Radical Material and Resources Reporting Criteria in LEEDv4

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NRMCA VP of Sustainability
LEED v4 Points by Credit Category

<table>
<thead>
<tr>
<th>Credit Category</th>
<th>LEED v4 Points</th>
<th>LEED 2009 Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP – Integrative Process</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>LT - Location &amp; Transportation</td>
<td>16</td>
<td>0</td>
</tr>
<tr>
<td>SS - Sustainable Sites</td>
<td>10</td>
<td>26</td>
</tr>
<tr>
<td>WE - Water Efficiency</td>
<td>11</td>
<td>10</td>
</tr>
<tr>
<td>EA - Energy &amp; Atmosphere</td>
<td>33</td>
<td>35</td>
</tr>
<tr>
<td>MR - Materials &amp; Resources</td>
<td>13</td>
<td>14</td>
</tr>
<tr>
<td>EQ - Indoor Environmental Quality</td>
<td>16</td>
<td>15</td>
</tr>
<tr>
<td>ID - Innovation</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>RP - Regional Priority</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>110</strong></td>
<td><strong>110</strong></td>
</tr>
</tbody>
</table>
Walkable Streets

Surrounding Density and Diverse Uses
Access to Quality Transit

Rainwater Management
Heat Island Reduction

Water use Reduction
Optimized Energy Performance

Low Emitting Interiors
Daylight

Acoustic Performance
MR: Materials and Resources

- Recycled content for structural materials eliminated
- Regional Material eliminated
- Certified Wood eliminated

LEED v4
Materials & Resources Credits
Marketing

![Image of asbestos advertisement]

![Image of cola advertisement]

Marketing

![Image of cigarette advertisement]

![Image of Camel advertisement]
Disclosure

SURGEON GENERAL’S WARNING:
Smoking Causes Lung Cancer, Heart Disease, Emphysema, And May Complicate Pregnancy.

Disclosure

Fuel Economy and Environment

You save $1,850 in fuel costs over 5 years compared to the average new vehicle.
Transparency

Marketing
Disclosure

LEED v4

<table>
<thead>
<tr>
<th>MATERIALS &amp; RESOURCES</th>
<th>POSSIBLE 13</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRp1 Storage and collection of recyclables</td>
<td>REQ</td>
</tr>
<tr>
<td>MRp2 Construction and demolition waste management planning</td>
<td>REQ</td>
</tr>
<tr>
<td>MRC1 Building life-cycle impact reduction</td>
<td>5</td>
</tr>
<tr>
<td>MRC2 Building product disclosure and optimization – environmental product declarations</td>
<td>2</td>
</tr>
<tr>
<td>MRC3 Building product disclosure and optimization – sourcing of raw materials</td>
<td>2</td>
</tr>
<tr>
<td>MRC4 Building product disclosure and optimization – material ingredients</td>
<td>2</td>
</tr>
<tr>
<td>MRC5 Construction and demolition waste management</td>
<td>2</td>
</tr>
</tbody>
</table>
LEED v4 MR Credits

Global warming potential
Depletion of stratospheric ozone layer
Acidification of land and water sources
Eutrophication
Formation of tropospheric ozone
Depletion of nonrenewable energy

Land use
Water use
Biodiversity
Human rights
Noise
Human health (cancer)
Human health (non-cancer)

MRc2: ENVIRONMENTAL PRODUCT DECLARATIONS
Environmental Product Declarations

Option 1 – EPDs (1 point)
20 Permanently Installed Products

- **Product specific declaration** – publicly available (1/4 product)
- **Industry average EPD** – Third party certified Type III (1/2 product)
- **Product specific EPD** – Third party certified Type III (Full product)
- **USGBC Approved Program**
Advantage: Concrete

- Lightweight slabs
- Normal weight slabs
- Lightweight beams
- Normal weight beams
- 4000 psi columns
- 6000 psi columns
- Basement slabs
- Grade beams
- Spread footings
- Caissons

Roof slab
Parapets
Shear Walls
Stairs
Exterior walls
Sidewalks
Plazas
Parking areas
Pervious concrete
Driveways

What are EPDs?

EPD: Environmental Product Declarations
LCA: Life Cycle Assessment
Data: Life Cycle Inventory Data, plant specific
PCR: Product Category Rule
Environmental Product Declaration

- Provide quality assured and comparable information regarding environmental performance of a product and/or service

<table>
<thead>
<tr>
<th>Type</th>
<th>Standard</th>
<th>3rd party reviewed</th>
<th>Endorsement</th>
<th>Shorthand</th>
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<tbody>
<tr>
<td>I</td>
<td>ISO 14024</td>
<td>Yes</td>
<td>Yes</td>
<td>Eco-label</td>
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<tr>
<td>II</td>
<td>ISO 14021</td>
<td>No</td>
<td>Yes</td>
<td>Self-declaration</td>
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<tr>
<td>III</td>
<td>ISO 14025</td>
<td>Yes</td>
<td>No</td>
<td>Nutrition label</td>
</tr>
</tbody>
</table>

**Type III EPD**

**Nutrition Facts**

- Calories 150
- % Daily Value:
  - Total Fat: 2%
  - Saturated Fat: 3%
  - Trans Fat: 2%
  - Cholesterol: 6%
  - Sodium: 8%
  - Total Carbohydrate: 12%
  - Dietary Fiber: 2%
  - Sugars: 1%
- Vitamin A: 8%
- Vitamin C: 8%
- Calcium: 8%
- Iron: 8%

**Impact Category**  
<table>
<thead>
<tr>
<th>Total Primary Energy</th>
<th>2.10 MMBtu/yr</th>
<th>2.10 MMBtu/yr</th>
<th>MIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-l narrative</td>
<td>2.06 MMBtu/yr</td>
<td>2.06 MMBtu/yr</td>
<td>MIA</td>
</tr>
<tr>
<td>Renewable</td>
<td>0.01 MMBtu/yr</td>
<td>0.01 MMBtu/yr</td>
<td>MIA</td>
</tr>
<tr>
<td>Wash Water</td>
<td>131 lb/yr</td>
<td>131 lb/yr</td>
<td>MIA</td>
</tr>
<tr>
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<td>131 lb/yr</td>
<td>131 lb/yr</td>
<td>MIA</td>
</tr>
<tr>
<td>Total Waste Disposal</td>
<td>34 lb/yr</td>
<td>34 lb/yr</td>
<td>MIA</td>
</tr>
<tr>
<td>Global Warming Potential</td>
<td>254 kg CO2eq/yr</td>
<td>254 kg CO2eq/yr</td>
<td>TRACO</td>
</tr>
<tr>
<td>Carcinogenic Potential</td>
<td>0.00 kg/yr</td>
<td>0.00 kg/yr</td>
<td>TRACO</td>
</tr>
<tr>
<td>Acidification Potential</td>
<td>0.00 kg/yr</td>
<td>0.00 kg/yr</td>
<td>TRACO</td>
</tr>
<tr>
<td>Ecotoxicity Potential</td>
<td>0.00 kg/yr</td>
<td>0.00 kg/yr</td>
<td>TRACO</td>
</tr>
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<td>Ecotoxicity Potential</td>
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<tr>
<td>Human Health Criteria</td>
<td>0.00 kg/yr</td>
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<td>TRACO</td>
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</tbody>
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**Reference**

- MIA: Minimum Impact Assessment
- TRACO: Toxicity and Resource Assessment for Chemicals with Outcomes

For detailed analysis, please refer to the full report. The data presented is a summary of the environmental impacts of the product.
Product Category Rules (PCR)

- Instructions on how and what to report via the EPD
  - Product studied
  - Functional unit
  - System boundaries
  - Life cycle stages included
  - Impacts reported
PRODUCT Manufactures EPDs

Supplier EPDs

Supplier EPDs

Product EPD
Product EPDs to Whole Building LCA

Environmental Product Declarations

Option 2 – Multi-Attribute Optimization
(1 point) 50% by Cost

- Environmental Impact Reduction below industry average – USGBC Approved Certification Program – (100% Value)
  - GWP
  - Ozone depletion
  - Eutrophication
  - Smog formation
  - Acidification
  - Depletion of nonrenewable energy
Environmental Product Declarations
(Locally Sourced still matters)

FINAL PRODUCT VALUE =
(based product value x valuation factor based on location)

100 Miles (200% Cost)

500 Miles (LEED 2009)

MRc3: RESPONSIBLE SOURCING
Sourcing of Raw Materials

Option 1: Raw Material Source and Extraction Reporting (1 point)
- Manufacturer declared commitment (1/2 product)
- Corporate Sustainability Report (Third Party Verified CSR) (Full product)
Global Reporting Initiative (1997)

- Voluntary globally applicable sustainability reporting guidelines
- 341 organizations in 31 countries

www.globalreporting.org

UN Global Compact - COP

HUMAN RIGHTS

- Principle 1 Businesses should support and respect the protection of internationally proclaimed human rights;
- Principle 2 make sure that they are not complicit in human rights abuses.

LABOUR

- Principle 3 Businesses should uphold the freedom of association and the effective recognition of the right to collective bargaining;
- Principle 4 the elimination of all forms of forced and compulsory labour;
- Principle 5 the effective abolition of child labour; and
- Principle 6 the elimination of discrimination in respect of employment and occupation.

ENVIRONMENT

- Principle 7 Businesses are asked to support a precautionary approach to environmental challenges;
- Principle 8 undertake initiatives to promote greater environmental responsibility; and
- Principle 9 encourage the development and diffusion of environmentally friendly technologies.

ANTI-CORRUPTION

- Principle 10 Businesses should work against corruption in all its forms, including extortion and bribery.
OECD Guidelines for Multinational Enterprises

- information disclosure
- employment and industrial relations
- the environment
- bribery
- consumer interests
- science and technology
- competition and taxation

ISO 26000: 2010 Guidance on Social Responsibility

Social responsibility: 7 core subjects
What’s in the Report- GRI Example

Content, in context - 11 key issues, 33 indicators

- Environmental Issues
  - Climate change and energy (4 indicators)
  - Ecosystem services (2 indicators)
  - Local environmental impacts (4 indicators)

- Health and Safety Issues
  - Workforce protection (3 indicators)
  - Product health, safety and environmental risks (1 indicator)
  - Process safety and asset integrity (1 indicator)

- Social and Economic Issues
  - Community and society (4 indicators)
  - Local content (3 indicators)
  - Human rights (3 indicators)
  - Business ethics and transparency (4 indicators)
  - Labor practices (4 indicators)
MR Credit 3- Responsible Sourcing

- Option 2. Leadership Extraction Practices (1 point) 25% by Cost
  - Extended producer responsibility
  - Bio-based materials (Sustainable Agriculture Standard)
  - Wood products (FSC)
  - Materials reuse (salvaged, refurbished, or reused)
  - Recycled content (postconsumer + ½ preconsumer)
  - USGBC approved program

Leadership Extraction Practices
Extended Producer Responsibility

Recycled Content

Use materials with recycled content such that the sum of post consumer recycled content plus 1/2 of the pre-consumer content

**Post-Consumer:** Waste material generated by households or by commercial, industrial and institutional facilities in their role as end users of the product, which can no longer be used for its intended purpose.

**Pre-Consumer:** Material diverted from the waste stream during the manufacturing process.
Sourcing of Raw Materials

MRc4: MATERIAL INGREDIENTS
Material Ingredients

Option 1: Material Ingredients Reporting
(1 Point)
20 Permanently Installed Products
- Manufacturer Inventory
- Health Product Declaration (HPD)
- Cradle to Cradle (Basic)
- USGBC Approved Program
- Inventoried to 1000 ppm

Material Ingredients

Option 2: Material Ingredients Optimization
(1 Point) 25% by Cost
- Manufacturer Inventory
- Cradle to Cradle Certification
- USGBC Approved Program
- International Alternate – REACH

Option 3: Product Manufacturer Supply Chain Optimization (1 point) 25% by Cost
- Transparently of chemical ingredients
Human Health Linked to Toxins

**Chemicals of Concern**

**REDLIST (Living Building)**

- Arsenic
- Cadmium
- Chromium
- Mercury
- PVC
- PCB

**BANNED LIST (C2C)**

**TECHNICAL**

- Arsenic
- Cadmium
- Chromium
- Mercury
- PVC
- PCB

**BIOLOGICAL**

- Arsenic
- Cadmium
- Mercury
- Lead
- PVC
- PBDE
- Penta-BDE
Chemical Abstract Service (CAS)

CAS REGISTRY℠

Example CAS Number:

111111-11-1

2 to 6 digits  2 digits  1 digit

GreenScreen

Benchmark 4

Prefer—Safer Chemical

Benchmark 3

a. moderate P or moderate 8
b. moderate Ecotoxicity
c. moderate Human Toxicity
d. moderate Flammability or moderate Explosiveness

Use but Still Opportunity for Improvement

Benchmark 2

a. moderate P or moderate 8 or moderate Ecotoxicity
b. high P or high 8 or high Ecotoxicity
c. [high P or moderate Ecotoxicity] or [high 8 or moderate Ecotoxicity]
d. moderate Human Toxicity or any priority effect or high Human Toxicity
e. high Flammability or high Explosiveness

Use but Search for Safer Substitutes

Benchmark 1

a. PF: high P or high 8 or high Ecotoxicity or high Human Toxicity or high Flammability or high Explosiveness
b. PF and high P or high 8 or high Ecotoxicity or high Flammability or high Explosiveness
c. high P or high 8 or high Ecotoxicity or high Flammability or high Explosiveness or any priority effect or high Human Toxicity
d. high Human Toxicity for one priority effect or high Flammability or high Explosiveness

Avoid—Chemical of High Concern
Cradle2Cradle (C2C)

- Material Health
- Material Reutilization
- Renewable Energy
- Water Stewardship
- Social Fairness

- Certification Levels
  - Basic
  - Bronze
  - Silver
  - Gold
  - Platinum

Health Product Declaration (HPD)

- IDENTIFY
- INVENTORY
- ASSESS
- COMPLIANCE
- ACCESSORIES
- SUMMARIZE
- PUBLISH
HPD- Example

CONTENTS DISCLOSURE

CONTENTS IN ORDER OF QUANTITY

REACH

- Registration
- Evaluation
- Authorization
- Restriction
Material Ingredients

What Does This Mean To You?
OPPORTUNITY
Be part of the solution
It’s the right thing to do
OPPORTUNITY Demanded by A/E Firms

Defined metrics for environmental impacts
OPPORTUNITY

Potential market advantage for early adopters

U.S. Residential Green Building Market 2005-2016 ($Billions)

Source: McGraw Hill
($Billions)

Source: McGraw Hill

OPPORTUNITY

Prescriptive Specification
Concrete shall have minimum fly ash content of 50%

Performance Specification
Concrete shall have maximum Global Warming Potential of 350 kg CO2e/m³
CHALLENGE

Just more paperwork

CHALLENGE

Just more regulation
U.S. CONCRETE INDUSTRY

5000 Plants
1000 Products/Plant

5,000,000 EPDs?

CHALLENGE

Will EPDs result in lower environmental impacts…
…or just increase product costs?
BUT DOES IT REALLY MATTER?
It’s here whether we like it or not

What’s NRMCA Doing to Help?
Environmental Product Declarations

NRMCA EPD Program

INDUSTRY AVERAGE EPD
INDUSTRY BASELINES

NRMCA Project

Responsible Sourcing

NRMCA Sustainable Concrete Plant Certification

International Responsible Sourcing Scheme

Sustainable Concrete Plant Guidelines

wbcsd Responsible Sourcing of Concrete
BRE 6001
ISO 26000
Ingredient Disclosure

NRMCA Educating Members

NRMCA GUIDE to Material Ingredient Disclosure for Concrete

NRMCA RMCREF Project

www.nrmca.org/sustainability
Questions?

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