are the building blocks of LID. This includes not only open space, but also rooftops, streetscapes, parking lots, sidewalks, and medians.

• LID is a versatile approach that can be applied equally well to new development, urban retrofits, and redevelopment/revitalization projects.
Green Infrastructure

- Green infrastructure practices maintain or restore storm water’s natural flow patterns by allowing the water to slowly permeate into the ground and be used by plants.
- These practices include rain gardens, vegetated swales, green roofs, and porous pavements.
- Green infrastructure also includes preserving or restoring natural areas, such as forests, stream buffers, and wetlands, and reducing the size of paved surfaces.

Green Infrastructure

- Green infrastructure generally includes “better site design” or “low impact development” storm water projects.
- In addition to managing storm water, green infrastructure can recharge groundwater, provide wildlife habitat, beautify neighborhoods, cool urbanized areas, improve air quality and reduce stress on combined sewer systems.

c4 – Rainwater Management

- CR
- Points: 1-3

1) EISA 0-38
   - Retain onsite 100% of 95th percentile rain = 2
   - Retain onsite 100% of 99th percentile rain = 3
   - Zero lot line only: retain 86th percentile rain = 3

2) Natural land cover conditions = 3
   - Manage onsite post-developed condition

NEW!
EISA 438 – Option 1

<table>
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<tr>
<th>City</th>
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<tbody>
<tr>
<td>Atlanta</td>
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<tr>
<td>Cincinnati</td>
<td>1.5&quot;</td>
</tr>
<tr>
<td>Denver</td>
<td>1.1&quot;</td>
</tr>
<tr>
<td>Louisville, KY</td>
<td>1.5&quot;</td>
</tr>
<tr>
<td>Salt Lake City</td>
<td>0.8&quot;</td>
</tr>
<tr>
<td>Seattle</td>
<td>1.6&quot;</td>
</tr>
</tbody>
</table>

EISA 438 – Option 2

Designer conducts hydrological analysis to determine site-specific pre-development hydrological conditions.

Design, construct, and maintain stormwater management practices which preserve pre-development runoff conditions following construction.

C5 – Heat Island Reduction

- CR
- Points: 1-2

1) non-roof + roof = area of non-roof / 50 + area of high reflectance roof / 75 + vegetated roof / 75 ≥ total site paving + total roof = 2 points
**C5 – Heat Island Reduction**

- Opt 1 measures:
  - Shade in 10 years
  - Vegetated planters
  - Shade with PV covered structures
  - Shade with architectural structures
  - Shade with vegetated structures

**C5 – Heat Island Reduction**

- Opt 2 measures:
  - Paving materials $SR = 0.33$ ($0.28$ @ 3 years)
  - Open grid pavement (min. 50% unbound)
  - Low roof $\geq 2:12 = SRI 82$ ($64$ @ 3 yrs)
  - Steep roof $\geq 2:12 = SRI 39$ ($32$ @ 3 yrs)
  - Vegetated roof

2) Minimum 75% parking under cover = 1 point
c6 – Light Pollution Reduction

- CR
- Points: 1
- Meet uplight and light trespass requirements by BUG Rating or Calculations
- BUG = backlight, uplight, & glare
- Tool to help municipalities reduce glare, light trespass, and skyglow

Sustainable Sites – Additional Prerequisites and Credits

- P2 – Environmental Site Assessment (Schools & Healthcare)
- C7 – Site Master Plan (Schools)
- C8 – Tenant Design & Construction Guidelines (CS)
- C9 – Places of Refuge (Healthcare)
- C10 – Direct Exterior Access (Healthcare)
- C11 – Joint Use of Facilities (Schools)

Water Efficiency
Holistic Approach
- Fixtures and fittings
- Process water
- Appliances
- Outdoor water
- Cooling towers
- Fundamental building metering
- Metering of subsystems

WE Intents
- Reduce outdoor (potable) water consumption
- Reduce indoor (potable) water consumption
- Support water management and identify opportunities for additional water savings by tracking consumption.
- Conserve water used for cooling tower makeup while controlling microbes, corrosion, and scale.

p1 – Outdoor Water Use Reduction
- Prerequisite
- Points: None
  - No irrigation beyond 2 years or
  - Reduced irrigation by 30%
p2 – Indoor Water Use Reduction

- Prerequisite
- Points: None

- Reduce usage by 20%
- Utilize Water Sense fixtures
- Appliance and process water use

NEW!

p3 – Building-Level Water Metering

- Prerequisite
- Points: None

- Permanent meters for total potable water consumption for building plus grounds
- Share data on usage with USGBC for 5 years

c1 – Outdoor Water Use Reduction

- CR
- Points: 1-2

- No irrigation beyond 2 years = 2
- Or reduce landscape water requirements by 50% = 1, 100% = 2
c2 – Indoor Water Use Reduction

- CR
  - Points: 1-6
  - Reductions:
    - 25% = 1
    - 30% = 2
    - 35% = 3
    - 40% = 4
    - 45% = 5
    - 50% = 6

NEW!

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c3 – Cooling Tower Water Use

- CR
  - Points: 1-2
  - Conduct one-time analysis to calculate maximum allowed concentration + actual concentration to determine cycles
  - Points are based upon cycles calculations

NEW!

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c4 – Water Metering

- CR
  - Points: 1
  - Permanent metering for 2 or more:
    - Irrigation
    - Indoor fixtures
    - Domestic hot water
    - Boiler
    - Reclaimed water
    - Other process water

NEW!
Energy and Atmosphere

Holistic Approach
- Efficiency first
- Rewarded for demand reduction and production of your own energy

EA Intents
- Support design, construction, and operation of project which meets owner’s project requirements for energy, water, indoor environmental quality, and durability
- Reduce environmental and economic harms of excessive energy use by achieving minimum level of energy efficiencies for building systems
- Support energy management and identify opportunities for additional energy savings
EA Intents
- Reduce stratospheric ozone depletion
- Achieve increasing level of energy performance beyond standard to reduce harms
- Increase participation in demand response programs that improve energy generation and distribution system efficiencies, increase grid reliability, and reduce GHG emissions.

EA Intents
Reduce environmental and economic harms associated with fossil fuel energy by increasing self-supply of renewable energy
- Reduce ozone depletion and support early compliance with Montreal protocol while minimizing direct contributions to climate change
- Encourage reduction of GHG emissions through use of grid-source, renewable energy technologies and carbon mitigation projects

p1 – Fundamental Commissioning and Verification
- Prerequisite
- Points: None
1) Cx for MEP systems, renewable energy and requirements for exterior enclosure included in DPR and BOD
- Owner’s Project Requirements
- Basis of Design
p1 – Fundamental Commissioning and Verification

2) Engage Cx Authority by end of design development phase
3) Prepare & maintain current facilities and O+M plan

Why Commission a Building?
- Reduce design errors and redesign costs
- Reduce construction rework
- Improve efficiency of systems
- Extend equipment life
- Improve indoor air quality

p2 – Minimum Energy Performance

- Prerequisite
- Points: None

1) Whole building energy simulation to confirm improvement of minimum 5% over ASHRAE 90.1-2010 for NC

Or: 2) ASHRAE 50% Advanced Energy Design Guide
Or: 3) Advanced Buildings Core Performance Guide

Money Isn’t All You’re Saving

p3 – Building-Level Energy Metering

- Prerequisite
- Points: None

- Meters for consumption of:
  - Electricity
  - Natural gas
  - Chilled water
  - Steam
  - Fuel oil
  - Propane
  - Biomass

- Share data on usage with USGBC for 5 years

NEW!

<table>
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<tr>
<th>TEXAS BIOMASS, GENERAL RESOURCE TYPES</th>
<th>AGRICULTURE</th>
<th>FORESTS</th>
<th>URBAN BIOMASS</th>
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<td>Biomass in Agriculture</td>
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<td>Biomass in Forests</td>
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<tr>
<td>Biomass in Urban Applications</td>
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</tbody>
</table>
### p4 – Fundamental Refrigerant Management

- **Prerequisite:**
- **Points:** None

| No CFC-based refrigerants | Or 2) Phase out plan by project completion |

### c1 – Enhanced Commissioning

- **CR**
- **Points:** 2–6

1) Enhanced Systems Cx
   - Cx process activities = 3 or
   - Cx process activities + develop monitoring-based procedures

And/or 2) Envelope Cx
   - Cx process activities = 2

Validate performance of materials, components, assemblies, systems, & design to achieve OPR
   - Review envelope design, observe construction, perform field testing, complete checklists, verify corrective actions, etc.

### c2 – Optimize Energy Performance

- **CR**
- **Points:** 1–20

1) Whole building energy simulation = 1–18 (NC)
   - 6% = 1
   - 8% = 2
   - 10% = 3
   - 50% = 18
   - ASHRAE 90.1-2010
c2 – Optimize Energy Performance
Or 2) ASHRAE 50% AEDG × 1.6
- Building envelope, opaque
- Building envelope, glazing
- Interior lighting
- Exterior lighting
- Plug loads

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c3 – Advanced Energy Metering
- CR
- Points: 2
- Advanced metering – whole building energy systems + any individual energy uses 10% or more of total annual consumption

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c4 – Demand Response
- CR
- Points: 1-2
- Demand response programs through load shedding/shifting
  - Program available = 2
  - Program not available = 1
  - Reduce power use during peak demand times
  - Encourages 2-way communication between buildings & electric utilities

NEW!

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Demand response programs are designed to be both fiscally and environmentally responsible ways to respond to occasional and temporary peak demand periods. The programs offer incentives to businesses that volunteer and participate by temporarily reducing their electricity use when demand could outpace supply.
• $\% \text{ of renewable energy} = \frac{\text{cost of usable energy production} + \text{total building annual energy cost}}{\text{total building annual energy cost}}$
  - $5\% = 1$
  - $5\% = 2$
  - $10\% = 3$

**c5 – Renewable Energy Production**

- CR
- Points: 1-3
c6 – Enhanced Refrigerant Management

- CR
- Points: 1

3) no refrigerants or low-impact refrigerants

Or 2) provide calculations of refrigerant impact
- ODP
- GWP
- GHG

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c7 – Green Power and Carbon Offsets

- CR
- Points: 1-2

- Minimum 5 year contract for US green power, carbon offsets, or RECs
  - 50% = 1
  - 100% = 2
- RECs = renewable energy certificates
- Offsets = GHG-reduction projects, like tree planting, landfill-gas reclamation, etc., to mitigate/offset carbon emitted by activities

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Materials and Resources
Holistic Multi-Attribute Approach

- Reuse
- Assessment and optimization
- Human and ecological health
- Waste management
- Option 1 – disclosure activities
- Option 2 – material optimization
- Rewards local extraction, manufacture, and purchase

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p1 – Storage & Collection of Recyclables

Prerequisite

Points: None

Store and collect:
- Mixed paper
- Corrugated cardboard
- Glass
- Plastics
- Metals

Plus 2:
- Batteries
- Mercury-containing lamps
- Electronic waste

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p2 – Construction & Demolition Waste Management Planning

- Prerequisite
- Points: None
- Develop waste plan
- Establish diversion goals for min. 5 materials
- Specify commingled or separated collection
- Identify destination of waste & how processed
- Provide final diversion report

NEW!
c1 – Building Life-Cycle Impact Reduction

- CR
- Points: 1–6
  1) Historic building reuse = 5
  Or 2) Renovation of abandoned/blighted building = 5

Or 3) Building material reuse:
- 25% = 2
- 50% = 3
- 75% = 4

Or 4) Whole-building life cycle assessment = 3
- min. 10% reduction in 3 of 6:
  - GWP
  - ODP
  - Acidification
  - Eutrophication
  - Formation of tropospheric ozone
  - Depletion of nonrenewable energy resources

Waste and wastewater 3%
Forestry 17%
Agriculture 14%
Industry 19%
Residential & Commercial buildings 2%
Transport 12%
Energy supply 26%

Environmental Product Declarations

PCR ➔ LCA ➔ EPD

Building Product Disclosure
- Product Category Rule (PCR)
- Life Cycle Assessment (LCA)
- Environmental Product Declaration (EPD)

Product Category Rule
- Product Category Rule (PCR) – defines which data is used in a life cycle analysis and how the data is collected and reported.
- Defined in ISO 14025 – Environmental Labels and Declarations: Type II Environmental Declarations.
Life Cycle Assessment
- Life Cycle Assessment (LCA)
  - analyzes data specified in the PCR
  - measures outputs and environmental impacts of a product across its lifespan from cradle to grave

Environmental Product Declaration
- Environmental Product Declaration (EPD)
  - Summary document of data collected in LCA as specified by the PCR
  - Enables comparison of a category of products on environmental impacts
  - Can be verified by an independent third party
  - Type III EPD – independently verified according to ISO standards

Benefits of PCRs and EPDs
- Manufacturers can assess the position of their products in the marketplace
- Respond to increasing demands for environmentally sustainable products
- Transparency in environmental claims
- Collection of LCA data helps identify areas for improvement of environmental attributes and adoption of more sustainable operational practices and business approaches
Responsible Sourcing

Provides a means to manage and ensure the attainment of sustainability objectives by procuring materials with a certified provenance.

Demonstrated through an organization’s procurement policy via its purchasing decisions and practices; addresses range of environmental, economic and social considerations.

c2 – Building Product Disclosure & Optimization – Environmental Product Declarations

- 1) Assessement of permanent products, min. 20 x 1
  - Product-specific declaration = ½ product
  - Generic EPD = ½ product
  - Product-specific Type III EPD = 1 product
  - USGBC approved equal
  - Encourage better environmental performance
  - Cradle to gate minimum
2 PRODUCT CATEGORY RULES FOR LCA

2.1 THE PRODUCT CATEGORY COVERED BY THIS PCR

The product category referred to in this PCR covers preformed concrete products for use in buildings and other construction work, including the following products:

- Ready mixed concrete
- Concrete blocks, but excluding aerated concrete
- Concrete masonry units
- Masonry

It does not cover non-floored concrete including floor cement. For the purposes of this PCR, concrete is defined as “Material formed by mixing cement, coarse and fine aggregate and water, with or without the incorporation of admixtures or addition, which develops its properties by the hardening of the cement part (cement and water).”

In accordance with the standard EN 206-1:2001, concrete is classified by:

- Compressive strength class
- Environmental exposure class
- Blump class (optional)

Meet at least 1 for 50% by cost:

- Certification:
  - GWP
  - ODP
  - Acidification
  - Eutrophication
  - Formation of tropospheric ozone
  - Depletion on nonrenewable energy resources

- Local sourcing
- Extraction
- Manufacture
- Purchase
- within 100 miles valued at 200% of cost
  - USGBC approved

- Structure/enclosure materials ≤ 30% value of compliant materials
- May include if included consistently in all cost-based MR credits:

- Furniture
- Piping
- Pipe insulation
- Ducts
- Duct insulation
- Conduit
- Plumbing fixtures
- Faucets
- Showerheads
- Lamp housing
C3 – Building Product Disclosure & Optimization – Sourcing of Raw Materials

- CR
- Points: 1-2

1) Raw material source & extraction reporting, min. 20 products = 1
- 5 different manufacturers
- Manu. Reports = ½ product
- 3rd party reports = 1 product

NEw!

C3 – Building Product Disclosure & Optimization – Sourcing of Raw Materials

- Corporate Sustainability Reports (CSR)
- 5 different manufacturers
- Manufacturer Reports = ½ product
- 3rd party verified reports = 1 product

Or 2) Leadership Extraction Practices, 25% by cost = 2
- Land Use
- Extraction & manufacturing impacts
- Social responsibility
Responsible Extraction Criteria, meet at least 1:

• Extended responsibility
• Biobased
• Wood FSC or USGBC approved equal
• Materials reuse
• Recycled content
• USGBC approved program

Extraction, manufacture, and purchase within 100 miles = 200% of cost

Structure/enclosure materials ≤ 30% value of compliant materials

May include if included consistently in all project-based MR credits:

Furniture
Pipe
Pipe insulation
Ducts
Duct insulation
Conduit
Plumbing fixtures
Faucets
Showerheads
Lamp housing
1) Min. 20 products by 5 manufacturers with ingredient disclosure, health product declaration, cradle to cradle, or USGBC approved program = 1

2) Ingredient optimization, min. 25% by cost with ingredient certification = 3

- Green Screen v1.2 Benchmark
- Cradle to Cradle v2 Certified
- Cradle to Cradle v3 Certified
- International Alternative Compliance Path
- USGBC approved program
c4 – Building Product Disclosure & Optimization – Material Ingredients

Or 3) Product Manufacturer Supply Chain Optimization = 1
• Manufacturers engage in validated and robust safety, health, hazard, and risk programs
• Options 2 & 3 – extraction, manufacture, and purchase within 100 miles = 200% of cost

HPD = Health Product Declaration
• explicitly state level of ingredient disclosure & provide hazard profile for 100% of ingredients, even if ingredients aren’t identified

HPD:
• The Green Screen for Safer Chemicals
• Clean Production Action
• www.cleanproduction.org
Green Screen

Foundation principles:
• Greener, safer chemicals
• 12 Principles of Green Chemistry
• US EPA DfE – Design for Environment Program
• Open source – transparent & publicly available resource
• Identifies hazards, not risks
• Life cycle thinking

Green Screen

Toward a method for defining safer, healthier chemicals
• Fully effective, yet little or no toxicity
• Break down to innocuous substances after use to avoid accumulation in environment
• Minimize potential for chemical accidents (explosions, fires, releases to environment)

c5 – Construction & Demolition Waste Management

• CR
• Points: 2-3
t 1) Diversion of 50% in 3 material streams = 1; 75% in 4 material streams = 2
Or 2) Reduction of total waste materials, generate max. 2.5#sf of building floor area = 2
Materials & Resources—Additional Prerequisites and Credits

- C6 – PBT Source Reduction - Mercury (Healthcare)
- C7 – PBT Source Reduction - Lead, Cadmium, & Copper (Healthcare)
- C8 – Furniture & Medical Furnishings (Healthcare)
- C9 – Design for Flexibility (Healthcare)
  
PBT = persistent, bioaccumulative, and toxic

Indoor Environmental Quality

Environmental Quality Parameters
  - Air
  - Light
  - Sound
  - Occupant experience
p1 – Minimum Indoor Air Quality Performance

- Prerequisite
- Points: None

2) Monitoring
   - Mechanical – direct outdoor airflow measurement device &/or balance outdoor airflow to design min. OA rate per ASHRAE 62.1-2010

p2 – Environmental Tobacco Smoke Control

- Prerequisite
- Points: None

- No smoking inside
- No smoking outside except designated areas min. 25’ distant
- No smoking outside property line in spaces used for business purposes
- Post signage
c1 – Enhanced Indoor Air Quality Strategies

1) Enhanced strategies = 1
   - Entryway systems
   - Interior cross-contamination prevention
   - Filtration
   - Natural ventilation design calculations
   - Mixed-mode design calculations

2) Additional strategies = 1
   Select 1:
   - Exterior contaminant prevention
   - Increased ventilation
   - CO2 monitoring
   - Additional source control & monitoring
   - Natural ventilation room by room calcs

Important tips that will help control indoor pollutants:
- Test for radon and fix if there is a problem.
- Reduce odors, including such as mold and dust mites.
- Do not let people in the indoor.
- Keep all areas clean and dry. Clean up any mold and get rid of excess water or moisture.
- Always ventilate when using products that can release chemicals into the air, products must be stored following use, make sure to close tightly.
- Impact fuel-burning appliances regularly for leaks, and make repairs when necessary.
- Install a carbon monoxide alarm.

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c2 – Low-Emitting Materials

1) Achieve threshold compliance with emissions and content standards or
2) Budget calculation method
   - ≥ 50% - < 70% = 1
   - ≥ 70% - < 90% = 2
   - ≥ 90% = 3
c2 – Low-Emitting Materials

Emissions and content:
• VOC emission - how much off-gases over time
• Wet-applied materials must be tested for both emissions and VOC content

Material Safety Data Sheet

<table>
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<th>NFPA</th>
<th>Health</th>
<th>Physical</th>
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<td>0</td>
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</table>

c2 – Low-Emitting Materials

• Paints, coatings
• Adhesives, sealants
• Flooring
• Composite wood

Ceilings
• Walls
• Thermal & acoustic insulation
• Furniture (if in contract)

CR Points:
• Prohibit tobacco use inside and within 25'

IAQ Management Plan
• SMACNA control measures
• Protect absorptive materials stored onsite
• Use AH equipment with min. MERV 8 filters
• Replace filters before occupancy

c3 – Construction IAQ Management Plan

• SCR
• Points: 1
• Construction suitably for smoking
• SMACNA control measures
• Protect absorptive materials stored onsite
• Use AH equipment with min. MERV 8 filters
• Replace filters before occupancy
c4 – IAQ Assessment

- CR
  - Points: 2-2
  1) Flush out before or during occupancy = 1
  2) Air testing = 2

- Contaminants:
  - Formaldehyde
  - Particulates
  - Ozone
  - TVOCs
  - Target chemicals
    - Benzene, chloroform, ethylene glycol, toluene
  - Carbon Monoxide

- Formaldehyde is a colorless, flammable, strong-smelling chemical that is used in building materials and to produce many household products.
- Formaldehyde sources in the home include pressed-wood products, cigarette smoke, and fuel-burning appliances.
- When exposed to formaldehyde, some individuals may experience various short-term effects.
- Formaldehyde has been classified as a known human carcinogen (cancer-causing substance) by the International Agency for Research on Cancer and as a probable human carcinogen by the U.S. Environmental Protection Agency.
- Research studies of workers exposed to formaldehyde have suggested an association between formaldehyde exposure and certain cancers, including non-Hodgkin’s lymphoma and leukaemia.

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c5 – Thermal Comfort

- CR
  - Points: 1
  1) Thermal comfort design & control
  2) ASHRAE 55-2010 or ISO & CEN Standards
  1) Individual thermal comfort controls for min. 50% individually occupied spaces
  2) Group thermal controls @ shared multi-occupant spaces

---

c6 – Interior Lighting

- CR
  - Points: 2-2
  1) Lighting control min. 50% individually occupied spaces = 1
  2) Shared spaces must have multizone control systems and lighting control
c6 – Interior Lighting
And/or 2) Lighting quality = 1
• Choose 4 strategies:
  • Luminance
  • CRI of 80 or higher
  • Lamp life
  • Ambient lighting
  • Surface reflectance
  • Surface illuminance

---

c7 - Daylight
• CR
  • Points: 1-3
  • Manual/auto glare control devices at regularly occupied spaces
1) Simulation – spatial daylight autonomy = 2-3
Or 2) Simulation – illuminance calculations = 1-2
Or 3) Measurement = 1

---

c7 - Daylight
• Spatial daylight autonomy = percentage of work plan above 28 fc at least 50% of time during occupied hours over the course of full year
c8 – Quality Views
• Direct line of sight to outdoors via vision glazing for 75% regularly occupied floor area
  And 75% must have views with:
  • Multiple lines of sight
  • Flora, fauna, sky
  • Movement
  • Objects min. 25' distant
  • Unobstructed view to distance
  CR
• Points: 2 - 2

NEW!
c9 – Acoustic Performance
• Room noise levels – 2011 ASHRAE Handbook HVAC Applications, CH 4B, Table 1,
  or AHRI Standard 885-2008, Table 15
  • HVAC background noise
  CR
• Points: 1

• Sound isolation – meet STC rating requirements
• Reverb time & reverberant noise buildup – meet requirements
  • Sound reinforcement & masking systems – evaluate need for sound reinforcement and AV playback capabilities for large conference rooms and auditoriums seating more than 50
  CR
• Points: 9

Masking systems provide ambient background sound that reduces exposure to distracting office noises by emitting a discreet, electronically-generated sound through specially installed, ambientive speakers. When installed properly, employees won’t be aware of the pink noise being generated around them, but they will be able to focus on their work without unwanted sound distractions. Of course, carefully choosing office furniture, wall treatments and flooring systems will also contribute to a productive work area.
Indoor Environmental Quality—Additional Prerequisites and Credits

P3 – Minimum Acoustic Performance (Schools)

Innovation in Design

• CR
• Points: 1-6
• Innovative strategies (1-3)
• Pilot Credits (1-3)
• Exemplary Performance (1-2)
• LEED AP with Specialty = 1
Regional Priority

Regional Priority credits

- CR
  - Points: 1-4
  - Incentivize credits that address geographically specific environmental priorities
- LEED Online automatically determines a project's RPCs based on its zip code
  - [www.usgbc.org/rpc](http://www.usgbc.org/rpc)

Austin, TX

- EA2: On-site renewable energy, 2%
- MR2: Waste diversion, 75%
- SS6.1: Protect/restore habitat
- SS6.2: Stormwater quantity control
- SS6.3: Stormwater quality control
- WE2: Innovative wastewater technologies
LEED Pilot Credit Library

- Mechanism for testing proposed credits in the marketplace
- Feedback on usability
- Initially launched with 7 credits as part of LEED 2009, library now contains 80 credits

Pilot credits are the next big thing

- Find proposed credit suitable to project
- Submit evaluation forms to provide input
- One Innovation in Design (up to 3 points)

LEED Pilot Credit Library

Early Pilot Credits released in 2009:
- PC 1 – Life Cycle Assessment of Building Assemblies
- PC 5 – Preliminary Integrative Project Planning and Design
- PC 14 – Walkable Project Site
- PC 17 – Cooling Tower Makeup Water
- PC 20 – Recycled Content

LEED Pilot Credit Library

Early Pilot Credits translated to LEED v4:
- PC 1 – Life Cycle Assessment of Building Assemblies – v4 new credit: Life‐Cycle Impact Reduction
- PC 5 – Preliminary Integrative Project Planning and Design – v4 new credit: Integrative Process
- PC 14 – Walkable Project Site
- PC 17 – Cooling Tower Makeup Water – v4 new credit: Cooling Tower Water Use
- PC 20 – Recycled Content – v4 new credit: Sourcing of Raw Materials

LEED Pilot Credit Library

Pilot Credits released in 2011:
- PC 43 – Certified Products – v4 new credit: EPDs
- PC 45 – Site Assessment – v4 new credit
- PC 49 – Implementing Synergies
- PC 55 – Bird Collision Deterrence
LEED Pilot Credit Library – The Future of LEED

Recent Pilot Credits released in 2012:
- PC 59 – Occupant Engagement
- PC 60 – Integrative Process – v4 new credit
- PC 62 – Disclosure of Chemicals of Concern – v4 new credit
- PC 64 – Site Improvement Plan
- PC 65 – Monitoring Based Commissioning – v4 new strategy
- PC 66 – Community Contaminant Prevention
- PC 67 – Pilot Alternative Compliance Path – EA p2

Pilot Credits

- Design for Active Occupants
- Clean Construction
- Energy Star Homes
- Active Solar-Ready Design
- Material Ingredient Reporting
- Material Ingredient Optimization
- HVAC Start-Up Credentialing
- Demand Response
- Green Vehicles
- Sustainable Wastewater Management

Pilot Credits

- Walkable Project Site
- Rainwater Management
- Cooling Tower Water Use
- Appliance & Process Water Use Reduction
- Low-Emitting Interiors
- Interior Lighting Quality
- Acoustics
- Reconcile Projected & Actual Energy Performance
Pilot Credits

- Responsible Sourcing of Raw Materials
- Avoidance of Chemicals of Concern
- Bird Collision Deterrence
- Renewable Energy – Distributed Generation

Pilot Credits

- Enhanced Acoustical Performance – Exterior Noise Control
- Occupant Engagement
- Integrative Process
- Material Disclosure & Assessment

USGBC Advocacy

- Current Policy Priorities
- Whole-Building Life Cycle Assessment
- Monitoring Based Commissioning
- Community Contaminant Prevention – Airborne Releases
- Occupant Engagement
- Integrative Process
- Material Disclosure & Assessment
Current Policy Priorities

- Better buildings
- Support green building policy
- Incentives and financing
- Green schools
- Green affordable housing
- Sustainable communities
- Code adoption
- Resiliency
- Green jobs

Summary

Rating system is developed through continuous process to accommodate industry & technology changes, new markets, and refinements.

Major trends in v4 include:
- Life cycle analysis
- Emphasis on measurement and performance
- Increasing rigor and higher baselines for performance
- Moving away from building-centric view to encompass broader view of built environment
- Rainwater management vs. stormwater management
Course Objectives

- Outline the changes brought about by rating system development
- Discuss major trends in v4
- Describe the value of the Pilot Credit Library

Resources

- www.usgbc.org
- www.leeduser.com

Thank you!

www.v4extravaganza.com
How to Self-Report CE Hours

LEED Credential Maintenance Program
GBCI
How to Self-Report CE Hours

- [www.gbcio.org](http://www.gbcio.org)
- Click on My Credentials at top right hand
- Log in
- Click on Report CMP Activity on My Credentials page
- Complete training information using drop down menus and entering text
- Click submit
- Review CE hours reported by clicking on Review CMP Activity
STEP 1: CLICK ON MY CREDENTIALS
STEP 2 - LOG IN

LOG INTO MY CREDENTIALS

Email Address

Password

Forgot Your Password?
Reset it

First time here? If you have previously logged into the USGBC or GBCI websites or if you have applied, registered for, or taken a LEED Professional Exam, you already have an account. Log in above with your existing username and password. If you need help logging in, contact customer service. If you don't have a USGBC or GBCI account, register now.
MY CREDENTIALS

SARAH ANDREWS (GBCI Number: [Redacted])

Listed below is your current information on file. Please verify that your address and contact information is correct. To update your profile, please click on the link under Account Management.

Mailing Address: [Redacted]

Record Type: Certified
LEED AP: Certified since 11/10/2008
LEED AP BD+C: Certified since 6/31/2009 (Primary Specialty)

Download your LEED Professional logo(s)
Download or order your LEED Professional certificate(s)

You have enrolled in prescriptive credential maintenance on 6/30/2009

Current CMP Reporting Period
6/31/2013 - 6/30/2015

Primary Phone [Redacted]
Primary Email: andrew55945@aol.com
GBCI Number: [Redacted]

Credential Exams (LEED AP, LEED Green Associate)
• Apply for a credential exam

Certificate Exams (LEED for Homes Green Rater, LEED Project Reviewer)
• Apply for a certificate exam

Credential Maintenance Program (CMP)
• Report CMP Activity
• Review CMP Activity

Important Documents
• View the CMP Guide
• View the Enrollment Guide
• View the Disciplinary and Exam Appeals Policy
• View the Candidate Terms and Conditions

Account Management
• Update Profile
• Change Password
• Change Email Address
• Log Out

STEP 3 – CLICK THIS BOX
**STEP 4 – COMPLETE DATE, CE HOURS (1.5), AND CONTENT TYPE (GENERAL)**

**ACTIVITY TITLE:** “LEED V4: A PREVIEW” presented by Sarah Andrews, CSI CDT, LEED AP BD+C, USGBC Faculty

**COMPLETE DELIVERY METHOD (EDUCATION)**

**YOU MAY ADD DETAILS ABOUT THE PRESENTATION, SUCH AS THE EVENT ATTENDED, OBJECTIVES, ETC. IN THE COMMENTS BOX.**

**CLICK SUBMIT**
REPORT CMP ACTIVITY

SARAH ANDREWS  Reporting Period
8/31/2013- 8/30/2015

Record for the following activity has been added successfully:
Curriculum development for presentation entitled “Focus Session
on Sites and Water Efficiency”. Course length is 1 hour. Objectives:
identify the intents of the LT, SS, and WE credit categories;
contrast the conventional approach to rainwater management vs.
low impact development; list the major threats to groundwater
quality - (09/06/2013)

- Add New Record
- Return to Main Menu
- Return to CMP Reporting Summary

CLICK HERE TO REVIEW SUMMARY
REVIEW CMP ACTIVITY

SARAH ANDREWS

Reporting Period
8/31/2013 - 8/30/2015

Primary Specialty
LEED AP BD+C

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• Return to Main Menu