



2024 Fall Conference at The Ashore Resort  
Ocean City, Maryland

# Advancing Asphalt Sustainability in Maryland

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STATE HIGHWAY  
ADMINISTRATION

*MARYLAND ASPHALT ASSOCIATION*



# BIOGRAPHY

## ■ Tim Smith

- 30 Years of experience in materials, pavements, & transportation.
- Current President of the Maryland Asphalt Association.
- 25 years at SHA:
  - State Materials Engineer, District Engineer, Chief Engineer & Administrator.
- BS & MS in Civil Engineering from Virginia Tech.



## ■ Eric Frempong

- With 39 years of experience in materials research & geotechnical engineering.
- Current State Materials Engineer as OMT Director at SHA.
- PhD in Geotechnical Engineering from Western University.
  - London, Ontario - Canada.
- BS and MS in Kumasi, Ghana.



# ABSTRACT

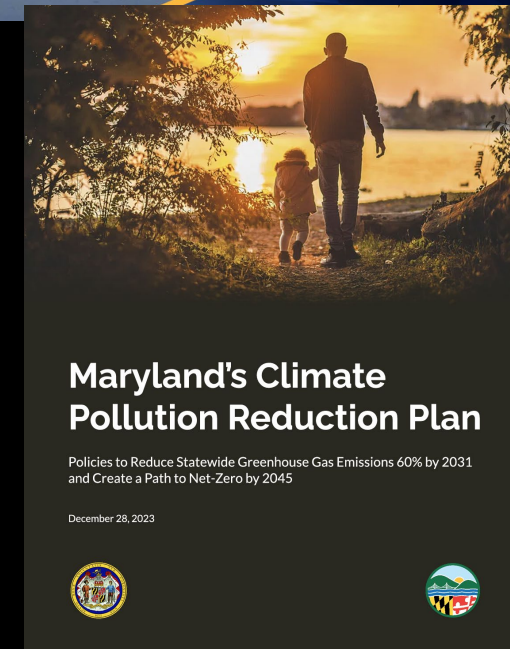
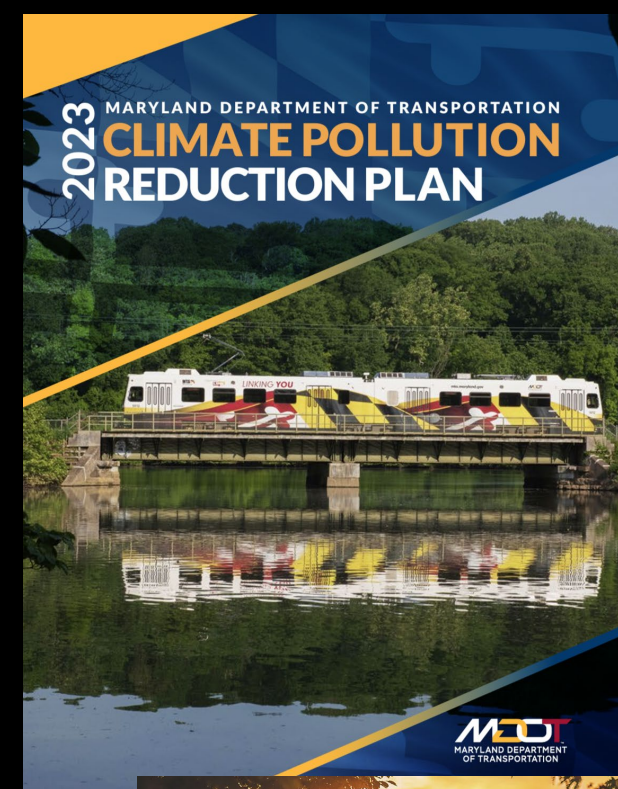
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## Advancing Asphalt Sustainability in Maryland

- Share the State and Federal Goals for Net Zero Carbon Footprint in Paving.
  - Provide the History of Use of Recycled Materials in Asphalt Pavement in Maryland.
  - Highlight the Benefits on Recycled Asphalt Pavement (RAP) both Environmentally & Financially.
  - Emphasize the Opportunities and Restrictions that Exist in County Projects.
  - Challenge Each County to Increase Their Use of RAP.
- 
- 1.0 PDH

# MD Environmental Laws & Goals

- MD Department of Environment.
  - 60% Reduction in GHG Emission Levels from 2006 by 2031.
  - Achieve 100% Clean Energy by 2035.
  - Net Zero Carbon Emissions by 2045.
- MD Department of Transportation.
  - Compliments MDE Plan.
  - Target to Lowering Vehicle Miles Traveled.
  - Electric Vehicle Expansion.
  - More Multi-Modal CTP Initiatives.



# National Environmental Laws & Goals

- Federal Government.
  - Net Zero Carbon Emissions by 2050.
    - 65% Reduction by 2030.
  - Achieve 100% Pollution-Free Energy by 2030.
  - Net Zero Carbon Emissions Procurement by 2050.
    - Low-Carbon Materials Initiative.
  
- National Asphalt Pavement Association.
  - Net Zero Carbon Emissions by 2050.
  - Net Zero Material Supply Chain by 2050.
  - Transition to Other Energy Sources by 2050.

Federal Sustainability Plan

[Home](#) / Federal Sustainability Plan





# Asphalt Sustainability Committee

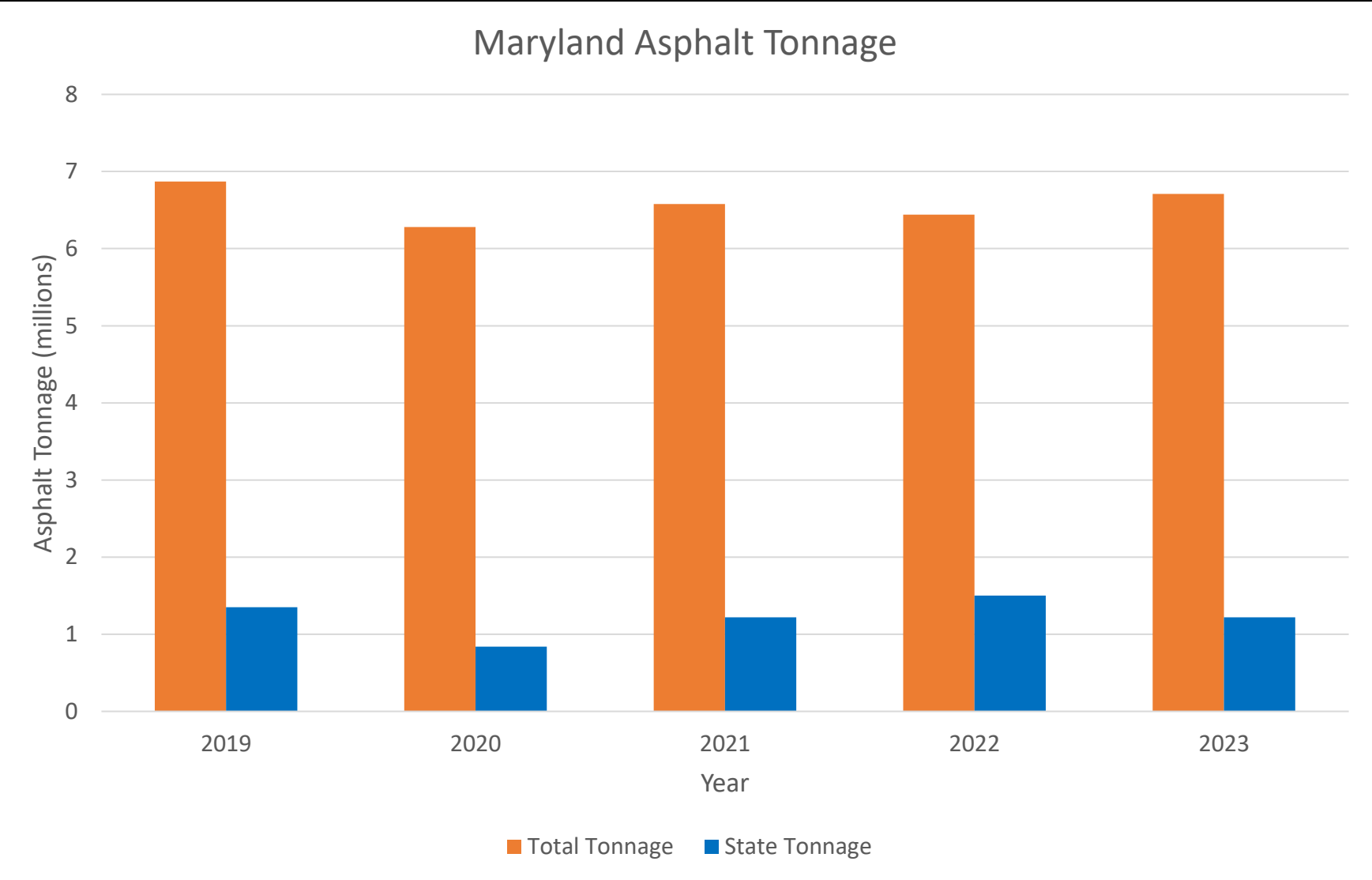
- Partnership Around Shared Objectives.
  - MDE, MDOT, MD Asphalt Association, & UMD.
  - New perspectives & collaboration.
  
- Developed 2-yr Objectives.
  - County Engineer partnership.



**MARYLAND ASPHALT ASSOCIATION**



# Asphalt Production History in MD



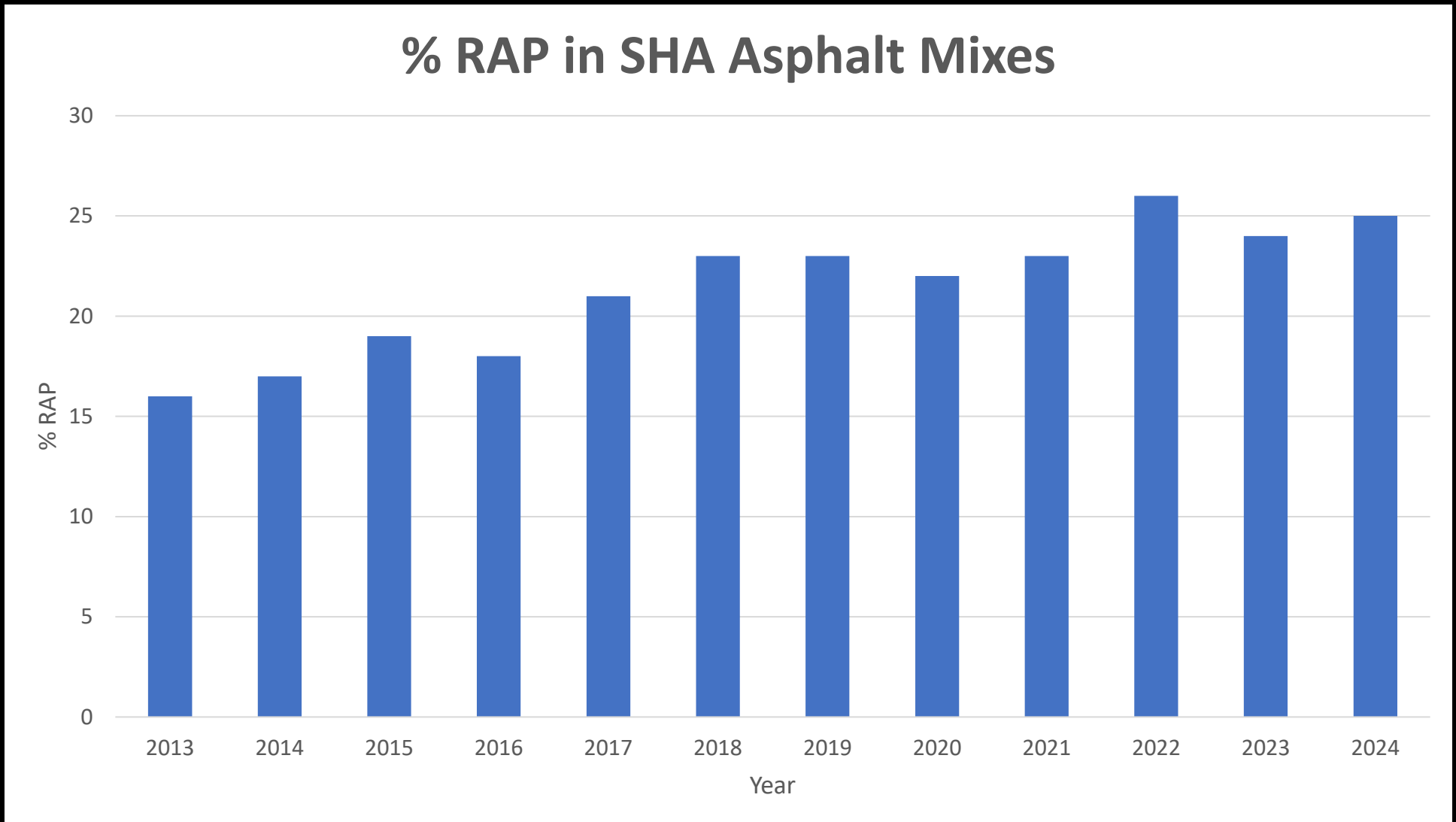
# RAP History in MD

- Prior to 2000.
  - Negligible usage of RAP.
  - Spec changes in 2000 and 2015.
- Section 904 – MSMT 412.
- Permissive Specification.
  - Current Spec <30% for non-polymer binders.
    - No additional testing or binder changes.
  - For Polymer binder mixes <15%
    - For example, Gap-Graded – SMA.



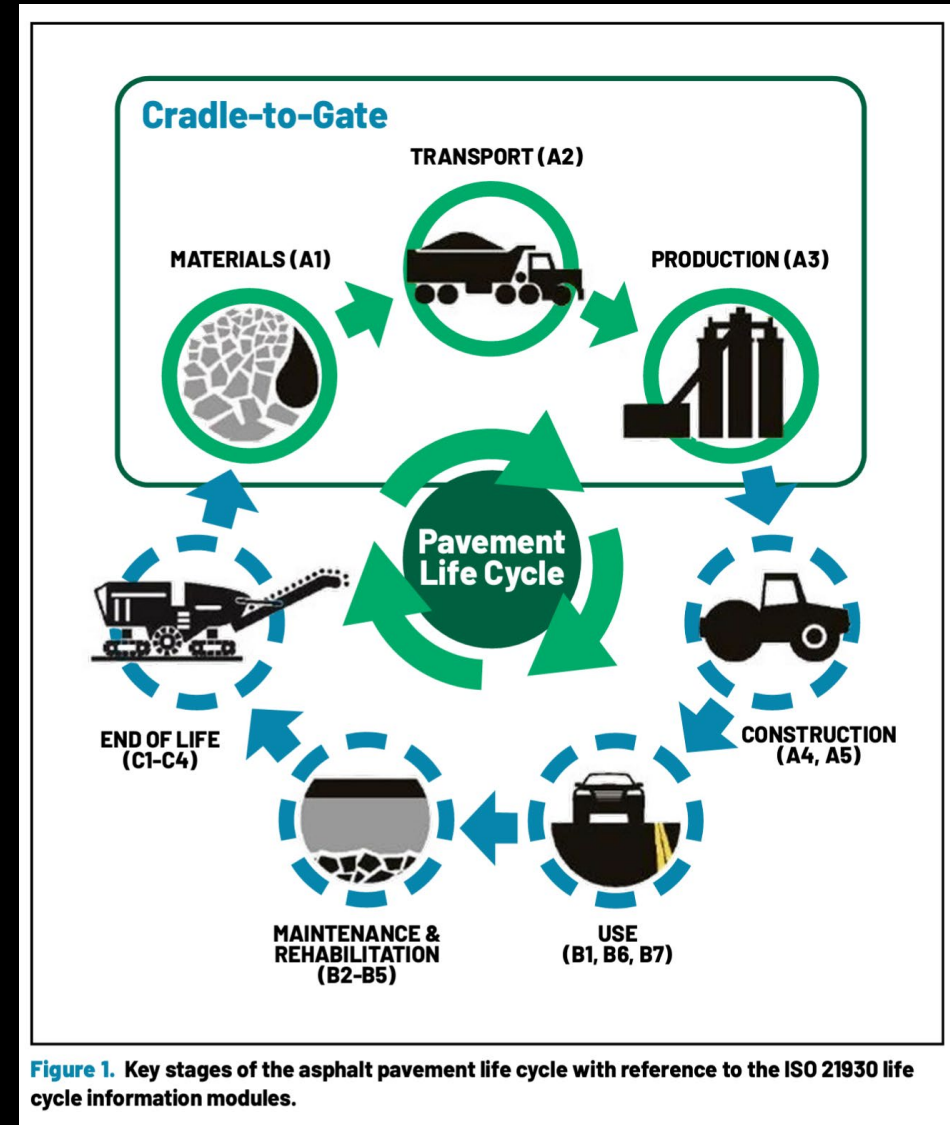


# RAP History in MD



# Sustainability Basics - 101

- Entire Life Cycle of a Product.
  - Ton of CO2e produced.
  - Measure of Green House Gas Emissions (GHG).
- Initial Focus on Cradle to Gate (A1-A3).
- Environmental Product Declarations (EPD).
  - Ingredient label for sustainability.
  - Ability to identify impacts from adjustments.
  - Global Warming Potential (GWP).



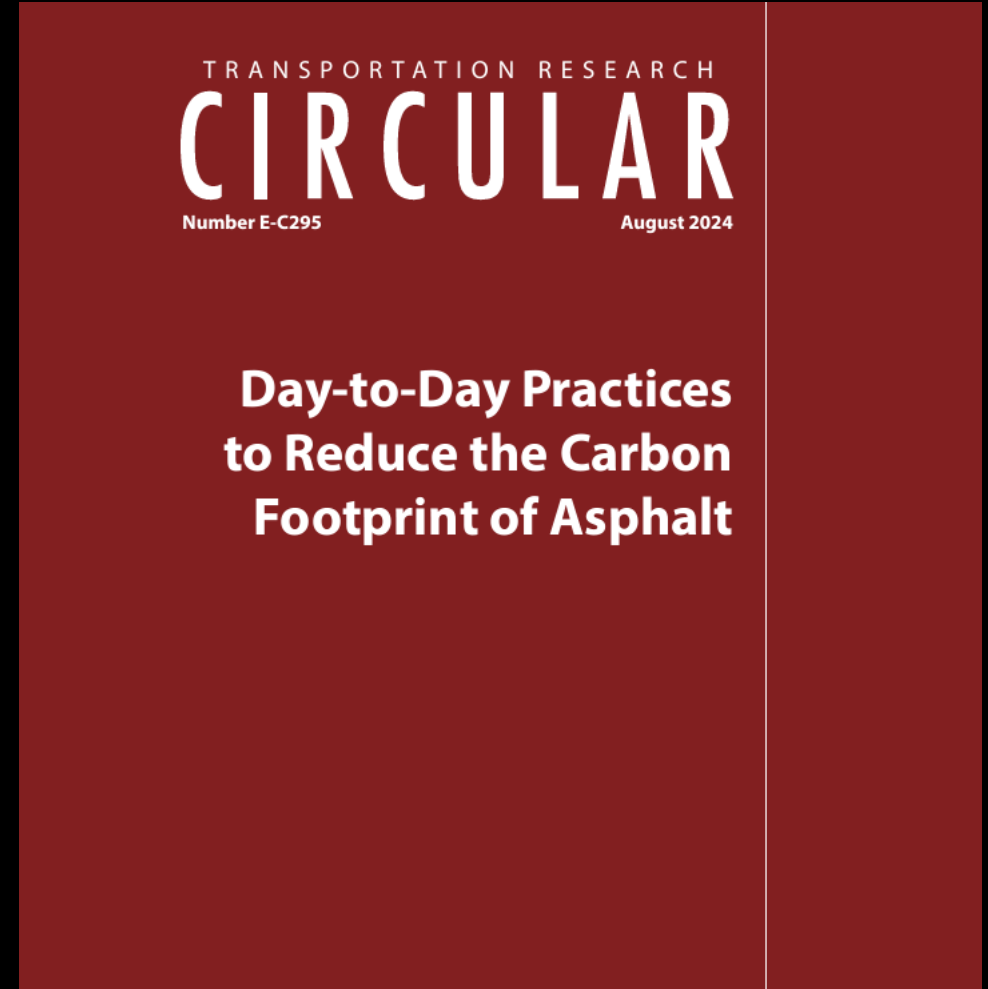
# Sustainability Basics - 201

- Typical Range for Asphalt Mix.
  - 40 to 120 GWP.
  - Depends on performance additives & special requirements.
- Cradle to Tailgate (CO<sub>2</sub>e/ton):
  - 40% to 60% - Raw Materials
  - 3% to 10% - Transportation
  - 30% to 40% - Plant Operations



# Best Practices - TRB Report

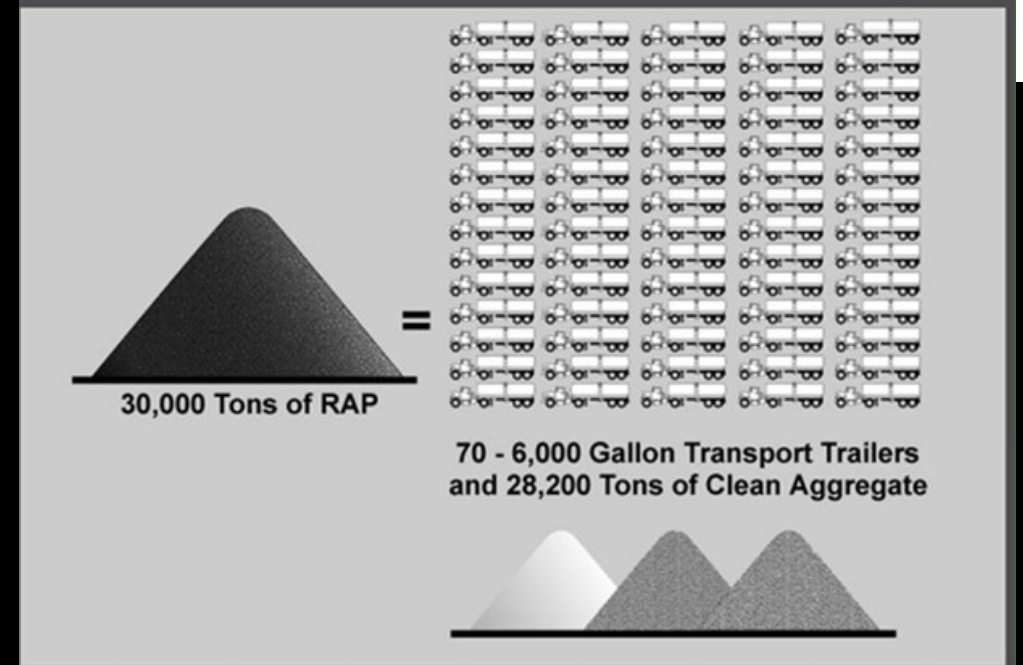
- New Recipe for Mixes.
  - 22% RAP - National Average.
  - 50% to 70% RAP – Current Technology.
- Plant Operations.
  - 90% of GWP comes from drying process.
  - Improved stockpile management.
  - Improved energy efficiency.
- Alternate Energy Sources.
  - Plant in Maryland currently using solar to power their operations.





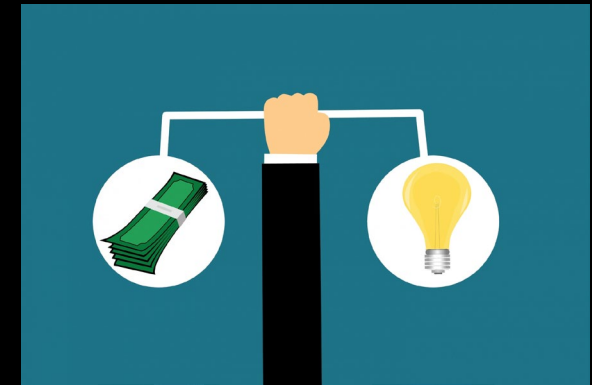
# Great Initial Benefit Opportunities

- Increasing RAP % in our Asphalt Mixes.
  - Maintains existing performance and quality.
- Widen our Gaze & Perspectives.
  - Valuable existing resources.
  - Immensely helps our sustainability goals.
  - Bulk of our tonnage – Local.
- Increasing RAP Usage.
  - 20% RAP – 11% Reduction in CO<sub>2</sub>e/ton.
  - 50% RAP – 29% Reduction in CO<sub>2</sub>e/ton.



# Current State Efforts

- Low Carbon Transportation Materials Grant.
  - Applied for \$48M in potential advancements.
  - Training, equipment, research.
- Environmental Product Declaration Deployment.
  - Requirement for material suppliers in 2026.
- Asphalt Sustainability Committee.
  - Formed in partnership – MD Asphalt, MDOT, MDE.
  - Looking at 2-year targeted objectives.



# NOFO – Local

- Local Government Opportunities.
  - State Agencies prohibited.
- \$800 Million Available Nationally.
  - Closes Monday, November 25, 2024, at 11:59 p.m.
  - <https://www.fhwa.dot.gov/lowcarbon/funding.cfm>
- Establish thresholds and data requirements.
  - Asphalt mix, concrete (and cement), glass, and steel materials.
  - Products that meet the substantially lower embodied carbon.





# Other Recycled Materials

- Existing Options:
  - Recycled Asphalt Shingles (RAS).
- Potential Future Options:
  - Engineered crumb rubber tires.
  - Crushed and processed glass.
  - Other forms of plastics.
- Debate about Future Treatment Cycles.
  - Future recycling opportunities still unproven, unlike RAP.





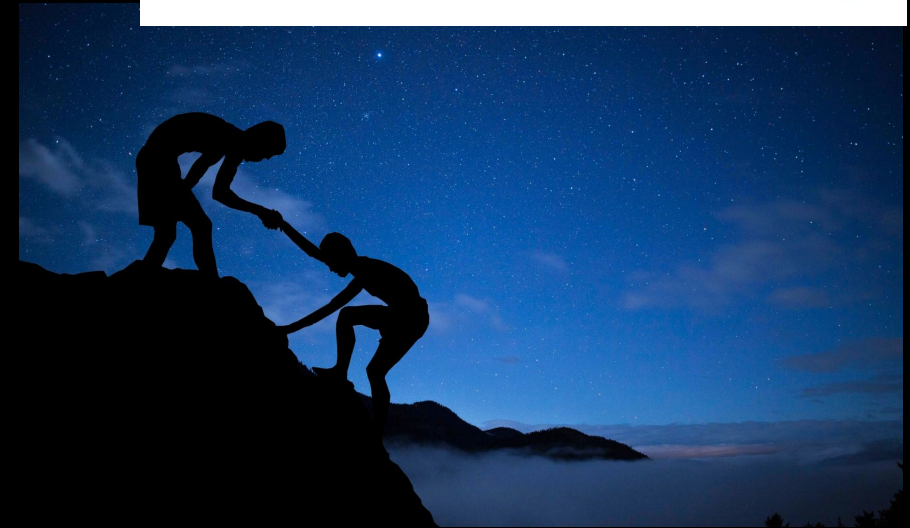
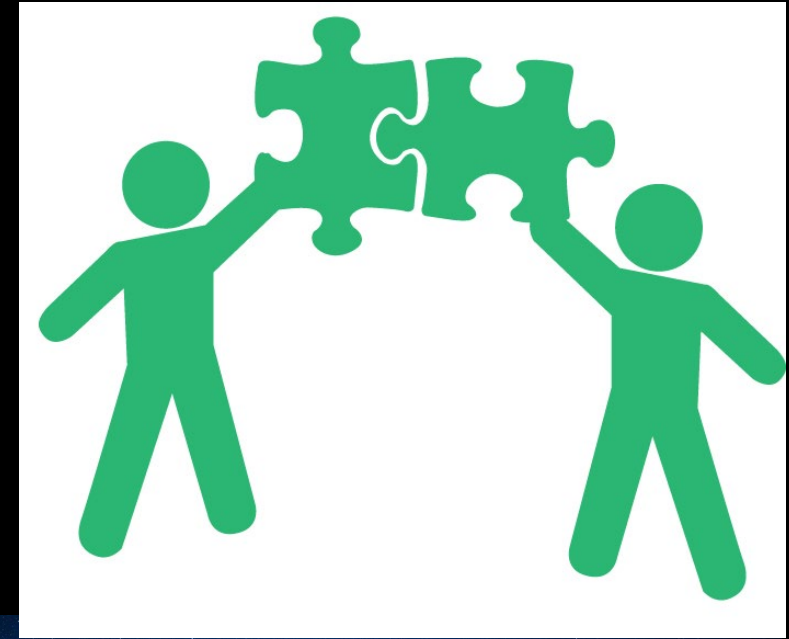
# Potential Other RAP Benefits

- Fiscal Numbers.
  - TRB - \$5/ton to \$10/ton savings with 4% to 8% RAP increase.
  - RAP is a valuable known resource for our industry.
- Beneficial Re-Use.
  - Stockpile and gradation management.
  - No limit on the number of rehabilitation cycles.
- Create Opportunities for Other Advancements.
  - Equipment, plant operations & materials.
  - Gaining that next level of additional 30% RAP usage.



# Partnering & Collaboration

- Counties are Essential to Success.
  - Collectively more influential than the State.
  - Looking for CEAM participation on Committee.
- Resources Available to Assist.
  - MD Asphalt Association & SHA/OMT.
- Recognition.
  - Better understanding of statewide operations.
  - 2024 Asphalt Paving Sustainability Award!



# Paving Awards

- 2024 Maryland Excellence In Paving Awards.
  - Encourage County submittals.
  - Inclusion of subdivision/parking facility categories.
- Deadline to Apply is Friday, October 18, 2024.
  - <https://mdasphalt.org/2024-excellence-in-paving-awards/>
- March 12<sup>th</sup>, 2025 – Annual Asphalt Paving Conference.
  - Awards ceremony & recognition.



# Key Takeaways

- Identify County Asphalt Sustainability Plans.
  - Are they aligned with State and National goals?
- Review County Asphalt Specifications.
  - Specifically, % of RAP permitted.
  - What are your current targets?
  - Opportunities for increase?
- Utilize Existing Partnership Opportunities.
  - Maryland Asphalt Association and Maryland DOT.





# QUESTIONS?

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