

Getting to Substantially Lower Embodied Greenhouse Gas Emission Construction Materials

Environmental Product Declaration Assistance

EPA Office of Chemical Safety & Pollution Prevention
Inflation Reduction Act Stakeholder Engagement

March 22, 2023



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Engagement



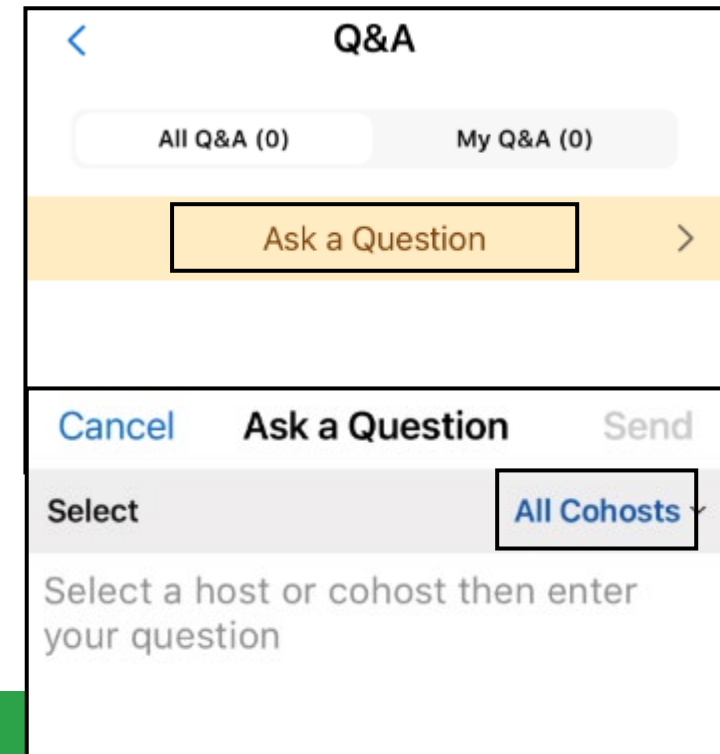
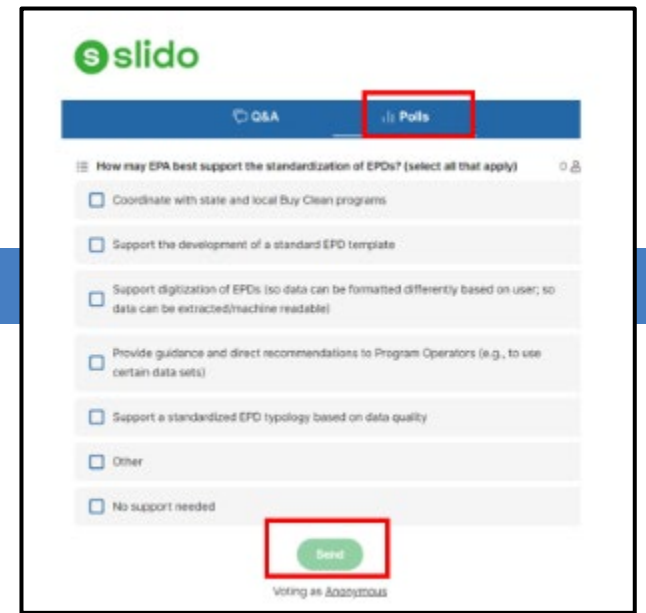
Slido polling questions will appear on the right of your screen. Results will display real-time.



Submit questions at any time using the Q&A panel. Select *All Cohost* and type in your questions and someone will answer your questions verbally or written.



Submit your written responses to EPA's RFI via the open docket on Regs.gov. Link provided in this presentation.



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EPA Low Embodied GHG Emission Construction Materials *Stakeholder Engagement Webinar Series*

- 1. Construction Materials Prioritization
and Environmental Data Improvement**
March 2, 2023, 2 – 3:30 p.m. ET
- 2. Grants and Technical Assistance for
Environmental Product Declarations**
March 22, 2023, 2 – 3:30 p.m. ET
- 3. Carbon Labeling**
April 19, 2023, 2 – 3:30 p.m. ET



Today's Agenda

Time	Topic	Speakers
2:05- 2:20 PM	Overview of IRA Low Embodied Carbon Construction Materials Programs and EPA's Role	<ul style="list-style-type: none">Jennie Romer, Deputy Assistant Administrator, EPA Office of Chemical Safety and Pollution Prevention
2:20– 3:00 PM	EPD Assistance RFI Questions and Context	<ul style="list-style-type: none">Alison Kinn Bennett, Senior Advisor Environmentally Preferable Purchasing Program/Sustainable Marketplace
3:00 – 3:30 PM	Q&A	All

Inflation Reduction Act Overview

- **The Inflation Reduction Act (IRA), signed August 16, 2022, makes historic investments in climate action** that are expected to reduce U.S. emissions ~40% by 2030 while supporting disadvantaged communities and the clean energy industrial base.
- **EPA will play a major role in delivering these programs.** The Agency received \$41.5 billion in appropriated funds and expects to receive an additional \$11.7 billion in future revenue from reinstating the Superfund Tax on oil and gas production.
- **The Embodied Carbon programs at EPA will enable the agency to drive additional decarbonization** through federal purchasing not just for IRA but also the Bipartisan Infrastructure Law, American Innovation and Manufacturing (AIM) Act, and regular appropriations while setting standards that can be utilized by state, local, and private partners.
- **EPA is implementing two programs directly** while also collaborating with the General Services Administration (GSA), Federal Highway Administration (FHWA) and other agencies to support their IRA funding distribution as well.

IRA 2022 provides a major boost to lowering embodied carbon

Sec #	Agency	Funding	Purpose	Funds expiration
60503	GSA Federal Buildings Fund	\$2.15B	To acquire and install materials/products for use in the construction or alteration of buildings that have substantially lower levels of embodied GHG emissions (<i>as determined by EPA</i>)	9/30/26
60506	DOT FHWA	\$2B	To reimburse or provide incentives (up to 2% of incremental costs) to eligible recipients for the use of construction materials/products that have substantially lower levels of embodied GHG emissions (<i>as determined by EPA</i>)	9/30/26
60116	EPA	\$100M	For administrative costs to develop (<i>with GSA and DOT-FHWA</i>) a program to identify and label construction materials/products that have substantially lower levels of embodied GHG emissions, based on EPDs and determinations by State agencies, as verified by EPA.	9/30/26
60112	EPA	\$250M	Grants and technical assistance to businesses, states, tribes and nonprofit organizations to support the development, enhanced standardization and transparency, and reporting criteria for EPDs for construction materials/products that include measurements of the embodied GHG emissions across all life cycle stages	9/30/31
50161	DOE	\$5.812B	For financial assistance for advanced technology retrofits for US industrial or manufacturing facilities that produce iron, steel, steel mill products, aluminum, cement, concrete, glass, and other energy intensive industrial processes	
	DOE	\$10B	For the 48C tax credit to expand clean technology manufacturing	
30002	HUD	\$837.5M	For direct loans and grants to improve climate resilience of affordable housing, including low-emission building materials/processes	
70006	FEMA		May provide financial assistance for costs associated with low-carbon materials	

Federal Buy Clean Initiative

Leverages Federal procurement and funding to catalyze markets for low-carbon construction materials to upgrade our transportation, buildings and energy infrastructure

- As the **world's largest buyer of goods and services**, the Federal government's supply chain emissions are twice as large as emissions from Federal buildings and vehicles.
- The **U.S. manufacturing sector** produces the materials that are critical to rebuilding and strengthening the nation's infrastructure.
- U.S. manufacturing sector is linked to nearly **a third of U.S. greenhouse emissions** from industrial processes.
- Buy Clean Federal efforts aim to build upon and accelerate **existing Buy Clean efforts** led by cities and states with critical support from industry, labor and environmental groups.
- A White House-led **Buy Clean Task Force** is coordinating interagency efforts to send the **first Federal demand signal** for lower embodied-carbon construction materials – **steel, cement/concrete, asphalt and glass** – that are made in America with union jobs.



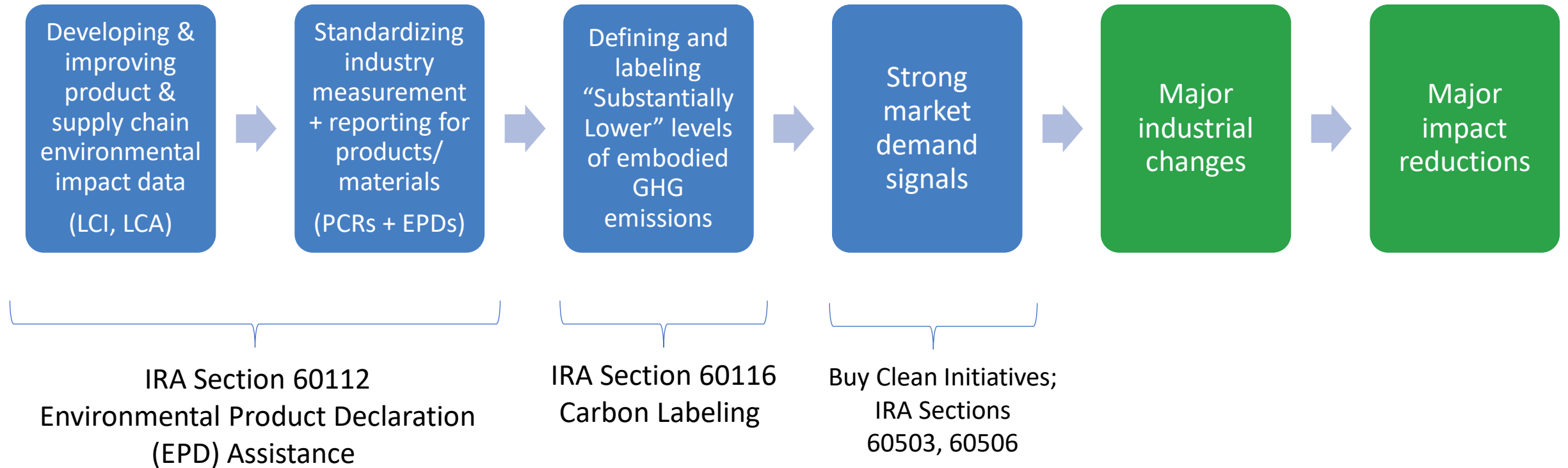
www.sustainability.gov/buyclean

White House Buy Clean Task Force High Level Recommendations

Executive Order 14057 (December 2021) requires Task Force to provide recommendations for:

Collecting environmental performance information	Increasing transparency of emissions and verifying accuracy of and auditing EPDs
<ul style="list-style-type: none">• Utilize Environmental Product Declarations (EPDs)• Recommended additional facility-level benchmarking data to be requested of manufacturers:<ul style="list-style-type: none">• EPA carbon intensity benchmarks• ENERGY STAR Energy Performance Scores	<ul style="list-style-type: none">• Require actual supply chain data in EPDs for the most carbon intensive processes• Engage in and consider assessing Product Category Rules (PCRs) to ensure EPDs are suitable, consistent and comparable• Develop and update background datasets to support life cycle analysis (LCA) and EPDs for construction materials• Develop mechanisms for digital tracking of EPDs


High-Level Theory of Change




Sustainable Marketplace


Defining Green. Buying Green. Measuring Green. www.epa.gov/greenerproducts


 Take a lifecycle, multi-attribute approach to defining “greener”

 Engage in the development and update of private sector product & service sustainability standards & ecolabels

 Assess and recommend standards & ecolabels for federal purchasers

 Assist feds (and others) in buying greener products and services

 Assist small businesses in selling their greener products and services to the federal government

 Measure compliance and benefits of buying green



Request for Information

EPD Assistance

Please submit your comments on RFI questions to the open docket at <https://www.regulations.gov/docket/EPA-HQ-OPPT-2022-0924/document>

What factors should EPA consider for the EPD Assistance program?

- Technical Assistance Needs*
- Distribution of Resources*

Inflation Reduction Act Section 60112: ENVIRONMENTAL PRODUCT DECLARATION ASSISTANCE

- (a) IN GENERAL.—In addition to amounts otherwise available, there is appropriated to the Administrator of the Environmental Protection Agency for fiscal year 2022 ... **\$250,000,000, to remain available until September 30, 2031**, to develop and carry out a program to support the **development, enhanced standardization and transparency, and reporting criteria for environmental product declarations** that include measurements of the embodied greenhouse gas emissions of the material or product associated with all relevant stages of **production, use, and disposal**, and conform with international standards, for construction materials and products by—
 - (1) providing **grants to businesses** that manufacture construction materials and products for developing and verifying environmental product declarations, and to **States, Indian Tribes, and nonprofit organizations** that will support such businesses;
 - (2) providing **technical assistance to businesses** that manufacture construction materials and products in developing and verifying environmental product declarations, and to **States, Indian Tribes, and nonprofit organizations** that will support such businesses; and
 - (3) carrying out **other activities that assist in measuring, reporting, and steadily reducing the quantity of embodied carbon** of construction materials and products.

Context: What is an EPD?

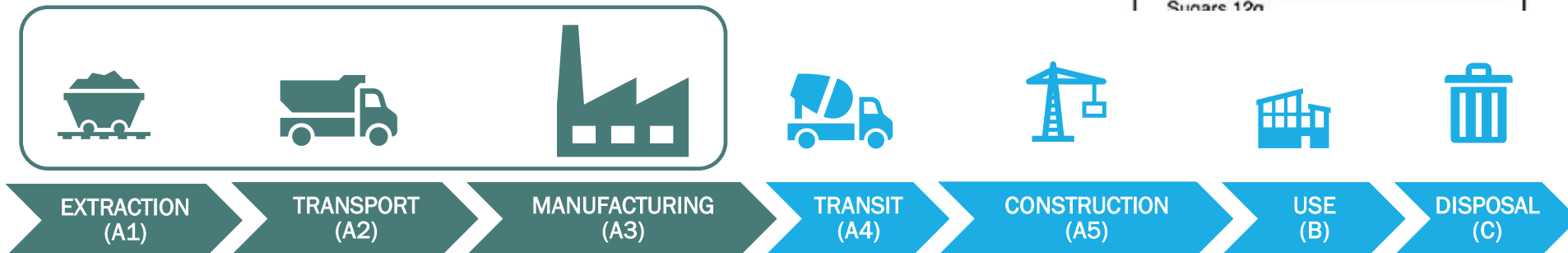
Discloses the “lifecycle” environmental impacts of a product similar to a nutrition label

ENVIRONMENTAL IMPACTS	
Declared Product:	
Plant name	
Compressive strength: 3000 PSI at 28 days	
Declared Unit: 1 m ³ of concrete	
Global Warming Potential (kg CO ₂ -eq)	281
Ozone Depletion Potential (kg CFC-11-eq)	7.8E-6
Acidification Potential (kg SO ₂ -eq)	0.84
Eutrophication Potential (kg N-eq)	0.37
Photochemical Smog Creation Potential (kg O ₃ -eq)	16.9

...but without a lab test for all impacts and without the “recommended values”

Up to “buyer” to specify thresholds

Nutrition Facts	
Serving Size 2/3 cup (55g)	
Servings Per Container 8	
Amount Per Serving	
Calories 230	Calories from Fat 70
	% Daily Value*
Total Fat 8g	12%
Saturated Fat 1g	5%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 160mg	7%
Total Carbohydrate 37g	12%
Dietary Fiber 4g	16%
Sugars 12g	



Context: Key EPD Types

Increasing levels of specificity, comparability, usefulness in procurement and potentially cost

Industry-wide

- Provides averages for a sector
- Useful for benchmarking & facilitating development of more specific EPDs

Product-specific

- Typically provides data on products from a single manufacturer averaged across multiple facilities

Facility-specific

- Provides data on a specific product from a single facility

Supply Chain-specific

- Provides primary data for key upstream inputs and materials

Context: Drivers for EPDs

IRA 60503 & 60506 EPA's Interim Determination on "Substantially Lower" Embodied Carbon Construction Materials

- To access the additional IRA funds for concrete/cement, glass, asphalt mix, and steel, a **facility-specific, material/product-specific cradle-to-gate Type III (third-party verified) EPD** is required that:
 - (i) is based on the PCR for the applicable product category that was active when the EPD was issued
 - (ii) conforms with ISO 14025 and ISO 21930
 - is based on supply chain-specific data for the associated unit processes, where available/feasible.
- When an EPD with facility-specific and/or supply chain-specific data is not available, for this interim determination, EPDs at least consistent with (i) and (ii) are sufficient.

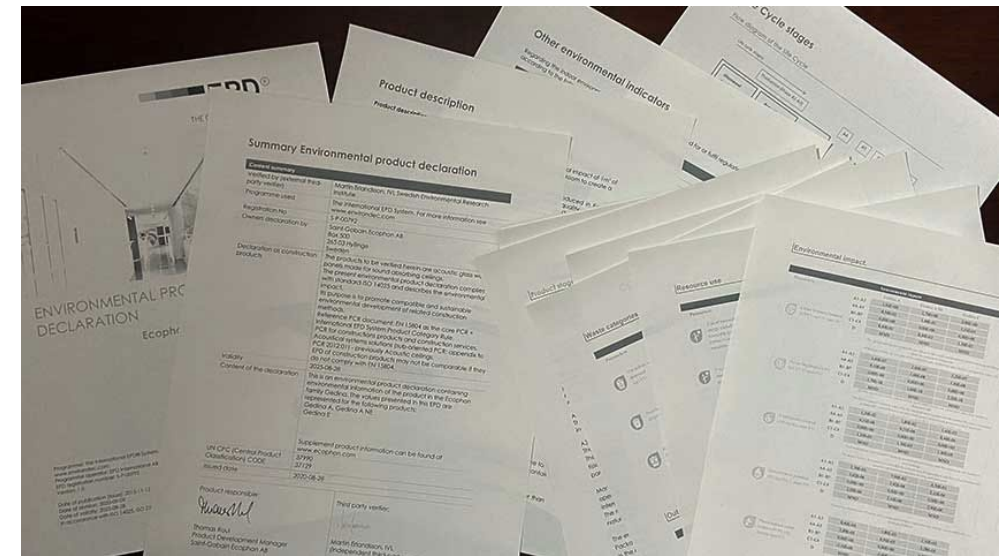


Image of printed EPDs from:
<https://www.archtoolbox.com/environmental-product-declarations/>

Context: EPD requirements in Buy Clean laws & regulations in the US

Table source: C2ES brief “A Building Block for Climate Action: Reporting on Embodied Emissions”

	JURISDICTION	POLICY TEXT	TYPE OF EPD	STATUS	IMPLEMENTS GWP LIMITS
2022	Federal—GSA	<i>Facilities Standards (P100)</i>	Product-specific	Passed	Partially
2022	Virginia	<i>SB 272</i>	Not specified	Proposed	No
2022	Illinois	<i>HB 5564</i>	Not specified	Proposed	Yes
2022	Oregon	<i>HB 4139</i>	Product-specific	Passed	No
2021	Federal—Congress	<i>H.R. 5376—Inflation Reduction Act</i>	Not specified	Passed	No
2021	Federal—Congress	<i>H.R. 1512—CLEAN Future Act</i>	Facility-specific	Proposed	Yes
2021	Washington State	<i>HB 1103</i>	Supply chain-specific	Proposed	No
2021	New Jersey	<i>A5223</i>	Product-specific	Proposed	Yes
2021	Colorado	<i>HB 21-1303</i>	Supply chain-specific	Passed	Yes
2021	California	<i>AB-1365</i>	Supply chain-specific	Proposed	Yes
2021	New York State	<i>SB 542A</i>	Not specified	Passed	No
2020	New Jersey	<i>S3091</i>	Not specified	Passed	Yes
2019	Local—Portland	<i>Concrete Requirements</i>	Product-specific	Passed	Yes
2019	Minnesota	<i>HF 2204</i>	Facility-specific	Proposed	Yes
2019	Minnesota	<i>HF 3702</i>	Product-specific	Proposed	No
2017	California	<i>AB-262</i>	Facility-specific	Passed	Yes

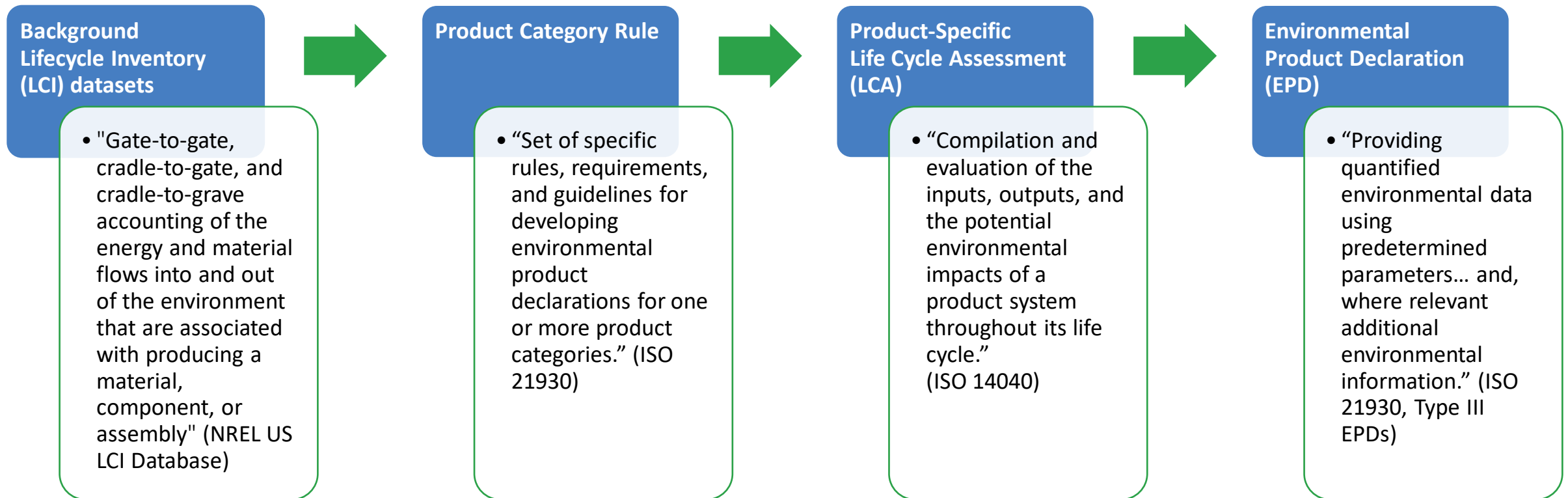
Sources: Carbon Leadership Forum, Natural Resources Defense Council, BlueGreen Alliance, and C2ES.

Context: Sampling of the many existing related Federal resources

- [EPA's ENERGY STAR for Industry](#)
- [EPA's Small Business Innovation Research \(SBIR\)](#)
- [EPA's Center for Corporate Climate Leadership GHG Emission Factors Hub](#)
- [DOD Strategic Environmental Research and Development Program \(SERDP\)](#) and [Environmental Security Technology Certification Program \(ESTCP\)](#)
- [DOD's Army Corps of Engineers Engineering Research & Development Center \(ERDC\)](#) [Construction Engineering Research Laboratory \(CERL\)](#)
- [DOE's Better Plants](#)
- [DOE's Industrial Heat Shot™](#)
- [DOE's Industrial Assessment Center \(IAC\)](#)
- [DOE's Life Cycle Assessment and Techno-Economic Analysis Training](#)
- [GSA's SF Tool Green Procurement Compilation](#) and [SF Tool Sustainability Facilities Tool](#)
- [DOT's Federal Highways Association Sustainable Pavements](#) and [LCA Pave Tool](#)
- [USDA's wood innovations and community wood grants](#)
- And more!

Coming soon
- Curated list
of resources
to support
EPDs

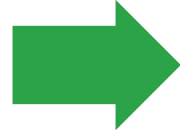
Context: Need for assistance at many points along this data, standardization, assessment, and reporting continuum



Context: Key Needs Stakeholders Have Identified Thus Far

Product Category Rule

- More PCRs to fill gaps
- Updated PCRs
- Material agnostic PCRs
- Financial & technical support for public agency & NGO participation in PCR committees
- Multistakeholder Consensus-based PCR Standard & Third-Party Conformity Assessment Program
- And more



Life Cycle Assessment (LCA)

- LCA education
- Access to free LCA consultants for small businesses
- New lifecycle inventories/datasets
- Updates to outdated lifecycle inventories/datasets
- Tools to help industry share/report LCA data confidentially
- And more



Environmental Product Declaration (EPD)

- General EPD education for producers & purchasers
- Cradle to Grave & Cradle to Cradle EPDs
- A consensus standard EPD template
- More industry-wide EPDs to fill gaps
- More EPD generator tools to fill gaps
- Development & Update of EPDs
- Digitization of EPDs
- Free access to EPD generator tools
- An accreditation program for EPD verifiers
- Funding/reimbursement for EPD third-party verification
- Publicly-funded EPD Database with x, y, and z functionality
- And more

Context: Range of Possible Technical Assistance Approaches



Hotline



One-on-One
Consulting



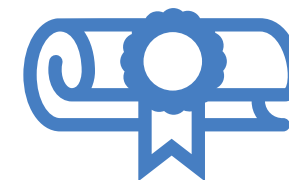
Convenings;
Communities
of Practice;
Expert Office
Hours



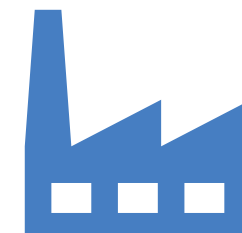
In-person or
Virtual
Classroom
Trainings



Digital
Automation
Tools



Accreditation
Programs



Facility
Walk-thrus

Context: Range of Possible Technical Assistance Providers

With whom do you want to work? Does this vary by TA type?

- Industry Trade Associations
- Professional Associations
- Environmental NGOs
- Universities
- Consultants
- States
- Cities
- Local and tribal governments
- Federal Policy Agencies, like EPA
- Federal Procurement Agencies, like GSA and FHWA
- Collaborations between some of the above



Your Feedback – EPD Assistance

RFI Question 19. Manufacturer Needs:

- What types of incentives and/or financial and technical support would help construction material and product manufacturers, including small businesses, to develop high quality, digital/machine-readable, third-party verified EPDs for the materials and products they produce?

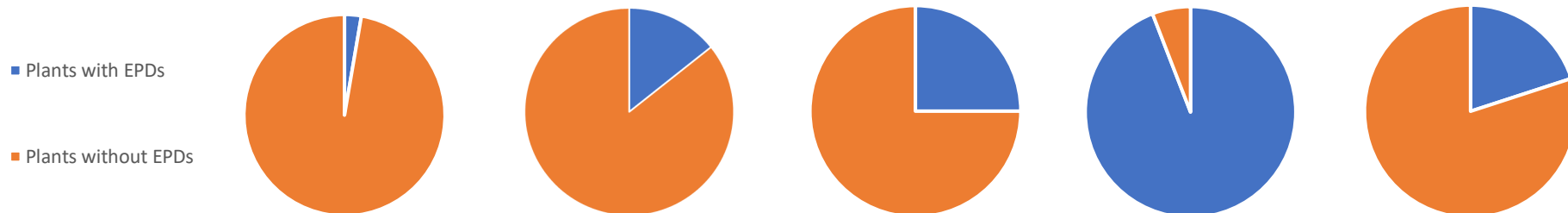
Context: Distribution of Resources?

Different needs by Region, Sector, Business Size, etc

Estimated Number of EPDs

Federal Buy Clean First Tier of Materials

	Asphalt Mixes	Concrete (ready-mix)	Cement (Portland)	Steel (hot-rolled sections, plate, and rebar)	Flat Glass
# of US Companies		~2,100	~20	17	5
# of US Plants	~3,700	~7,000	~100	51	~30
# of Plants with EPDs	~100	~1,000	~25	48	~6
# of Published EPDs	~540	~73,000	~70	41	4



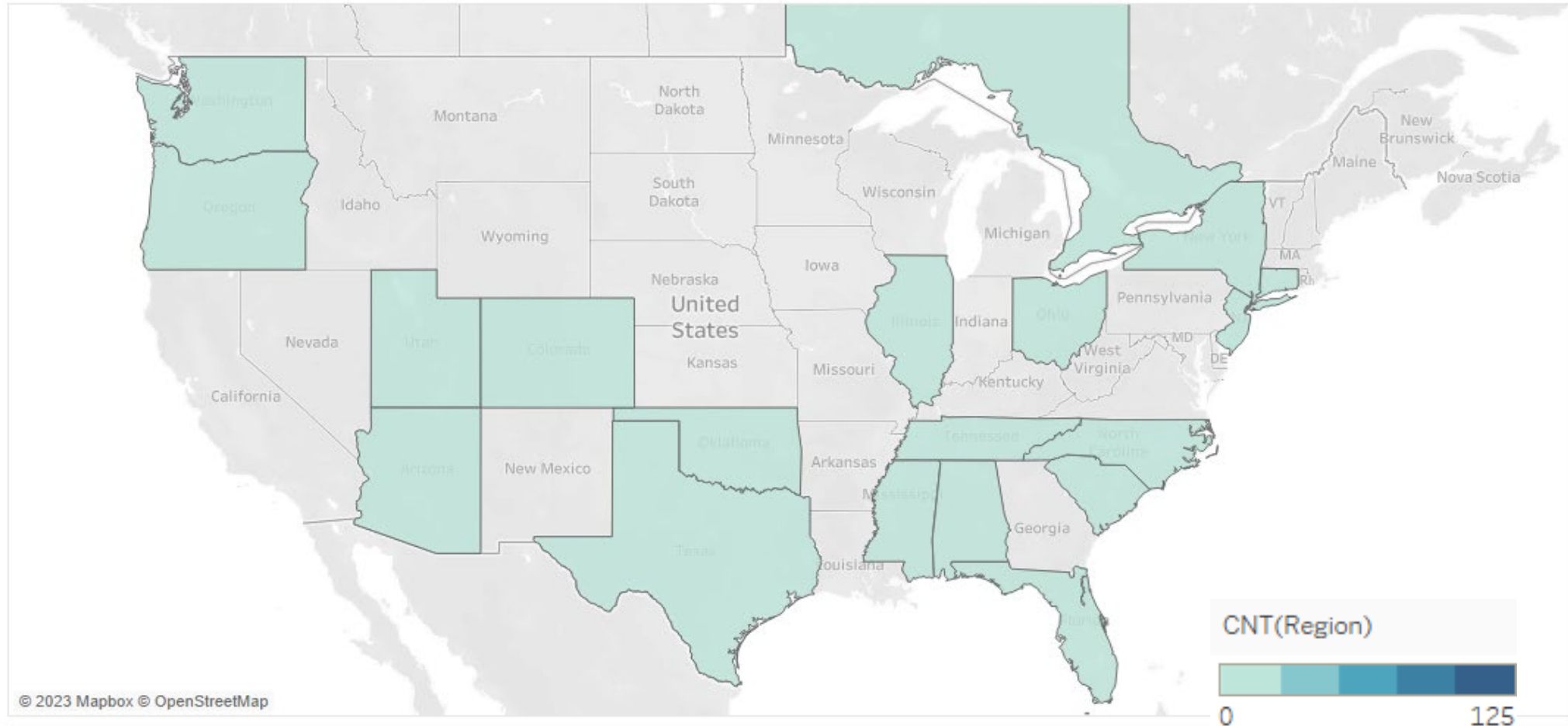
Sources: ASTM International's [EPD Page](#), Building Transparency's Embodied Carbon in Construction Calculator ([EC3](#)), ICC Evaluation Service's [EPD Directory](#), EPD International AB's [EPD Library](#), the National Asphalt Paving Association's [Emerald Eco-Label](#) EPD Tool, the National Ready Mixed Concrete Association's [Concrete EPDs](#) page, NSF's [Search for EPDs](#) tool, and UL's [SPOT](#) product catalog.

Context: Current State of Sectors – A Good Start!

	Asphalt Mixes	Concrete (ready-mix)	Cement (Portland and Blended)	Steel	Flat Glass
Key PCRs developed?	yes <i>(aggregate and binder PCRs forthcoming)</i>	yes	yes	yes	yes
Industry-wide EPD(s) available?	no	yes	yes	yes	yes
EPD Generator Tool(s) available?	yes	yes	yes	no	no
Product-specific EPDs represent significant market share?	no	no	yes <i>PCA estimates that at least 20-30% of market share is covered by EPDs.</i>	yes	yes
Facility-specific EPDs represent significant market share?	<i>(all EPDs for asphalt mixtures are product and facility-specific)</i>	<i>(all product-specific EPDs are also facility specific)</i>	<i>(all product-specific EPDs are also facility specific)</i>	yes <i>(for sections, plate, HSS, and rebar products)</i>	no

Context: Steel Rebar – Distribution of product EPDs

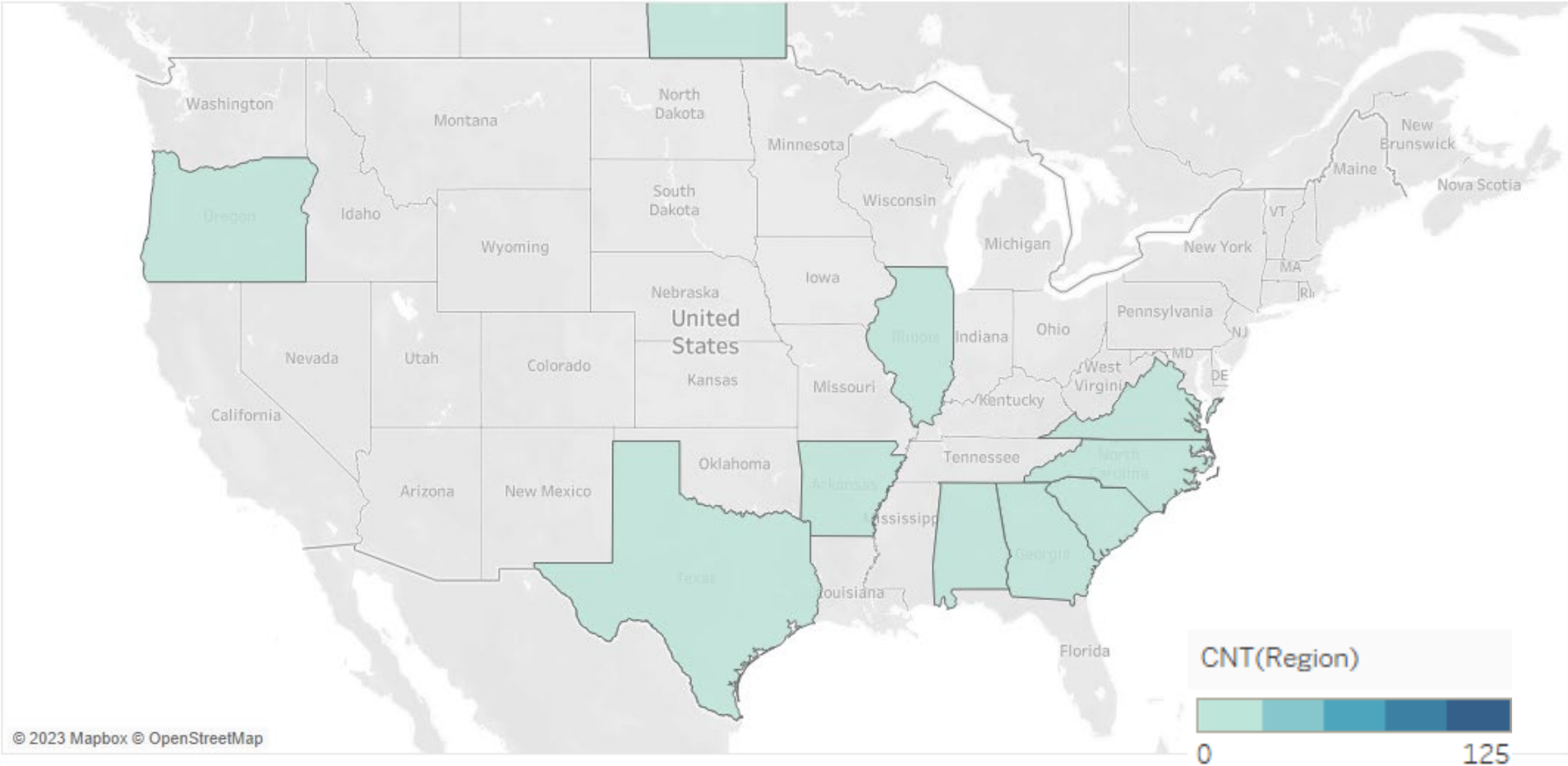
Source: Carbon Leadership Forum (limited to unexpired EPDs that pass CLF QA process)



© 2023 Mapbox © OpenStreetMap

Context: Structural Steel - hot-rolled, plate, HSS – Distribution of EPDs

Source: Carbon Leadership Forum (limited to unexpired EPDs that pass CLF QA process)



Context: Distribution of EPA Resources?

Different needs by Region, Sector, Business Size, etc

Estimated average cost* per EPD for Federal Buy Clean first phase of materials

	Asphalt Mixes	Concrete (ready-mix)	Cement (Portland)	Steel (hot-rolled sections, plate, and rebar)	Flat Glass
LCA and EPD development					
Average first plant per company	~\$4,500	~\$1K-4,200	~\$1K-4,200	~\$16-45K	~\$28-65K+
Additional plants per company	~\$4,500	~\$1,200	~\$1,200	~\$5-12K	~\$10K
Annual subscription fees (first plant)		~ \$500-2,500	~\$500-\$2,500		
Annual subscription fees (additional plants)		~\$500-1,100	~\$500-1,100		
Critical Review & 3rd Party Verification					
First LCA/EPD per company		~\$1,250-2K	~\$2,500	~\$4,500	~\$5-8K
Additional EPD per company		~\$250-650		~\$600	~\$1500

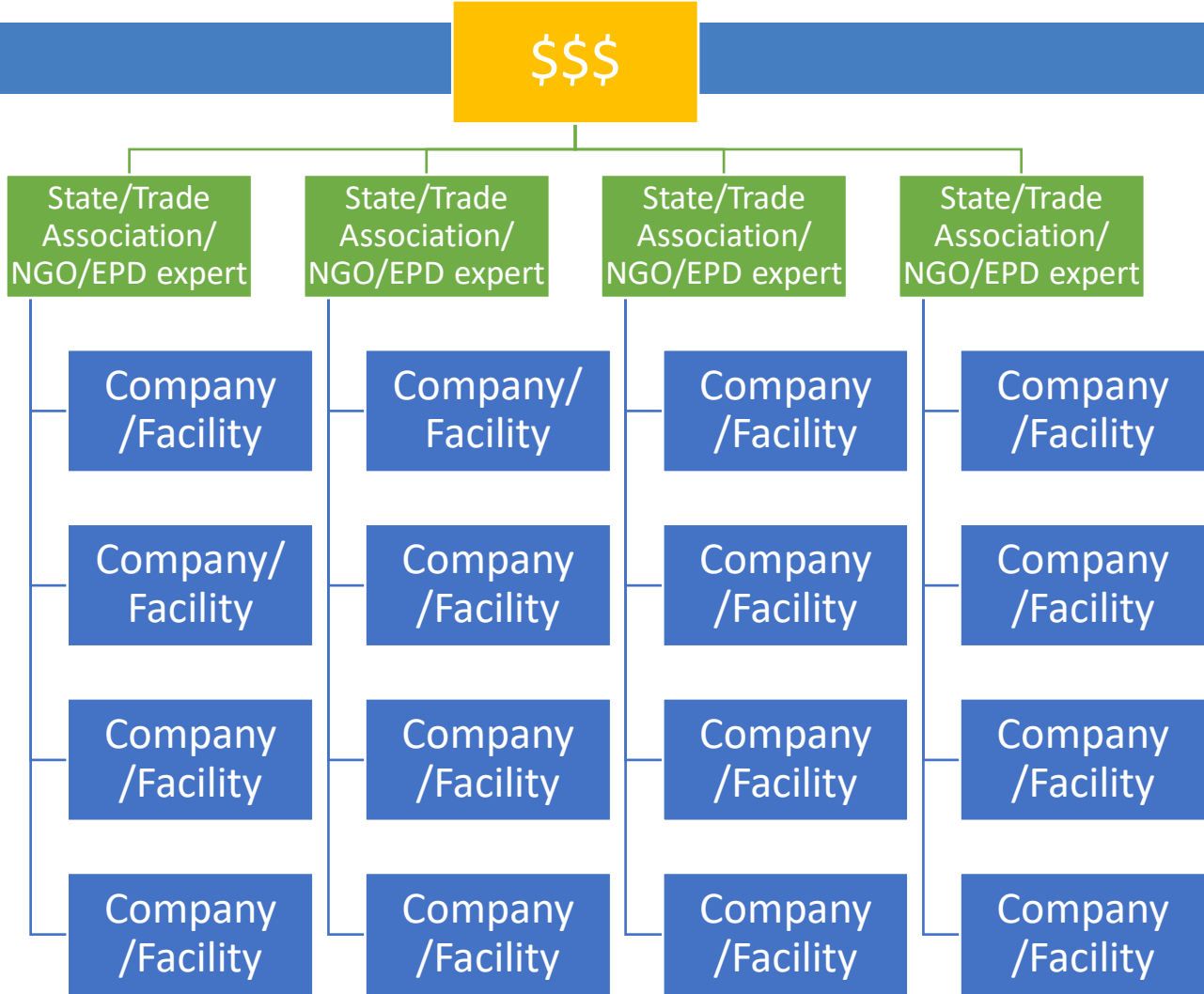
* These costs are just the consultant/trade association/program operator costs; not the cost for the company personnel gathering the information, etc.

Context: Distribution of EPA Resources?

“Wholesale” Grant/TA Approach

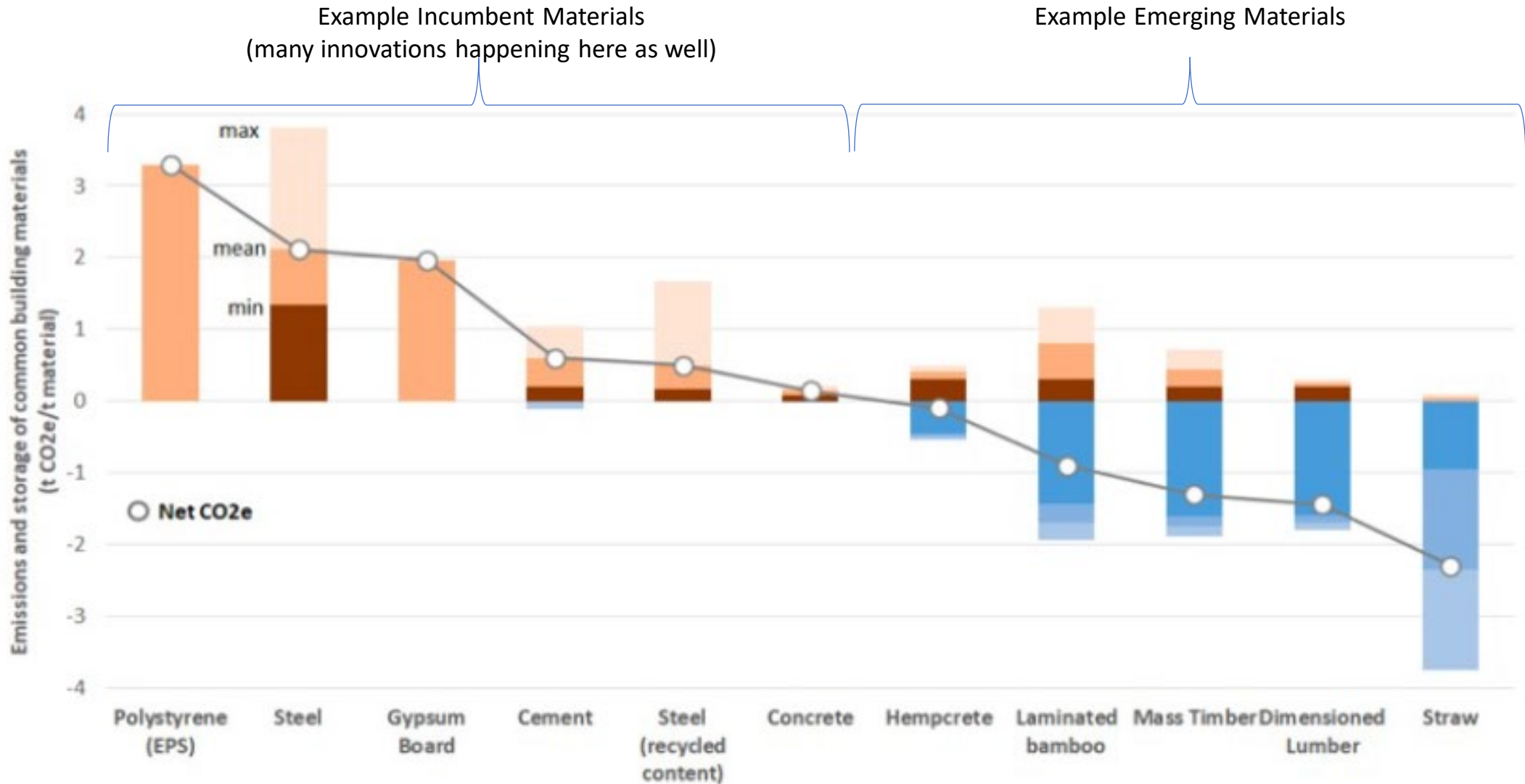
Example Program: Oregon Dept of Environmental Quality’s Concrete EPD Assistance Program working via state-based concrete trade association:

- Provided:
 - \$2,500/plant or 75% of total EPD cost - whichever was less (no more than 8 plants per company)
 - Technical assistance
 - Free tool access
 - 1:1 technical support
 - Lots of presentations, conference sessions, technical workgroups, etc.
- Results:
 - Over 1500 EPDs produced
- Program Costs:
 - ~\$50,000 of direct reimbursements
 - ~\$20,000 of tool development
 - ~\$10,000 program administration



Context: Distribution of EPA Resources?

Emerging materials have limited code compliant options and EPDs



Data from: Pomponi, F. and Moncaster, A. "Scrutinising Embodied Carbon in Buildings: The Next Performance Gap Made Manifest," *Renewable and Sustainable Energy Reviews*, V. 81(P2), 2431-2442, 2018, DOI: 10.1016/j.rser.2017.06.049. Ruuska, "Carbon Footprint for building products," 2013, <https://cris.vtt.fi/en/publications/carbon-footprint-for-building-products-eco2-data-for-materials-an>.

Typical Process for EPA Pollution Prevention Grants

EPA will provide a thorough training when this IRA RFA is posted!

- **Steps to prepare for applying for grants** - <https://www.epa.gov/p2/steps-take-applying-p2-grant>
- **EPA issues Requests for Applications (RFAs) including:**
 - threshold eligibility criteria
 - evaluation criteria
 - grantee reporting requirements
 - submission process
- **Applicants apply, including:**
 - Register on SAM.gov & Grants.gov
 - Standard Form 424 – Application for Federal Assistance (SF-424)
 - Standard Form 424A, Budget Information – Non-Construction Programs
 - EPA Form 4700-4, Pre-Award Compliance Review Report for All Applicants Requesting Federal Financial Assistance
 - EPA Key Contacts Form 5700-54
 - Project Narrative form
 - Comprehensive plan for gathering and reporting on the expected environmental outputs and outcomes of proposed grant work.
 - Budget table
- **Awardee reporting, including:**
 - Awarded grantees must report on the outcomes achieved (typically mid-year and annual performance reports during the project period and a final technical report at the completion of the grant).



Your Feedback – EPD Assistance

20. Fair, Equitable Distribution of Resources:

- How should EPA shape grant programs providing technical assistance or funding for developing EPDs to reach a maximum number of entities and to ensure equitable, fair distribution of resources?

Target FY23/24 Timeline for EPA's Low Embodied Carbon Construction Materials Program Implementation

Spring/
Summer
2023

Summer
/Fall
2023

Early
2024

- Receive stakeholder feedback on shaping EPD assistance and carbon labeling programs
- Engage federal expertise in Product Category Rules, ASHRAE 189.1, LEED, other standards
- Establish direct, near-term EPD assistance in priority sectors
- Enhance Federal LCA Commons - Developing new & improving existing LCA datasets
- Solicit proposals for competitive grant programs potentially including:
 - Development & harmonization & typology of Product Category Rules; conformity assessment of PCRs and EPDs
 - Development of industry-wide EPDs & tools to generate product-specific, digital EPDs
 - Expansion of tools/resources for businesses to conduct LCAs and measure & report actual GHG emissions
 - Development of aspects of new carbon labeling program
- Award first round of competitive grants
- Evaluate year 1 effectiveness and course-correct, where necessary



Q&A time!

For more information & to stay in touch...

- Please submit your comments on the RFI questions to the open docket at <https://www.regulations.gov/docket/EPA-HQ-OPPT-2022-0924/document>
- EPA's IRA Low Carbon Materials Program: <https://www.epa.gov/inflation-reduction-act/inflation-reduction-act-programs-fight-climate-change-reducing-embodied>
- White House Council on Environmental Quality
Federal Buy Clean Initiative <https://www.sustainability.gov/buyclean/>
Federal Sustainable & Net-Zero Emissions Buildings Policies
<https://www.sustainability.gov/federalsustainabilityplan/buildings.html>
- Listserv sign-up: <https://www.epa.gov/greenerproducts/forms/contact-us-about-greener-products-and-services>
- Email: embodiedcarbon@epa.gov - also reach out if you want to dive deeper on salvaged/reused construction materials!

