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A COALITION OF THE NATIONAL READY MIXED CONCRETE ASSOCIATION

Industry-Wide EPD & Regional Benchmark Report

James Bogdan
Sr. Director, Sustainability Initiatives

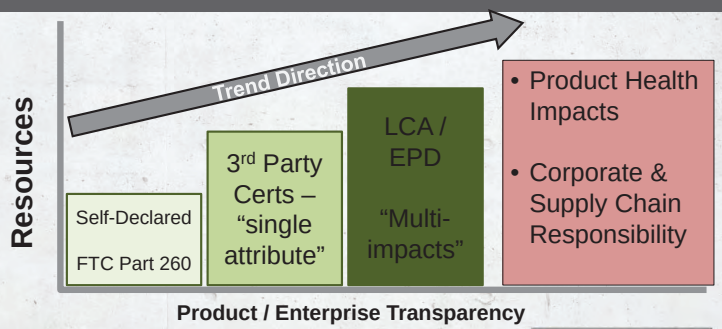
Agenda

- 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



Transparency in LEED

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Transparency in Green Building

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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**

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Product Transparency Credits - LEED v4.x

0	0	0	**Materials and Resources**		13
			Prereq	Storage and Collection of Recyclables	Required
			Prereq	Construction and Demolition Waste Management Planning	Required
			Credit	Building Life-Cycle Impact Reduction	5
			Credit	Building Product Disclosure and Optimization - Environmental Product Declarations	2
			Credit	Building Product Disclosure and Optimization - Sourcing of Raw Materials	2
			Credit	Building Product Disclosure and Optimization - Material Ingredients	2
			Credit	Construction and Demolition Waste Management	2

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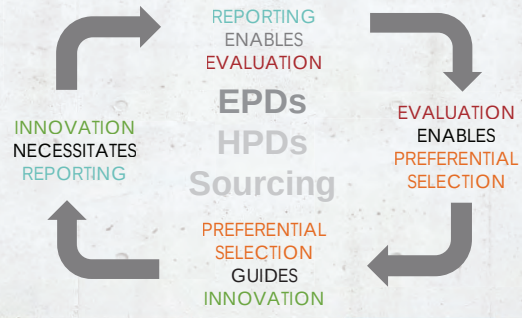
Transparency Loop



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**

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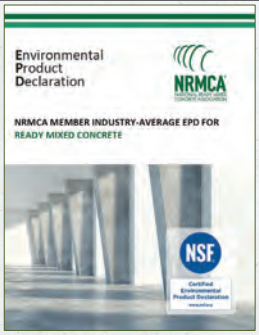
Option 1: Industry-Wide EPD



- 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

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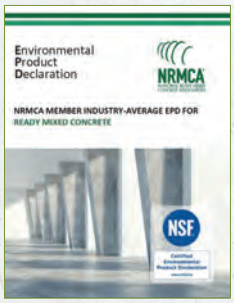
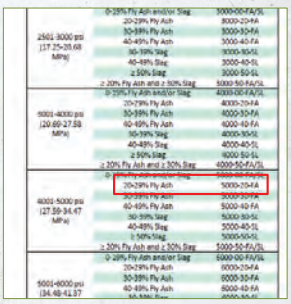
Option 1: Industry-Wide EPD



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



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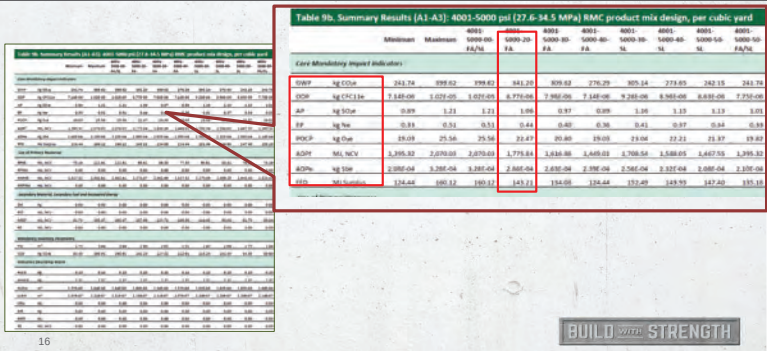
Option 1: Industry-Wide EPD



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Option 1: Product-specific EPD

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

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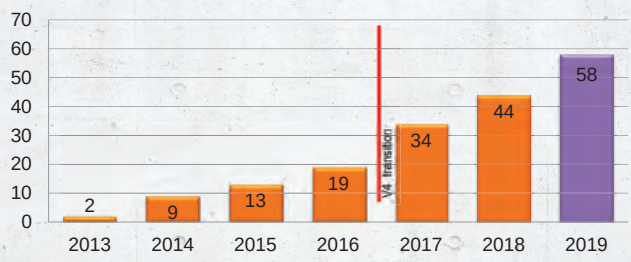
Tracking Industry EPDs (cumulative)



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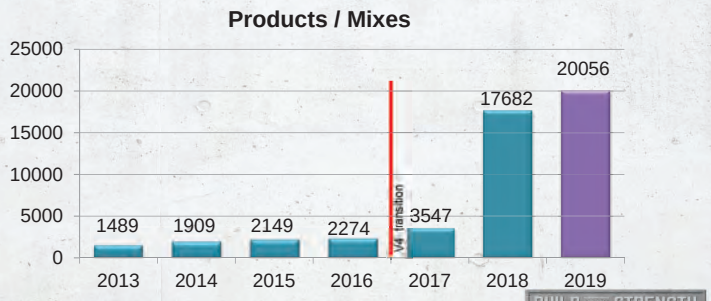
Tracking Mixes w/in EPDs (cumulative)



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Product Disclosure

In Construction Documents

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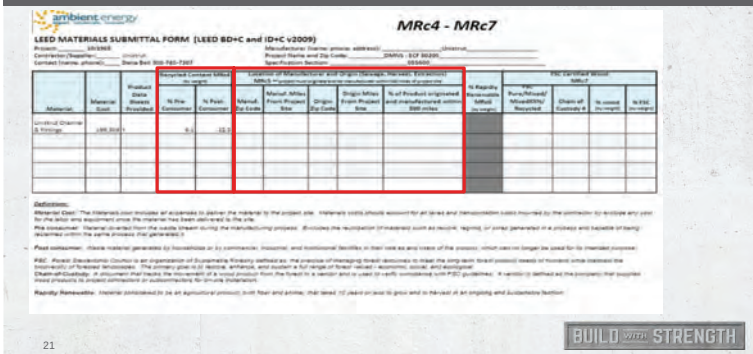
LEED Materials Submittal Form - Historical



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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: Fill 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 Paving, 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 03-12, 31 (Sections relating to Foundations), and 32 (Sections relating to Pavings, Site Improvements, and Planting) according to the following schedule and requirements:

- Contractor to complete:
  - Env Materials Reporting Form
  - BPDO Calculator

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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

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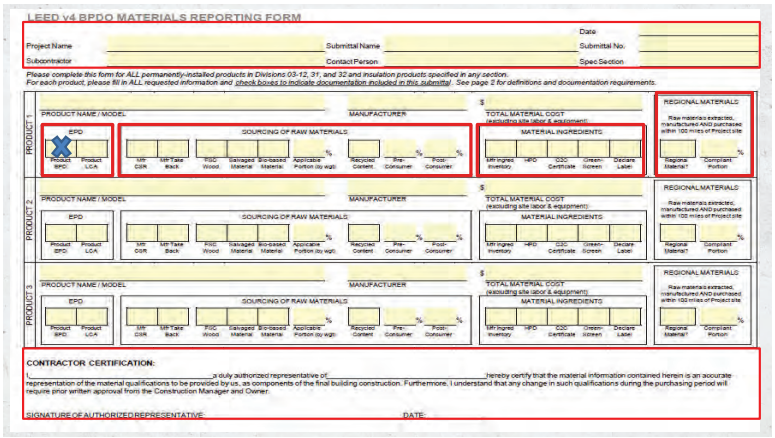


LEED v4 BPDO MATERIALS REPORTING FORM

Project Name | Submittal Name | Date | Submittal No.
Subcontractor | Contact Person | 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: Raw materials extracted, manufactured AND purchased within 100 miles of Project site

EPD: Product EPD, Product LCA | SOURCING OF RAW MATERIALS: MR CSR, MR Take Back, FSC Wood, Salvaged Material, Bio-based Material, Applicable Portion (by wgt), % | Recycled Content, Pre-Consumer, Post-Consumer | MATERIAL INGREDIENTS: MR Ingred Inventory, HPD, C2C Certificate, Green-Screen, Declare Label | Regional Material?, Compliant Portion

PRODUCT 2 — PRODUCT NAME / MODEL | MANUFACTURER | $ TOTAL MATERIAL COST (excluding site labor & equipment) | REGIONAL MATERIALS: Raw materials extracted, manufactured AND purchased within 100 miles of Project site

EPD: Product EPD, Product LCA | SOURCING OF RAW MATERIALS: MR CSR, MR Take Back, FSC Wood, Salvaged Material, Bio-based Material, Applicable Portion (by wgt), % | Recycled Content, Pre-Consumer, Post-Consumer | MATERIAL INGREDIENTS: MR Ingred Inventory, HPD, C2C Certificate, Green-Screen, Declare Label | Regional Material?, Compliant Portion

PRODUCT 3 — PRODUCT NAME / MODEL | MANUFACTURER | $ TOTAL MATERIAL COST (excluding site labor & equipment) | REGIONAL MATERIALS: Raw materials extracted, manufactured AND purchased within 100 miles of Project site

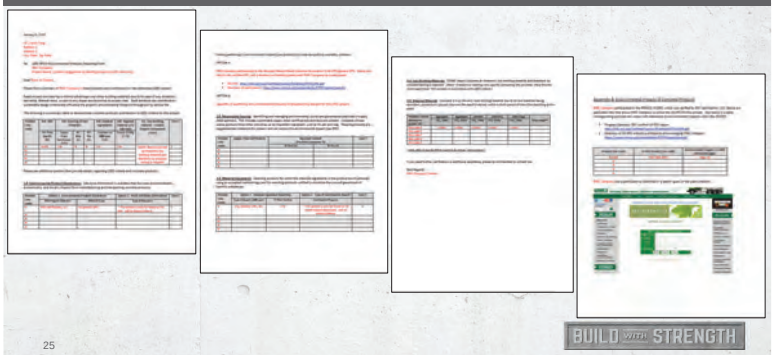
EPD: Product EPD, Product LCA | SOURCING OF RAW MATERIALS: MR CSR, MR Take Back, FSC Wood, Salvaged Material, Bio-based Material, Applicable Portion (by wgt), % | Recycled Content, Pre-Consumer, Post-Consumer | MATERIAL INGREDIENTS: MR Ingred Inventory, HPD, C2C Certificate, Green-Screen, Declare Label | Regional Material?, Compliant Portion

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 Communication Letter



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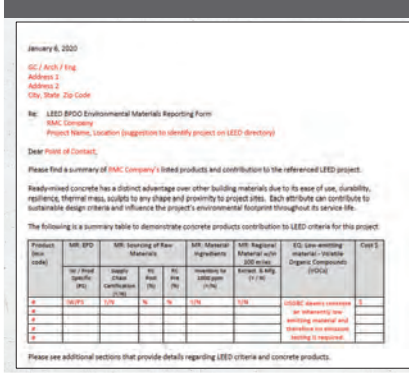
LEED Communication Letter- summary



January 6, 2020

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

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

Dear Point of 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, sculpts to any shape and proximity to project sites. Each attribute can contribute to sustainable design criteria and influence the project's environmental footprint throughout its service life.

The following is a summary table to demonstrate concrete products contribution to LEED criteria for this project:

Product (box code)	MR. EPD	MR. Sourcing of Raw Materials			MR. Material Ingredients	MR. Regional Material w/in 100 miles	EQ. Low-emitting material - Volatile Organic Compounds (VOCs)	Cost $
	Ind / Prod Specific (PS)	Supply Chain Certification (SCM)	RC Post (%)	RC Pre (%)	Inventory to 1000 ppm (H/N)	Extract. & Mfg. (Y / N)		
#	NA/PS	Y/N	%	%	Y/N	Y/N	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.

- LEED project information & registration
- High level promotion of concrete
- Summary table addressing "transparency" credits
- Cost
- Goes into credit details

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LEED Communication Letter - EPD

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

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

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

OPTION A:

RMC Company participated in the National Ready-Mixed Concrete Association's IW-EPD/generic EPD. Below are links to the verified EPD, and a directory of industry plants with RMC Company as a participant:

- IW-EPD: http://info.nsf.org/Certified/Sustain/ProdCert/EPD10294.pdf
- Directory of participants: https://www.nrmca.org/sustainability/EPDProgram/search/

OPTION B:

Appendix A specifically lists environmental impacts of proposed mix designs for this LEED project.

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LEED Communication Letter – Sourcing

2.0 Responsible Souring: 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 supplementary materials for cement and can reduce the environmental impact (see EPD).

Product (mix code)	Supply chain certification	Recycled Content (Pre/Post-Consumer %)		Cost $
		RC Post (%)	RC Pre (%)	
#				
#				
#				
#				
#				

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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.

Product (mix code)	Option 1: Material Ingredient Reporting		Option 2: Type of Optimization Report	Cost $
	Type of Report (1000 ppm)	3rd Part Verified	Certification Program	
#	C2C, Declare, HPD, etc.	Y/N	* This section is only for those w/ PS health hazard disclosures. Call to discuss criteria.	$
#				
#				
#				
#				

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LEED Communication Letter - Other

4.0 Low-Emitting Materials: USGBC deems concrete an inherently low emitting material and therefore no emission testing is required. *[Note: If sealers or coatings are used for protecting the concrete, these finishes must report their VOC content in accordance with LEED criteria.]*

5.0 Regional Material: Concrete is truly the only local building material due to its raw materials being abundant, proximity to project sites and the need to deliver within a short period of time from batching at the plant.

Product / source distance to project site	Aggregate City, State	Aggregate City, State	Cement City, State	SCM (FA) City, State	SCM (Slag) City, State	% by weight*
Mix code #	x miles	x miles	x miles	x miles	x miles	
Mix code #						
Mix code #						
Mix code #						
Mix code #						

** Note: LEED v4 requires 90% by weight to be consider "entire product."*

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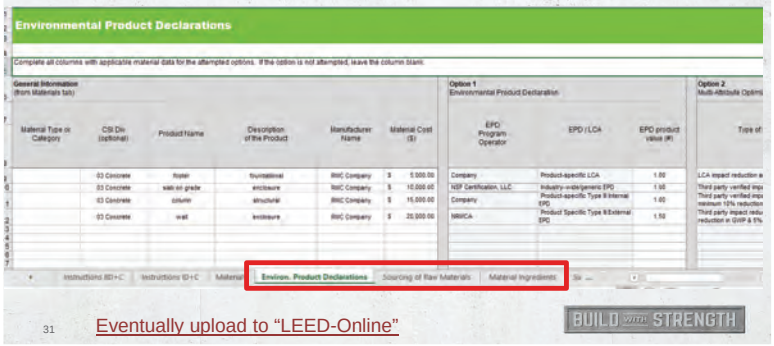
Example - BPDO Calculator



Eventually upload to “LEED-Online”

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Regional Benchmark Report

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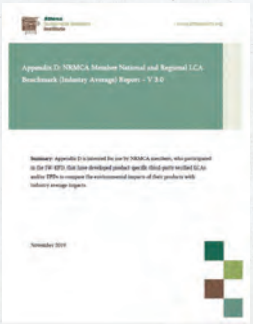
Regional Benchmark Average



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

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Option 2: Optimization to Reduce Impact

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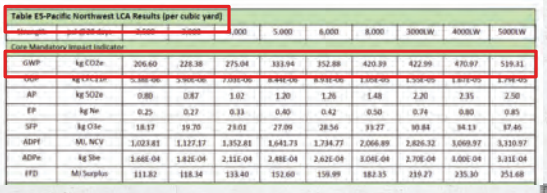
Influence Legislation, Codes, etc.

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



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Market Perspective

Why Does Transparency Matter?

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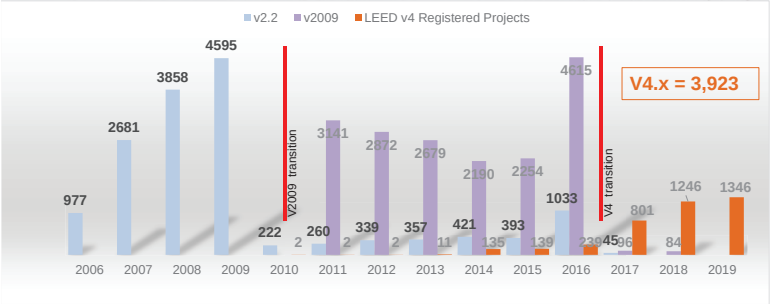
LEED v 4 Registration Activity (target projects)



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V4.x: Top 10 States

#	State	# LEED v4+ projects	#	State	# LEED v4+ projects
1	CA	765	6	VA	196
2	TX	247	7	DC	174
3	NY	235	8	WA	163
4	MA	201	9	MD	147
5	FL	200	10	PA	134

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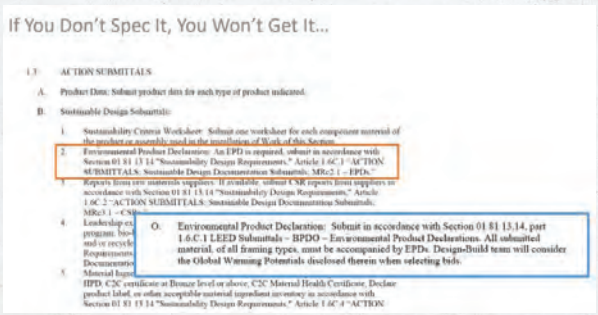
Kristin Richie - Gensler



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. Incl... and/or recycle... Requirements... Documentatio...
5. Material Ingre... 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

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.

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Disclosure – Product Categories

Div	Industry	EPDs
03	Concrete	115
04	Masonry	32
05	Metals	54
06	Wood / Plastic / Composite	37
07	Thermal & Moisture	106
08	Openings	179
09	Finishes	349

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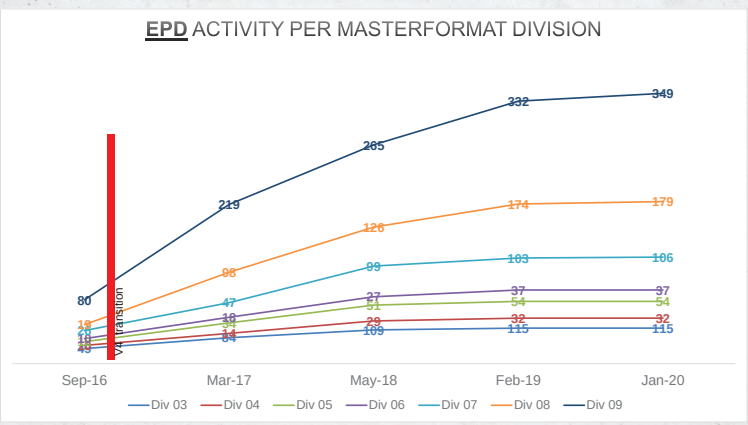
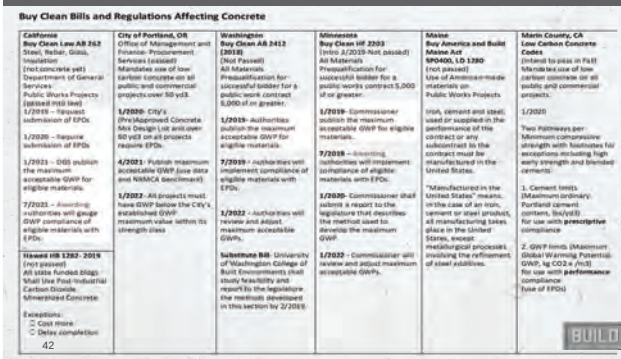


Influence Legislation, Codes, etc.



Buy Clean Bills and Regulations Affecting Concrete

California	City of Portland, OR	Washington	Minnesota	Maine	Marin County, CA
Buy Clean Law AB 262 Steel, Rebar, Glass, Insulation (not concrete yet) Department of General Services Public Works Projects (passed mid-law) 1/2019 – Request submission of EPDs 1/2020 – Require submission of EPDs 1/2021 – DGS publish the maximum acceptable GWP for eligible materials. 7/2023 – Awarding authorities will gauge GWP compliance of eligible materials with EPDs.	Office of Management and Finance- Procurement Services (passed) Mandates use of low carbon concrete on all public and commercial projects over 50 yd3. **1/2020**- City's (Pre)Approved Concrete Mix Design List and over 50 yd3 on all projects require EPDs. **4/2021**- Publish maximum acceptable GWP (use data and NRMCA benchmark) **1/2022**- All projects must have GWP below the City's established GWP maximum value within its strength class	**Buy Clean AB 2412 (2018)** (Not Passed) All Materials Prequalification for successful bidder for a public work contract 5,000 sf or greater. **1/2019**- Authorities publish the maximum acceptable GWP for eligible materials. **7/2019** – Authorities will implement compliance of eligible materials with EPDs. **1/2022** – Authorities will review and adjust maximum acceptable GWPs. **Substitute Bill**- University of Washington College of Built Environments shall study feasibility and report to the legislature the methods developed in this section by 2/2019.	**Buy Clean HF 2203** (Intro 3/2019-Not passed) All Materials Prequalification for successful bidder for a public works contract 5,000 sf or greater. **1/2019**- Commissioner publish the maximum acceptable GWP for eligible materials. **7/2019** – Awarding authorities will implement compliance of eligible materials with EPDs. **1/2020**- Commissioner shall submit a report to the legislature that describes the method used to develop the maximum GWP. **1/2022** – Commissioner will review and adjust maximum acceptable GWPs.	**Buy America and Build Maine Act SP0400, LD 1280** (not passed) Use of American-made materials on Public Works Projects. Iron, cement and steel, used or supplied in the performance of the contract or any subcontract to the contract must be manufactured in the United States. "Manufactured in the United States" means, in the case of an iron, cement or steel product, all manufacturing takes place in the United States, except metallurgical processes involving the refinement of steel additives.	**Low Carbon Concrete Codes** (intend to pass in Fall) Mandates use of low carbon concrete on all public and commercial projects. 1/2020 Two Pathways per Minimum compressive strength with footnotes for exceptions including high early strength and blended cements: 1. Cement limits (Maximum ordinary Portland cement content, lbs/yd3) for use with **prescriptive** compliance 2. GWP limits (Maximum Global Warming Potential GWP, kg CO2 e /m3) for use with **performance** compliance (use of EPDs)
Hawaii HB 1282- 2019 (not passed) All state funded bldgs Mail Use Post-Industrial Carbon Dioxide Mineralized Concrete Exceptions: ☐ Cost more ☐ Delay completion					

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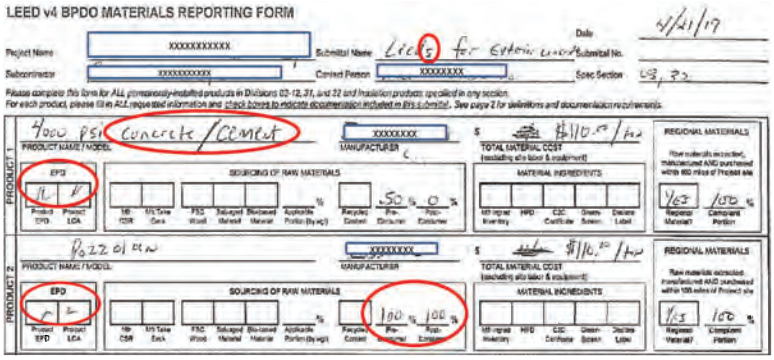
Risks & Liabilities


LEED v4 BPDO MATERIALS REPORTING FORM

Project Name: XXXXXXXXXXX
Submittal Name: Leeds for Exterior Concrete
Date: 4/21/17
Submittal No.:
Subcontractor: XXXXXXXXXXX
Contact Person: XXXXXXXX
Spec Section: 03, 32

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
4000 psi Concrete / Cement
PRODUCT NAME / MODEL
XXXXXXXX
MANUFACTURER
$ $110.00 / ton
TOTAL MATERIAL COST (excluding site labor & equipment)
EPD: Product EPD / Product LCA
SOURCING OF RAW MATERIALS: Mfr CSR / Mfr Take Back / FSC Wood / Salvaged Material / Bio-based Material / Applicable Portion (by wgt) %
Recycled Content: .50 % Pre-Consumer / 0 % Post-Consumer
MATERIAL INGREDIENTS: Mfr Ingred Inventory / HPD / C2C Certificate / Green-Screen / Declare Label
REGIONAL MATERIALS: Raw materials extracted, manufactured AND purchased within 100 miles of Project site
Yes Regional Material? / 100 % Component Portion

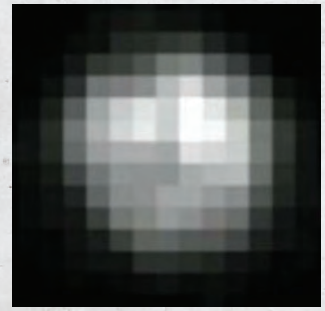
PRODUCT 2
Pozzolan
PRODUCT NAME / MODEL
XXXXXXXX
MANUFACTURER
$ $110.00 / ton
TOTAL MATERIAL COST (excluding site labor & equipment)
EPD: Product EPD / Product LCA
SOURCING OF RAW MATERIALS: Mfr CSR / Mfr Take Back / FSC Wood / Salvaged Material / Bio-based Material / Applicable Portion (by wgt) %
Recycled Content: 100 % Pre-Consumer / 100 % Post-Consumer
MATERIAL INGREDIENTS: Mfr Ingred Inventory / HPD / C2C Certificate / Green-Screen / Declare Label
REGIONAL MATERIALS: Raw materials extracted, manufactured AND purchased within 100 miles of Project site
Yes Regional Material? / 100 % Component Portion

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.
- https://www.nrmca.org/sustainability/index.asp
- Reach out for customized strategic discussions for business case to be more transparent

BUILD WITH STRENGTH

Pluto: 1984 vs 2018



Thank You

Any Questions

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