

LIFE CYCLE ASSESSMENT FOR PAVEMENT INFRASTRUCTURE

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TRIPLE BOTTOM LINE

Sustainability
Rating Systems
(e.g., INVEST)
Social LCA
(S-LCA)



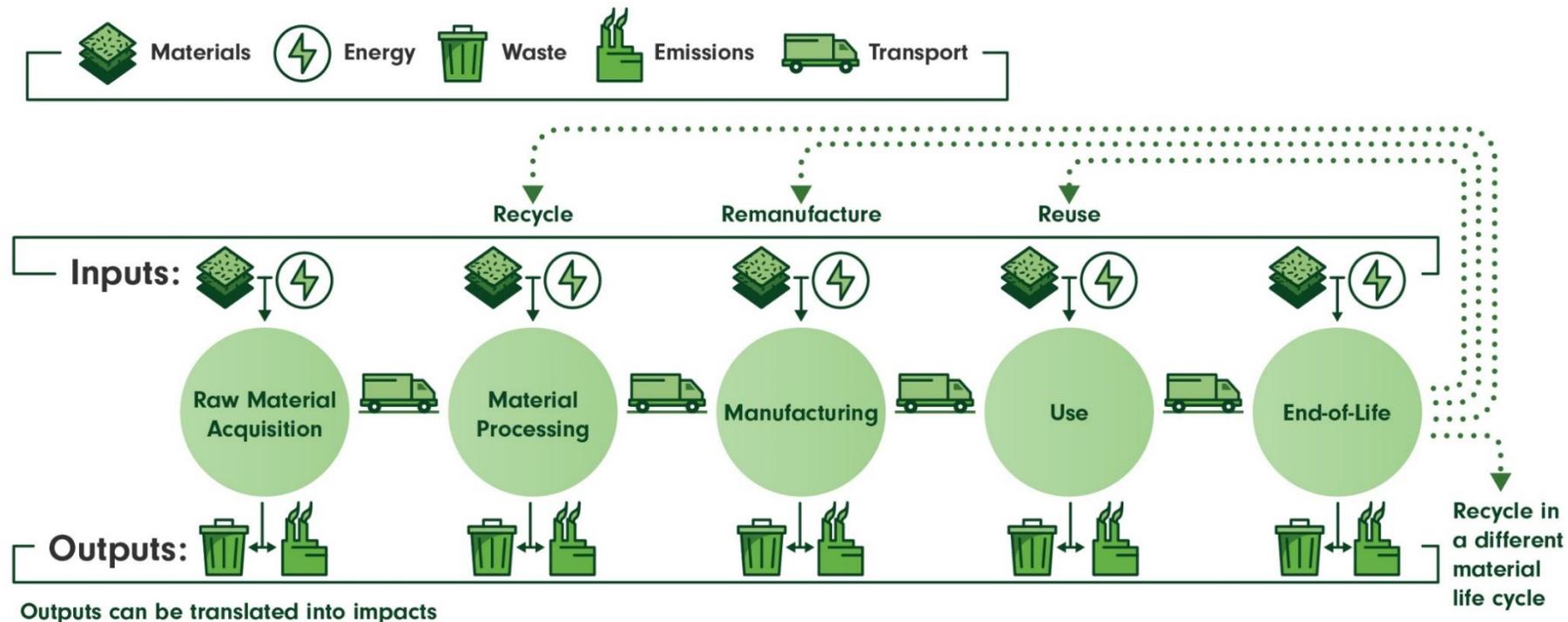
Life-Cycle Cost Analysis
(LCCA)

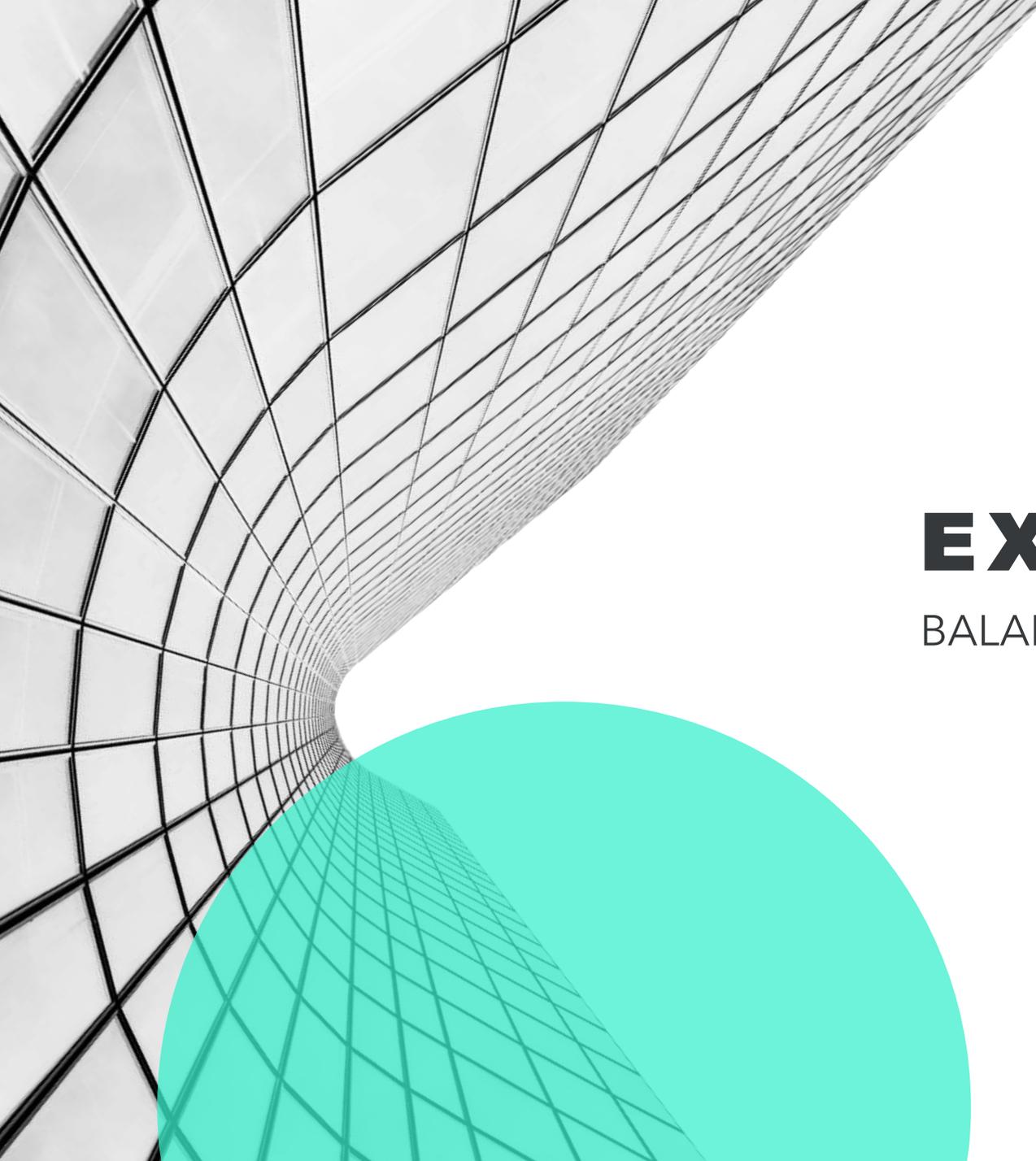
Life-Cycle Assessment
(LCA)

LIFE CYCLE ASSESSMENT

Technique to quantify environmental impacts of products and processes

Covers range of environmental impacts





EXAMPLE

BALANCED MIX DESIGN

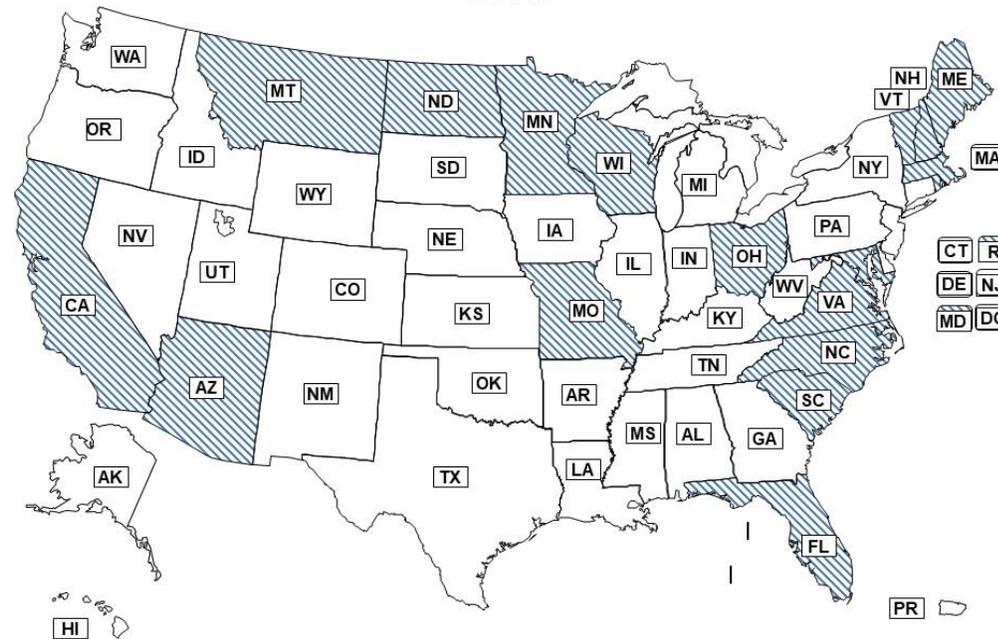
MIXES COLLECTED BY MATC (2021)

Total of 11 mixes from 7 states

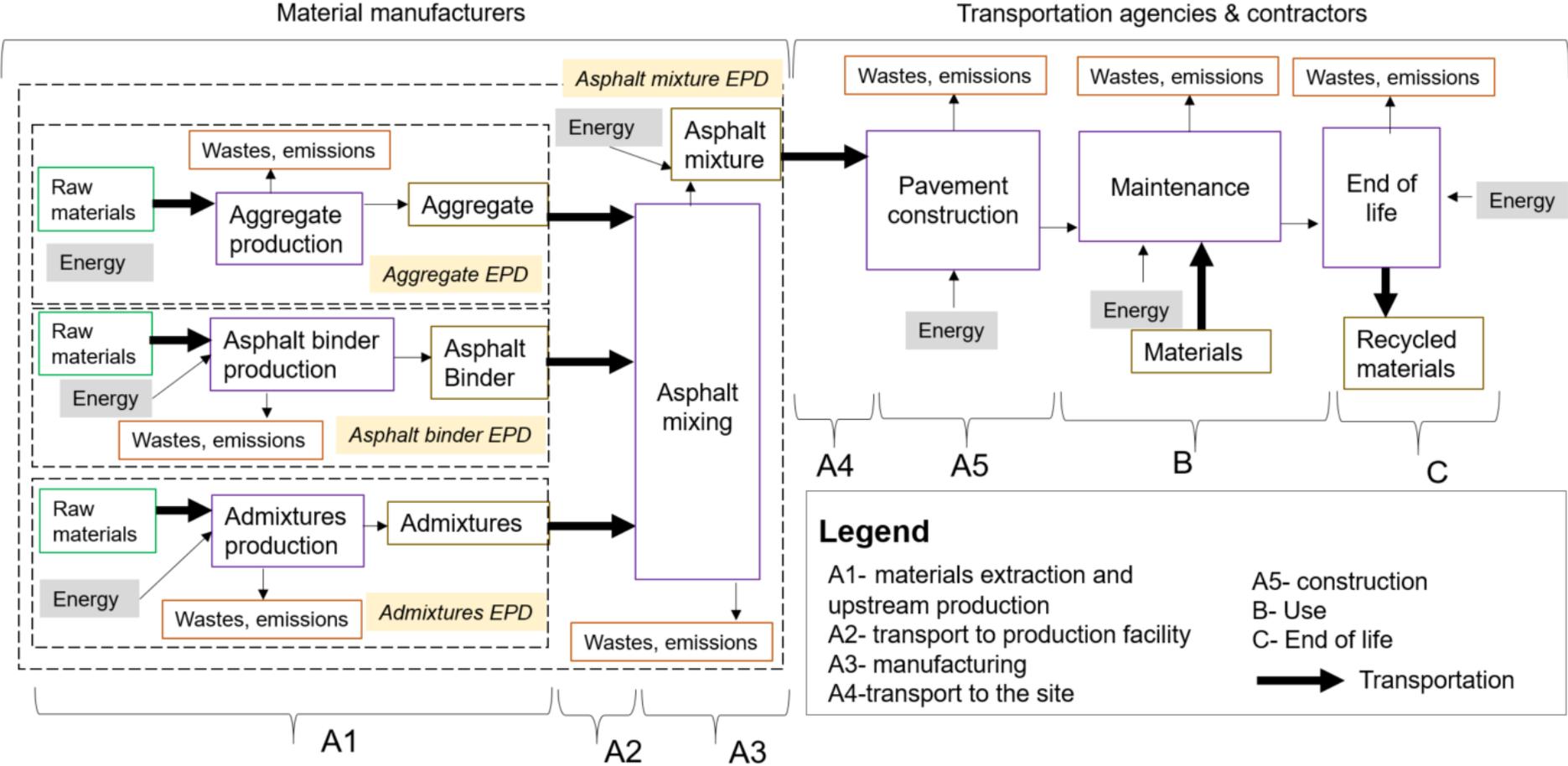
Cradle-to-gate LCA for all mixes



States Who Worked with the MATC 2021

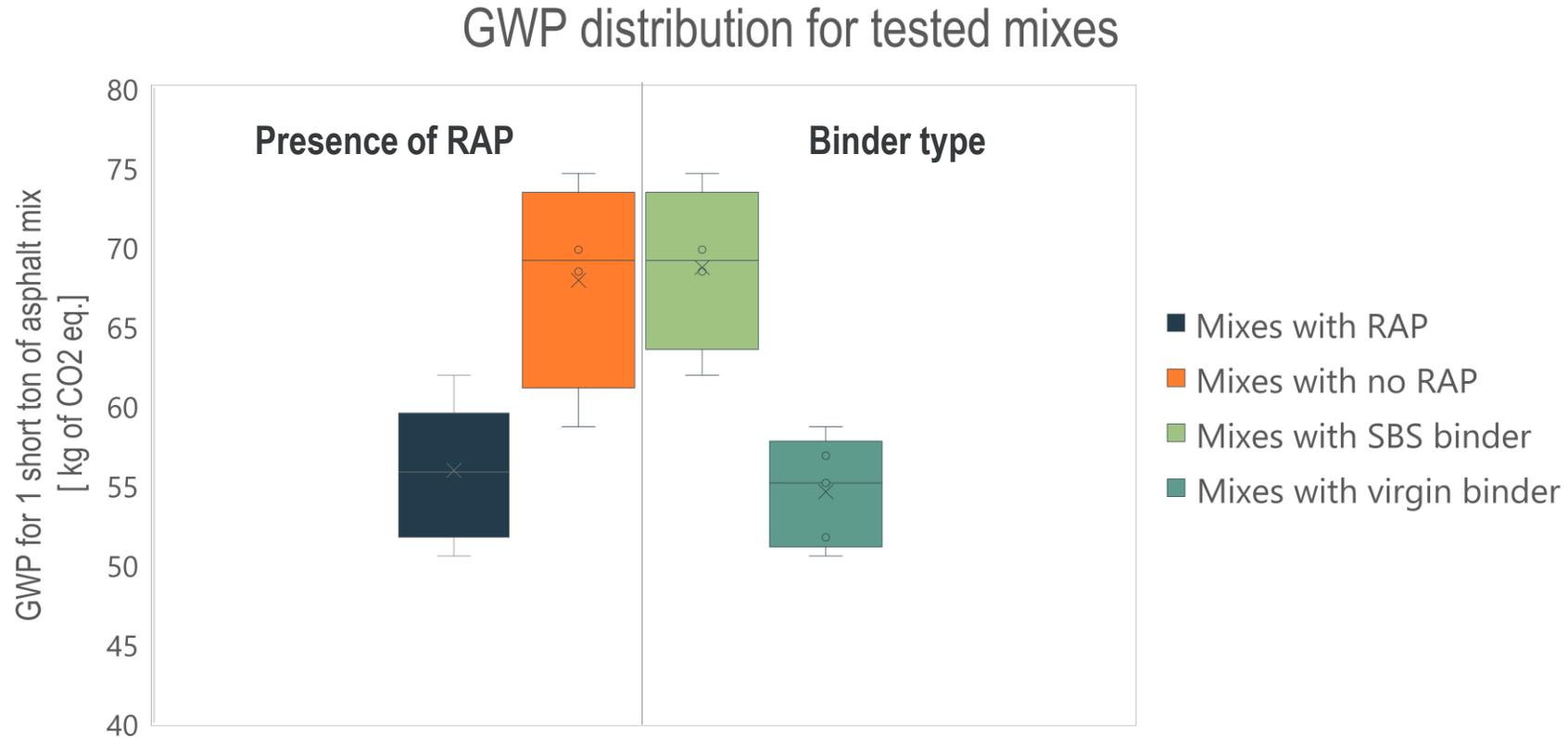


ASPHALT MIX PRODUCT SYSTEM



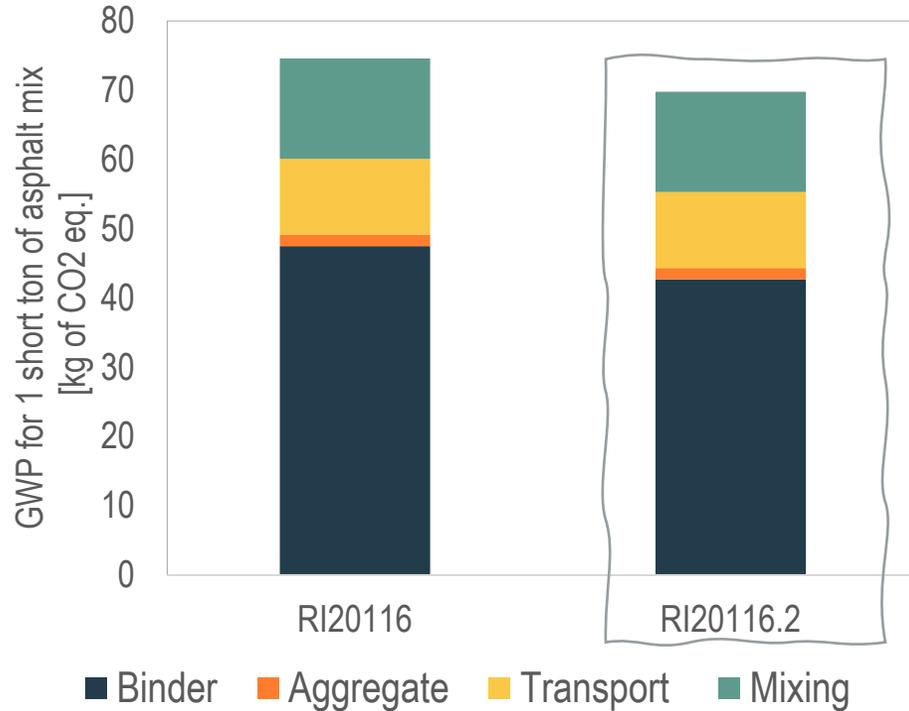
Source: FHWA

RESULTS- GENERAL TRENDS



- Addition of RAP lowers GWP because of binder replacement.
- Mixes with polymer-modified binder have higher GWP.
- **Performance considerations should be included.**

RESULTS- RHODE ISLAND



Mix RI 20116.2:

- 6.2% binder
- Lower GWP
- Lower cost
- Improved performance

Performance Test / Parameter		Mix 1	Mix 2	
Cracking	IDEAL-CT		✓	
	I-FIT	Same		
	OT	B		✓
		CRI	Same	
Rutting	IDEAL-RT	✓		
	SSR	✓		
	HWTT	Rut Depth @ 20,000 passes (mm)	✓	

* checkmark indicates better performer between the two mixtures



CLOSER LOOK AT EPDS

ENVIRONMENTAL PRODUCT DECLARATIONS

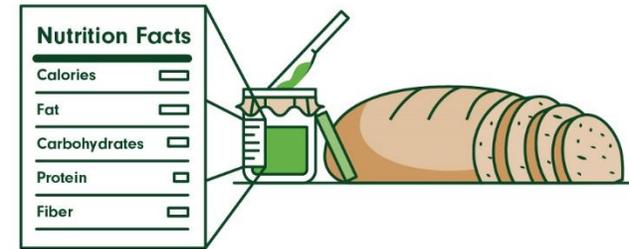


Communicate environmental impacts of material or product.

Express the results of an LCA.

Developed with stakeholder input.

Follow industry standards described in the Product Category Rules (PCRs).

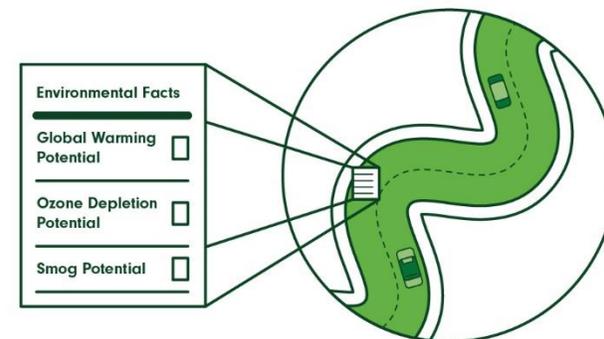


Similar to nutrition labels for food products, EPDs communicate critical environmental information on pavement materials to the customer.

Using guidance from ISO and European Standards,



An LCA is conducted for the product, process, or system.



Source: FHWA.

GREEN PUBLIC PURCHASING



Information collected from State legislative websites.



States that legislated green public purchasing



States that have considered green public purchasing legislation in past 2 years

Source: FHWA.

FEDERAL BUY CLEAN

EO 14057- Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability



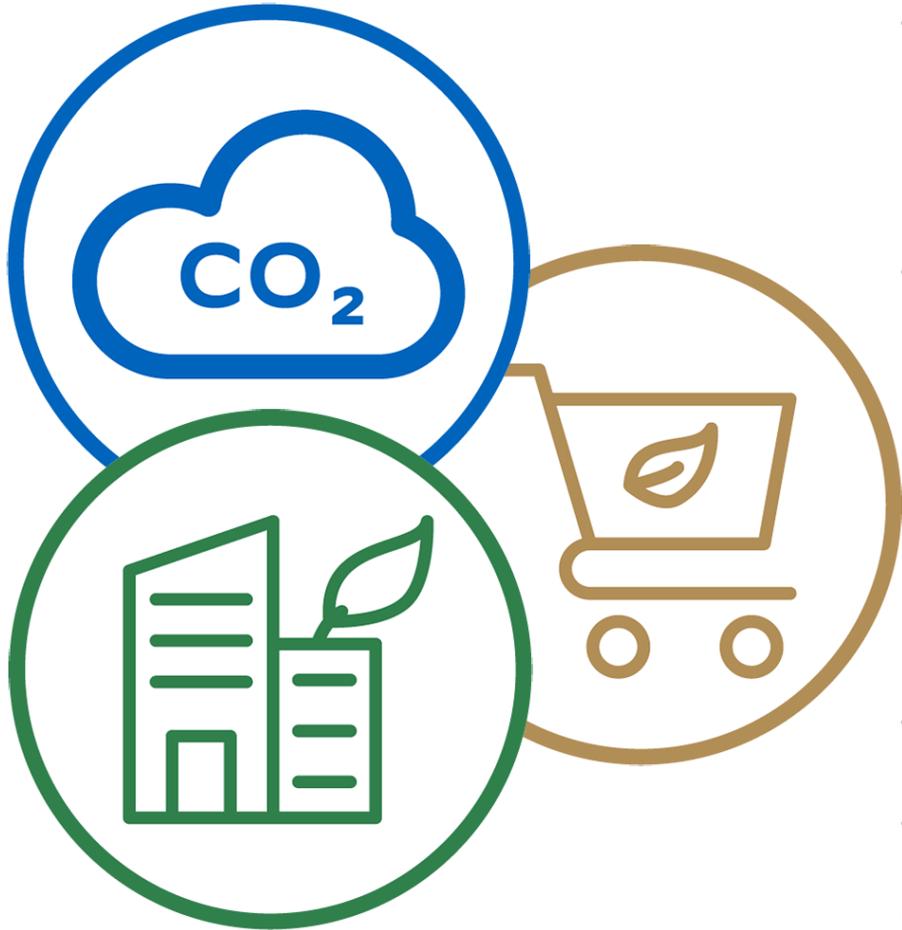
Goal 5: Net-zero emissions from Federal procurement, including a Buy Clean policy to promote use of construction materials with lower embodied emissions



The Buy Clean Task Force provides recommendations on policies and procedures to expand consideration of embodied emissions and pollutants of construction materials in Federal procurement and federally funded projects.

Source: <https://www.whitehouse.gov/briefing-room/presidential-actions/2021/12/08/executive-order-on-catalyzing-clean-energy-industries-and-jobs-through-federal-sustainability/>

WHITE HOUSE BUY CLEAN ANNOUNCEMENT



Source: Council of Environmental Quality

- Buy Clean leverages federal procurement to catalyze markets for low-carbon construction materials to upgrade US transportation, buildings and energy infrastructure.
- Priority materials and pollutant recommendations (**GHG**):
 - Asphalt
 - Concrete
 - Flat glass
 - Steel
- Reporting Tool recommended: **EPDs**
- Aligned with Inflation Reduction Act of 2022 funding

Source:

[Fact Sheet: Biden-Harris Administration Announces New Buy Clean Actions](#)

DOT – POLICY STATEMENT ON BUY CLEAN INITIATIVE

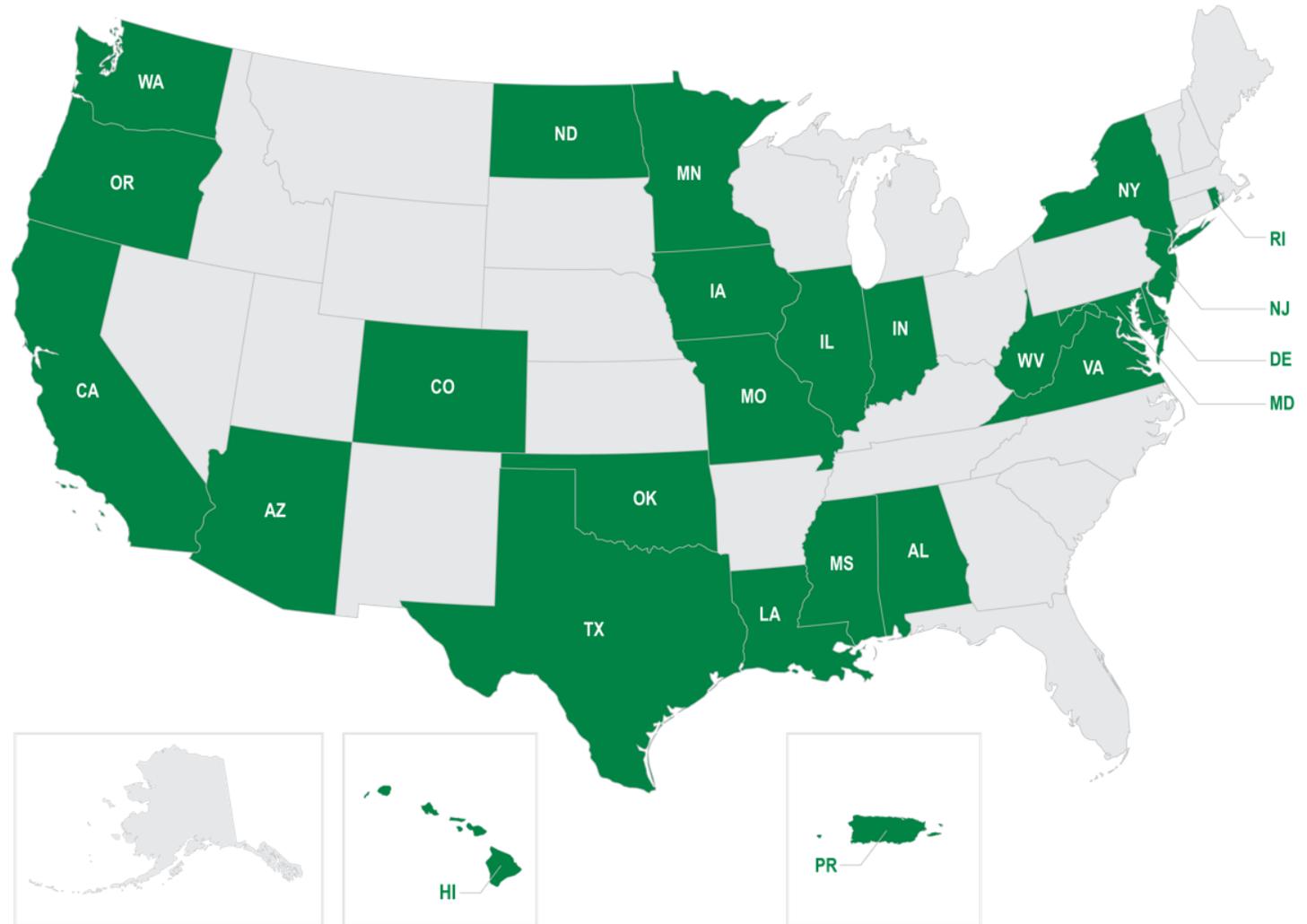
- September 15, 2022 – first Buy Clean Policy Statement. DOT Embodied Carbon Working Group formed.
- Details the commitment to assess and address the embodied carbon emissions from transportation projects.
- Prioritize three actions
 - Use of EPDs
 - Develop a Buy Clean Policy
 - Education and Research commitments



Source: [DOT-signed Policy](#)

FHWA CLIMATE CHALLENGE

- 35+ projects from 27 agencies (including 2 local agencies)
- \$7.1 million to 25 state DOTs
- FHWA Technical assistance will be provided to all the 27 agencies.



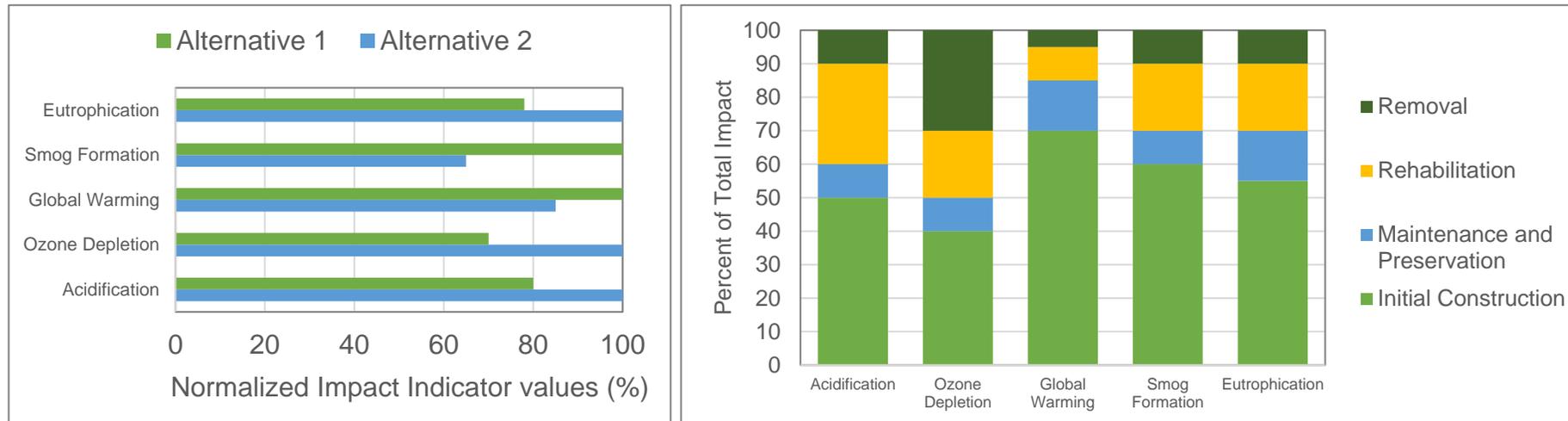
Source:

<https://www.fhwa.dot.gov/infrastructure/climatechallenge/projects/index.cfm>

LCA BENCHMARKING TOOL



- Created with stakeholder input
- Use the identified background datasets
- Incorporate material EPDs



Available at: <https://www.fhwa.dot.gov/pavement/lcatool/>

SUSTAINABLE PAVEMENTS PROGRAM



Education



Research



Deployment

[Pavement LCA Framework](#)

[LCA fit in transportation decision-making](#)

[LCAPave](#)

[Webinars](#)

[EPDs in Green Public Procurement](#)

[Pilot projects with State DOTs](#)

[Tech briefs, studies](#)

[LCA of recycled plastics in pavements](#)

[Mobile Pavement Technologies Centers](#)

[Technical articles](#)

[LCA of ground tire rubber in pavements](#)

[Informing pre-engineering with ICE Tool](#)

THANK YOU

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