



The Road
Forward

A Vision for Net Zero Carbon Emissions
for the Asphalt Pavement Industry

Embodied Carbon Infrastructure: Policy Drivers and State of the Practice for Asphalt Mixture EPDs

Richard Willis, Ph.D.
NAPA

rwillis@asphaltpavement.org



NAPA
NATIONAL ASPHALT
PAVEMENT ASSOCIATION

Our mission:

To advance the asphalt pavement industry through leadership, stewardship, and member engagement.

Our vision:

Sustainable transportation infrastructure that paves the way for thriving communities and commerce.

A Look Back

What is an EPD?

- Environmental Product Declaration
 - **Quantified** environmental information on the **life cycle** of a product to enable **comparisons** between products fulfilling the **same function***
- “Nutrition label” for environmental impacts
- Independently verified



EPD “Nutrition” Label	
Your Building Product	
Amount per Unit	
LCA IMACT MEASURES	TOTAL
Primary Energy (MJ)	12.4
Global Warming Potential (kg CO ² eq)	0.96
Ozone Depletion (kg CFC- 11 eq)	1.80E-08
Acidification Potential (mol H ⁺ eq)	0.93
Eutrophication Potential (kg N ⁻ eq)	6.43E-04
Photo-Oxidant Creation Potential (kg O ₃ eq)	0.121
Your Product’s Ingredients: Listed Here	

<https://westcoastclimateforum.com/cfpt/concrete/strategy1>

*Source: ISO 14025:2006. EPDs from different Product Categories should NOT be compared to each other.

Types of EPDs

Industry-Wide

ENVIRONMENTAL PRODUCT DECLARATION
NORTH AMERICAN SOFTWOOD PLYWOOD
 AMERICAN WOOD COUNCIL
 CANADIAN WOOD COUNCIL



The American Wood Council (AWC) and the Canadian Wood Council (CWC) are pleased to present this Environmental Product Declaration (EPD) for North American softwood plywood. The EPD includes Life Cycle Assessment (LCA) results for all processes up to the point that plywood is packaged and ready for shipment at the manufacturing gate. The underlying LCA and the EPD were developed in compliance with ISO 14025:2006 and ISO 21930:2017 and have been verified under the UL Environment EPO program.

The AWC and CWC represent wood product manufacturers across North America. The North American forest product industry is a global leader of sustainably sourced wood products. This EPD reflects years of research and numerous sustainability initiatives on behalf of our members to continually improve the environmental footprint of North American wood products. We are pleased to present this document to show our progress.

Please follow our sustainability initiatives at www.awc.org and www.cwc.ca.



Product-Specific

AkzoNobel 

Interpon®
 POWDER COATINGS

Third party verified EPD – According to the International EPD® system

Interpon D1000
Interpon D2000
Interpon D3000



First date of publication:	06 April 2015
Valid until:	02 May 2023
PCR reference:	CPC division 3511 Paint and varnishes PCR 2012:01 CONSTRUCTION PRODUCTS AND CONSTRUCTION SERVICES; ver.2.2 of 2017-05-30
Registration number:	S-P-00692
Revision date:	03 May 2018
Verified by:	NEVEN Mijokonsult
Programme operator:	The International EPD® System
Declaration owner:	AkzoNobel Powder Coatings B.V.

Plant-Specific & Product-Specific

Durum Wheat semolina pasta
 in paperboard box

Environmental Product Declaration  The first EPD process certified in the Food industries





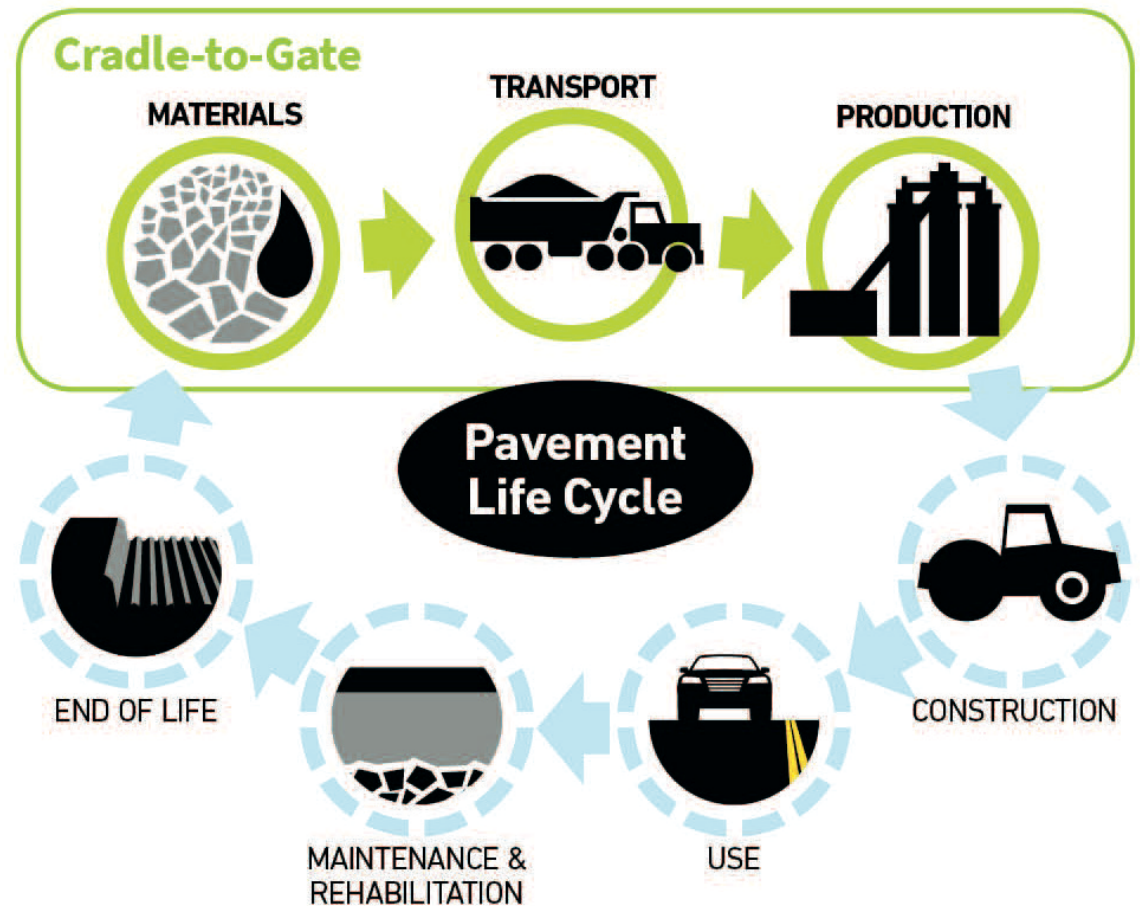

REGISTRATION NUMBER	CPC CODE	PUBLICATION DATE	REVISION	VALID UNTIL	PROGRAMME	PROGRAMME OPERATOR
S-P-00217	2731 Uncooked pasta, not stuffed or otherwise prepared PCR 2015:05 v. 3.11 06.09.2019	2011/03/10	9 of 2009/09/24	2024/11/06	The International EPD® System www.epdinc.com	EPD International AB

This EPD has been developed in conformity to ISO 14025. An EPD should provide current information and may be updated if conditions change. The stated validity is, therefore, subject to the continued registration and publication at www.epdinc.com.

EPDs for **Asphalt Mixtures** are Plant-Specific & Product-Specific

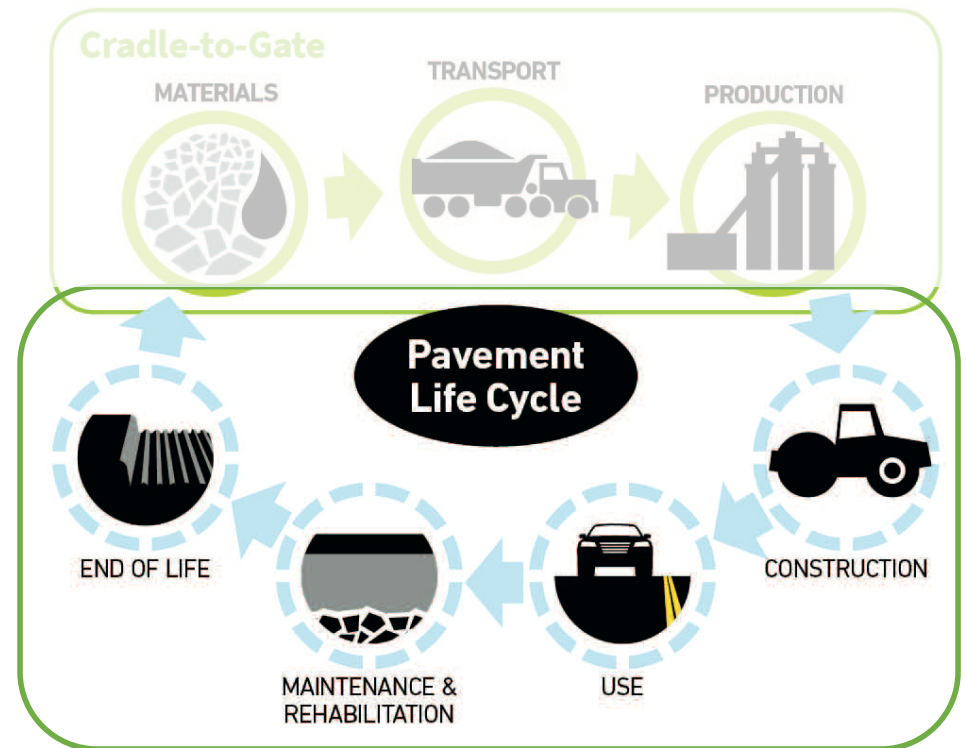
Most EPDs for construction materials have a **Cradle-to-Gate** scope

- Materials
 - Aggregates
 - Asphalt Binder
 - Additives
- Transport
 - Truck
 - Barge
 - Rail
- Production
 - Burner Fuel
 - Electricity
 - Equipment
 - Water



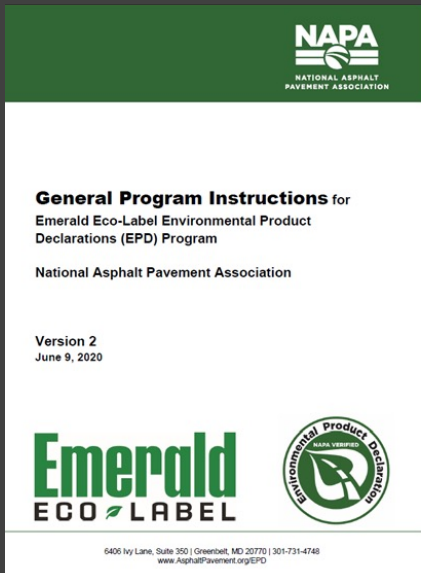
What about the other life cycle stages?

- Outside the scope of the Asphalt EPD
 - As defined in the Product Category Rules (PCR)
- Mix producers have little control beyond the gate of the plant
 - Owners can evaluate these stages through their own Life Cycle Assessment (LCA)



Key Components of NAPA's EPD Program

General Program Instructions




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**General Program Instructions for
Emerald Eco-Label Environmental Product
Declarations (EPD) Program**

National Asphalt Pavement Association

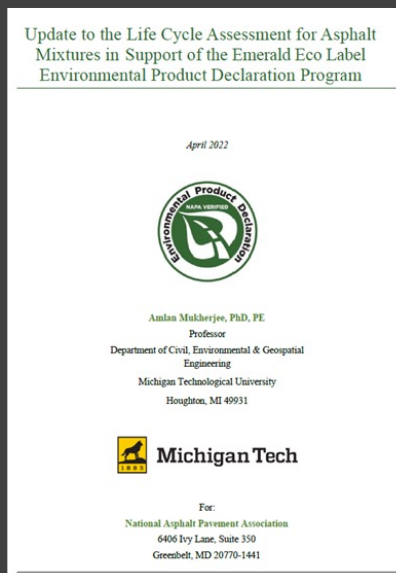
Version 2
June 9, 2020

**Emerald
ECO LABEL**



6406 Ivy Lane, Suite 350 | Greenbelt, MD 20770 | 301-731-4748
www.AsphaltPavement.org/EPD


Underlying Life Cycle Assessment




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Update to the Life Cycle Assessment for Asphalt
Mixtures in Support of the Emerald Eco Label
Environmental Product Declaration Program

April 2022

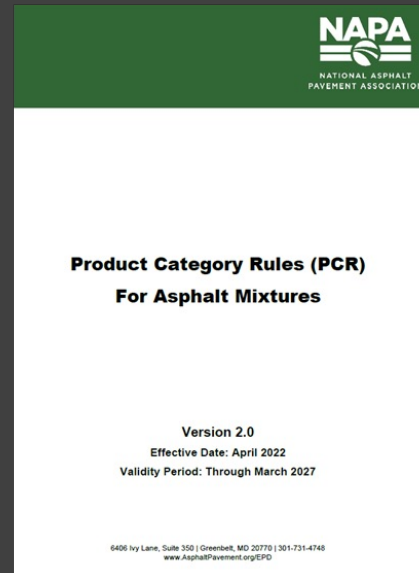


Amlan Mukherjee, PhD, PE
Professor
Department of Civil, Environmental & Geospatial
Engineering
Michigan Technological University
Houghton, MI 49931



For:
National Asphalt Pavement Association
6406 Ivy Lane, Suite 350
Greenbelt, MD 20770-1441

Product Category Rules (PCR)



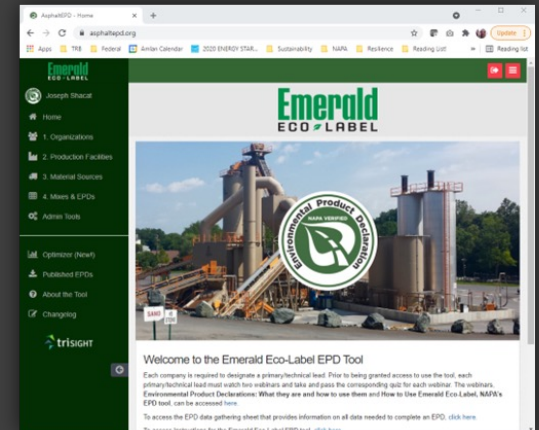
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**Product Category Rules (PCR)
For Asphalt Mixtures**

Version 2.0
Effective Date: April 2022
Validity Period: Through March 2027

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www.AsphaltPavement.org/EPD

EPD Software



AsphaltEPD - Home

**Emerald
ECO LABEL**

- Home
- 1. Organizations
- 2. Production Facilities
- 3. Material Sources
- 4. Mixes & EPDs
- Admin Tools

Optimizer (New)

Published EPDs

About the Tool

Changelog

trisight

Welcome to the Emerald Eco-Label EPD Tool

Each company is required to designate a primary/technical lead. Prior to being granted access to use the tool, each primary/technical lead must watch two webinars and take and pass the corresponding quiz for each webinar. The webinars, Environmental Product Declarations: What they are and how to use them and How to Use Emerald Eco-Label, NAPA's EPD tool, can be accessed here.

To access the EPD data gathering sheet that provides information on all data needed to complete an EPD, click here.

To access instructions for the Emerald Eco-Label EPD tool, click here.

Emerald Eco-Label Software

- NAPA's web-based software tool
- Asphalt mix producers use it to develop verified EPDs
- EPDs are plant-specific & mix-specific
- Can be used for asphalt plants located in the U.S.
- Simplified process that saves mix producers time and money

AsphaltEPD - Home

asphaltedp.org

Apps TRB Federal Amlan Calendar 2020 ENERGY STAR... Sustainability NAPA Resilience Reading List

Emerald
ECO LABEL

Joseph Shacat

Home

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Emerald
ECO LABEL

Environmental Product Declaration
NAPA VERIFIED

WELCOME TO THE EMERALD ECO-LABEL EPD TOOL

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Independent Verification

EPD Optimizer Tool

- Easily **compare** two of your own mixes to each other
- More **granular analysis** of data
- Create **plant variants** to see how changes to plant operations affect EPDs
- Evaluate **economic** and **environmental** impacts of certain changes
 - Switching fuel types
 - Aggregate moisture reduction



Can EPDs for Asphalt Mixtures be Compared to Each Other?

EPDs for different asphalt mixtures are comparable if:

- They perform a similar function and have similar performance characteristics

Examples of mixes that should not be compared to each other:

- Porous vs. dense-graded
- Binder mix vs. surface mix

Beware of data gaps!





**Does the EPD
give credit for
Warm Mix?**

<https://www.fhwa.dot.gov/publications/focus/08apr/03.cfm>



- What are the biggest contributors to GHG emissions?
 - **Burner fuel** consumption
 - **Asphalt binder** content
 - Sometimes, **aggregate hauling** exceeds everything else

Hey NAPA!

What should I know about environmental product declarations?

My Chats

Public Chats



Users

Documents

Chats

Logout



Environmental Product Declarations (EPDs) are standardized documents that provide quantified environmental data for a product, based on information from a life cycle assessment (LCA). Here are some key points about EPDs, especially in the context of asphalt pavement:

1. **Defining EPDs:** An EPD is a Type III environmental declaration as detailed in ISO Standard 14025:2006. It communicates the environmental impacts of a product or service, quantifying aspects such as energy consumption, material use, and waste production over the product's life cycle stages.
2. **Purpose of EPDs:** EPDs aim to provide transparent, comparable, and

New chat

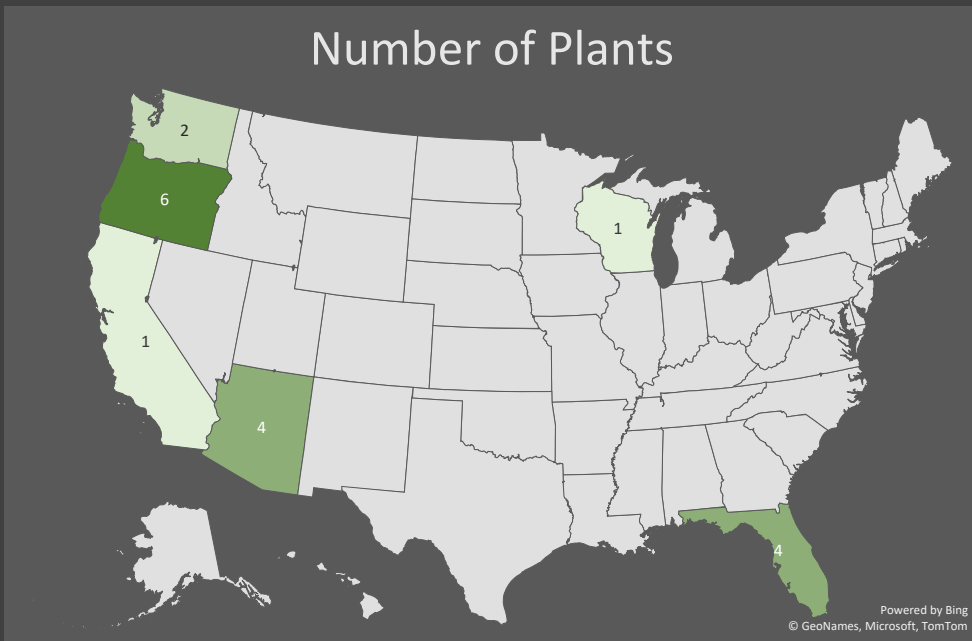
Ask a follow-up question.



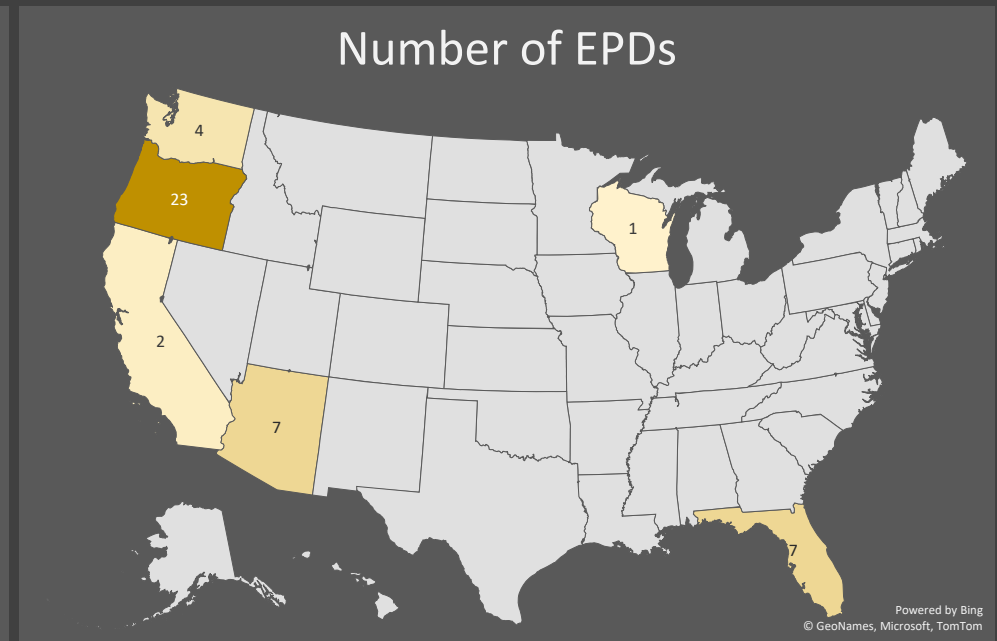
Published EPDs in **March 2022**

- 18 plants with 44 EPDs across 6 states

Number of Plants

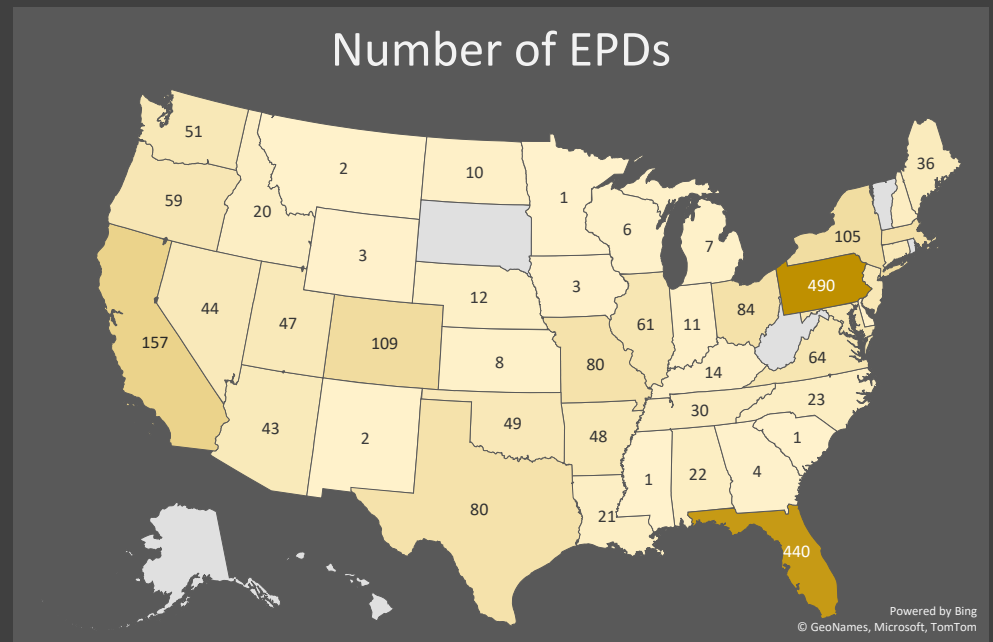
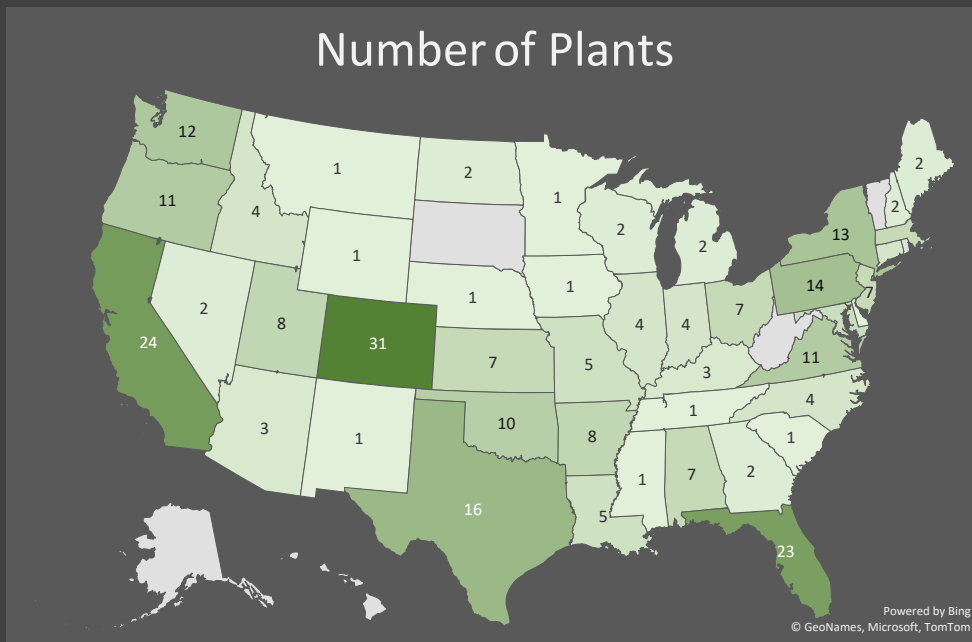


Number of EPDs



Published EPDs in **May 2024**

- 284 plants with 2,599 EPDs across 44 states + DC



NAPA's Approach to Benchmarking

GSA – Lower Embodied Carbon Materials

- Low Embodied Carbon Construction Materials – 157 Projects

- Emphasize use of product and facility specific EPDs
- Inclusion of Energy Star metrics

GSA IRA Limits for Low Embodied Carbon Asphalt - May 16, 2023 (EPD-Reported GWPs, in kilograms of carbon dioxide equivalent per metric ton - kgCO ₂ e/ t)		
Top 20% Limit	Top 40% Limit	Better Than Average Limit
<u>55.4</u>	<u>64.8</u>	<u>72.6</u>

FHWA Benchmarking Approach

- Industry is empowered to establish its own benchmarks
- Agencies implement industry benchmarking approach
 - Paid for by FHWA grants





EPD BENCHMARK

FOR ASPHALT
MIXTURES

Prepared for NAPA by WAP Sustainability
Lianna Miller, Benjamin Ciavola, Amlan Mukherjee

February 9, 2024



EPD BENCHMARK

FOR NATIONAL ASPHALT
PAVEMENT ASSOCIATION

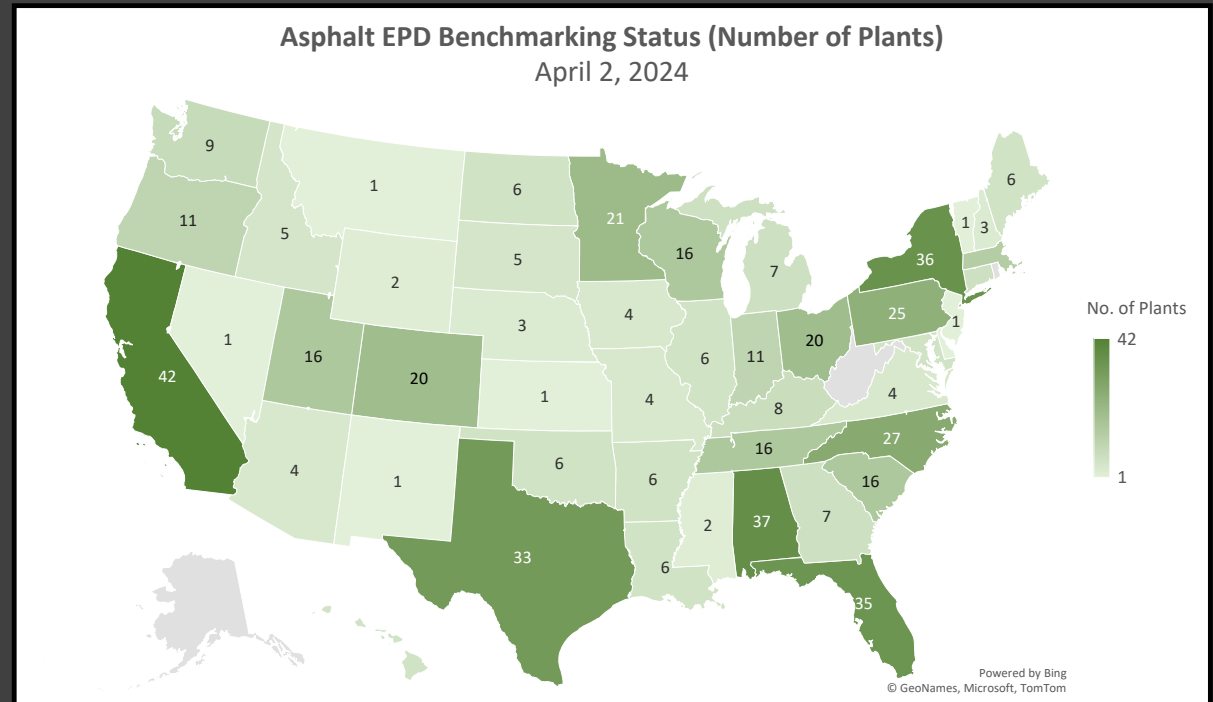
Version 2.0: Including Round 2 of Data Collection

Authors: Lianna Miller, Benjamin Ciavola, Amlan Mukherjee



NAPA EPD Benchmarking Initiative

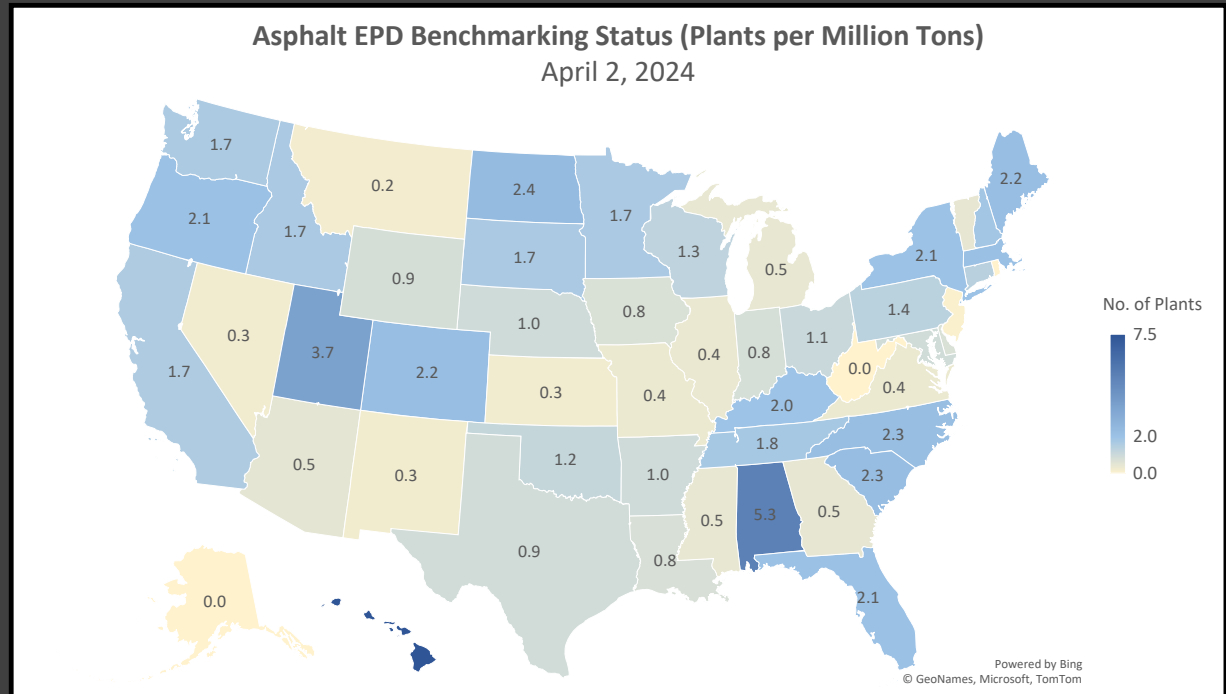
- No cost to participate
- Will enable agencies to develop reasonable estimates for industry averages based on:
 - local conditions
 - key parameters in their specifications
- 525 plants participated



Benchmarking data collection closed on **April 1**

NAPA EPD Benchmarking Initiative

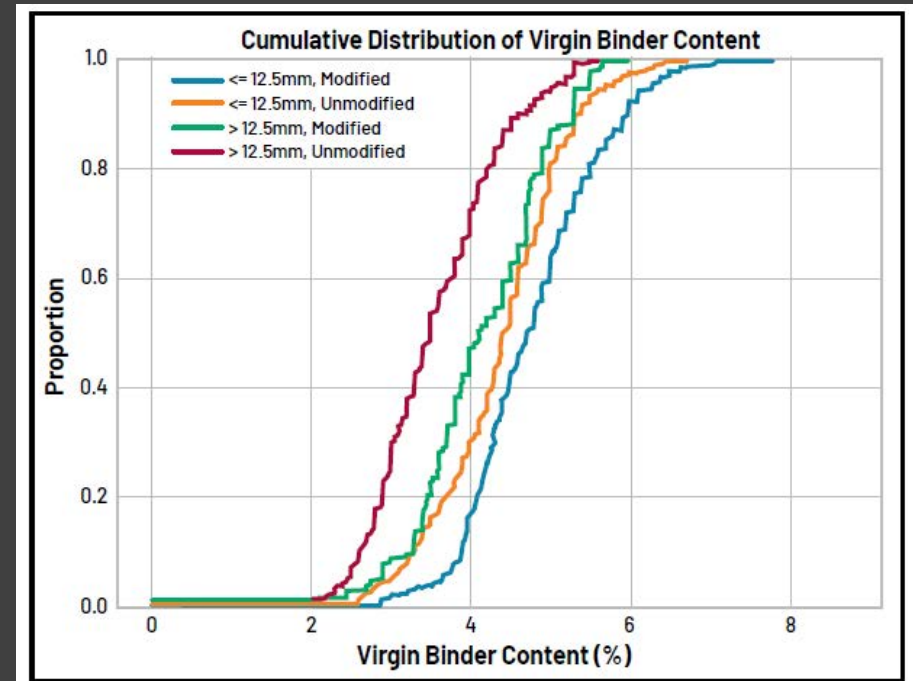
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Benchmarking data collection closed on **April 1**

AI - Materials

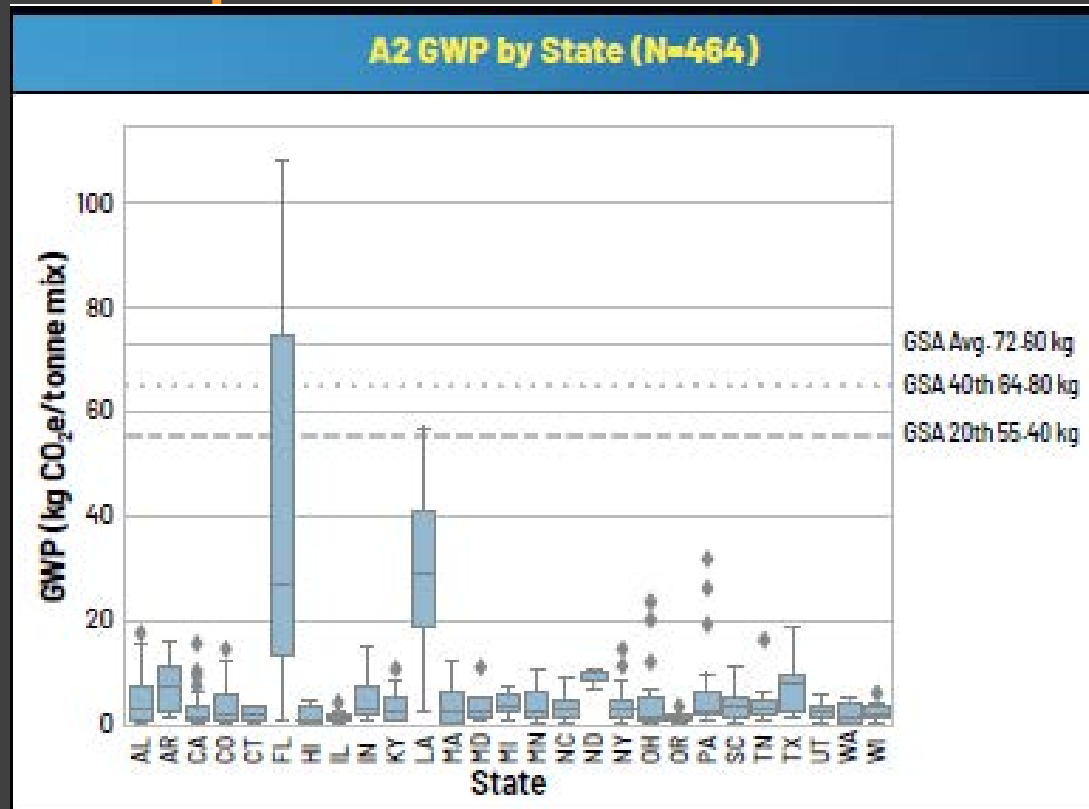
- Used currently published EPDs to get ranges of material types
- Types of mixtures
 - NMAS
 - Binder modification



Location/Specifications Matter



A2: Transportation



A3: Production

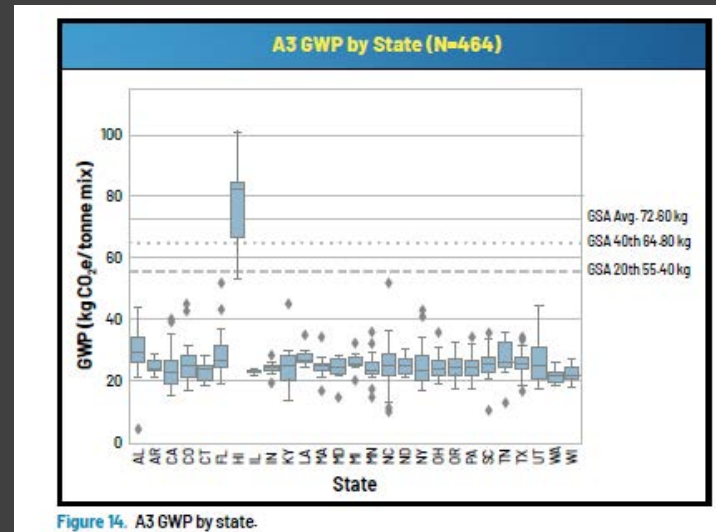
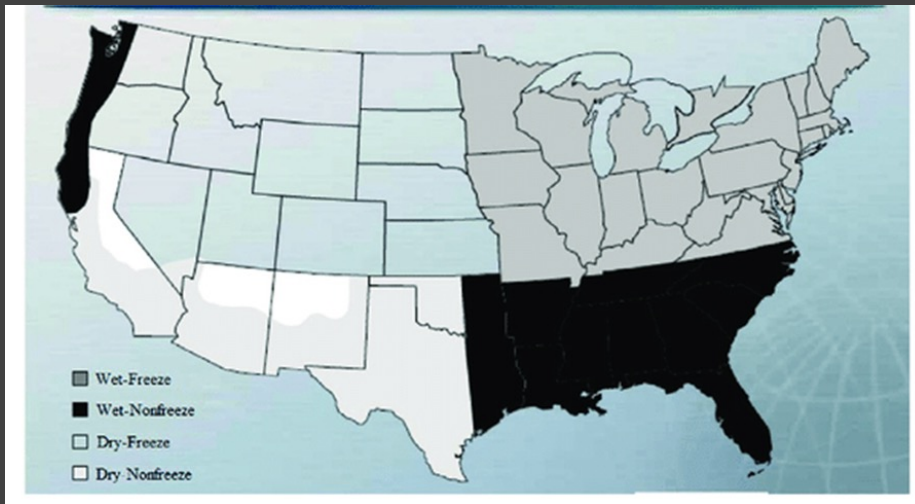
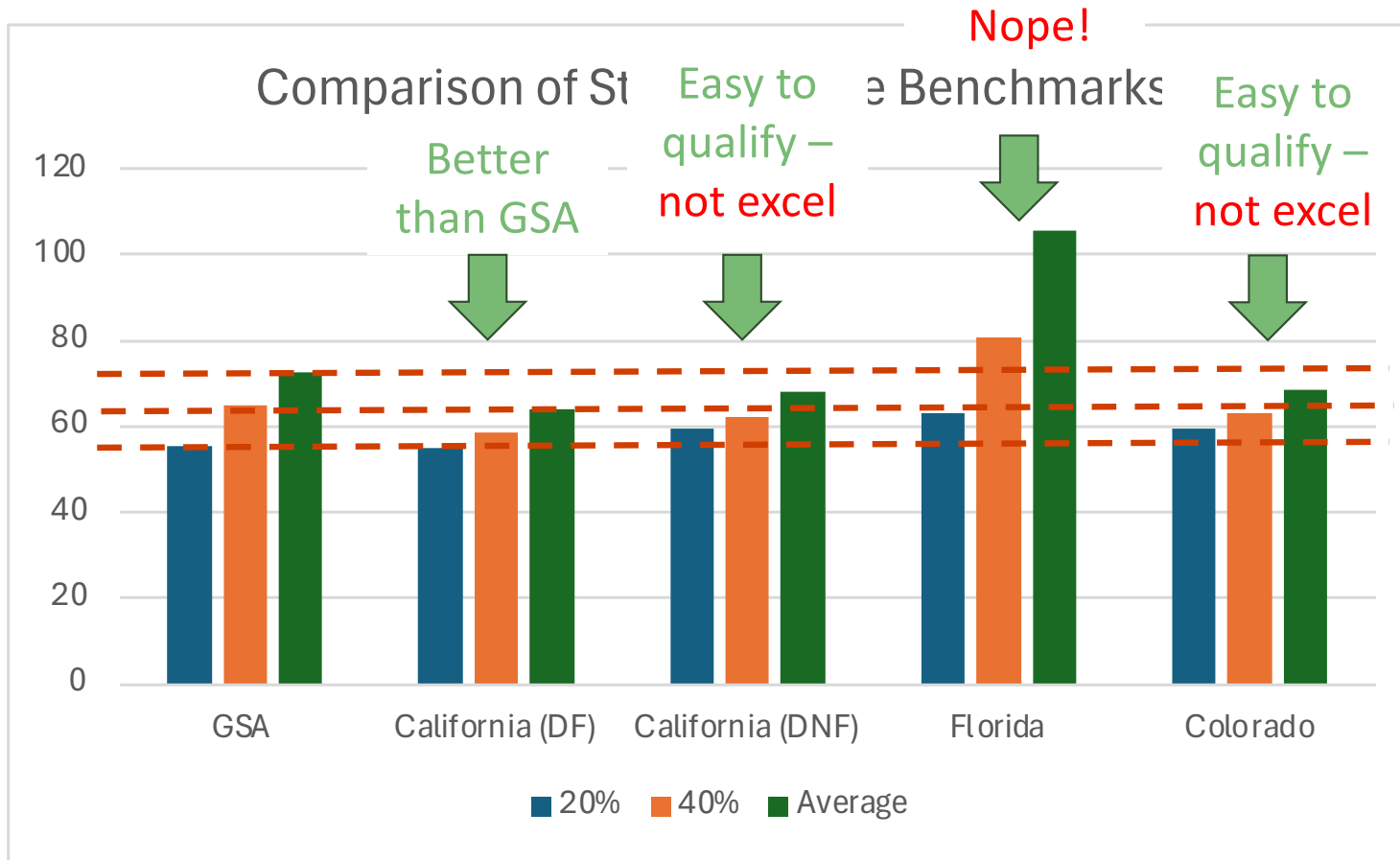


Figure 14. A3 GWP by state.



**Benchmarking
Methodology
Submitted to
FHWA
Conformant to
ISO 21678**

Things To Consider

- Local is best
- Specifications matter
- Don't rush the process
- We are still learning and updating the science
- Are benchmarks the best way to move forward?

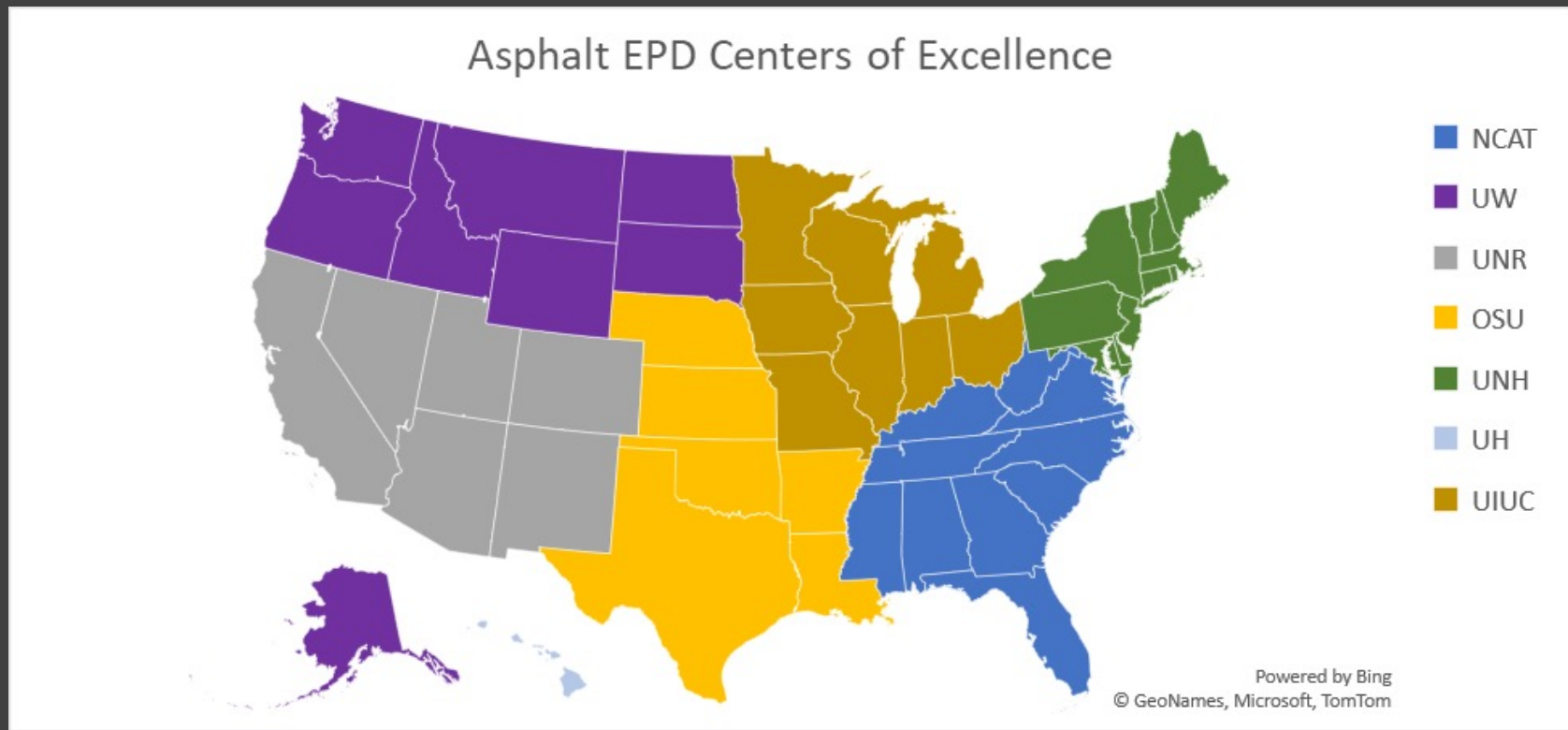
The Team



EPA Grant

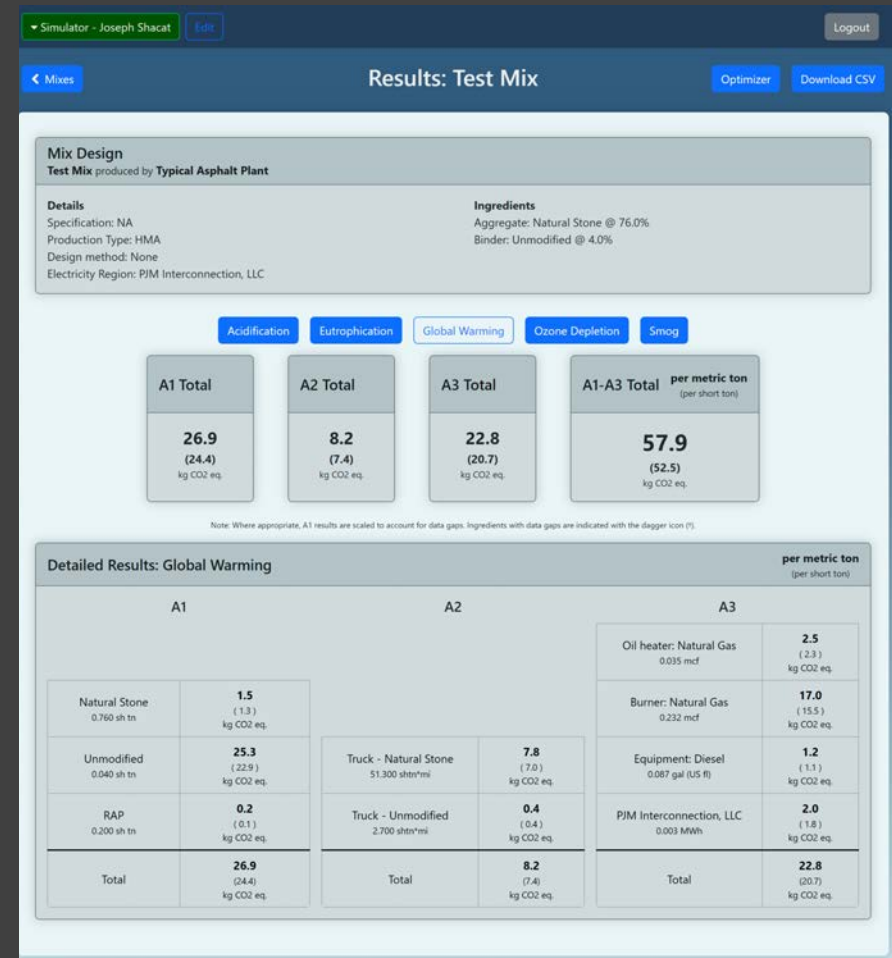
- Management & Reporting
- Robust and Widely Available EPDs for Asphalt Mixtures
 - Mid-cycle and 5-Year Update
 - Rebate program
- Enable Analysis of Whole Life Cycle for Flexible Pavements
 - Data development for modules currently unavailable
- Workforce Development

Centers of Excellence Grant



What is the Simulator?

- Launching point for research, innovation, and policy analysis
- Expand knowledge and understanding
- Consistent results with EPDs for Asphalt Mixtures
- Accessible cost structure



Final Thoughts

- How is Quality Assurance completed?
- Data confidentiality is important
- Must be thinking years ahead
- Changes cost \$\$\$
- Can't do 50 one-off's

Asphaltpd.org

