Agenda

- Generalize trends of transparency
- Transparency in construction industry
  - LEED v4 MR “transparency credits”
- IW-EPD
  - Disclosure in specifications/CDs
  - Suggestions to communicate IW-EPD on LEED projects
- Regional Benchmark Reports
  - For comparison and influencing market activities
- Why does transparency matter?
- Q&A

Drivers of Transparency

- “Marketing in the age of transparency”
- Customers / influencers are investigating the risks from the products or companies
- Effort of making more informed and responsible decisions

Product Transparency Trends

- Product Health Impacts
- Corporate & Supply Chain Responsibility

Resources

- Self-Declared
  - FTC Part 260
- 3rd Party Certs – “single attribute”
- LCA / EPD “Multi-impacts”
Transparency in LEED

**LEED® Versions**
- LEED®
  - Market Driven Rating System
  - NOT a building code (IGCC)
- Several Major Revisions
  - 2.0
  - 2.1
  - 2.2
  - LEED 2009
  - LEED v4.0
  - LEED v4.1

**Product Transparency Credits - LEED v4.x**

<table>
<thead>
<tr>
<th>Credit</th>
<th>Description</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prereq</td>
<td>Building Life-Cycle Impact Reduction</td>
<td>5</td>
</tr>
<tr>
<td>Credit</td>
<td>Building Product Disclosure and Optimization - Environmental Product Declarations</td>
<td>2</td>
</tr>
<tr>
<td>Credit</td>
<td>Building Product Disclosure and Optimization - Sourcing of Raw Materials</td>
<td>2</td>
</tr>
<tr>
<td>Credit</td>
<td>Building Product Disclosure and Optimization - Material Ingredients</td>
<td>2</td>
</tr>
<tr>
<td>Credit</td>
<td>Construction and Demolition Waste Management</td>
<td>2</td>
</tr>
</tbody>
</table>

**Transparency in Green Building**
Environmental Product Declarations

- **Option 1: Disclose environmental impacts**
  - **Industry average EPD**
    - third party certified Type III (partial contribution)
  - **Product specific EPD**
    - third party certified Type III (more contribution)
- **Option 2: Optimizing by demonstrating an impact reduction from Option 1**
  - Compare Product Specific to Regional Benchmark Report

**Option 1: Industry-Wide EPD**

- Provides average industry-wide or “generic” environmental impacts
  - 6 compression strengths
  - w/ various SCMs % and LW aggregate
  - 72 mix designs that represents >90% of production
- Contribution by smaller companies with limited resources
  - 153 companies / 1,954 plants
- Plants provide significant project coverage across the U.S.
- Only participants can utilize document for LEED evidence
- Registered with NSF Certification, LLC
Option 1: Industry-Wide EPD

Specified / submitted mix, i.e., 4,000 psi mix w/ 25% fly ash

Option 1: Product-specific EPD

- Commissioned by the RM producer
- Contracted with LCA consultant
- Verified through EPD programs operators
  - NRMCA, ASTM, NSF, UL-Env

Tracking Industry EPDs (cumulative)
Tracking Mixes w/in EPDs (cumulative)

Product Disclosure
In Construction Documents

LEED Materials Submittal Form - Historical

Div 01 18 13 – SUSTAINABLE DESIGN REQUIREMENTS

- Contractor to complete:
  - Env Materials Reporting Form
  - BPDO Calculator
Div 03 30 00 – Cast in place concrete

1.4 SUBMITTALS

a. LEED Submittals: Submit product and material documentation to comply with and contribute to the Project’s LEED requirements, as specified in Section O1.01.18 (Sustainable Design Requirements). For all installed products and materials of this Section, complete the following forms attached at the end of Section O1.01.18 “Sustainable Design Requirements”:
   1. Environmental Materials Reporting Form.
   2. Low-Emitting Materials Reporting Form.
   3. PB2 Materials Reporting Form.

b. Manufacturer’s Data: Concrete Work – For information only, submit manufacturer’s data with application and installation instructions for concrete materials and dosages.

LEED Communication Letter

- LEED project information & registration
- High level promotion of concrete
- Summary table addressing “transparency” credits
- Cost
- Goes into credit details
LEED Communication Letter - EPD

1.8 Environmental Product Declaration: Libraearth information is available that discloses environmentally, economically, and socially important data about the products.EDP

Details pertaining to environmental impacts per product/property code are publicly available whereas

EPD Code:

BMC Company participated in the National Ready Mixed Concrete Association’s M-EPD (aggregate EPD) database, and they are listed in the verified EPD and a directory of industry players with M-EPD Company as a participant:

- Directory of participants: https://www.nrmca.org/standards/EPD/Program/leed/

DP: 9.0

Appendix A provides specific details on environmental impacts of proposed new designs for the LEED project.

LEED Communication Letter – Sourcing

2.2 Responsible Sourcing: Identifying and managing environmental, social and governance practices of supply chain partners. This includes sustainable supply chain certifications and recycled content. Concrete utilizes waste products from other industries as an important ingredient, such as fly ash and slag. These byproducts are non-toxic materials for concrete and can reduce the environmental impact (see EPD).

<table>
<thead>
<tr>
<th>Product</th>
<th>Waste Material</th>
<th>Recycled Content</th>
<th>Cost 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waste</td>
<td>Ash (WA)</td>
<td>10%</td>
<td>$2,000</td>
</tr>
<tr>
<td>Waste</td>
<td>Slag (WS)</td>
<td>5%</td>
<td>$1,500</td>
</tr>
</tbody>
</table>

LEED Communication Letter - Hazards

3.0 Material Ingredients: Selecting products for which the chemical ingredients in the product are inventoried using an accepted methodology and for selecting products verified to minimize the use and generation of harmful substances.

<table>
<thead>
<tr>
<th>Product</th>
<th>Ingredient</th>
<th>Type of Report (DoE/ERP)</th>
<th>% of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>KOE, Diacres, PD</td>
<td>X/A</td>
<td>2.5%</td>
</tr>
</tbody>
</table>

LEED Communication Letter - Other

4.0 Low-Emitting Materials: USGBC defines concrete as an inherently low-emitting material and therefore no emission testing is required. [Note: Emissions or odors are used for protecting the concrete; these finishes must report their VOC content in accordance with LEED criteria.]

<table>
<thead>
<tr>
<th>Product</th>
<th>City Scale</th>
<th>Aggregate City Scale</th>
<th>Connect City Scale</th>
<th>VOC (mg/kg)</th>
<th>% by Weight*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waste 1</td>
<td>WD</td>
<td>x riders</td>
<td>x riders</td>
<td>x riders</td>
<td>x riders</td>
</tr>
<tr>
<td>Waste 2</td>
<td>WD</td>
<td>x riders</td>
<td>x riders</td>
<td>x riders</td>
<td>x riders</td>
</tr>
</tbody>
</table>

* Note: 100% of emissions 10X is precluded to complete “waste product.”
Example - BPDO Calculator

Regional Benchmark Report

Eventually upload to “LEED-Online”

Regional Benchmark Average

• Regional benchmark
• Data segmented from IW-EPD
  – Allows comparison to average impacts from benchmark products
  – Influence local activities

Option 2: Optimization to Reduce Impact
Influence Legislation, Codes, etc.

- Together we are collecting the data for our industry.
- Together we will inform and influence by presenting that information.

Why Does Transparency Matter?

Market Perspective

LEED v 4 Registration Activity (target projects)

V4.x: Top 10 States

<table>
<thead>
<tr>
<th>#</th>
<th>State</th>
<th># LEED v4+ projects</th>
<th>#</th>
<th>State</th>
<th># LEED v4+ projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CA</td>
<td>765</td>
<td>6</td>
<td>VA</td>
<td>196</td>
</tr>
<tr>
<td>2</td>
<td>TX</td>
<td>247</td>
<td>7</td>
<td>DC</td>
<td>174</td>
</tr>
<tr>
<td>3</td>
<td>NY</td>
<td>235</td>
<td>8</td>
<td>WA</td>
<td>163</td>
</tr>
<tr>
<td>4</td>
<td>MA</td>
<td>201</td>
<td>9</td>
<td>MD</td>
<td>147</td>
</tr>
<tr>
<td>5</td>
<td>FL</td>
<td>200</td>
<td>10</td>
<td>PA</td>
<td>134</td>
</tr>
</tbody>
</table>
### Disclosure – Product Categories

<table>
<thead>
<tr>
<th>Div</th>
<th>Industry</th>
<th>EPDs</th>
</tr>
</thead>
<tbody>
<tr>
<td>03</td>
<td>Concrete</td>
<td>115</td>
</tr>
<tr>
<td>04</td>
<td>Masonry</td>
<td>32</td>
</tr>
<tr>
<td>05</td>
<td>Metals</td>
<td>54</td>
</tr>
<tr>
<td>06</td>
<td>Wood / Plastic / Composite</td>
<td>37</td>
</tr>
<tr>
<td>07</td>
<td>Thermal &amp; Moisture</td>
<td>106</td>
</tr>
<tr>
<td>08</td>
<td>Openings</td>
<td>179</td>
</tr>
<tr>
<td>09</td>
<td>Finishes</td>
<td>349</td>
</tr>
</tbody>
</table>

#### Influence Legislation, Codes, etc.

**EPA ACTIVITY PER MASTERFORMAT DIVISION**

<table>
<thead>
<tr>
<th>Month</th>
<th>Div 03</th>
<th>Div 04</th>
<th>Div 05</th>
<th>Div 06</th>
<th>Div 07</th>
<th>Div 08</th>
<th>Div 09</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sep-16</td>
<td>105</td>
<td>152</td>
<td>197</td>
<td>209</td>
<td>208</td>
<td>194</td>
<td>183</td>
</tr>
<tr>
<td>Mar-17</td>
<td>135</td>
<td>162</td>
<td>176</td>
<td>175</td>
<td>168</td>
<td>162</td>
<td>148</td>
</tr>
<tr>
<td>May-18</td>
<td>126</td>
<td>148</td>
<td>148</td>
<td>152</td>
<td>146</td>
<td>140</td>
<td>127</td>
</tr>
<tr>
<td>Feb-19</td>
<td>132</td>
<td>147</td>
<td>149</td>
<td>152</td>
<td>146</td>
<td>139</td>
<td>126</td>
</tr>
<tr>
<td>Jan-20</td>
<td>128</td>
<td>138</td>
<td>139</td>
<td>144</td>
<td>137</td>
<td>131</td>
<td>120</td>
</tr>
</tbody>
</table>
**Risks & Liabilities**

**Take Away Notes & Summary**

- Significant trends of transparency
- Pressure from AE to be more transparent & GCs are the messengers
- LEED v4 being discovered in CDs and specs
- Concrete industry was one of the first to disclose environmental impacts and continue to be positioned to meet disclosure demands
- Growing disclosure from competing product categories
- Modify LEED letter to meet your branding and communication strategy
- Reference the BM report to influence local legislation/regs, codes, standards, etc.
- Reach out for customized strategic discussions for business case to be more transparent