



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

# Asphalt Recycling: National Perspective

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# An Industry-Wide Vision

# THE ROAD FORWARD PARTNERS



The Future  
is Riding on AJAX.®

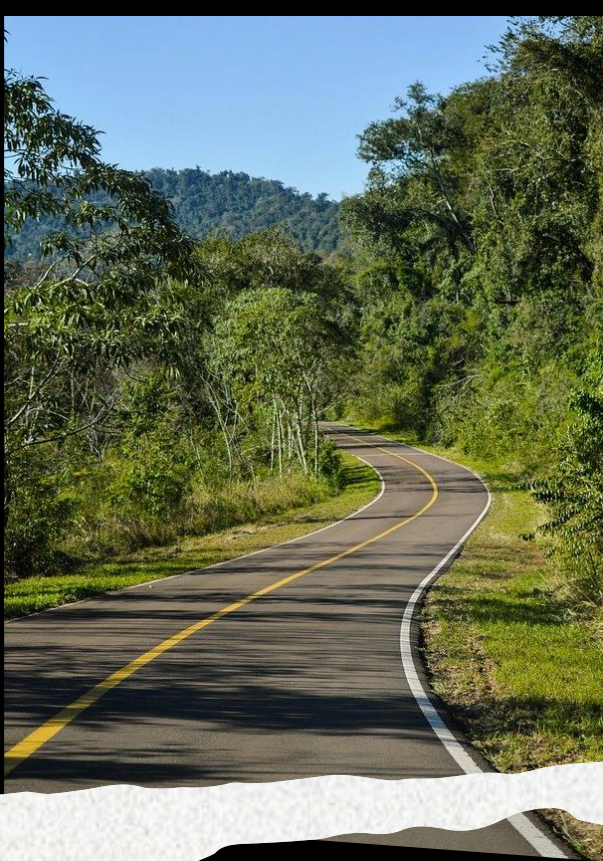


KOKOSING  
MATERIALS, INC.



Helping  
the world  
thrive





# Industry Goals



# NAPA Workshop - Results



# Net Zero Materials Supply Chain

- More recycled material
- Balanced Mix Design
- Industry summits
- New technology and materials

“We are America’s No. 1 most recycled product,”  
NAPA’s Jay Hansen told *The New York Times*.

Industry Goal 3

Upstream Scope 3 Emissions

Develop a net zero materials supply chain by 2050



# 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.

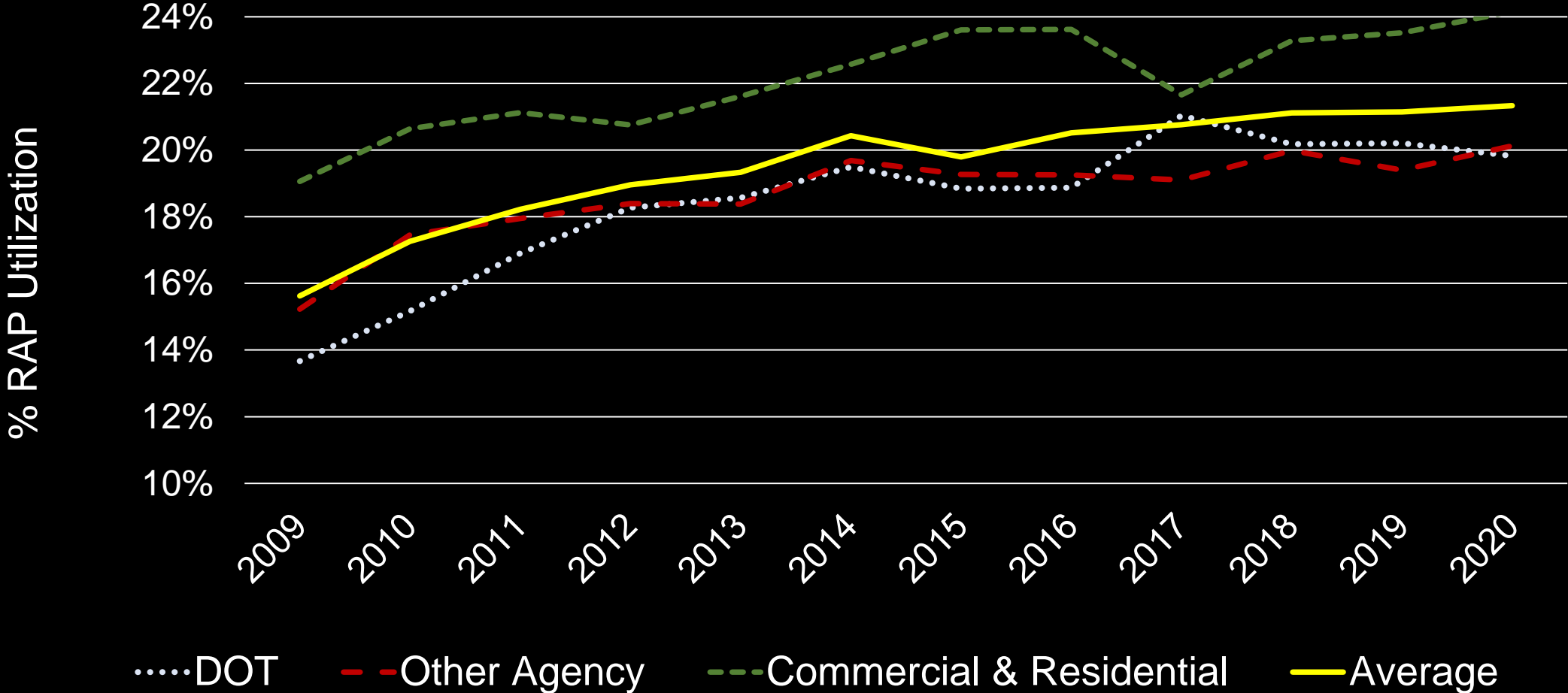
<https://www.gsa.gov/real-estate/design-construction/engineering-and-architecture/facilities-standards-p100-overview>





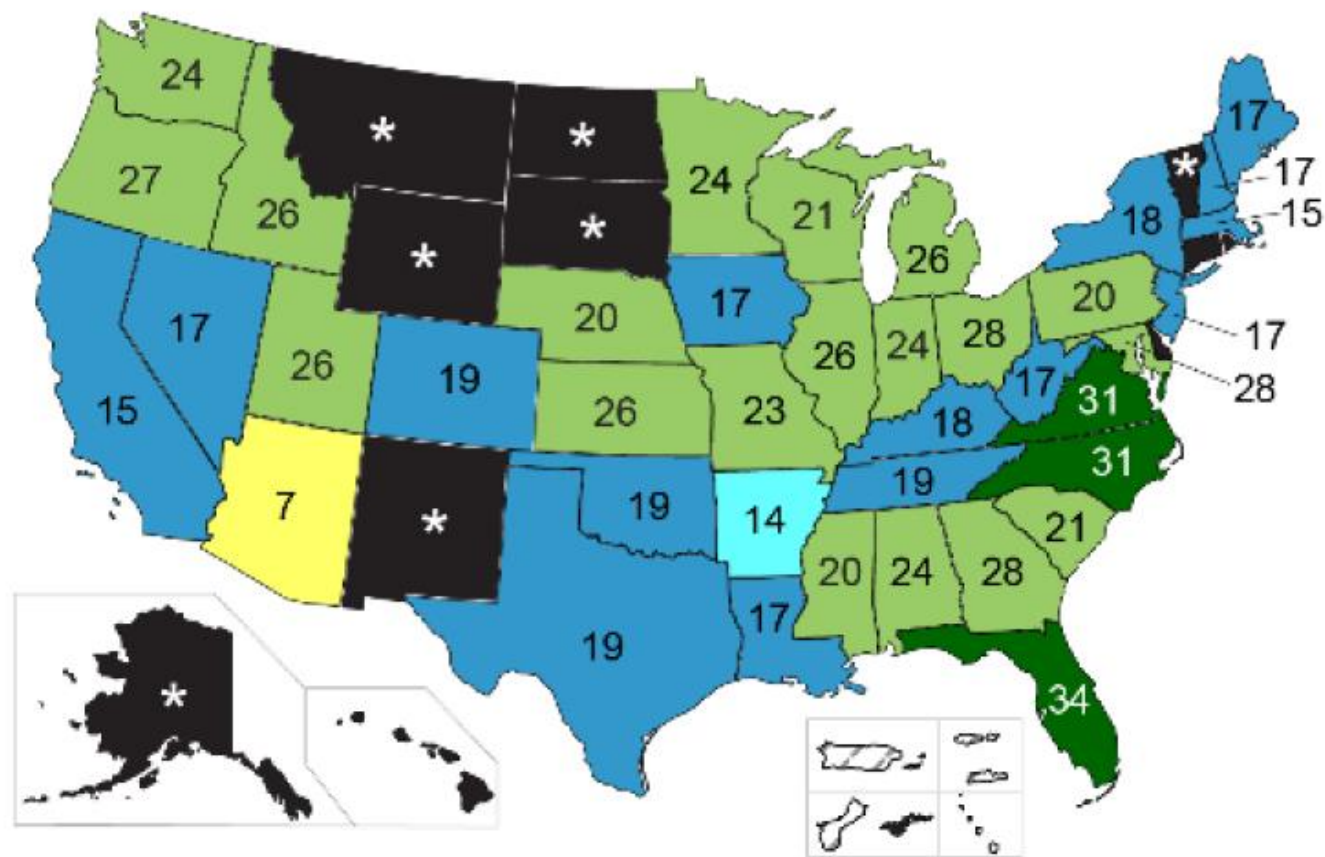
# % RAP Utilization in Asphalt

## Utilization by Sector



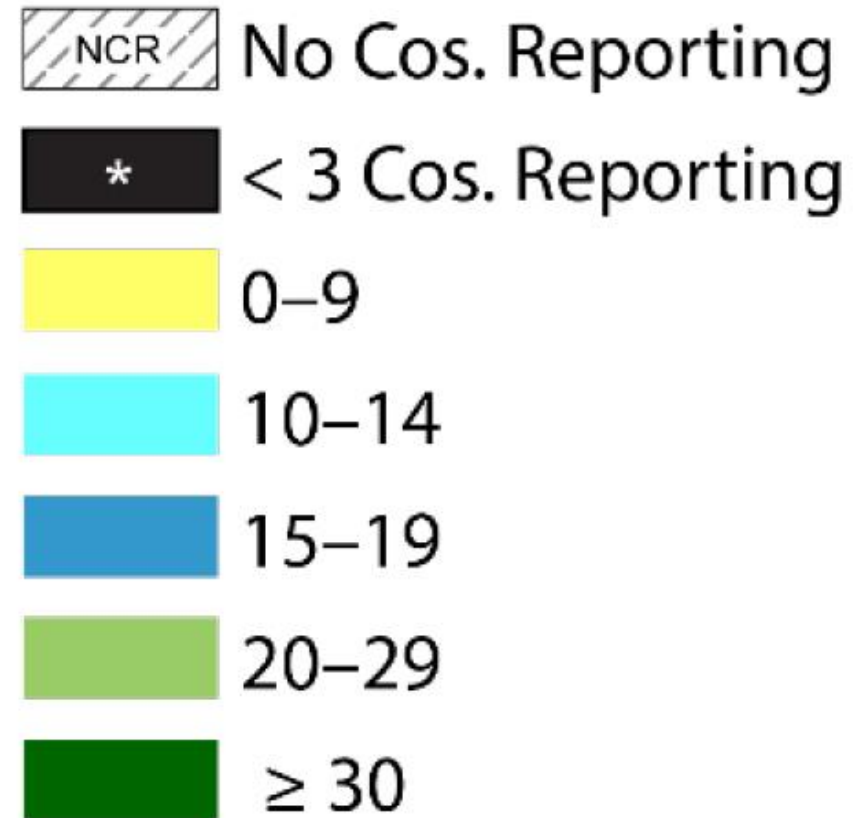
# % RAP Used by State

2020 Map



2020

Average RAP %



# Habit #2 – Begin with the end in mind - Covey

- How do we maximize research and implementation \$\$\$
- Track Record is not good for implementation
  - NCHRP 9-46 – NCHRP Report 752 – High RAP Mix Design
  - NCHRP 9-55 – RAS with WMA
- TRIP Database Search
  - \$49,049,615

# FHWA Recycling Policy – 9/8/2016

- The FHWA policy is:
  1. Recycling and reuse can offer engineering, economic and environmental benefits.
  2. Recycled materials should get first consideration in materials selection.
  3. Determination of the use of recycled materials should include an initial review of engineering and environmental suitability.
  4. An assessment of economic benefits should follow in the selection process.
  5. Restrictions that prohibit the use of recycled materials without technical basis should be removed from specifications.

# Benefits of Using More RAP

**Nationwide, increasing the amount of RAP in new asphalt mixtures by one percentage point (e.g., from 21.1% to 22.1%) would result in 0.14 MMT CO<sub>2</sub>e in avoided emissions, equivalent to approximately 30,000 passenger vehicles assuming typical passenger vehicle emissions of 4.6 tonne CO<sub>2</sub>e per year (U.S. EPA, 2018).**

# Impact of RAP Utilization

*2020 Estimates*

- 24 million barrels of liquid asphalt binder
- 82 million tons of aggregate

• **\$2.9 Billion in SAVINGS**



# Sustainability v Durability Not Mutually Exclusive Terms

SIP 106

## GHG EMISSIONS INVENTORY FOR ASPHALT MIX PRODUCTION IN THE UNITED STATES

Current Industry Practices and  
Opportunities to Reduce Future Emissions

Joseph Shacat  
J. Richard Willis, Ph.D.

## RAP Benefits for Pavement Owners

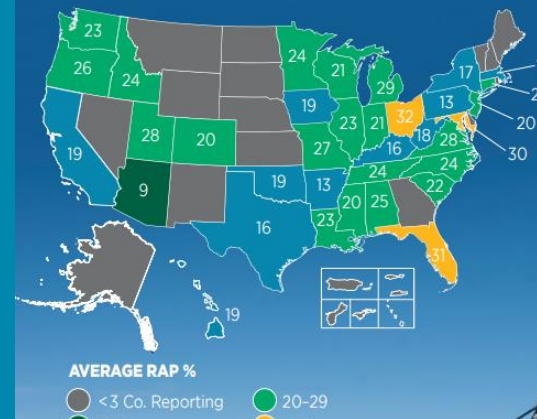
### WHAT IS RAP?

Reclaimed asphalt pavement (RAP) is the terminology used for materials generated when asphalt pavements are removed for reconstruction, resurfacing, or other construction activities. RAP consists of high-quality, graded aggregates that are coated with durable asphalt binder.

### HOW AND WHERE IS RAP RECYCLED?

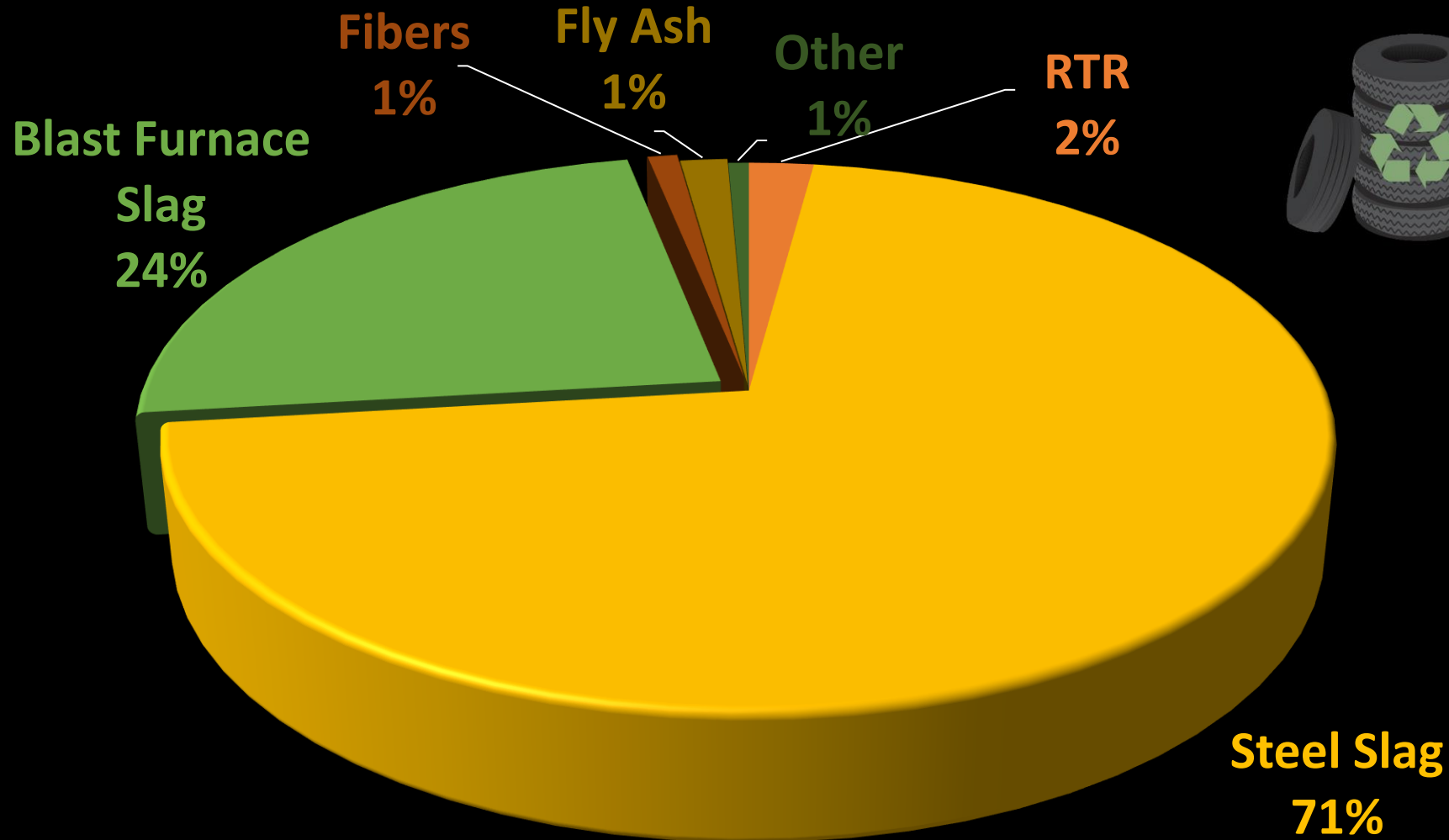
**89.2 million tons** of RAP are used annually in new asphalt pavement construction in the United States. As a fully recyclable product, RAP has many applications, and can be used over and over again, reducing the need for costly virgin materials. More than **94%** of RAP is used in new asphalt mixtures, while a small percentage is incorporated into other civil engineering applications like unbound aggregate bases. Nationally, RAP is utilized at an average rate of **21.1%** in new asphalt mixtures.

### AVERAGE PERCENTAGE OF RAP USED IN EACH STATE, 2019 (NAPA IS-138, 2020)



# Other Recycled Materials

*More than 900,000 Tons Recycled into Asphalt Pavements*





# Plastics and More

- Engineering in a marketing world
- Holistic approach to considering recycled materials
- Follow the research
- Understand the complexity
  - One size does not fit all

**THANK YOU**

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