







- Several Colorado producers see value in transferring their EPD program from their Environmental Manager to their QC Manager.
- Colorado Office of the State Architect (OSA) also implemented an EPD Program. OSA Policy and GWP Limits will take effect Jan 1, 2024. These will apply to state facilities, including parking lots.
- CDOT began collecting EPD data on July 1, 2022 and their policy and GWP Limits will take effect January 1, 2025.
- The Biden administration on September 15, 2022 announced an updated Federal Buy Clean policy, which directs federal agencies to buy low-emissions asphalt.

Sensitivity Factors

- #1 Virgin Binder Content %
- **#2 Burner Fuel** (natural gas fuel has lowest EPD).
- #3 LONG Transport distance (this factor can overwhelm the EPD if VERY long).



- Asphalt Binder EPD. Currently ECO Label uses four national standard inputs (virgin binder, polymer binder, etc.). Asphalt Institute is developing an EPD tool for specific binders/producers. This may/may not have a very significant impact on EPD's and thresholds established.
- Concerns about CO thresholds/limits. How will future methodologies (e.g., BMD, asphalt specific EPD) impact EPDs? In response, CDOT will be creating subcategories for new technologies.
- CDPHE wants producers to wash aggregates (reduce air particulates). Some producers require the dust as part of their mix design. The increased moisture content in the aggregate requires more energy to dry and is larger than the initial dust impact. Example of CDPHE vs CDOT and competing goals.







Rules of Thumb

1% aggregate moisture $\approx 50^{\circ}$ drum temp. $\approx 0.5\%$ AC binder ≈ 3 kg GWP

Eliminate/reduce the use of hydrated lime can drop EPD up to 25% (Solterra Materials in PHX has demonstrated this with lime/liquid antistrip combination)

Concrete Industry: ≈ 85% of the EPD for PCC mixes is attributed to % cement in mixture.

Asphalt Industry: ≈ 70% -80% of EPD is attributed to % binder + burner fuel

FHWA Climate Challenge

On Earth Day 2022 FHWA released their "Climate Challenge"

"This challenge will quantify GHG emissions from construction pavement materials by encouraging the use of sustainable pavement practices and encouraging quantification of the impacts of those practices."

"State DOTs explore the use of EPDs as a standard practice to inform pavement material and design selection for enhancing sustainable pavement practices and quantify the emissions and impacts of those practices."

Pilot projects – up to \$500k per participant (State DOT)



at AUBURN UNIVERSITY





Statewide EPD Implementation CDOT projects and State Facility Projects









Federal "Buy Clean" Implementation DOT projects and Federal Facility Projects

The Biden administration on September 15, 2022 announced an updated Buy Clean policy, which directs federal agencies to buy low-emissions steel, concrete, asphalt, and flat glass. The policy is a major step toward decarbonizing the U.S. industrial sector and reducing emissions.

The purpose of Federal Buy Clean Initiative is to spur the development of low-carbon construction materials by leveraging the Federal government's purchasing power to buy cleaner materials, create a market differentiation for low-carbon construction materials, and provide incentives for lower-carbon materials.

Key Actions under September 15th announcement as follows:

- The Federal government <u>will prioritize</u> the purchase of low carbon steel, concrete, asphalt, and flat glass construction materials.
- The Buy Clean Task Force will provide instructions to agencies for integrating Buy Clean into federal procurement and funding process. Ultimately, this means public works projects will have to consider carbon emission impacts generated in the manufacturing of these materials.
- The Federal Buy Clean policy will cover federal-funded projects (e.g., Federal-aid Highway funded projects.) The role of state DOTs will be critical.
- In October, the White House will convene States to share knowledge and build capacity for public construction projects that lower carbon emissions.
- The Administration will expand the reliability, transparency, and verification of Environmental Product Declarations (EPDs).
- The Administration will launch Federal Buy Clean Initiative pilots across the country to accelerate innovations and develop a commercial path for a range of low carbon construction materials.
- The Federal Buy Clean Task membership will expand from nine to seventeen members to include the Departments of Commerce, Homeland Security, Housing and Urban Development, Health and Human Services, NASA, and Veterans. They will join Agriculture, Defense, Energy, Transportation, Council on Environmental Quality, Environmental Protection Agency, the General Services Administration, and the Office of Management and Budget.

The U.S. Department of Transportation also announced on September 15th the following actions:

- Explore the use and expansion of Environmental Product Declarations (EPDs);
- Develop a Buy Clean policy based on EPD's that could:
 - a. Require EPDs;
 - b. Establish a carbon intensity ceiling;
 - c. Award performance-based bonuses to high performers







CO₂ Equiv. (Global Warming Potential) Colorado ≈ 72.5 kg



aggregates from Canada)

Company	Plant	Mix	EPD
Brannan	Lipan	40053-22-L	71.23
Brannan	Lipan	40054-22-L	69.26
Brannan	Lipan	40211-22-L-J-WMA	72.82
Brannan	Rock Creek	40013-22-R	70.41
Brannan	Rock Creek	40053-22-R	71.16
Elam	Roland	nd 12-921 5/8" PG64-22	
Elam	Roland	12-922 5/8" PG64-22 w/lime	61.70
Elam	Silverthorne	12-901 5/8" PG58-28	58.78
Elam	Silverthorne	12-901 SX(75) PG58-34 Lime	72.65







Company	Plant	Mix	EPD	
Four Corners	Animas Glacier	CDOT ST 75	79.31	
Four Corners	Animas Glacier	CDOT SX 75	76.70	
Holcim-US	Dahlia ASP	800071-SX-75-V	79.10	
Holcim-US	Dahlia ASP 80074-SX-75		73.22	
Holcim-US	Dahlia ASP	80075-SX-100-V	78.46	
Holcim-US	m-US Dahlia ASP 80078-S-100-25		67.99	
Holcim-US	Dahlia ASP	80079-SX-100	71.32	
Holcim-US	Dahlia ASP	800081-S-75	70.62	
Holcim-US	Dahlia ASP	80082-SX-100-P	77.09	
Holcim-US	Dahlia ASP	80084-S-100	70.62	
Holcim-US	Dahlia ASP	801240-SG-100	67.40	
Holcim-US	Dahlia ASP	801493-SX-75	72.97	
Holcim-US	Dahlia ASP	801501-S-75	70.39	
Holcim-US	Longmont ASP	80074-SX-75	71.65	







Company	Plant	Mix	EPD
Holcim-US	Longmont ASP	80079-SX-100	69.09
Holcim-US	Longmont ASP	800081-S-75	68.45
Holcim-US	Longmont ASP	800084-S-100	66.40
Holcim-US	Longmont ASP	802350-SX-100-P	76.28
Kiewit	Aurora	irora 1202-AL-22	
Kiewit	Aurora	Aurora 1202-AL-22-EVO	
Kiewit	Aurora	1204-SMA-21	85.40
Kiewit	Aurora	1222-AH-21	77.35
Kiewit	Aurora	1222-AH-21-EVO	72.62
Kiewit	Aurora	1223-AL-22	72.36
Kiewit	wit Aurora 1223-AL-22-EVO		73.55
Kiewit	it Aurora 1922-AH-RBL-21		73.26
Kiewit	Aurora	1922-AH-RBL-21-EVO	73.86







Company	Plant	Mix	EPD
Kiewit	Aurora	1922-AH21	69.62
Kiewit	Aurora	1922-AH21-EVO	69.93
Kiewit	Colo Spgs	1220-CL-21	81.06
Kiewit	Colo Spgs	1224-CH-21	77.34
United	River Road	SX(100) PG64-22 L Suncor	76.52
United	River Road	SX (100) PG76-28 L Suncor	77.21
United	River Road	SX(75) PG64-22 Suncor	61.74

Ρ	ublisł	ned EF	PDs =	43					
	Me	ean = '	72.5						
		σ = 6.3				/	Q		
					/				
0	10 2	0 30	40	50	60	70	80	90	100

Transport Distance Effect on EPDs

- 2 Identical plants (energy efficiency, fuels, etc.)
- Identical Asphalt Mixes
 - 94% Aggregates
 - 4% binder
 - 1% hydrated lime
 - Source from the same quarry
- **Plant A** 95 miles from Quarry
- Plant B Quarry on site at plant



Quarry

Plant A GWP = 82 kg CO2e/ton

Plant B GWP = 69 kg CO2e/ton



Designated area	Classification		
Designated area	Date ¹	Туре	
Denver-Boulder-Greeley-Ft. Collins-Loveland, CO: 2	November 7, 2022	Severe.	





CONSTRUCTION BULLETIN

Office of the Chief Engineer Materials and Geotechnical Services Branch

Environmental Product Declarations (EPDs) 2022 Number 3, Page 1 of 2 Date: August 5, 2022

Environmental Product Declarations (EPDs)

On Tuesday, July 6, 2021, Gov. Jared Polis signed <u>HB 21-1303 Global Warming Potential For</u> <u>Public Project Materials</u>, requiring Contractors to submit Environmental Product Declarations (EPDs) for all eligible materials to include asphalt and asphalt mixtures, cement and concrete mixtures, and steel.

The Standard Special Provision, <u>Revision of Section 101 and 106 - Environmental Product</u> <u>Declarations</u>, outlines the contract requirements for projects bid on or after July 1, 2022.

The protocol document, <u>Appendix O - Environmental Product Declarations</u> of the 2023 Field Materials Manual, provides guidance for the implementation and submission of EPDs. This document also contains cost and small quantity thresholds as well as the specific bid items requiring EPDs.

The CDOT EPD team is working with OIT on a more permanent EPD submission and storage solution through OnBase. In the meantime, EPDs shall be submitted using this Google Form.

The construction conference agendas have been updated to include items for the collection and submission of EPDs. The updated versions are linked below:

- Preconstruction Conference Agenda
 - o Landscape orientation
 - Portrait orientation
- Pre-paving Conference Agenda
 - o Asphalt
 - o Concrete

The CDOT EPD team requests invitations to the Preconstruction and Pre-pave meetings for all eligible projects with an Engineer's Estimate of \$3,000,000 or greater (not including CE, Indirect, or Force Account costs). Those invitations can be sent to the <u>CDOT EPD email</u> <u>address</u>.

A tool has been developed to assist project staff and Contractors in determining when EPDs are required for eligible materials. That spreadsheet can be accessed <u>here</u>.