

Setting Standards for Sustainable Construction

EPD's and Low Carbon Procurement

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Kentucky Bourbon Trail®



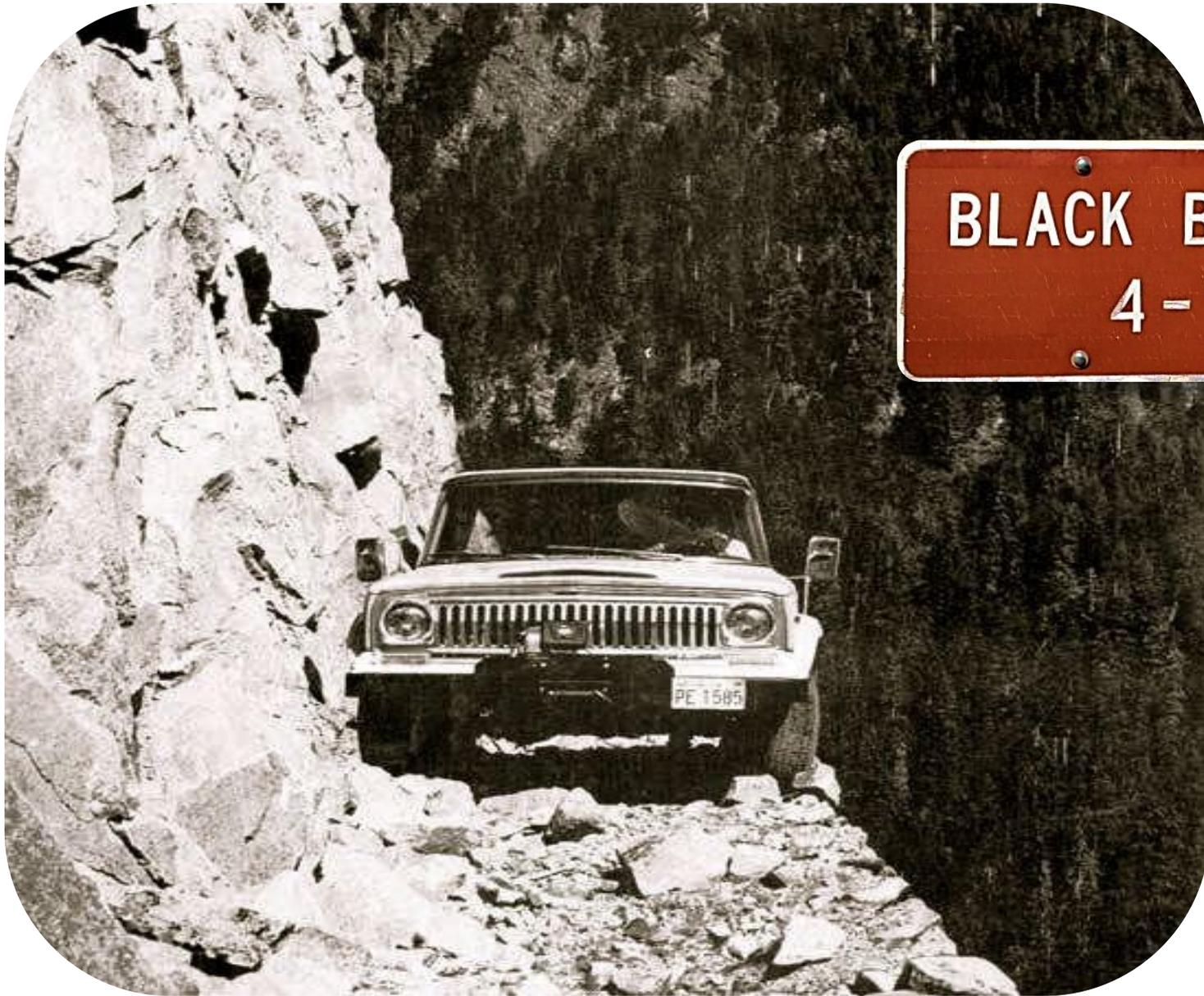
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BLACK BEAR PASS
4 - WHEEL



Glenwood Canyon





Glenwood Canyon

Environmental Product Declaration (EPD) reports the **CO2 Equiv. (kg)** generated by producing **1 ton** of asphalt impacting Global Warming Potential (GWP).

**What is an
EPD?**

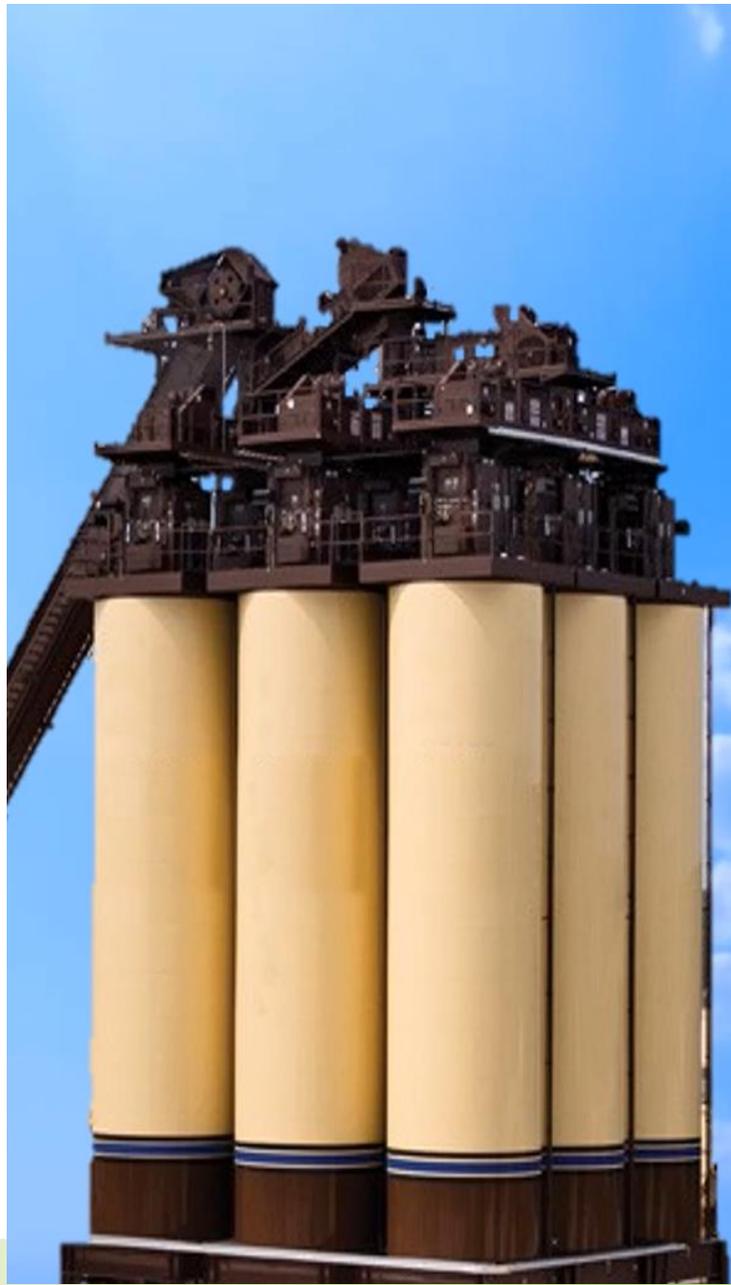


Asphalt is the **#1 Recycled Material**.

While asphalt production has increased by over 250% in the past 40 years, **emissions from asphalt material production facilities has decreased by 97%**.

Asphalt material production facilities have been **delisted** by the EPA/CDHPE from the list of major polluters.





COLORADO
Department of Public
Health & Environment



“...we need to accelerate the transition to Clean Energy.”

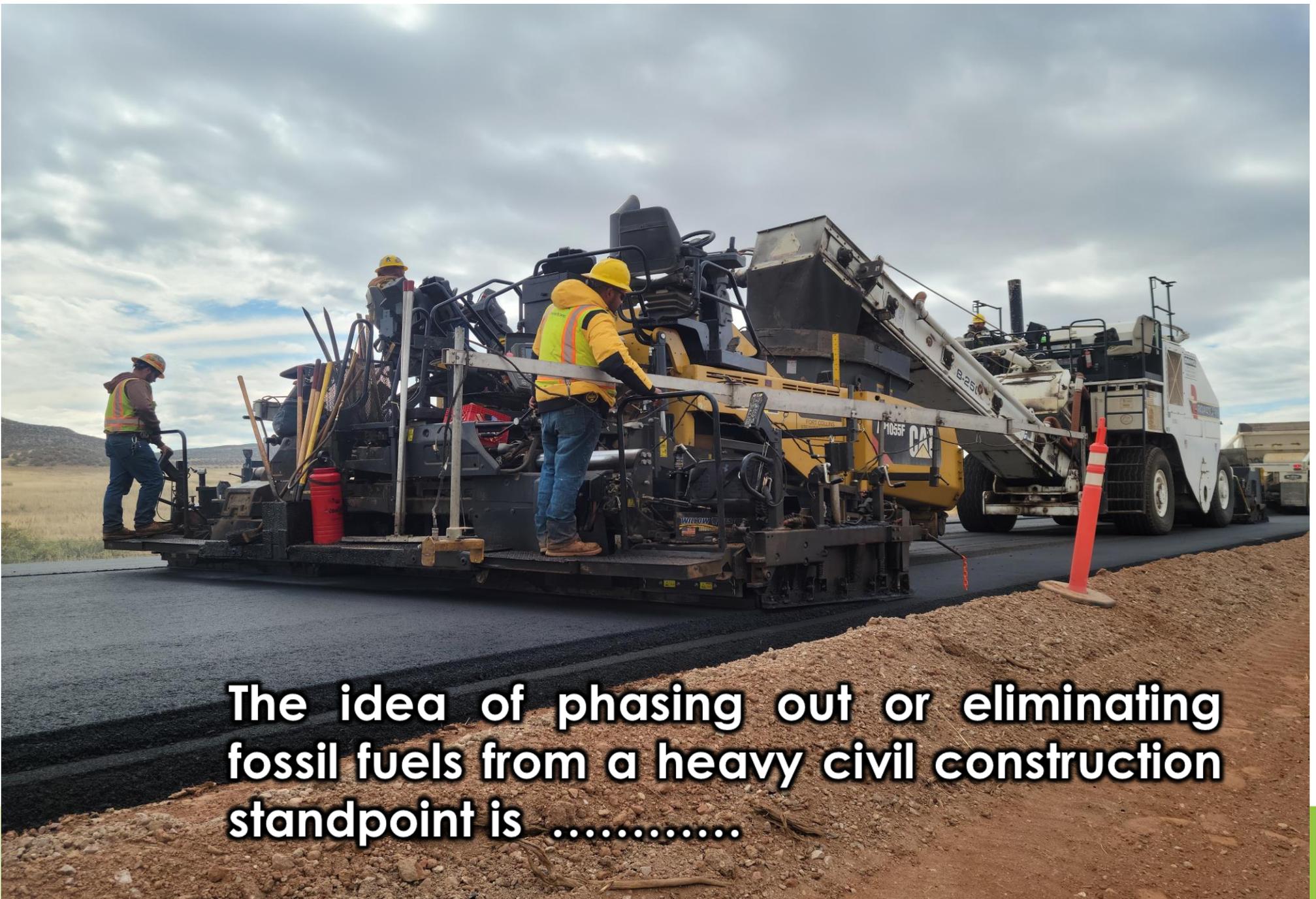
*“I Guarantee You We’re Going
to End Fossil Fuel”*

THE BIDEN PLAN FOR
A CLEAN ENERGY
REVOLUTION AND
ENVIRONMENTAL
JUSTICE





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The idea of phasing out or eliminating fossil fuels from a heavy civil construction standpoint is



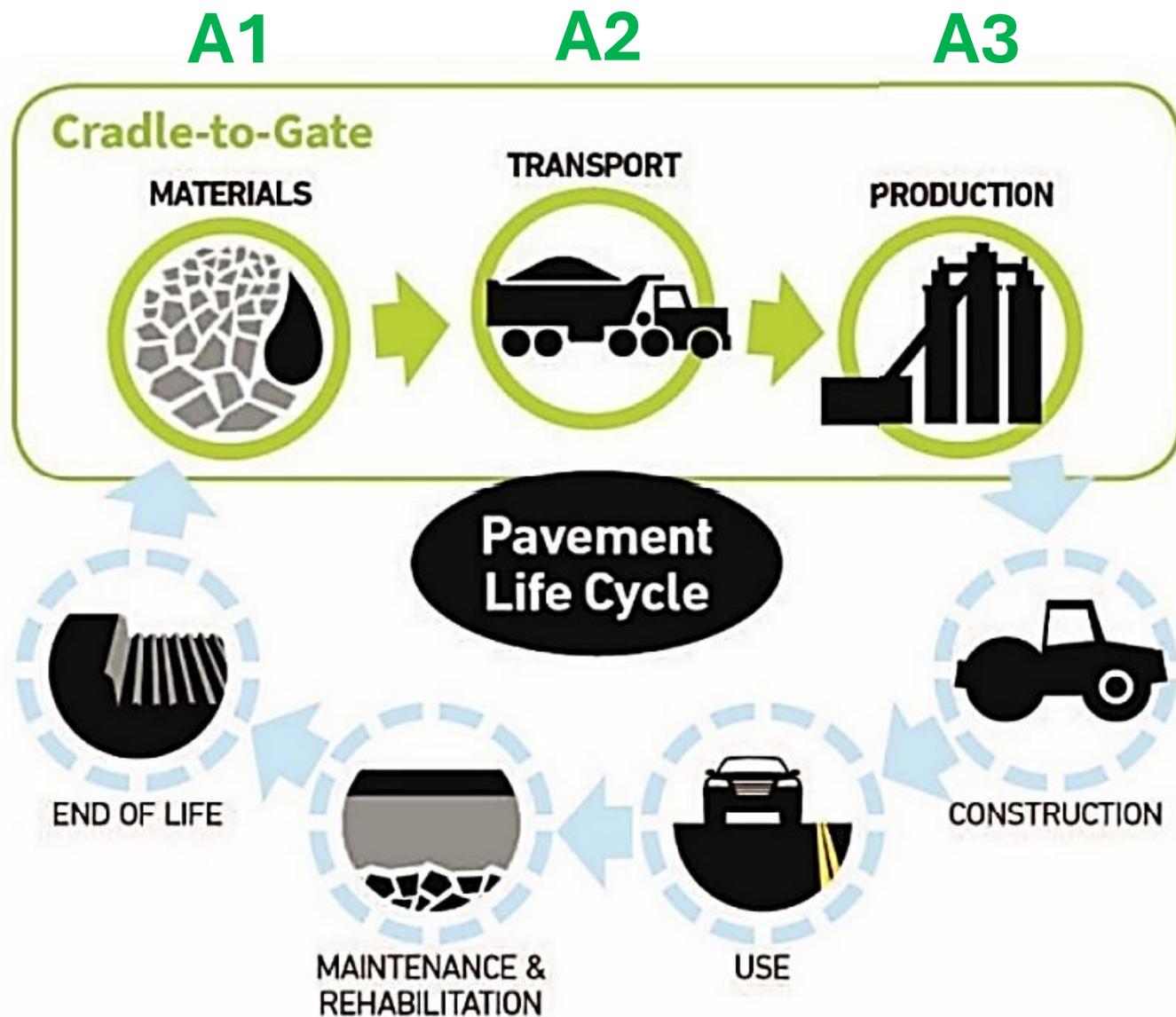
Two Separate Policies

Vertical Construction

- 2024 – State Architect establishes a **maximum GWP limit** for each type of material based on EPD
- 2026 – Review and revise maximum GWP limits

Roads and Highways

- **2022** – EPDs must be submitted to CDOT
- **2025** – CDOT establishes policy to **reduce GHG emissions**
- **2027** – CDOT policy reviewed and revised



EPDs report the cradle-to-gate emissions associated with asphalt mixture production.

Environmental Facts

Functional Unit: 1 U.S. short ton of Asphalt Mixture

Process Energy, Materials (MJ)	6.0×10 ³
<i>Non-Renewable Energy (MJ)</i>	4.9×10 ³
<i>Renewable Energy (MJ)</i>	1.5×10 ¹
Process Energy, Energy (MJ)	4.0×10 ³
<i>Non-Renewable Energy (MJ)</i>	3.9×10 ³
<i>Renewable Energy (MJ)</i>	5.5×10 ¹
Water Use (Gal.)	2.5
Global Warming Potential (kg CO₂ eq)	55
Acidification Potential (kg SO₂ eq)	0.233
Eutrophication Potential (kg N eq)	0.007
Ozone Depletion Potential (kg CFC-11 eq)	7.3×10 ⁻⁹
Smog Potential (kg O₃ eq)	4.4

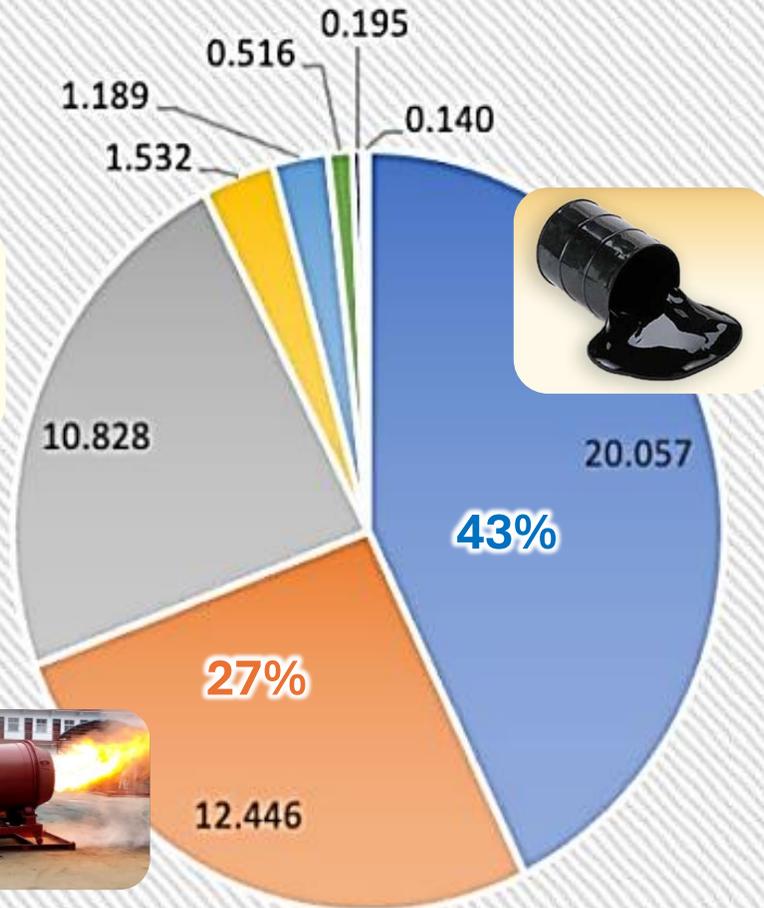
Boundaries: Cradle-to-Gate

Company: XYZ Asphalt

RAP: 10%



Global Warming Potential - kg of CO2 Eq.



Example: 30% RAP Mix

Asphalt binder: 42.7%

#1: 43%

Natural gas, in plant: 26.5%

#2: 27%

Transport, truck: 23.1%

Electricity, in plant: 3.3%

Aggregate: 2.5%

Diesel, in equipment: 1.1%

RAP: 0.4%

Transport, train: 0.3%



CO₂ Equiv. (Global Warming Potential)

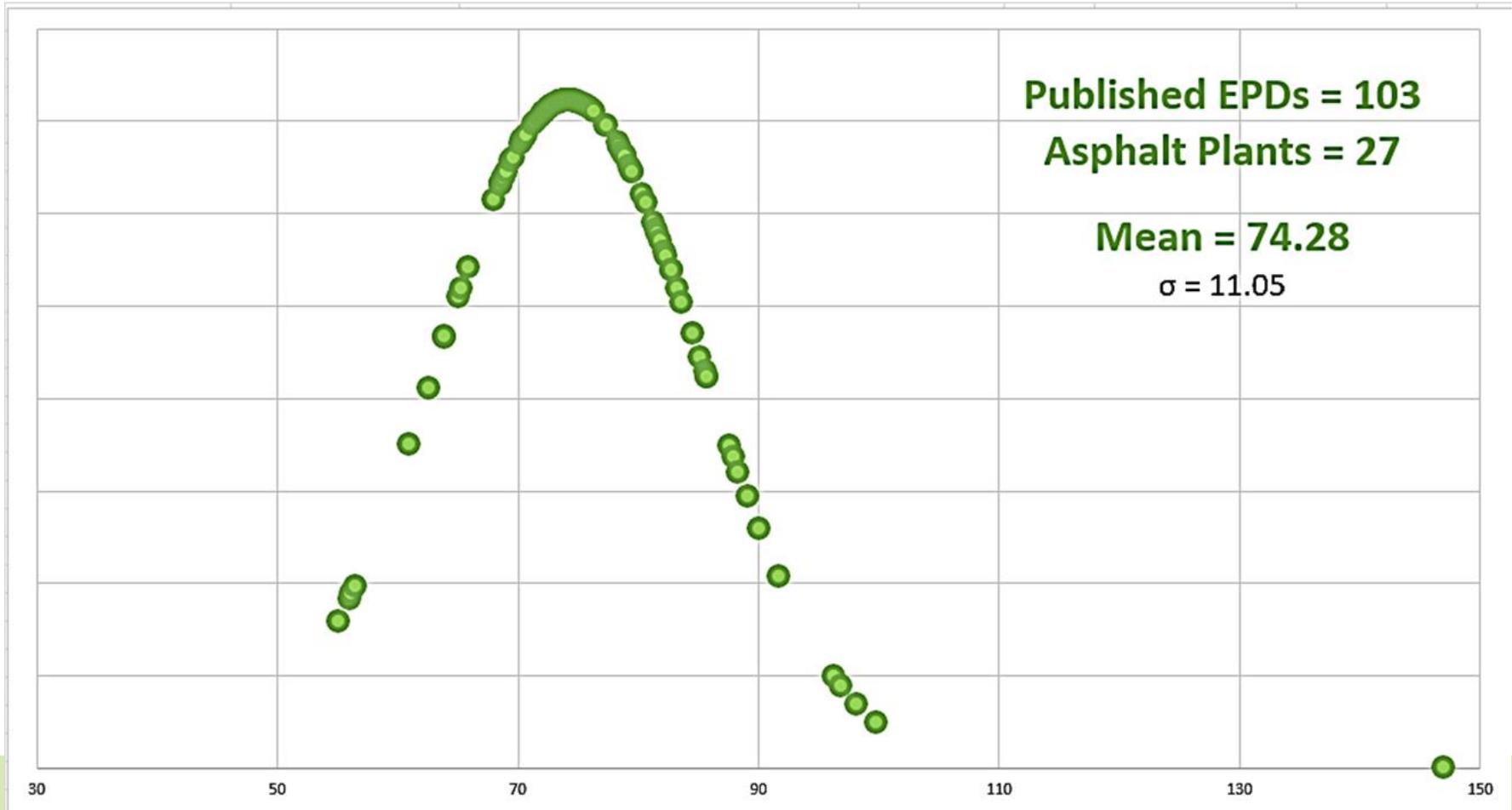
Range of EPD
GWP values
in Colorado

Colorado_{avg} ≈ 74.28 kg





BLACK AND GREEN





Proposed CDOT limit value – at the 90th percentile of EPD data

	CDOT mixes: A1-A3 GWP from published EPDs					NAPA EPD Benchmark: A1 from EPDs, A2 & A3 from NAPA surveys	
	Neat ST (3/8" NMAS)	Neat SX (1/2" NMAS)	Modified SX (1/2" NMAS)	Neat S (3/4" NMAS)	SMA	Colorado NMAS ≤ 1/2"	Colorado NMAS > 1/2"
Count (N)	7	54	34	27	6	64	22
Limit Value 20th percentile	79.8	71.1 71.0	69.7	66.7	83.5	63.8	60.2
Limit Value 40th percentile	82.4	72.4 73.0	74.3	69.7	85.4	69.0	64.5
Limit Value Average (mean not median)	83.7	74.8 76.1	76.6	70.1	88.8	77.9	71.5
2025 CDOT Limit Value* (90th percentile)	90.4	83.1	86.7**	76.7	95.0***	N/A	N/A

* Portable plants will be exempted until more data and better data consistency is obtained.

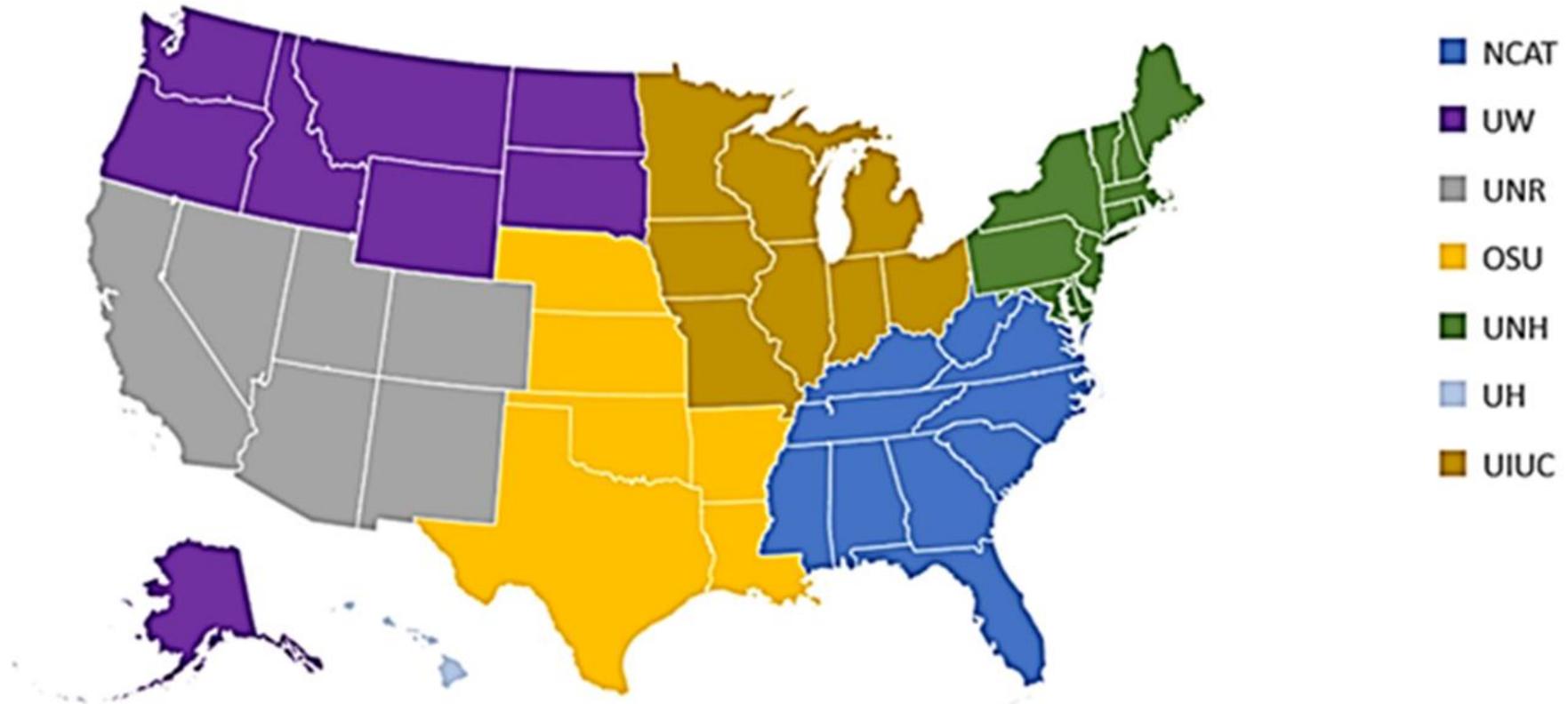
** Up to 10 of the Modified SX EPDs incorrectly list polyphosphoric acid (PPA) binder modification

*** A limit value is not presented due to potential data errors and limited number of samples



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Asphalt EPD Centers of Excellence





Thank You!



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