

EPDs: Market Drivers & Activity

James Bogdan, Sr. Director, Sustainability Initiatives

Agenda

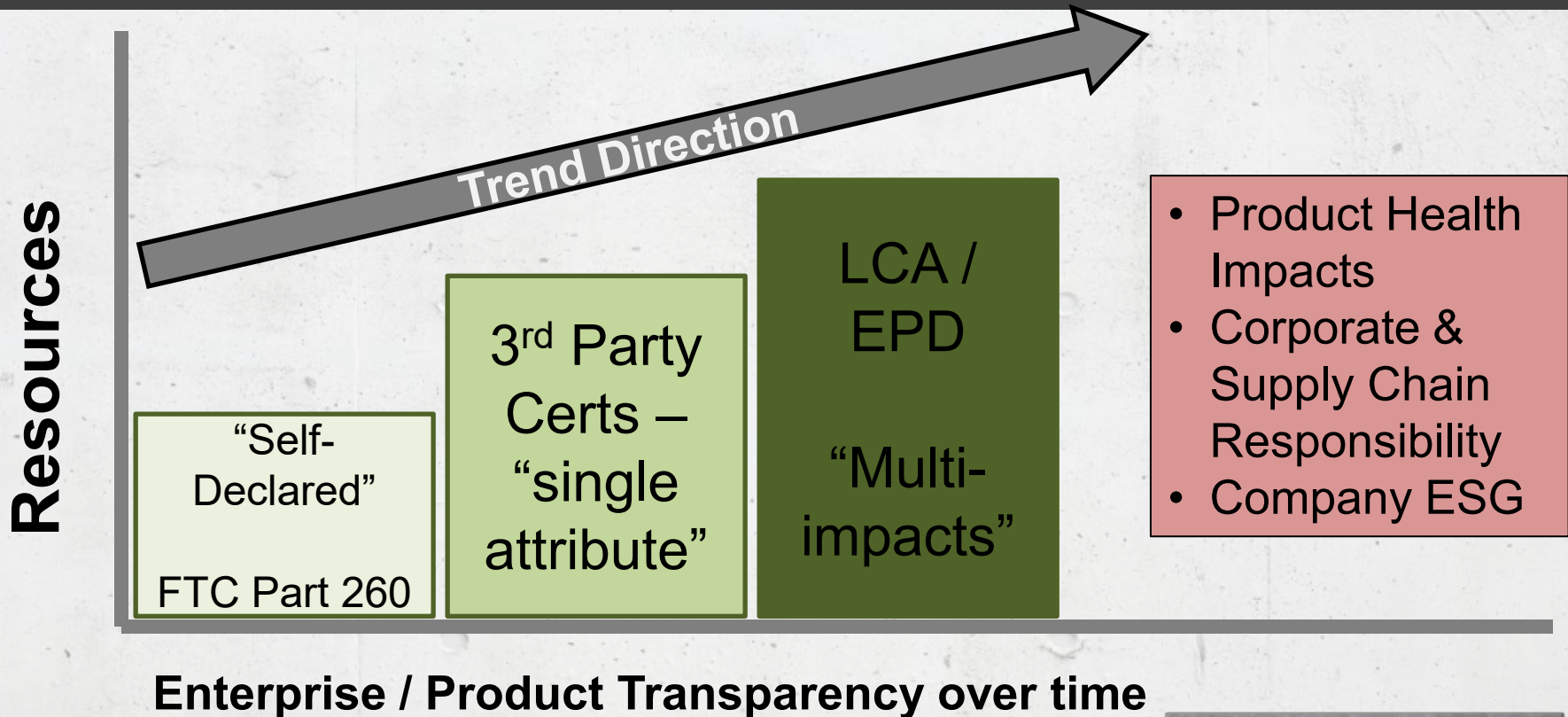
- Trends and specific drivers of transparency
- What are EPDs
- EPD Market Drivers
- EPD in LEED rating system
- Disclosure inquiries & response
 - examples of EPDs in specifications & AEC inquiries
- EPD market activity
- EPD Process
- Final thoughts and Q&A

Age 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



Transparency Trends



What are EPDs

Construction Market

BUILD WITH STRENGTH

ENVIRONMENTAL IMPACTS

Declared Product:

Mix 460N4200 • Morrisville Plant

4500 FAE

Compressive strength: 4500 PSI at 28 days

Declared Unit: 1 m³ of concrete

Global Warming Potential (kg CO ₂ -eq)	430
Ozone Depletion Potential (kg CFC-11-eq)	1.09E-5
Acidification Potential (kg SO ₂ -eq)	1.26
Eutrophication Potential (kg N-eq)	0.52
Photochemical Smog Creation Potential (kg O ₃ -eq)	25.3
Total Primary Energy Consumption (MJ)	2,886
Nonrenewable (MJ)	2,770
Renewable (MJ)	115
Total Concrete Water Consumption (m ³)	2.93
Batching Water (m ³)	0.18
Washing Water (m ³)	0.03
Nonrenewable Material Resource Consumption (kg)	2,319
Renewable Material Resource Consumption (kg)	2.90
Hazardous Waste Production (kg)	0.02
Nonhazardous Waste Production (kg)	4.02

Product Components: crushed aggregate (ASTM C33), natural aggregate (ASTM C33), Portland cement (ASTM C150), fly ash (ASTM C618), batch water (ASTM C1602), admixture (ASTM C494)

- List the env impacts when producing a product
- List many impacts
- Most focus on GWP
 - Proxy for embodied C

Transparency Drivers

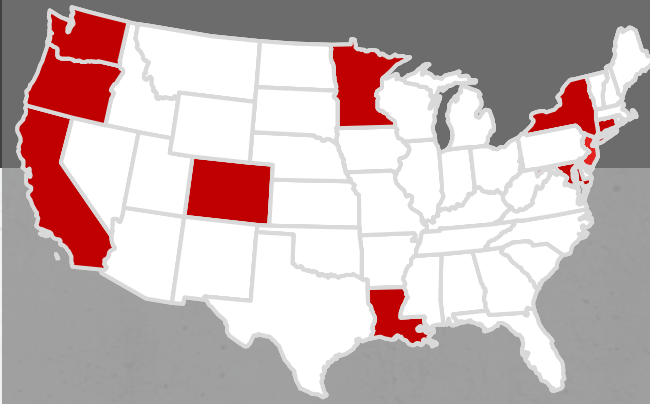
Construction Market

BUILD WITH STRENGTH

Disclosure in Green Building



State & Local Legislation



EPDs

Buy Clean Bills

CA, WA, MN, CO

Low C Concrete Rule

Portland, OR

Options

Low Embodied Carbon Concrete / Cement

CT, HI, NY, NJ, MD, LA

Low-C Concrete Codes

Marin, CA



Concrete's Contribution to LEED v4.x



LEED v4 BD&C: Points by Category

Credit Category	Credits	Pts. LEED v4.x	LEED 2009
IP – Integrative Process	1C	1	0
LT - Location & Transportation	8C	16	0
SS - Sustainable Sites	1P, 6C	10	26
WE - Water Efficiency	3P, 4C	11	10
EA - Energy & Atmosphere	4P, 7C	33	35
MR - Materials & Resources	2P, 5C	13	14
EQ - Indoor Environmental Quality	2P, 9C	16	15
IN - Innovation	2C	6	6
RP - Regional Priority	1C	4	4
TOTAL	--	110	110
C = credit P = prerequisite			

BUILD WITH STRENGTH

Summary: Concrete Contribution to LEED

Category	D - Design C - Construction M – Material	Direct or Indirect	Concrete Evidence
Integrative Process	D, C	Typically No	Influence project team
Location & Transportation	D	No	
Sustainable Sites	D, M	Direct / Indirect	SR values, Filtration #s, Ext lighting
Water Efficiency	D	Indirect	Water retention
Energy Efficiency	D	Indirect	Thermal mass
Materials & Resources	C, M	Direct	EPDs, HPDs, Sourcing, RC, RM
Indoor Env. Quality	D, C, M	Direct by default	Non-emitting material
Innovation	D	TBD	
Regional Priority	D	TBD	

LEED Changes: Concrete Contribution to MR

LEED v1.x, v2.x, v2009	LEED 4.0	LEED 4.1	LEED 4.x/5.0
Recycled Content Regional Material	WBLCA – 3 pts	WBLCA – 4 pts	TBD
	Env disclosure: IW-EPD = 0.5x PS-EPD = 1.0x	Env disclosure: IW-EPD = 1.0x PS-EPD = 1.5x	TBD
	Lower impact than IW	Lower impact than IW	
	Responsible Sourcing: RC & RM	Responsible Sourcing: RC & RM	? CSC Certification ?
	Health disclosure: Ingredient hazard report (HPD, C2C, etc.)	Health disclosure: Ingredient hazard report (HPD, C2C, etc.)	TBD

Product Disclosure

In Construction Documents

BUILD WITH STRENGTH

LEED Materials Submittal Form - Historical



MRc4 - MRc7

LEED MATERIALS SUBMITTAL FORM (LEED BD+C and ID+C v2009)

Project: 10/1968

Contractor/Supplier: Unistrut

Contact (name, phone): Dena Bell 303-745-7307

Manufacturer (name, phone, address): Unistrut

Project Name and Zip Code: DMNS - ECF 80205

Specification Section: 055600

Material	Material Cost	Product Data Sheets Provided	Recycled Content MRc4 (by weight)		Location of Manufacturer and Origin (Salvage, Harvest, Extraction) MRc5 ** project must originate and be manufactured within 500 miles of project site					% Rapidly Renewable MRc6 (by weight)	FSC Certified Wood MRc7			
			% Pre-Consumer	% Post-Consumer	Manuf. Zip Code	Manuf. Miles From Project Site	Origin Zip Code	Origin Miles From Project Site	% of Product originated and manufactured within 500 miles		FSC Pure/Mixed/ Recycled	Chain of Custody #	% wood (by weight)	% FSC (by weight)
Unistrut Channel & Fittings	199,509	Y	6.1	22.3										

Definitions:

Material Cost: The Materials cost includes all expenses to deliver the material to the project site. Materials costs should account for all taxes and transportation costs incurred by the contractor by exclude any cost for the labor and equipment once the material has been delivered to the site.

Pre consumer: Material diverted from the waste stream during the manufacturing process. Excludes the reutilization of materials such as rework, regrind, or scrap generated in a process and capable of being reclaimed within the same process that generated it.

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.

FSC: Forest Stewardship Council is an organization of Sustainable Forestry defined as: the practice of managing forest resources to meet the long-term forest product needs of humans while maintain the biodiversity of forested landscapes. The primary goal is to restore, enhance, and sustain a full range of forest values - economic, social, and ecological.

Chain-of-Custody: A document that tracks the movement of a wood product from the forest to a vendor and is used to verify compliance with FSC guidelines. A vendor is defined as the company that supplies wood products to project contractors or subcontractors for on-site installation.

Rapidly Renewable: Material considered to be an agricultural product, both fiber and animal, that takes 10 years or less to grow and to harvest in an ongoing and sustainable fashion.

Div 01 18 13 – SUSTAINABLE DESIGN REQUIREMENTS

B. LEED Product Submittals:

1. Projects seeking LEED certification must track and record product, material, and cost information for LEED credit documentation. The contractor shall complete and submit the following forms included with product submittals:
2. Environmental Materials Reporting Form: for all permanently installed products and materials specified in CSI MasterFormat 2012 Edition Divisions 03-12, 31 (Sections relating to Foundations), and 32 (Sections relating to Pavings, Site Improvements, and Planting). The Contractor shall submit:

C. LEED Materials Tracking Submittals

1. The contractor shall complete a LEED v4 Building Product Disclosure + Optimization (BPDO) Calculator for products in CSI MasterFormat 2012 Edition Divisions 03-11, 31 (Sections relating to Foundations), and 32 (Sections relating to Pavings, Site Improvements, and Planting) according to the following schedule and requirements:

- Contractor “shall” complete:
 - Env Materials Reporting Form
 - BPDO Form
 - Sustainable Material Content Form
 - LEED Materials Documentation Sheet
 - 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 01 81 13 (Sustainable Design Requirements). For all installed products and materials of this Section, complete the following forms attached at the end of Section 018113 "Sustainable Design Requirements":
1. Environmental Materials Reporting Form.
 2. Low-Emitting Materials Reporting Form.
 3. PBT Materials Reporting Form.
- B. Manufacturer's Data: Concrete Work - For information only, submit manufacturer's data with application and installation instructions for proprietary materials and items including

LEED v4 BDPO MATERIALS REPORTING FORM

Project Name		Submittal Name		Date	
Subcontractor		Contact Person		Submittal No.	
				Spec Section	

Please complete this form for ALL permanently-installed products in Divisions 03-12, 31, and 32 and insulation products specified in any section.

For each product, please fill in ALL requested information and check boxes to indicate documentation included in this submittal. See page 2 for definitions and documentation requirements.

PRODUCT 1	PRODUCT NAME / MODEL	MANUFACTURER	TOTAL MATERIAL COST (excluding site labor & equipment)	REGIONAL MATERIALS
<div>EPD</div> <div>Product EPD Product LCA</div>	<div>SOURCING OF RAW MATERIALS</div> <div> <div>Mfr CSR</div> <div>Mfr Take Back</div> <div>FSC Wood</div> <div>Salvaged Material</div> <div>Bio-based Material</div> <div>Applicable Portion (by wgt) %</div> </div> <div> <div>Recycled Content</div> <div>Pre-Consumer %</div> <div>Post-Consumer %</div> </div>	<div>MATERIAL INGREDIENTS</div> <div> <div>Mfr Inged Inventory</div> <div>HPD</div> <div>C2C Certificate</div> <div>Green-Screen</div> <div>Declare Label</div> </div>	<div>Raw materials extracted, manufactured AND purchased within 100 miles of Project site</div> <div> <div>Regional Material?</div> <div>Compliant Portion %</div> </div>	
PRODUCT 2	PRODUCT NAME / MODEL	MANUFACTURER	TOTAL MATERIAL COST (excluding site labor & equipment)	REGIONAL MATERIALS
<div>EPD</div> <div>Product EPD Product LCA</div>	<div>SOURCING OF RAW MATERIALS</div> <div> <div>Mfr CSR</div> <div>Mfr Take Back</div> <div>FSC Wood</div> <div>Salvaged Material</div> <div>Bio-based Material</div> <div>Applicable Portion (by wgt) %</div> </div> <div> <div>Recycled Content</div> <div>Pre-Consumer %</div> <div>Post-Consumer %</div> </div>	<div>MATERIAL INGREDIENTS</div> <div> <div>Mfr Inged Inventory</div> <div>HPD</div> <div>C2C Certificate</div> <div>Green-Screen</div> <div>Declare Label</div> </div>	<div>Raw materials extracted, manufactured AND purchased within 100 miles of Project site</div> <div> <div>Regional Material?</div> <div>Compliant Portion %</div> </div>	
PRODUCT 3	PRODUCT NAME / MODEL	MANUFACTURER	TOTAL MATERIAL COST (excluding site labor & equipment)	REGIONAL MATERIALS
<div>EPD</div> <div>Product EPD Product LCA</div>	<div>SOURCING OF RAW MATERIALS</div> <div> <div>Mfr CSR</div> <div>Mfr Take Back</div> <div>FSC Wood</div> <div>Salvaged Material</div> <div>Bio-based Material</div> <div>Applicable Portion (by wgt) %</div> </div> <div> <div>Recycled Content</div> <div>Pre-Consumer %</div> <div>Post-Consumer %</div> </div>	<div>MATERIAL INGREDIENTS</div> <div> <div>Mfr Inged Inventory</div> <div>HPD</div> <div>C2C Certificate</div> <div>Green-Screen</div> <div>Declare Label</div> </div>	<div>Raw materials extracted, manufactured AND purchased within 100 miles of Project site</div> <div> <div>Regional Material?</div> <div>Compliant Portion %</div> </div>	

CONTRACTOR CERTIFICATION:

I, _____ a duly authorized representative of _____ hereby certify that the material information contained herein is an accurate representation of the material qualifications to be provided by us, as components of the final building construction. Furthermore, I understand that any change in such qualifications during the purchasing period will require prior written approval from the Construction Manager and Owner.

SIGNATURE OF AUTHORIZED REPRESENTATIVE:

DATE:

LEED Criteria Worksheet

The LEED Criteria Worksheet lists Materials + Resources Building Product Declaration and Optimization (BPDO) Credits and Environmental Quality Low-Emitting Material Credit for LEEDv4 BD+C Rating. Please complete the form and provide required information. Gensler seeks to support the achievement of LEEDv4 requirements by utilizing the information provided on this form, to ensure project will meet LEED requirements. Be sure to fill out all fields and check Yes/No/NA for every question, unless otherwise indicated.

Date:		
Subcontractor:	Submittal No.:	
Contact Name:	Phone:	
Product/Manufacturer:	Model/Description:	
Total Cost (excluding tax + labor):	Estimated Cost or	Actual Cost

LOCATION VALUATION FACTOR:

How many miles is this product extracted, manufactured, and purchased from the project site? _____ miles

ENVIRONMENTAL PRODUCT DECLARATION (EPD):

Is one of the declarations below available for this product?

- Product specific, critically reviewed, with cradle-to-gate scope and in compliance with ISO 14044 ☐ Yes ☐ No ☐
- Industry-wide generic EPD, Type III, with third party certification including external verification, and manufacturer explicitly recognized ☐ Yes ☐ No ☐
- Product specific Type III declaration, in compliance with ISO 14025, 14040, 14044, and 21930 ☒ Yes ☐ No ☐

MULTI-ATTRIBUTE OPTIMIZATION:

Does the manufacturer use a third party organization to certify their products? ☐ Yes ☐ No ☒

If yes, indicate which of the following categories demonstrate impact reduction (below industry average):

- ☐ Global warming potential (greenhouse gases), in CO₂e ☐ Depletion of the stratospheric ozone layer, in kg CFC-1
- ☐ Acidification of land and water sources, in moles H⁺ or kg KO₂ ☐ Eutrophication, in kg nitrogen or kg phosphate
- ☐ Formation of tropospheric ozone, in kg NO_x or kg ethane ☐ Depletion of nonrenewable energy resources, in MJ

RAW MATERIAL SOURCE AND EXTRACTION REPORTING:

Does this product have a publicly released report from their raw material suppliers which includes extraction locations, commitment to long-term ecologically responsible land use, reducing environmental harms, and meeting standards that address responsible sourcing criteria? ☐ Yes ☐ No ☐

If yes, indicate which of the following categories demonstrate impact reduction (below industry average):

- ☐ Self Declared Report ☐ Global Reporting Initiative (GRI) Sustainability Report
- ☐ U.N. Global Compact: Communication of Progress ☐ ISO 26000: 2010 Guidance on Social Responsibility
- ☐ Organization for Economic Cooperation and Development (OECD) Guidelines for Multinational Enterprises

LEADERSHIP EXTRACTION PRACTICES:

Does the product meet any of the attributes below?

- Extended Producer Responsibility** - manufacturer participates in take back program ☒ Yes ☐ No ☐
- Bio-based materials** - that meet the Sustainable Agriculture Network's Sustainable Agriculture Standard tested using ASTM Test Method D 6866 _____ %
- New wood** - certified by the Forest Stewardship Council (FSC) _____ %
- Material reuse** - include salvaged, refurbished, or reused products _____ %
- Recycled content** - post-consumer and pre-consumer _____ % Post
_____ % Pre

MATERIAL INGREDIENT REPORTING:

Does the manufacturer use any of the following programs to demonstrate the chemical inventory of the product? ☐ Yes ☐ No ☒

If yes, indicate which of the following:

- Chemical Abstract Service Registration Number (CASRN)** ☐ Yes ☐ No ☐
- Health Product Declaration (HPD)** ☐ Yes ☐ No ☐
- Cradle-to-Cradle certified at a minimum v2 Basic Level OR v3 Bronze Level** ☐ Yes ☐ No ☐
- Declare Label** ☐ Yes ☐ No ☐
- UL Product Lens** ☐ Yes ☐ No ☐

MATERIAL INGREDIENT OPTIMIZATION:

Does the product meet any of the following documentation options? ☐ Yes ☐ No ☒

- GreenScreen v1.2 Benchmark** - Fully inventoried chemical ingredients to 110 ppm and no ingredients have Benchmark 1 hazards as defined by the Green Screen Test Translator Products ☐ Yes ☐ No ☐
- If yes, have all ingredients have undergone a full **GreenScreen Assessment**? ☐ Yes ☐ No ☐
- Cradle-to-Cradle certified v2 Gold or higher:** ☐ Yes ☐ No ☐
- ☐ v2 Gold Level ☐ v2 Platinum Level ☐ v3 Silver Level ☐ v3 Gold or Platinum Level

SUPPLY CHAIN OPTIMIZATION:

Are products sourced from manufacturers who engage in validated health, hazard, and risk programs which document at least 99% (by weight) of the ingredients used to make the building product? ☐ Yes ☐ No ☐

Products sourced from manufacturers with independent third-party verification of their supply chain that verifies:

- Processes are in place to communicate and transparently prioritize chemical ingredients along the supply chain according to available hazard, exposure, and use information to those that require more detailed evaluation ☐ Yes ☐ No ☐
- Processes are in place to identify, document, and communicate information on health, safety, and environmental characteristics of chemical ingredients ☐ Yes ☐ No ☐
- Processes are in place to implement measures to manage the health, safety, and environmental hazard and risk of chemical ingredients ☐ Yes ☐ No ☐
- Processes are in place to optimize health, safety, and environmental impacts when designing and improving chemical ingredients ☐ Yes ☐ No ☐
- Processes are in place to communicate, receive, and evaluate chemical ingredient safety and stewardship information along the supply chain ☐ Yes ☐ No ☐
- Safety and stewardship information about the chemical ingredients is publicly available from all points along the supply chain ☐ Yes ☐ No ☐

LOW-EMITTING MATERIALS:

The building interior is defined as everything within the weatherproofing membrane, and low-emitting requirements are applicable to interior paints and coatings, interior adhesives and sealants, flooring, composite wood, ceilings, walls, thermal and acoustical insulation, and furniture.

Is this product in compliance with the emissions and content requirements listed below?

- Inherently Non-Emitting Sources:** Products are inherently non-emitting sources of VOCs (stone, ceramic, powder coated metals, plated or anodized metal, glass, concrete, clay brick, and unfinished or untreated solid wood flooring). ☐ Yes ☐ No ☒

If yes, STOP HERE.

INTERIOR PAINT OR COATING, wet-applied inside weather barrier.

VOLUME: _____ liters

Not Applicable ☒

- General Emissions Evaluation:** Compliant in accordance with California Department of Public Health (CDPH) Standard Method v1.1-2010 using applicable exposure scenario. ☐ Yes ☐ No ☐

LEED Submittal Cover Sheet

Contractor: Turner Construction

Project Name:

Subcontractor: _____	Contact: _____
Product: _____	Submittal #: _____
Manufacturer: _____	Material Cost: \$ _____

Materials in Div 3-10 and 12, Sect 31.60.00 Foundation, 32.10.00 Paving, 32.30.00 Site Improvement, 32.90.00 Planting

Post-Consumer Recycled Content: _____ % Pre-Consumer Recycled Content: _____ % <input type="checkbox"/> Manufacturer documentation provided.	Bio-Based (Non-Wood) Materials: _____ % <input type="checkbox"/> Tested per ASTM Method D6866, and legally harvested. <input type="checkbox"/> Meets Sustainable Agriculture Network's Standard.
New Wood Content: _____ % FSC Certified Content: _____ % of New Wood <input type="checkbox"/> Manufacturer documentation provided identifying wood products for use on project.* <input type="checkbox"/> FSC Certificate provided. <input type="checkbox"/> Manufacturer documentation of FSC product provided.	
*Note: Itemized invoice from final vendor must be provided after purchase. Invoice must show FSC % for each new wood product and must show vendor's Chain of Custody (COC) number.	
% of Material Manufactured and Sourced within 100 miles: _____ %	
Location of Manufacturer: _____ Distance to Project Site: _____ <input type="checkbox"/> Manufacturer documentation provided.	Location of Extraction/Harvest: _____ Distance to Project Site: _____ <input type="checkbox"/> Manufacturer documentation provided.
Extended Producer Responsibility Program Name: _____ <input type="checkbox"/> Manufacturer documentation of take-back program provided.	
Environmental Product Declaration (EPD): Documentation Type: <input type="checkbox"/> LCA ISO 14044 with LEED <input type="checkbox"/> Industry Type III EPD, with Manufacturer Listed <input type="checkbox"/> Product Specific Type III EPD, Internally Reviewed <input type="checkbox"/> Product Specific Type III EPD, 3 rd Party Certified	Ingredient Reporting (to 1000 ppm): Documentation Type: <input type="checkbox"/> CASRN Inventory <input type="checkbox"/> Cradle to Cradle <input type="checkbox"/> Living Product Challenge <input type="checkbox"/> Product Lens <input type="checkbox"/> ANSI/BIFMA e3 <input type="checkbox"/> Facts NSF/ANSI 336 <input type="checkbox"/> GreenScreen List Translator or Benchmark <input type="checkbox"/> Declare: Red List Free or Declared

Low-Emitting Materials: Onsite Fluid Applied Materials

Product Use (describe application): _____	Volume to be used: _____ L
VOC Content: _____ g/L	Allowable Content: _____ g/L
<input type="checkbox"/> Manufacturer documentation of VOC content provided.	<input type="checkbox"/> VOC Emissions Evaluation also provided.

GC LEED Online - BPDO Calculator

Environmental Product Declarations									
Complete all columns with applicable material data for the attempted options. If the option is not attempted, leave the column blank.									
General Information (from Materials tab)						Option 1 Environmental Product Declaration			Option 2 Multi-Attribute Optimiz
Material Type or Category	CSI Div (optional)	Product Name	Description of the Product	Manufacturer Name	Material Cost (\$)	EPD Program Operator	EPD / LCA	EPD product value (#)	Type of f
	03 Concrete	footer	foundational	RMC Company	\$ 5,000.00	Company	Product-specific LCA	1.00	LCA impact reduction a
	03 Concrete	slab on grade	enclosure	RMC Company	\$ 10,000.00	NSF Certification, LLC	Industry-wide/generic EPD	1.00	Third party verified impa
	03 Concrete	column	structural	RMC Company	\$ 15,000.00	Company	Product-specific Type III Internal EPD	1.00	Third party verified impa
	03 Concrete	wall	enclosure	RMC Company	\$ 20,000.00	NRMCA	Product Specific Type III External EPD	1.50	Third party impact reduc
									reduction in GWP & 5%

Instructions BD+C
Instructions ID+C
Materials
Environ. Product Declarations
Sourcing of Raw Materials
Material Ingredients
Su ...

Flow of Information



Communication Risks & Liabilities

LEED v4 BPDO MATERIALS REPORTING FORM

Project Name XXXXXXXXXXXX Submittal Name Leeds for Exterior concrete Date 4/21/17
Subcontractor XXXXXXXXXXXX Contact Person XXXXXXXXXX Submittal No. _____
Spec Section 03, 22

Please complete this form for ALL permanently-installed products in Divisions 03-12, 31, and 32 and Insulation products specified in any section.
For each product, please fill in ALL requested information and check boxes to indicate documentation included in this submittal. See page 2 for definitions and documentation requirements.

PRODUCT 1	PRODUCT 2
<p>4000 psi <u>concrete / cement</u></p> <p>PRODUCT NAME / MODEL</p> <p>EPD <input checked="" type="checkbox"/> <input checked="" type="checkbox"/></p> <p>Product EPD Product LCA</p> <p>SOURCING OF RAW MATERIALS</p> <p>Mfr CSR Mfr Take Back FSC Wood Salvaged Material Bio-based Material Applicable Portion (by wgt) % Recycled Content 50% Pre-Consumer 0% Post-Consumer</p> <p>MANUFACTURER <u>XXXXXXXXXX</u></p> <p>TOTAL MATERIAL COST (excluding site labor & equipment) \$ <u>110.00 / ft²</u></p> <p>MATERIAL INGREDIENTS</p> <p>Mfr Ingrad Inventory HPD C2C Certificate Green-Screen Declare Label</p> <p>REGIONAL MATERIALS</p> <p>Raw materials extracted, manufactured AND purchased within 100 miles of Project site</p> <p>Yes 100% Regional Material? Compliant Portion</p>	<p>Pozzolana</p> <p>PRODUCT NAME / MODEL</p> <p>EPD <input checked="" type="checkbox"/> <input checked="" type="checkbox"/></p> <p>Product EPD Product LCA</p> <p>SOURCING OF RAW MATERIALS</p> <p>Mfr CSR Mfr Take Back FSC Wood Salvaged Material Bio-based Material Applicable Portion (by wgt) % Recycled Content 100% Pre-Consumer 100% Post-Consumer</p> <p>MANUFACTURER <u>XXXXXXXXXX</u></p> <p>TOTAL MATERIAL COST (excluding site labor & equipment) \$ <u>110.00 / ft²</u></p> <p>MATERIAL INGREDIENTS</p> <p>Mfr Ingrad Inventory HPD C2C Certificate Green-Screen Declare Label</p> <p>REGIONAL MATERIALS</p> <p>Raw materials extracted, manufactured AND purchased within 100 miles of Project site</p> <p>Yes 100% Regional Material? Compliant Portion</p>

January 6, 2020

GC / Arch / Eng
Address 1
Address 2
City, State Zip Code

Re: LEED BDPO Environmental Materials Reporting Form
RMC Company
Project Name, Location (suggestion to identify project on LEED directory)

Dear Project Contact,

Please find a summary of RMC Company's listed products and contribution to the referenced LEED project.

Ready-mixed concrete has a distinct advantage over other building materials due to its ease of use, durability, resilience, thermal mass, sculptability to any shape and proximity to project sites. Each attribute can contribute to sustainable design choices and influence the project's environmental footprint throughout its service life.

The following is a summary table to demonstrate concrete products contributing to LEED criteria for this project.

Product (mfr code)	Mfr. EPO	Mfr. Sourcing of Raw Materials	Mfr. Material Ingredients	Mfr. Regional Material w/in 500 miles	EQ: Low-emitting material w/in Organic Compounds (VOC)	Cost \$
	W / Prod Specific (PS)	Supply Chain Certification (VOC)	RC Prod (%)	RC Pre (%)	Extract & MP (V / N)	
#	160/PS	1/Y/N	%	%	1/Y/N	1
#					USGBC deems concrete an inherently low emitting material and therefore no emission testing is required.	
#						
#						

Please see additional sections that provide details regarding LEED criteria and concrete products.

1.0. Environmental Product Declaration: Life-cycle information is available that discloses environmentally, economically, and socially impacts from manufacturing and transporting concrete products.

Product (mfr code)	Option 1: Environmental Product Declaration EPD Program Operator EPD/CRA Type	Option 2: Multi-attribute Optimization Type of Evaluation	Cost \$
#	AGF Certification, LLC	160/generic EPO	* This section is only for those w/ PS EPD. Call to discuss criteria.
#			
#			
#			

Product (mils code)	Option 1: Environmental Product Declaration		Option 2: Multi-Attribute Optimization	Cost \$
	EPD Program Operator	EPD/LCA Type	Type of Reduction	
#	NGF Certification, LLC	IVU/generic EPD	* This section is only for those w/ PS EPD. Call to discuss criteria.	\$
#				
#				
#				
#				

Product (code)	Supply chain certification	Recycled Content (Pre/Post-Consumer %)		Cost \$
		RC Post (%)	RC Pre (%)	
1				
2				
3				
4				
5				

Product (mils code)	Option 1: Material Ingredient Reporting Type of Report (2000 ppm)	3 rd Party Verified	Option 2: Type of Optimization Report Certification Program	Cost \$
P	C2C, Declare, HFD, etc.	Y/N	* This section is only for those w/ PS health hazard disclosures. Call to discuss criteria.	\$
P				
P				
P				

Best Regards:
RMC Company Contact

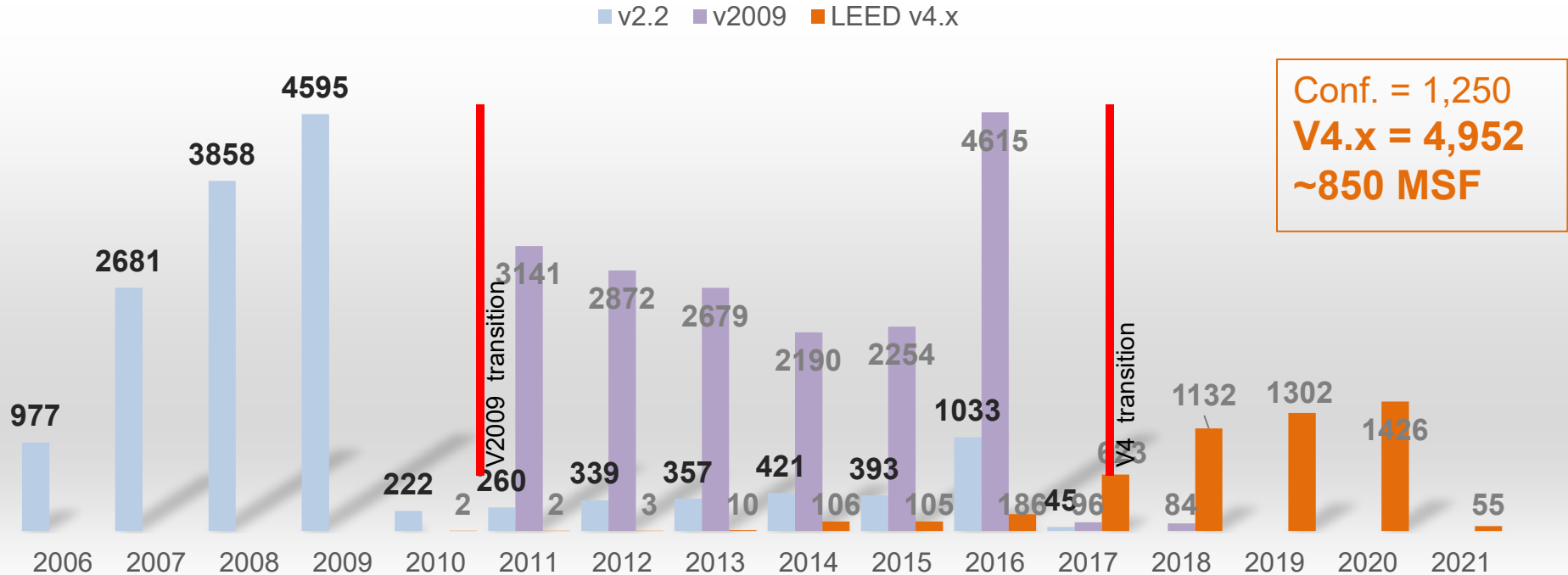
Product (mix code)	IW-EPD Product (mix code)	Environmental Impacts (IW-EPD referenced page)
#12345	2501-300-30FA	Page 19
#		
#		
#		

[illegible]

Market Perspective

Why Does Transparency Matter?

LEED v 4 Registration Activity (target projects)





USGBC State Market Brief: Michigan

last updated on 11/3/2020 3:56:29 PM

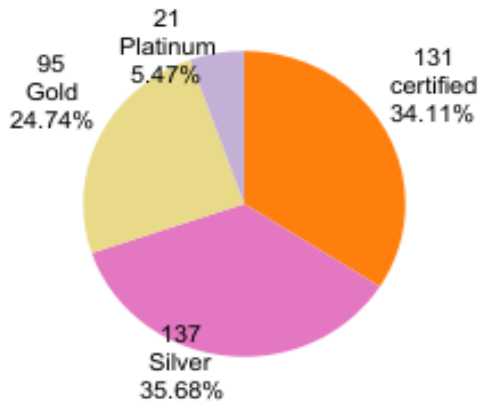
Number of Certifications

384

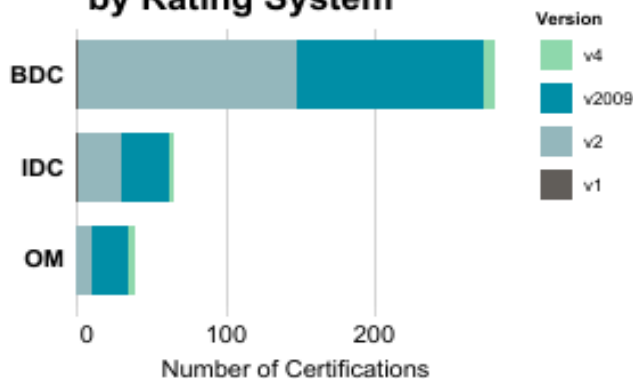
**Gross Square Footage of
Certifications**

32,535,328

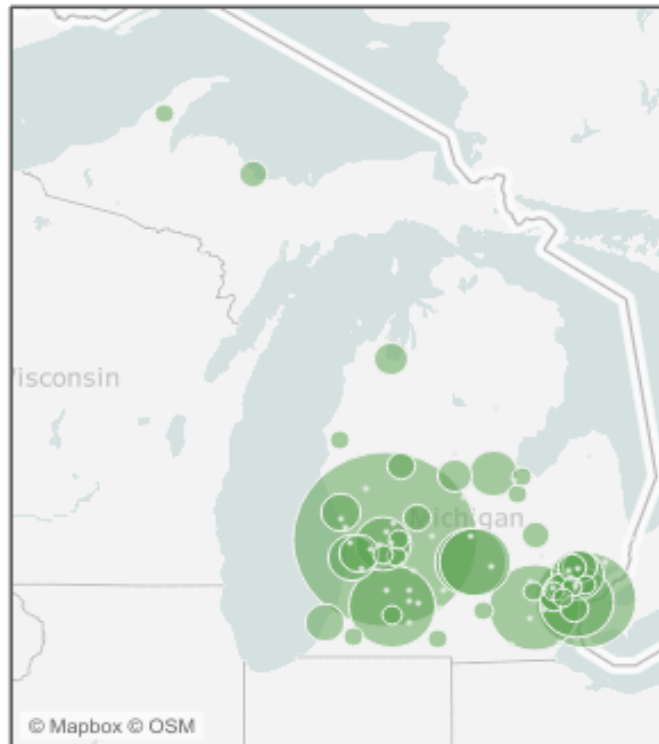
LEED Achievement



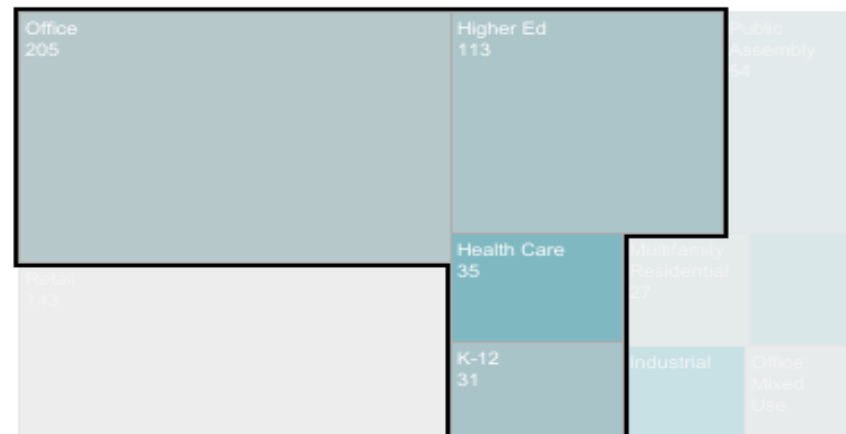
LEED Certifications by Rating System



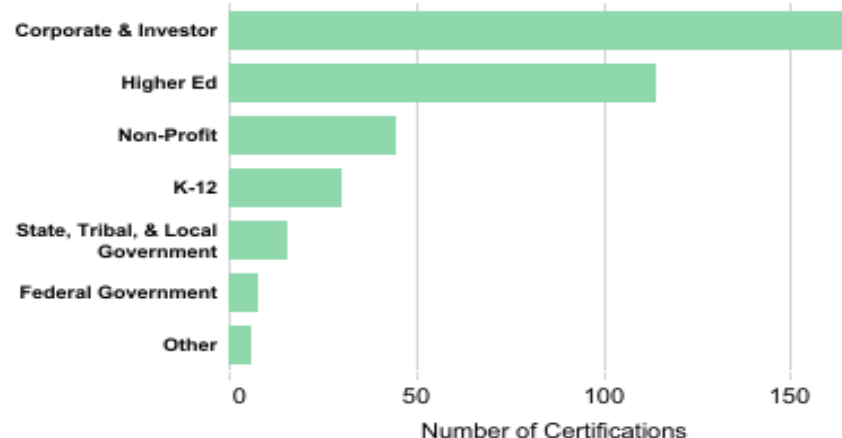
LEED Certifications by City



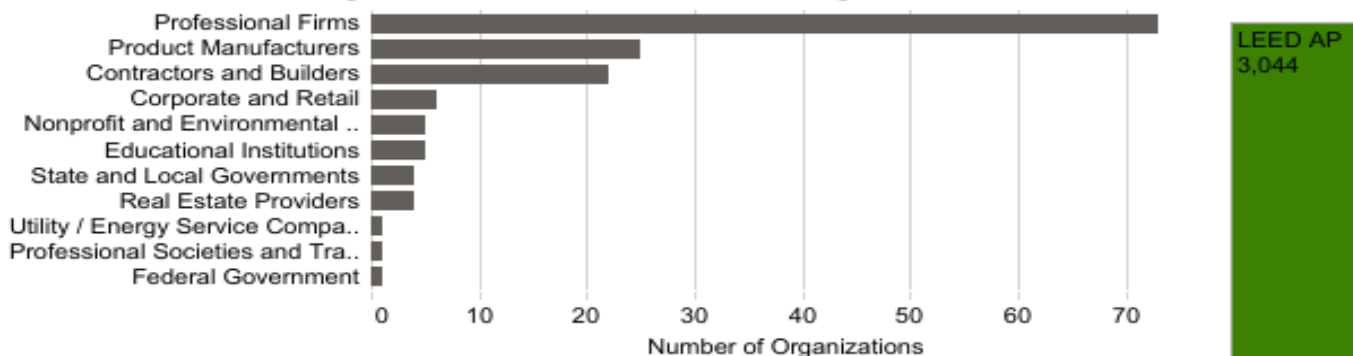
Top 10 Space Types for Certifications



Certifications by Owner Sector



USGBC Member Organizations Located In Michigan



Professionals with LEED Credentials



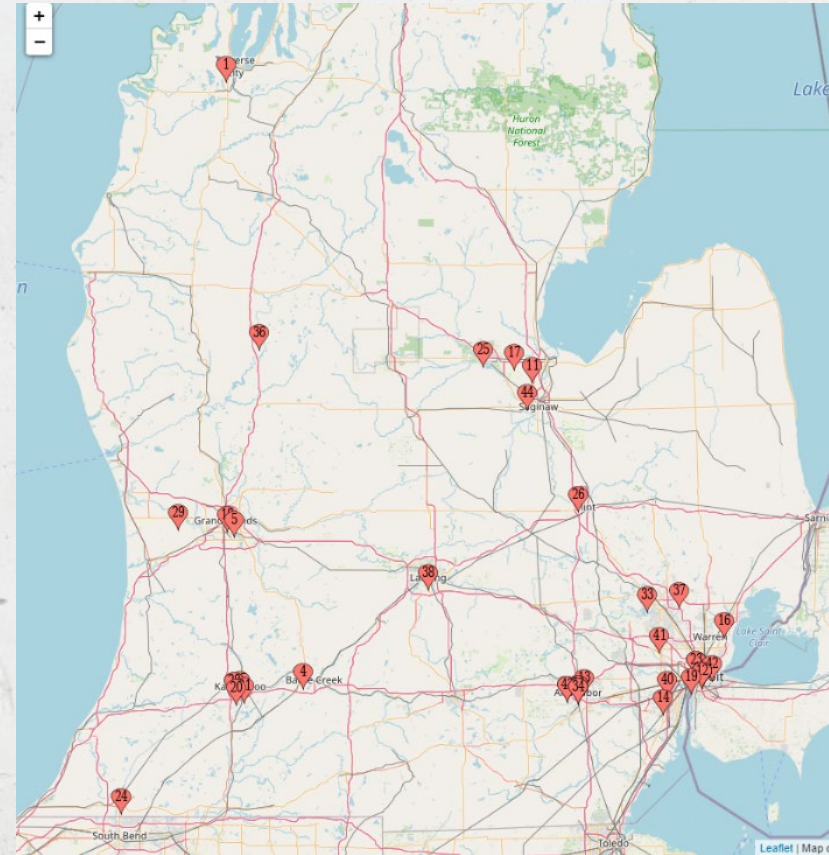
LEED project data only includes commercial rating systems. The underlying data does not include LEED ND or LEED for Homes projects.
LEED®, and its related logo, is a trademark owned by the U.S. Green Building Council®.

MI - LEED v4.x Projects

- 58 registered projects / 10 MSF

Owner type	Project type
EDU (Univ/college/CC)	Core learning space: Univ/college
Privately held	Laboratory
Publicly traded	Lodging
Government	Multifamily Apts.
	Mixed-use Office
	Public Assembly

BUILD WITH STRENGTH



Gensler – Decision Maker

If You Don't Spec It, You Won't Get It...

1.3 ACTION SUBMITTALS

A. Product Data: Submit product data for each type of product indicated.

B. Sustainable Design Submittals:

1. Sustainability Criteria Worksheet: Submit one worksheet for each component material of the product or assembly used in the installation of Work of this Section

2. Environmental Product Declaration: An EPD is required, submit in accordance with Section 01 81 13.14 "Sustainability Design Requirements," Article 1.6C.1 "ACTION SUBMITTALS; Sustainable Design Documentation Submittals; MRc2.1 – EPDs."

3. Reports from raw materials suppliers: If available, submit CSR reports from suppliers in accordance with Section 01 81 13.14 "Sustainability Design Requirements," Article 1.6C.2 "ACTION SUBMITTALS; Sustainable Design Documentation Submittals; MRc3.1 – CSR."

4. Leadership ex-
program; bio-
and/or recycle
Requirements,
Documentation
Material Ingre

O. Environmental Product Declaration: Submit in accordance with Section 01 81 13.14, part 1.6.C.1 LEED Submittals – BPDO – Environmental Product Declarations. All submitted material, of all framing types, must be accompanied by EPDs. Design-Build team will consider the Global Warming Potentials disclosed therein when selecting bids.

5. HPD, C2C certificate at Bronze level or above, C2C Material Health Certificate, Declare product label, or other acceptable material ingredient inventory in accordance with Section 01 81 13.14 "Sustainability Design Requirements," Article 1.6C.4 "ACTION

LCA Software Tools

- WBLCA
 - Athena
 - One Click
 - Tally
- Embodied Carbon Calculators
 - Embodied Carbon Construction Calculator (EC3)
 - Beacon (Thornton Tomasetti)
 - Concrete LCA Tool (ZGF Architects)



Athena
Sustainable Materials
Institute



One Click 

Product of Bionova Ltd



Top Green Building Contractors

ENR
TOP 100

Current Top 100 Green Building Contractors Story:

[2019 Top 100 Green Building Contractors and Design Firms: Sustainability Intensifies](#)

Click below for earlier editions:

[2018](#) | [2017](#) | [2016](#) | [2015](#) | [2014](#) | [2013](#) | [2012](#) | [2011](#) | [2010](#) | [2009](#) | [2008](#) | [2007](#)

Companies are ranked according to revenue for construction or design services generated in 2018 from projects that have been registered with or certified by a third-party organization that sets standards for measuring a building's or facility's environmental impact, energy efficiency or carbon footprint. Such groups include the U.S. Green Building Council (USGBC) and the

Green Building Initiative. The volume of revenue is measured in (\$ millions. Some markets may not add up to 100% due to rounding. Revenue from construction management on a fee-only basis is not included.

ENR 2019 Top 100 Green Building Contractors

RANK 2019	RANK 2018	FIRM	GREEN ACCREDITED STAFF	GREEN DESIGN REVENUE (\$ MIL.)
1	1	TURNER CORP., New York, N.Y.	1047	6623.90
2	3	AECOM, Los Angeles, Calif.	NA	4678.38
3	2	CLARK GROUP, Bethesda, Md.	360	4161.50
4	4	SWINERTON, San Francisco, Calif.	225	3459.60
5	5	HENSEL PHELPS, Greeley, Colo.	216	2663.26
6	6	SKANSKA USA, New York, N.Y.	321	2638.90
7	7	LENDLEASE, New York, N.Y.	263	2298.70
8	11	GILBANE BUILDING CO., Providence, R.I.	323	2029.97
9	9	WEBCOR CONSTRUCTION LP DBA WEBCOR BUILDERS, San Francisco, Calif.	185	2011.80
10	13	THE WHITING-TURNER CONTRACTING CO., Baltimore, Md.	307	2001.91

- Pertaining to green building:
 - LEED submittal process
 - material knowledge

BUILD WITH STRENGTH

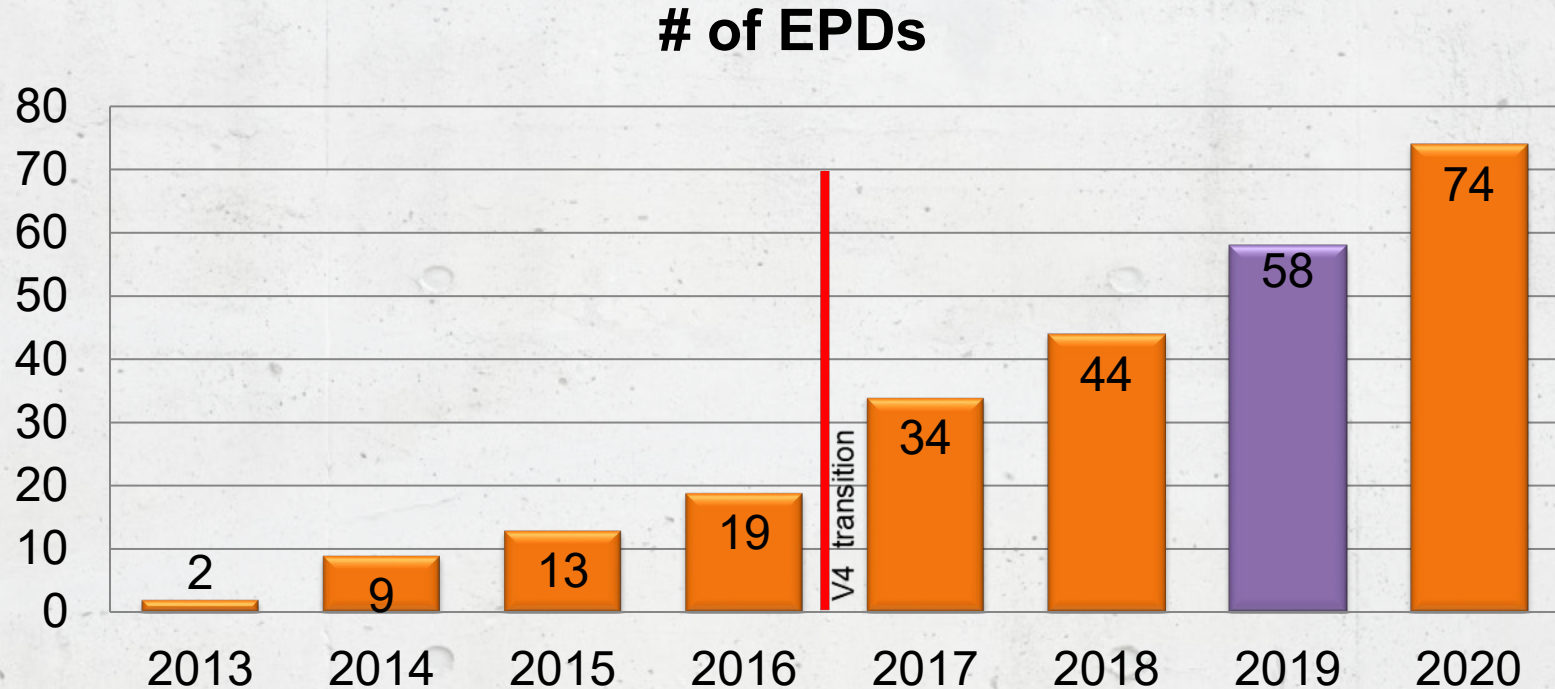
IW-EPD Participants

<https://www.nrmca.org/association-resources/sustainability/epd-program/testing-edpd-program-search/>

Company Name	Plant Name	Subsidiary	City	State/Province
Bichler Concrete & Gravel	Plant No. 2		Bark River	Michigan
Bichler Concrete & Gravel	Escanaba Plant No. 1		Escanaba	Michigan
Consumers Concrete Corporation	Battle Creek		Battle Creek	Michigan
Consumers Concrete Corporation	Benton Harbor		Benton Harbor	Michigan
Consumers Concrete Corporation	Byron Center		Byron Center	Michigan
Consumers Concrete Corporation	Charlotte		Charlotte	Michigan
Consumers Concrete Corporation	Freemont		Freemont	Michigan
Consumers Concrete Corporation	Grand Haven		Grand Haven	Michigan
Consumers Concrete Corporation	Holland		Holland	Michigan
Consumers Concrete Corporation	Ionia		Ionia	Michigan
Consumers Concrete Corporation	Kalamazoo		Kalamazoo	Michigan
Consumers Concrete Corporation	Lansing		Lansing	Michigan
Consumers Concrete Corporation	Muskegon		Muskegon	Michigan
Consumers Concrete Corporation	Niles		Niles	Michigan
Consumers Concrete Corporation	Paw Paw		Paw Paw	Michigan
Consumers Concrete Corporation	Quincy		Quincy	Michigan
Consumers Concrete Corporation	Rockford		Rockford	Michigan
Consumers Concrete Corporation	Sturgis		Sturgis	Michigan
Consumers Concrete Corporation	Three Rivers		Three Rivers	Michigan
Consumers Concrete Corporation	Whitehall		Whitehall	Michigan
Kuhlman Corporation	Kuhlman Yard 22		Monroe	Michigan
McCoig Materials	Primo Concrete		Brownstown	Michigan
McCoig Materials	Koenig Concrete		Detroit	Michigan
McCoig Materials	McCoig Concrete		Detroit	Michigan
McCoig Materials	Azteca Concrete		Redford	Michigan

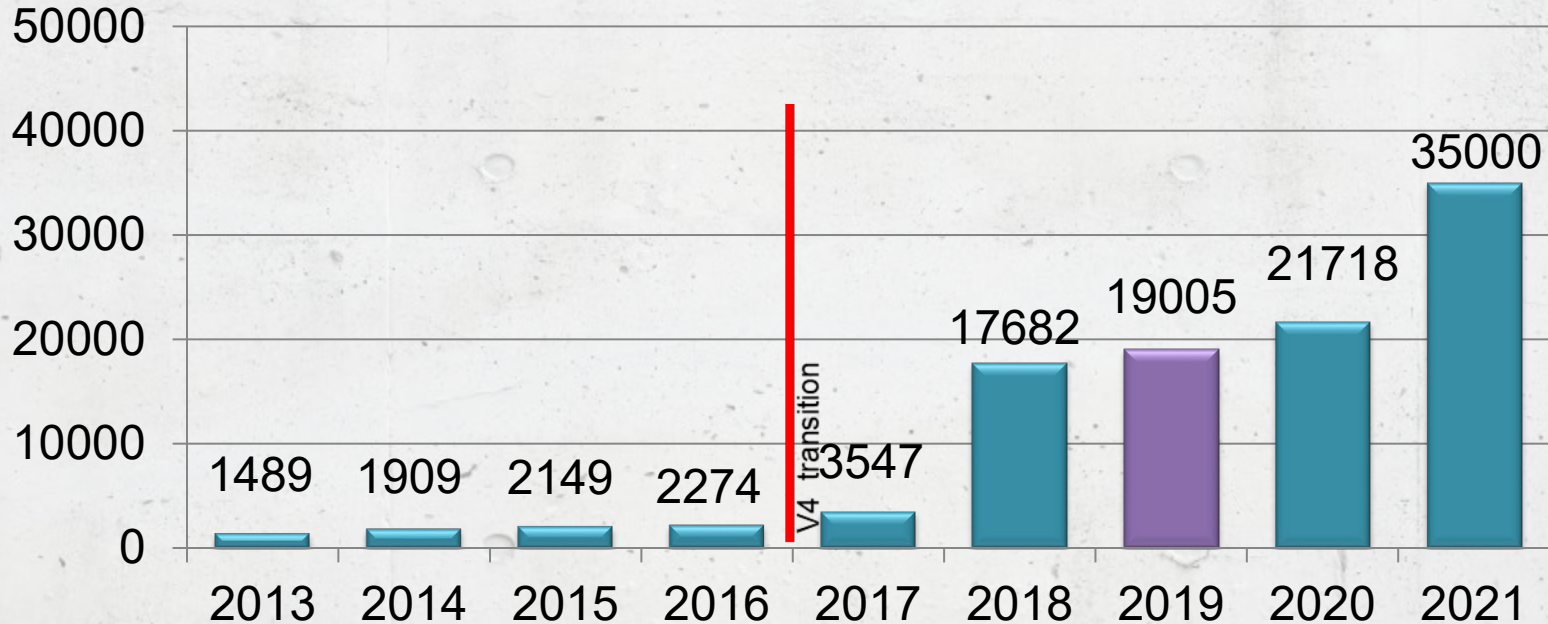
Company Name	Plant Name	Subsidiary	City	State/Province
McCoig Materials	Eastside Concrete		Warren	Michigan
McCoig Materials	Progressive Concrete		Wayne	Michigan
Ozinga Ready Mix Concrete	New Buffalo - Yard 330	Indiana Division	New Buffalo	Michigan
Protocon RM	PORT HURON		PORT HURON	Michigan
Protocon RM	Sterling Heights		Sterling Heights	Michigan
Protocon RM	Washington		Washington	Michigan
Superior Materials Holdings LLC.	Grand Ledge 16	Builders Redi-mix	Grand Ledge	Michigan
Superior Materials Holdings LLC.	LANSING 14	Builders Redi-mix	LANSING	Michigan
Superior Materials Holdings LLC.	ANN ARBOR 38		ANN ARBOR	Michigan
Superior Materials Holdings LLC.	AUBURN HILLS 36		AUBURN HILLS	Michigan
Superior Materials Holdings LLC.	BRIGHTON 103		BRIGHTON	Michigan
Superior Materials Holdings LLC.	HOOVER 02		DETROIT	Michigan
Superior Materials Holdings LLC.	JEFFERSON 32		DETROIT	Michigan
Superior Materials Holdings LLC.	FLINT 20		FLINT	Michigan
Superior Materials Holdings LLC.	LAPEER 23		LAPEER	Michigan
Superior Materials Holdings LLC.	MT. CLEMENS 101		MT. CLEMENS	Michigan
Superior Materials Holdings LLC.	NOVI 102		NOVI	Michigan
Superior Materials Holdings LLC.	ROMULUS 35		ROMULUS	Michigan
Superior Materials Holdings LLC.	STERLING HEIGHTS 39		STERLING HEIGHTS	Michigan
Van Horn Concrete	Van Horn Concrete - Main Plant Auburn Hills		Auburn Hills	Michigan
Van Horn Concrete	Van Horn Concrete - Waterford Location		Waterford	Michigan

Tracking Industry EPDs (cumulative)



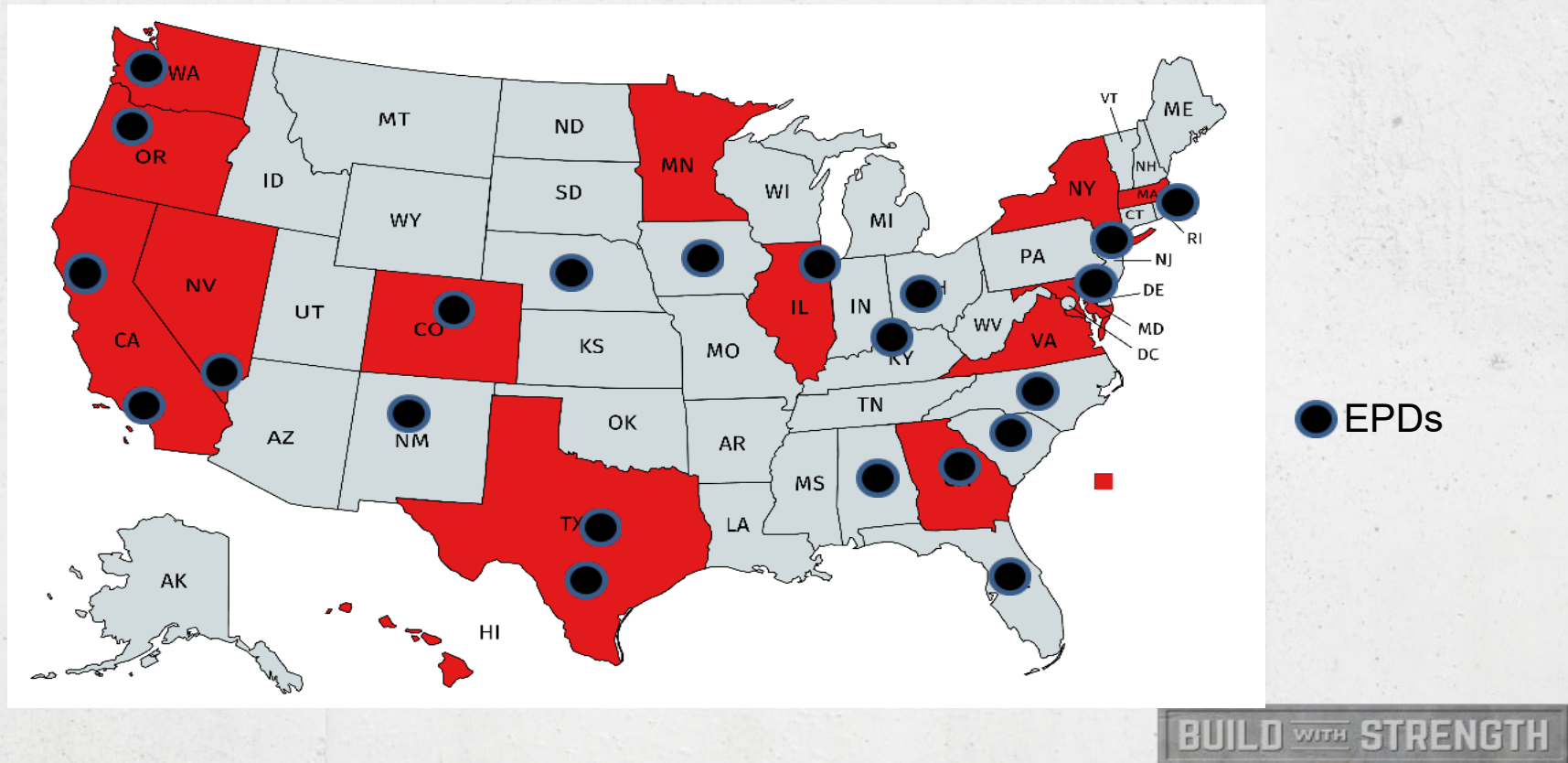
Tracking Mixes w/in EPDs (cumulative)

Products / Mixes



BUILD WITH STRENGTH

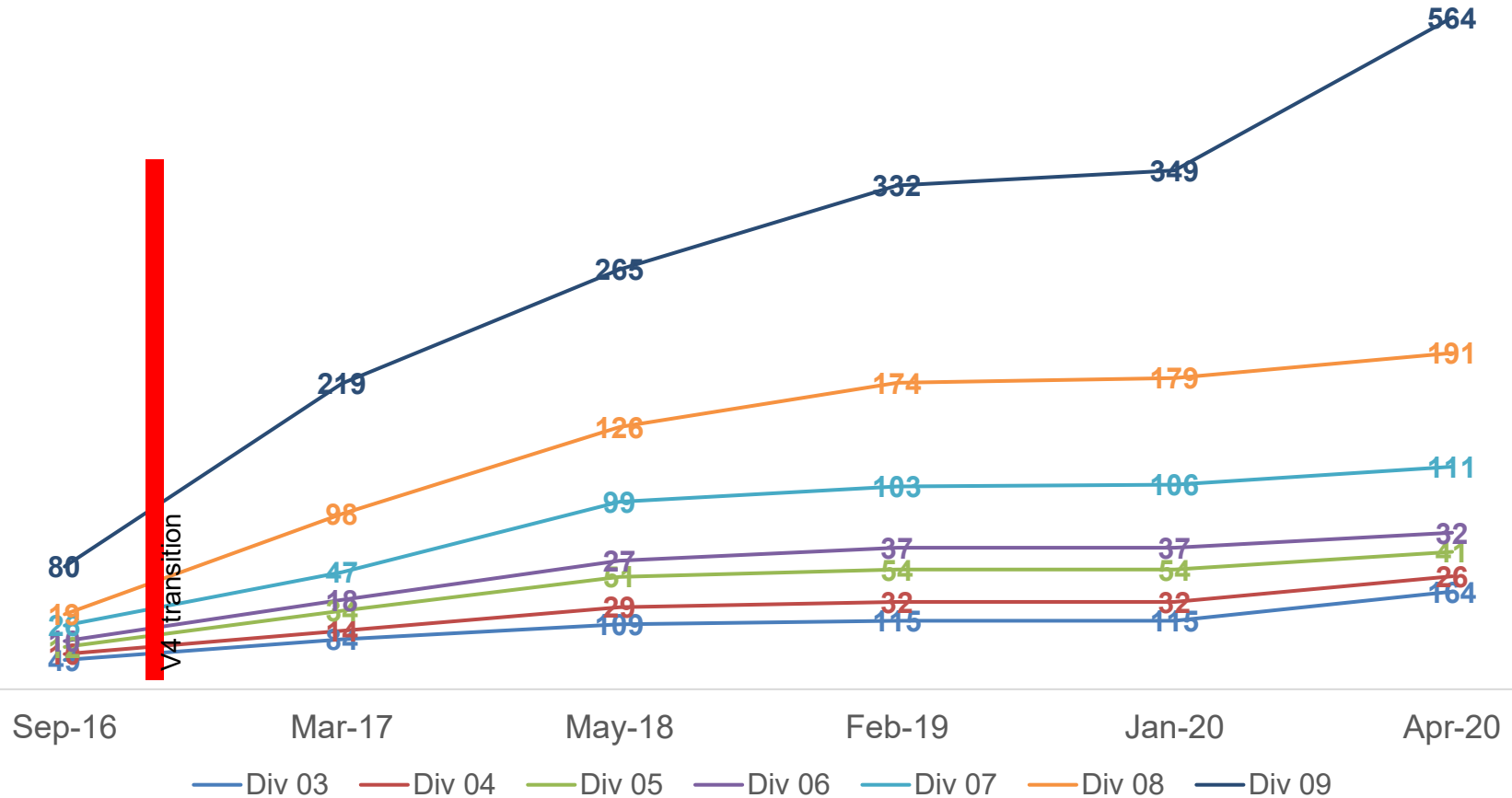
Top Markets for Green Building & RMC EPDs



Disclosure – Product Categories

Div	Industry	EPDs
03	Concrete	164
04	Masonry	26
05	Metals	41
06	Wood / Plastic / Composite	32
07	Thermal & Moisture	111
08	Openings	191
09	Finishes	564

EPD ACTIVITY PER MASTERFORMAT DIVISION



Environmental Product Declaration



CROSSLAM CLT

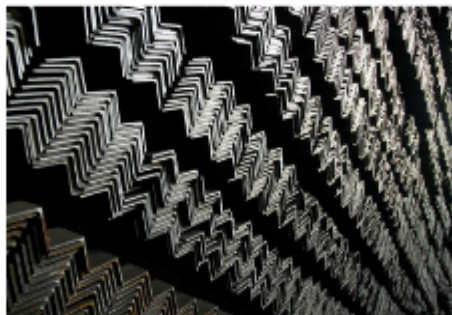
EPD for Cross Laminated Timber produced by Structurlam in Okanagan Falls, BC



Environmental Product Declaration

According to ISO 14025

Fabricated Steel Structural Sections



Issue Date: December 20, 2019

Valid Until: December 19, 2024

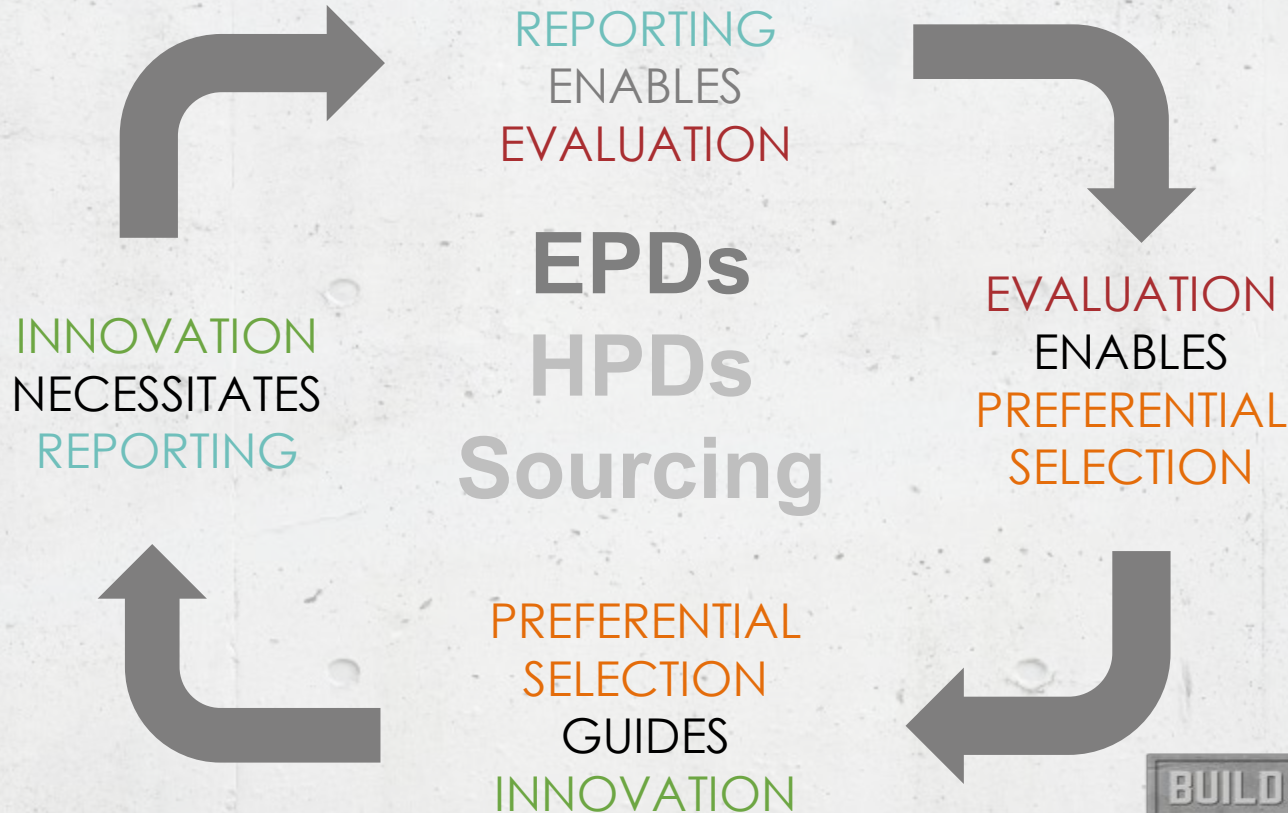
EPD Process

BUILD WITH STRENGTH

Process to Publish EPDs

- <https://www.nrmca.org/association-resources/sustainability/epd-program/>
- Collect 12 months of ops data
 - production, material use, energy use, air/water emissions, waste, supplier distances
- Consult with LCA/EPD practitioner
 - Athena, Climate Earth, MB Solutions, Quantis (PCA)
- EPD program operator for verification
 - NRMCA, ASTM, NSF

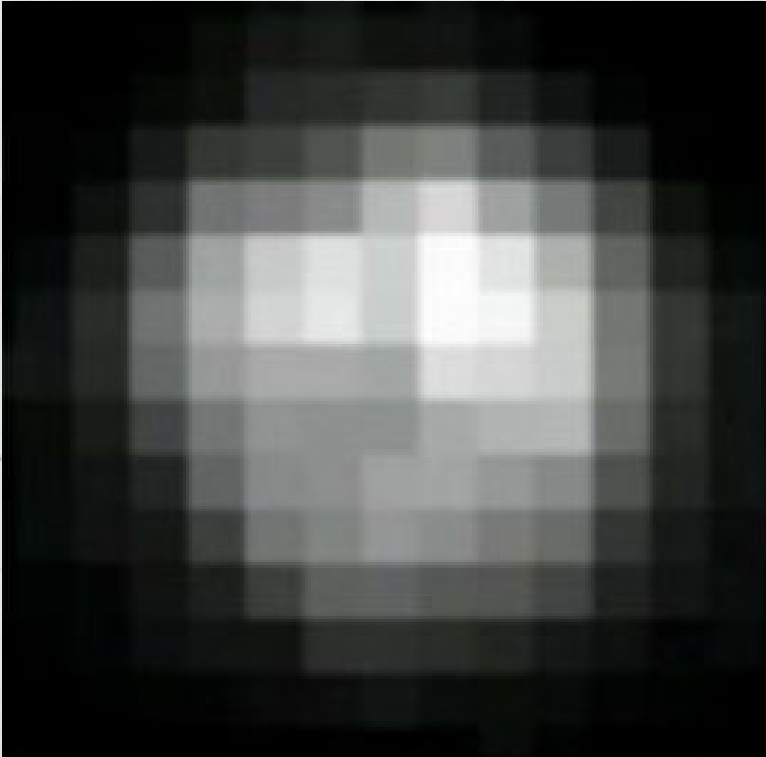
Transparency Loop



Take Away Notes & Summary

- Code/law and/or pressure from AE to be more transparent & GCs are the messengers
- LEED v4 being discovered in CDs and specs
- LEED letter template – modify it to meet your branding and communication strategy
- 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
- <https://www.nrmca.org/association-resources/sustainability/epd-program/>
- Reach out for customized strategic discussions for business case to be more transparent

Pluto: 1984 vs 2018



Thank You

Questions

James Bogdan

jbogdan@nrmca.org

