

# **ENVIRONMENTAL UPDATE: WHERE POLICY AND SCIENCE COLLIDE**

**RICHARD WILLIS**



- Trade Association representing asphalt industry

- NAPA's Mission
  - Support
  - Advocate
  - Advance

**What Is  
NAPA?**

# Asphalt by the Numbers

- Approximately 3,600 asphalt plants in the U.S.<sup>1</sup>
- 94% of U.S roads are surfaced with asphalt<sup>2</sup>
- 408 million tons of asphalt mixture produced in 2020<sup>3</sup>
  - Average RAP content 21.3% = 87 million tons
  - Use of RAP in 2020 reduced upstream GHG emissions by **2.3 MMT CO<sub>2</sub>e** while saving \$3 billion
  - Equivalent to emissions from 510,000 passenger vehicles

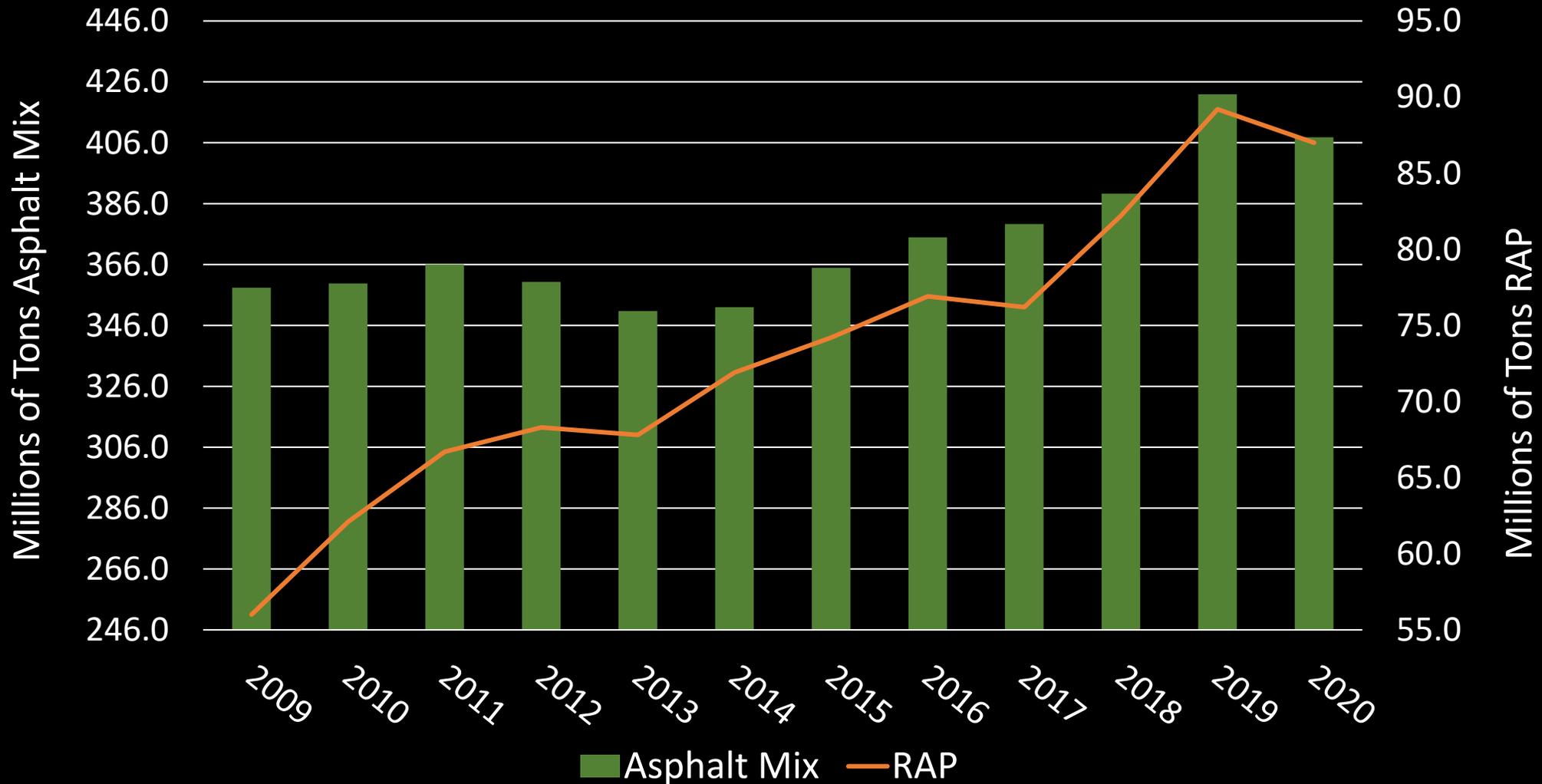
1 <https://www3.epa.gov/ttn/chief/ap42/ch11/related/ea-report.pdf>

3. <https://www.asphaltpavement.org/expertise/sustainability/sustainability-resources/recycling>

2. <https://www.fhwa.dot.gov/policyinformation/statistics/2020/hm12.cfm>

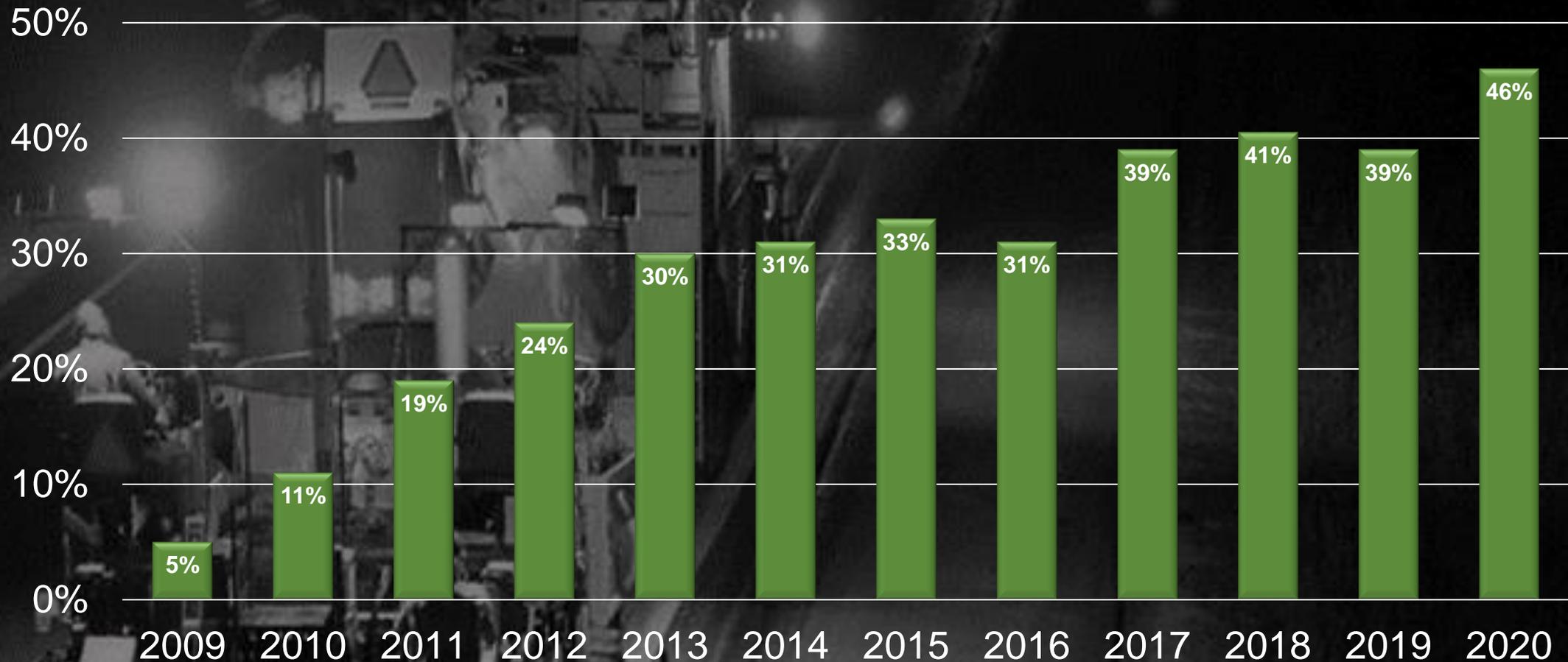
# Asphalt Mix and RAP Tonnage

*Total Production and Use in the U.S.*



# Warm Mix Asphalt (WMA) Technologies

*Percentage of Total Asphalt Production in the U.S.*



# Understanding Carbon



## Embodied Carbon

Manufacture, transport and installation of construction materials

## Operational Carbon

Building Energy Consumption

# 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 IMPACT MEASURES	TOTAL
Primary Energy (MJ)	12.4
Global Warming Potential (kg CO <sub>2</sub> eq)	0.96
Ozone Depletion (kg CFC-11 eq)	1.80E-08
Acidification Potential (mol H <sup>+</sup> eq)	0.93
Eutrophication Potential (kg N <sup>-</sup> eq)	6.43E-04
Photo-Oxidant Creation Potential (kg O <sub>3</sub> eq)	0.121

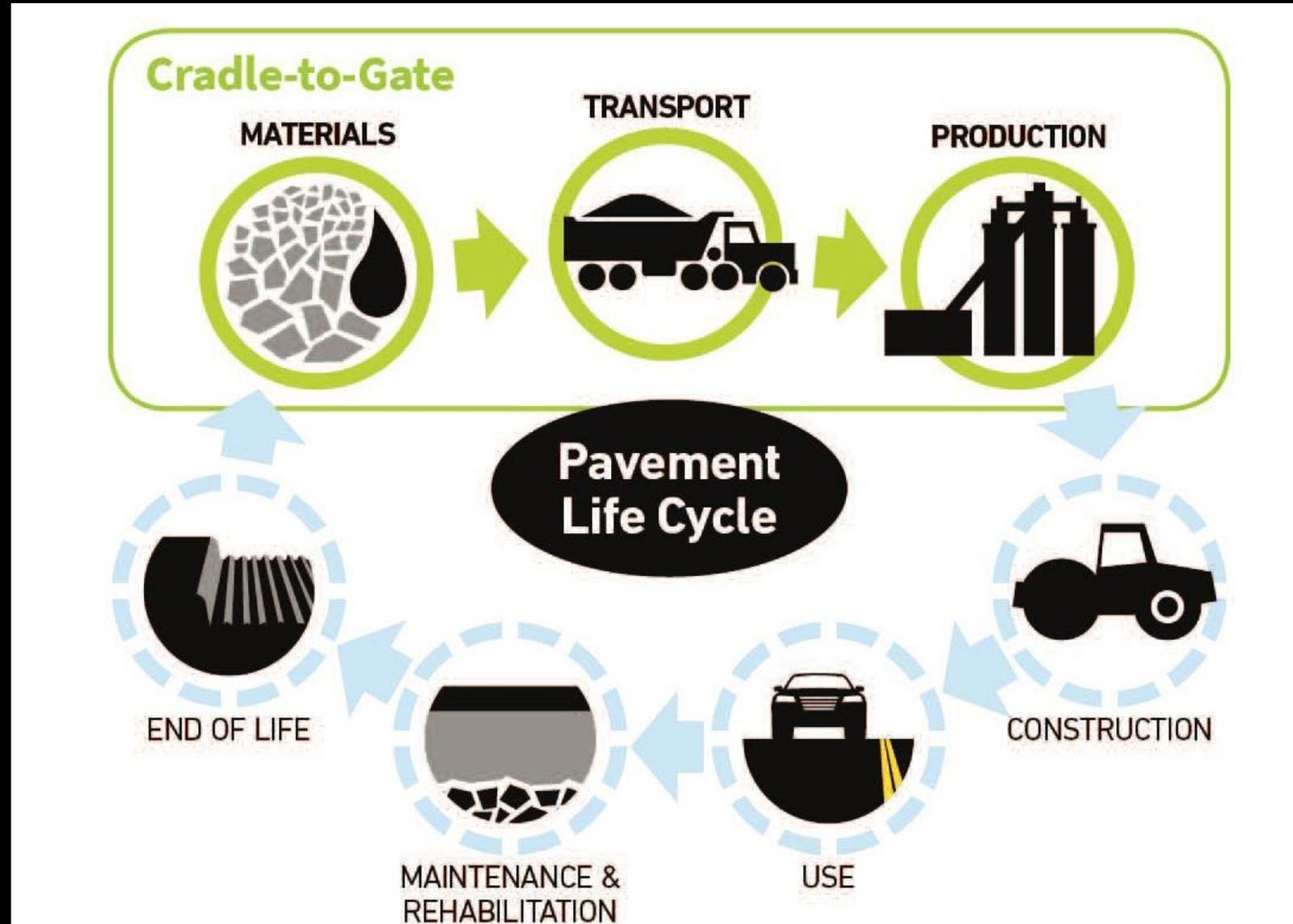
Your Product's Ingredients: Listed Here

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

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

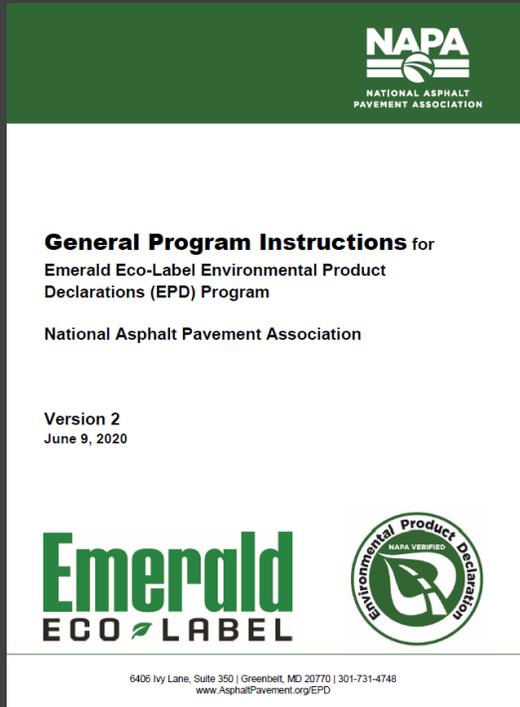
# Most EPDs for construction materials have a **Cradle-to-Gate** scope

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



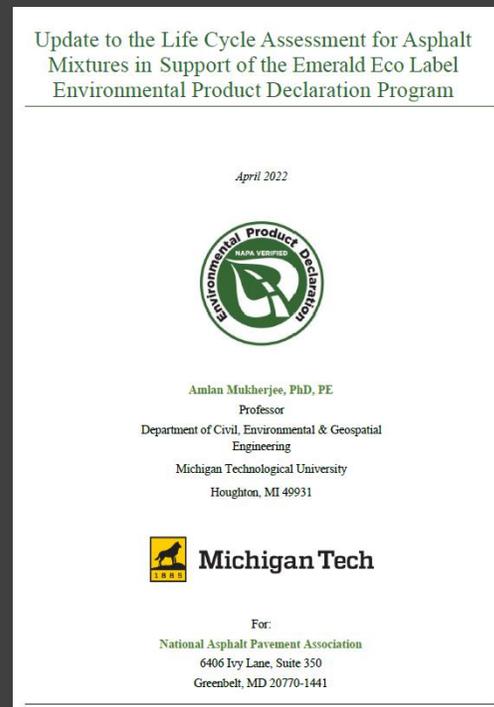
# Key Components of NAPA's EPD Program

## General Program Instructions



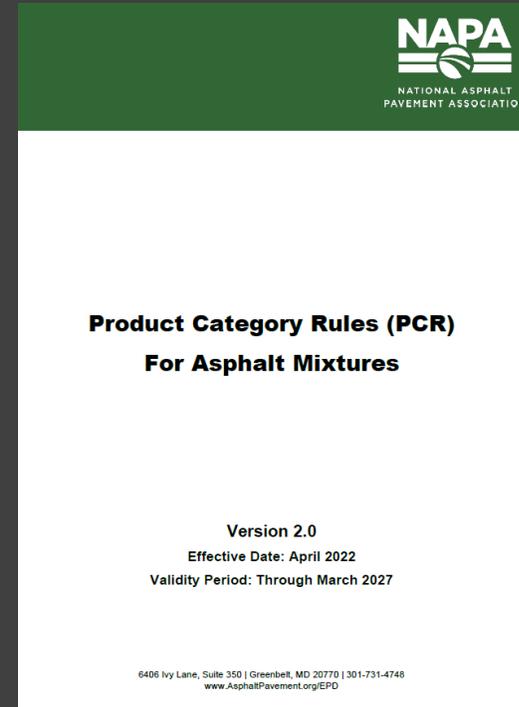
The cover of the 'General Program Instructions' document features the NAPA logo at the top right. The title 'General Program Instructions for Emerald Eco-Label Environmental Product Declarations (EPD) Program' is centered. Below the title is the NAPA name and address. The version 'Version 2' and date 'June 9, 2020' are listed. At the bottom, the Emerald Eco-Label logo and the Environmental Product Declaration logo are displayed, along with the NAPA contact information.

## Underlying Life Cycle Assessment



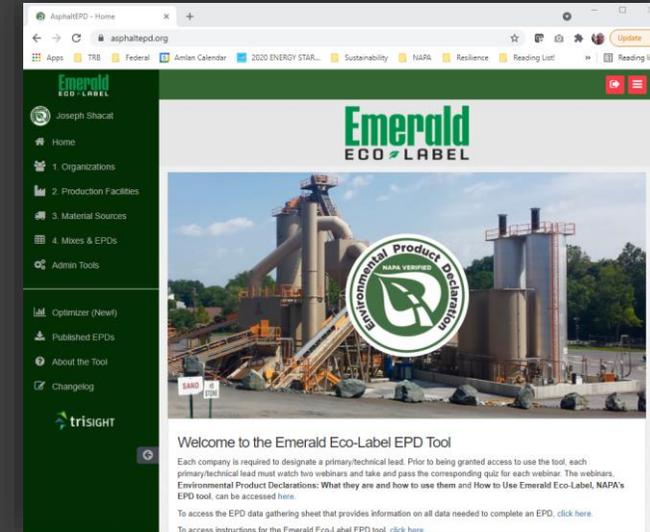
The cover of the 'Update to the Life Cycle Assessment for Asphalt Mixtures' document features the title at the top. Below the title is the date 'April 2022' and the Environmental Product Declaration logo. The author's name, 'Amlan Mukherjee, PhD, PE', and affiliation, 'Michigan Technological University', are listed. The Michigan Tech logo is prominently displayed. At the bottom, the NAPA name and address are provided.

## Product Category Rules (PCR)



The cover of the 'Product Category Rules (PCR) For Asphalt Mixtures' document features the NAPA logo at the top right. The title is centered. Below the title, the version 'Version 2.0' and the effective date 'Effective Date: April 2022' are listed. The validity period 'Validity Period: Through March 2027' is also included. The NAPA contact information is at the bottom.

## EPD Software



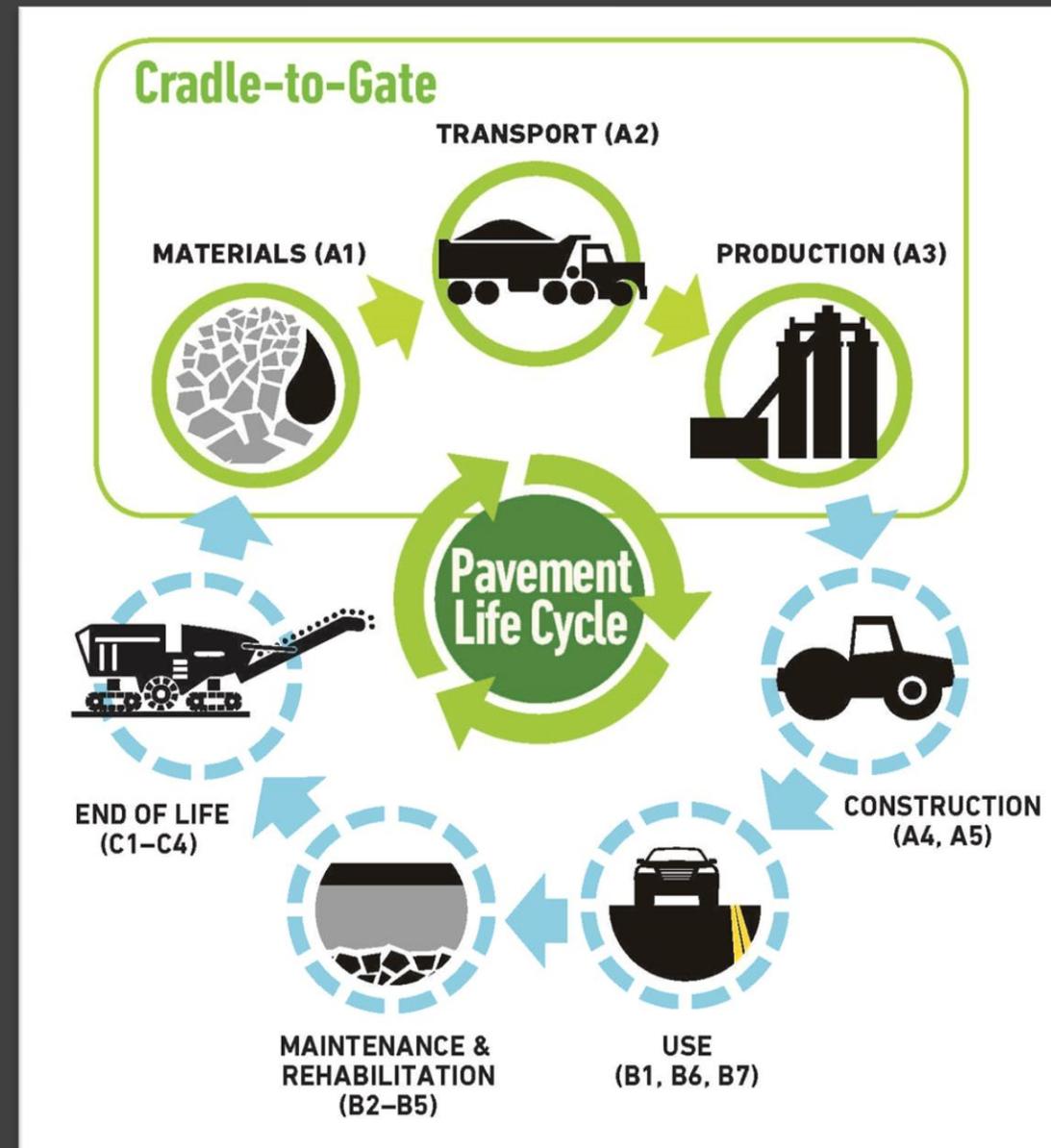
The screenshot shows the user interface of the Emerald Eco-Label EPD Software. The top navigation bar includes the Emerald Eco-Label logo and a list of menu items: Home, Organizations, Production Facilities, Material Sources, Mixes & EPDs, Admin Tools, Optimizer (New), Published EPDs, About the Tool, and Changelog. The main content area features a large image of an asphalt plant with the Environmental Product Declaration logo overlaid. Below the image is a welcome message and instructions for using the tool.

Learn more at [www.asphaltpavement.org/epd](http://www.asphaltpavement.org/epd)

# Key Aspects of Emerald Eco-Label Software

- Digital platform
- Independently verified
- All EPDs expire with the PCR
- Designed for asphalt mix producers
  - Low cost and easy to use

Published EPDs available at  
<https://asphaltep.org/published/>



# How to use Emerald Eco-Label



- Visit <https://asphaltep.org/> and login
- Watch two webinars and pass the quizzes
- Compile data for plant and mixes
  - Use EPD Data Gathering spreadsheet
- Purchase access for your plant(s)
- Enter data for plant and mixes to produce EPDs

[www.AsphaltPavement.org/EPD](http://www.AsphaltPavement.org/EPD)

Welcome to the EPD Tool data gathering sheet. It is meant to be used in conjunction with the EPD Tool Instructions (pdf).  
It is provided to help you gather the relevant data needed to create your first EPD using the Asphalt EPD tool.  
The data can be divided into three categories:  
1.) Organizational and Production (plant) level information  
2.) Supplier level information  
3.) Mix level information

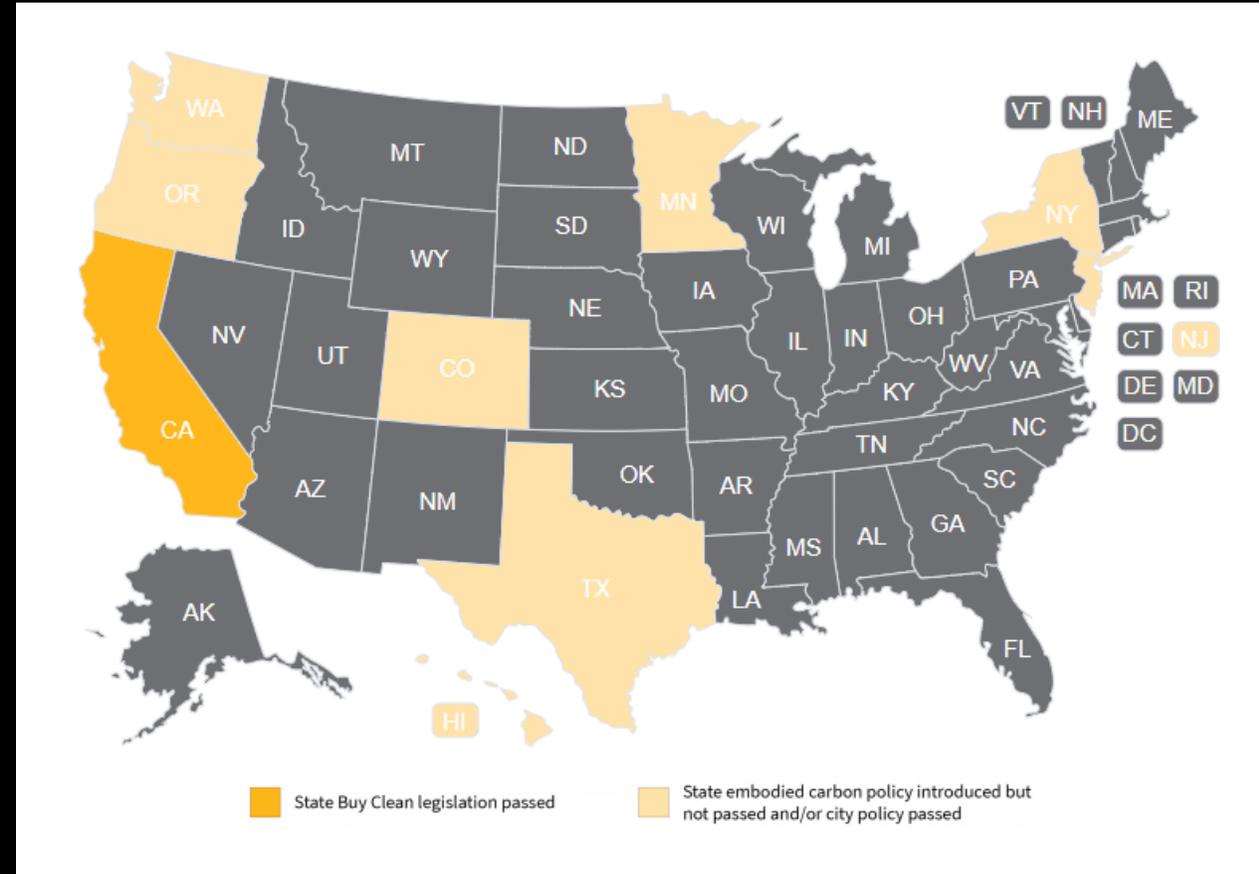
Rows 3-40 cover the Organizational and Production level information.  
Rows 44-80 are for gathering data on the sources of substances in mixes.  
Rows 90-213 are for specifying mixes.

All data entered into the EPD tool is confidential. Only the downstream environmental impacts will appear in the final EPD. No sensitive data about mix design or energy usage will be revealed in the EPD.

	Organizational Data	Units	Comments & Help
4	Company Name		In the EPD Tool, "Organization" refers to a whole company. For smaller operations, this may be the same as some of the "Plant" data
5	Contact information for headquarters or billing department		
6	Name and contact information for the person who will be the lead for EPD creation at your company		
7	<b>Production Facilities</b>		
8	Plant name		A user can create multiple plants
9	Physical address		Cannot be a PO Box; The ZIP code will be used for certain calculations
10	Name and contact for head of EPD creation for this plant		May be the same person for several plants. Does not need to be the Technical Lead
11	<b>Production Facility Resource</b>		
12	<b>Annual Production &amp; Electricity</b>		
13	Data collection start date		All quantities reported in the Production Facility section will be over a cumulative period of 12-months, within the last five years. Enter the start date of the twelve month period during which the data was recorded. The reported data for all the subsequent categories (in Production Facility) must have been measured for the same twelve month period starting from this date.
14	Total Asphalt Mix Sold (per year)	US Short Tons	This must be over the same 12 month period as all the other plant data
15	Total Water	Gal	If you have exact (metered) water use data, enter it here. Only water used in asphalt production and dust control should be included.
16	Electricity: Grid Power	kWh	Use your total line electricity for your 12 month period.
17	Electricity: eGRID subregion		This portion will self populate given the zip code of your plant. If you are interested, more about eGRID regions may be found by entering your zip code into the EPA's power profiler: <a href="https://www.epa.gov/energy/power-profiler">https://www.epa.gov/energy/power-profiler</a> Your region will appear in bold below the US map.
18	Electricity: Solar	kWh	If your plant uses onsite solar sources, report the estimated energy contribution from these sources during your 12-month period here. Note that this is only onsite solar! The percentage of solar from your electricity provider is already calculated.
19	Electricity: Wind	kWh	Electricity generated by onsite wind energy sources. As with solar, only wind power sources that are at your production facility should be accounted for here. The percentage of wind from your electricity provider is already calculated during the

# “Buy Clean” Legislation

- Process:
  1. Agencies collect EPDs for eligible materials for 1-2 yrs.
  2. Agencies determine **embodied carbon** (GWP in units of CO<sub>2</sub>e) limit for each material type
  3. Incorporate GWP limits into procurement (prequalification)
- Most Buy Clean policies target these materials:
  - Steel, Glass, Insulation, Concrete
  - Asphalt has been proposed in several jurisdictions

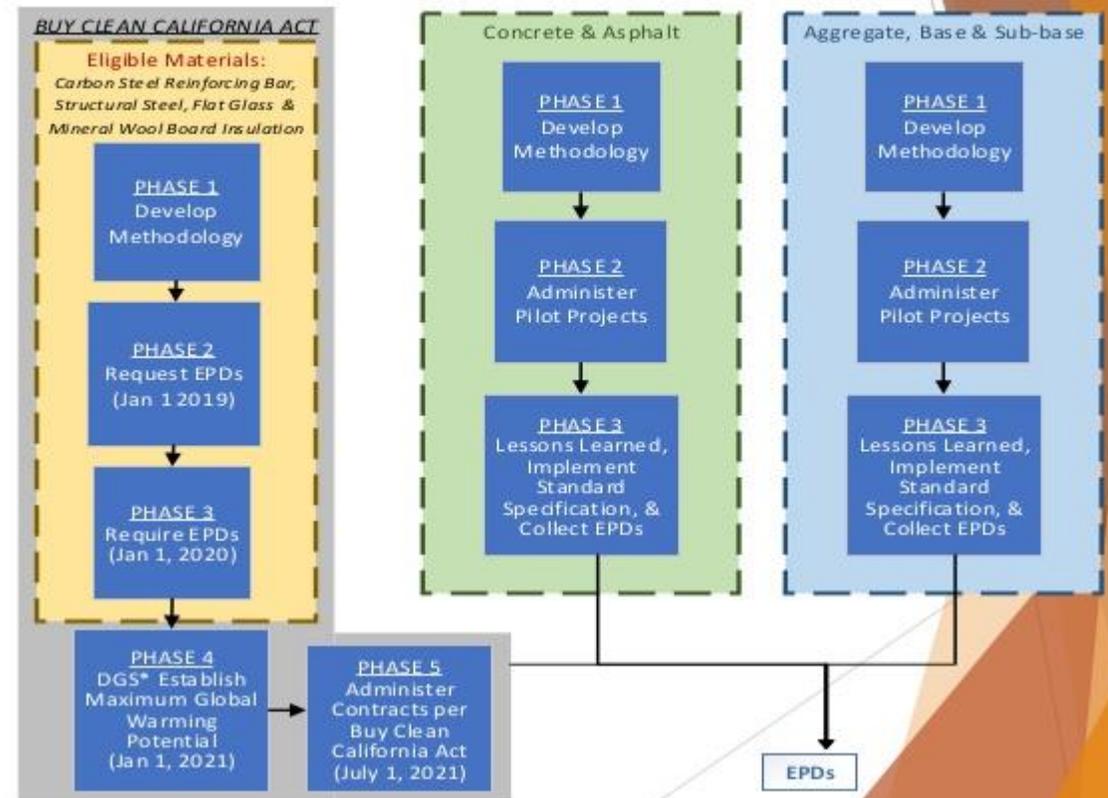


# Caltrans EPD Policy



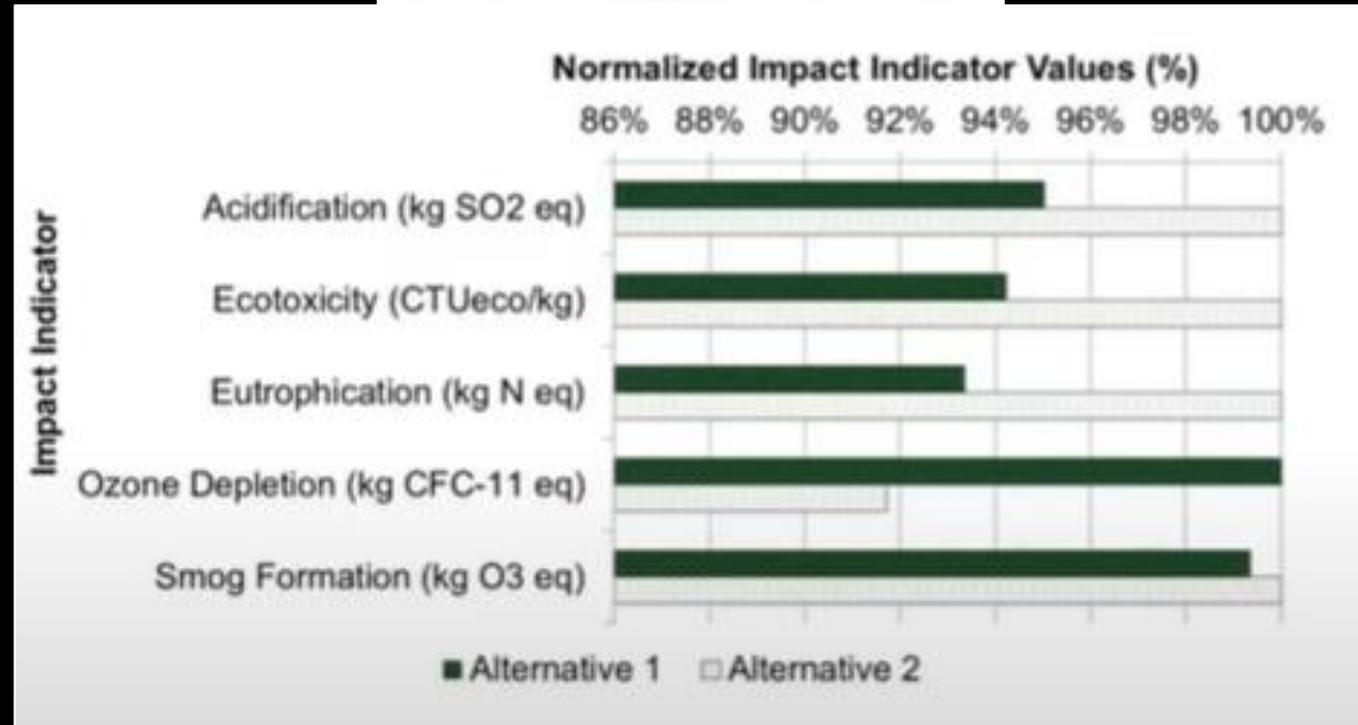
- Policy decision by Caltrans to get ahead of legislation
- Contractors must submit EPDs for Concrete, Asphalt, and Aggregates
- Started with 20 projects in 2019
- Now targeting 100 projects

## Roadmap to EPD Implementation



# FHWA Initiatives

- Roadmap for upstream datasets
  - For fuels, electricity, & common materials
- PCR Guidance
  - Goal is to align PCRs for different pavement materials
- Pavement LCA Framework in OpenLCA
  - LCA software used by consultants
- LCA-Pave Software Tool
  - Excel-based LCA software designed for agencies
  - Can use EPDs as a data input



# FHWA Initiatives (continued)

## FHWA's Proposed\* EPD Implementation Process:

- Step 1: Use EPDs as a **communication tool**
  - No decisions made based on content
  - Agencies can use EPDs to inform development of benchmarks
- Step 2: Use EPDs as a **material procurement aid**
  - Requires development of relevant benchmarks
- Step 3: Use EPDs as a **data source** for LCA
  - Requires harmonization of PCRs for different materials
- Step 4: Use multiple LCAs to inform policy



### \*References:

[Rangelov et al. \(2020\)](#). Integration of life cycle assessment into planning and project delivery for pavements in the USA. Roadways and Infrastructure.

[Rangelov et al. \(2021\)](#). Use of EPDs of pavement materials in the U.S.A. to ensure environmental impact reductions. Journal of Cleaner Production.

# FHWA CLIMATE CHALLENGE

- Quantifying the GHG Emissions of Sustainable Pavements
- State DOTs to explore the use of EPDs & LCAs to inform pavement material & design selection
- Two primary goals:
  - Enhance sustainable pavement practices
  - Quantify emissions & impacts of those practices

[www.fhwa.dot.gov/infrastructure/climatechallenge](http://www.fhwa.dot.gov/infrastructure/climatechallenge)



# EPDs & LCAs



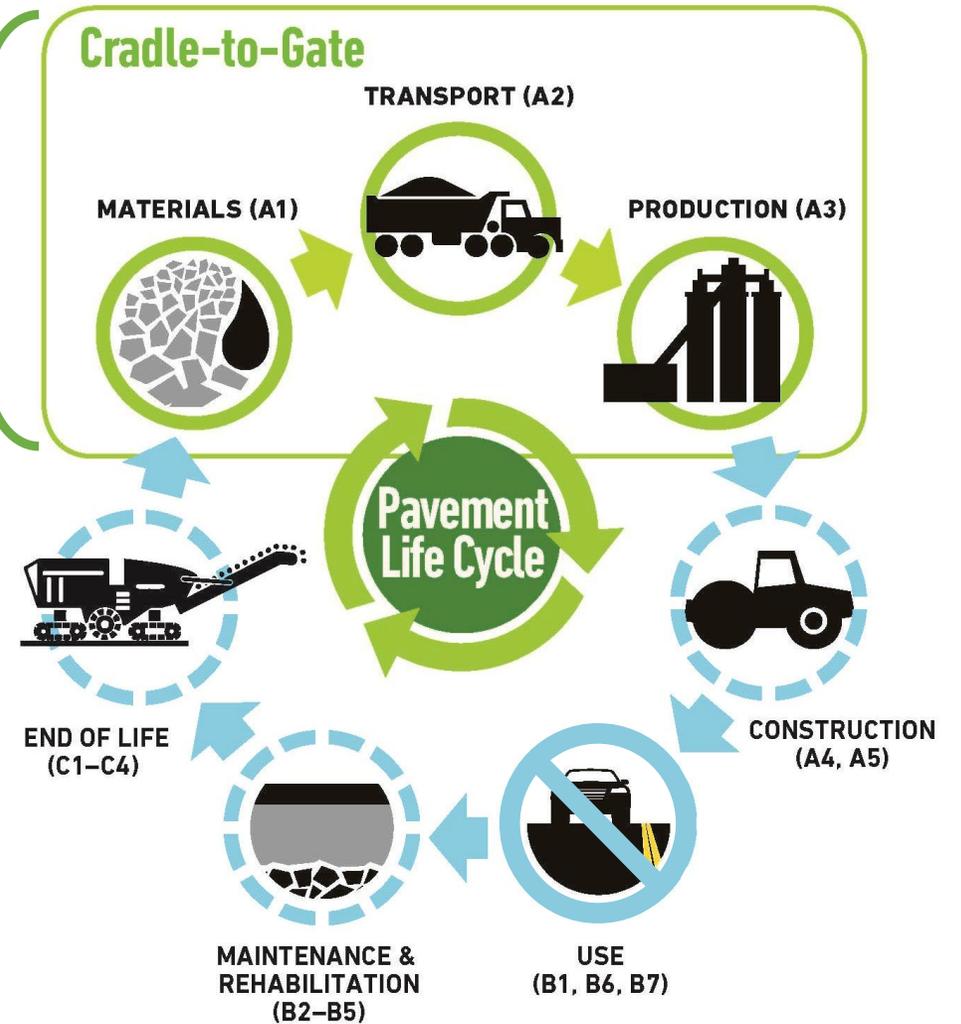
## Scope of FHWA LCA Pave

- Excel-based software
- Intended for agencies, academia, other stakeholders
- Does not include use stage
- EPDs can be a data input

**Emerald**  
ECO LABEL

## Scope of EPDs

- Developed by mix producers



# FHWA CLIMATE CHALLENGE

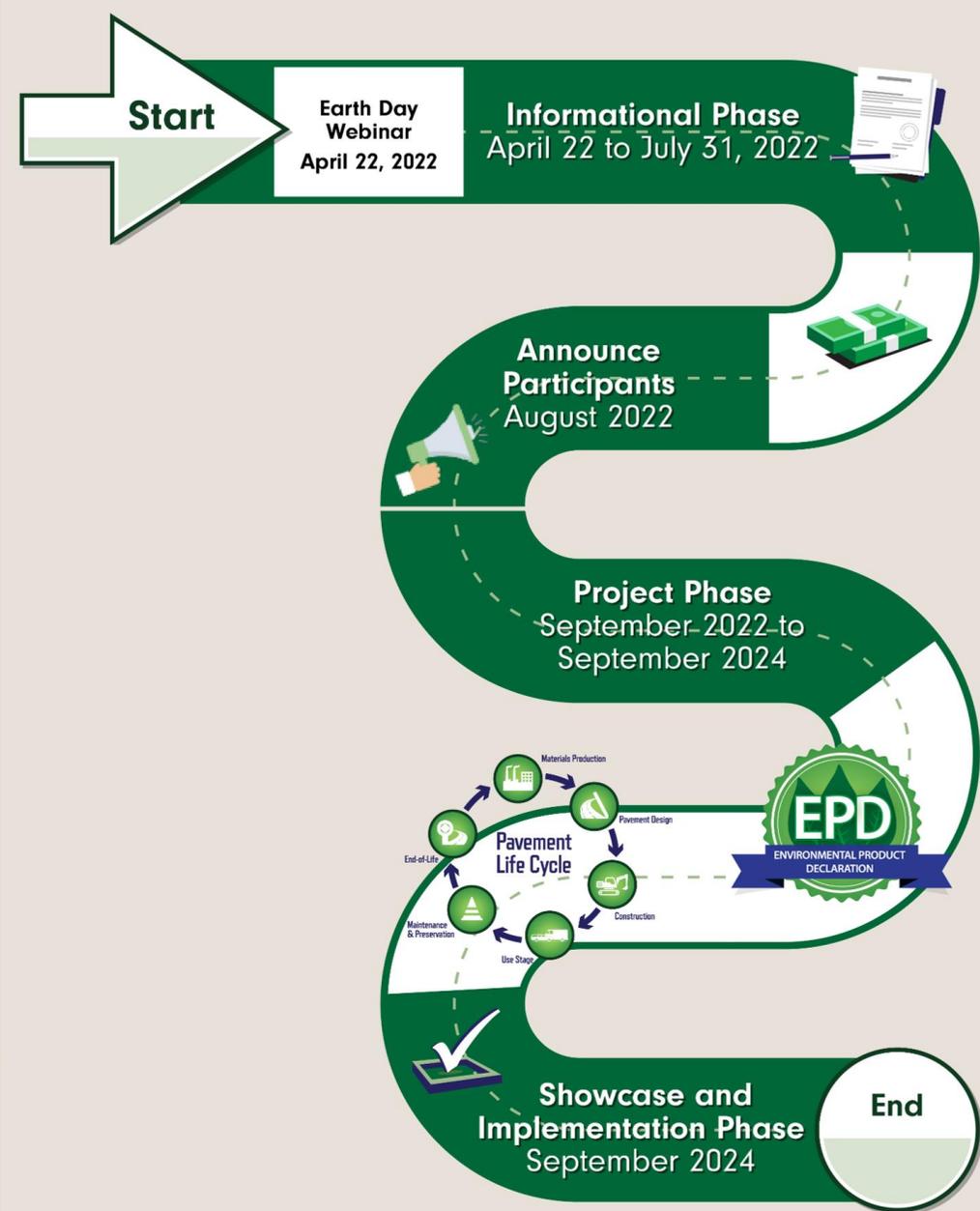
- Project examples
  - Development of Carbon Reduction Plans
  - Implementation of EPDs & LCA on select projects
  - Pilot programs that reduce GHG emissions
  - Working with industry to fill data gaps & initiate new EPD programs
- Up to \$500k per State DOT
  - Awarded on a rolling basis until funding exhausted

[www.fhwa.dot.gov/infrastructure/climatechallenge](http://www.fhwa.dot.gov/infrastructure/climatechallenge)



# CLIMATE CHALLENGE STEPS

- State DOTs must partner with other stakeholders
  - Academia
  - Industry organizations
  - EPD program operators
  - Material manufacturers
- Projects aim to complete in Fall 2024
  - Case studies
  - Reports
  - Peer exchanges



# Biden Administration

- Climate change is a top priority for Biden and Congress
- Direct Federal procurement?
  - National parks, military bases, other federal projects?
- Other Federal Legislation
  - Highway funding could be tied to greenhouse gas emissions and “low carbon” materials
- Federal policy expected to clarify in 2022

THE WHITE HOUSE  MENU

BRIEFING ROOM

## Executive Order on Tackling the Climate Crisis at Home and Abroad

JANUARY 27, 2021 • PRESIDENTIAL ACTIONS

The United States and the world face a profound climate crisis. We have a narrow moment to pursue action at home and abroad in order to avoid the most catastrophic impacts of that crisis and to seize the opportunity that tackling climate change presents. Domestic action must go hand in hand with United States international leadership, aimed at significantly enhancing global action. Together, we must listen to science and meet the moment.

By the authority vested in me as President by the Constitution and the laws of the United States of America, it is hereby ordered as follows:

PART I – PUTTING THE CLIMATE CRISIS AT THE CENTER OF UNITED STATES FOREIGN POLICY AND NATIONAL SECURITY

Share   

# GSA Environmentally Preferable Asphalt Standards

- P100 Facilities
- Revised March 29, 2022



The [prime contractor] shall provide a product-specific cradle-to-gate Type III environmental product declaration (EPD) for each asphalt mix specified in the design and used at the project, using version 2 of the National Asphalt Paving Association's [product category rule](#) for asphalt mixtures. Please send EPD(s) to [embodiedcarbon@gsa.gov](mailto:embodiedcarbon@gsa.gov), and upload EPD(s) into GSA's project management information system.

<https://www.gsa.gov/real-estate/design-construction/engineering-and-architecture/facilities-standards-p100-overview>



# WHO'S IMPACTED?



- States with border crossing station projects are subject to new standards
- \$3.4 billion IJA funding to modernize land ports of entry



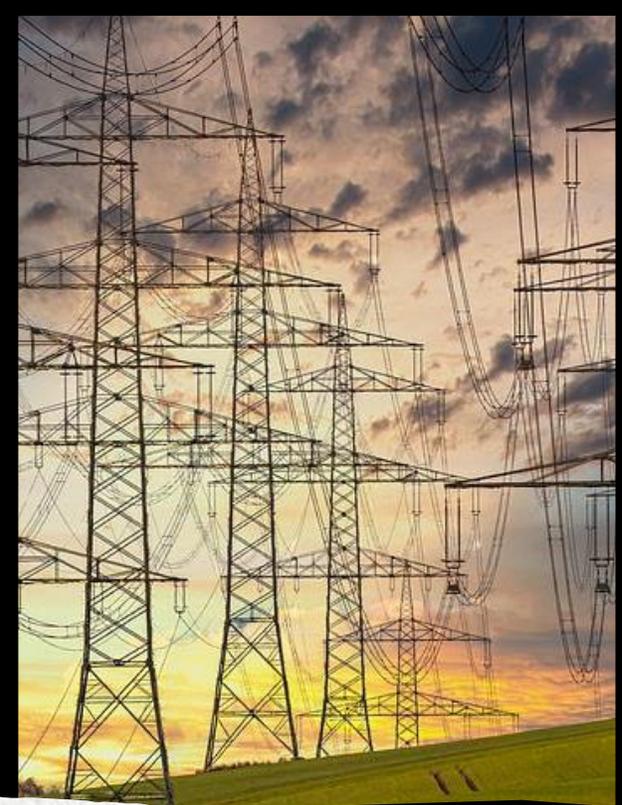
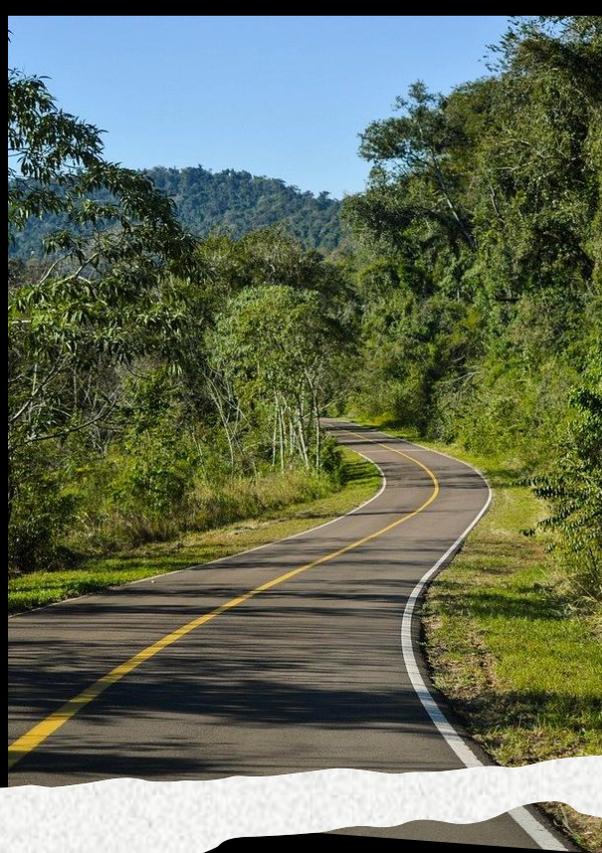


# The Road Forward

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



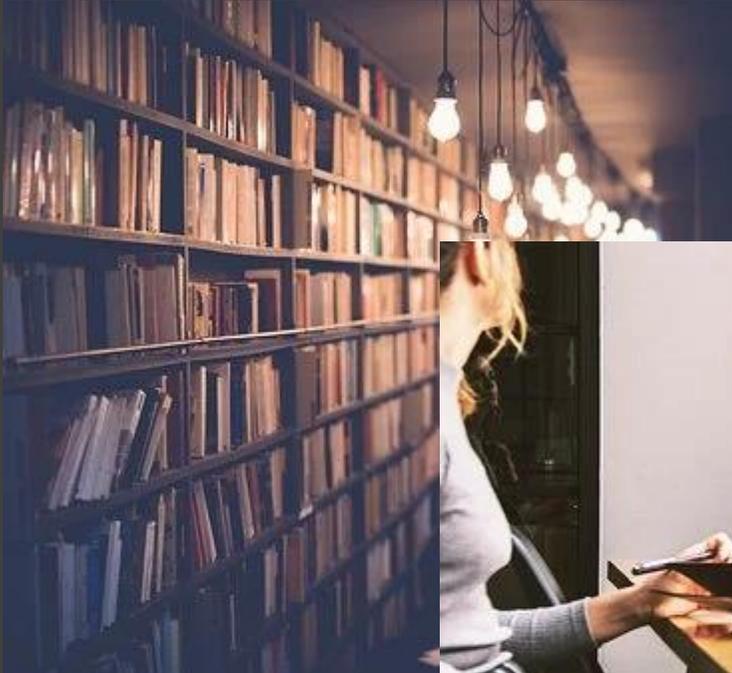
Begins Now!



# Industry Goals



# Where Do I Start?



**THANK YOU**

**RWILLIS@ASPHALTPAVEMENT.ORG**

