

EPD Development

NAPA's Industry Average Initiative



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NATIONAL ASPHALT
PAVEMENT ASSOCIATION



Thank you, Virginia!

Gold Club (50+ Years)

- Lee-Hy Paving

30-Plus Club

- B&S Contracting Inc.
- Branscome Inc.
- National Asphalt Manufacturing Corp.
- Superior Paving Corp.

State Advisor

David White, Superior Paving Corp.

Members

- Adams Construction Co.
- Allan Myers
- Associated Asphalt
- Blakemore Construction Corp.
- Boxley Asphalt LLC
- Boxley Materials Co.
- Branscome Inc.
- Chemung Contracting Corp.
- Colony Construction Asphalt LLC
- E.E. Lyons Construction Co. Inc.
- Gossom & Costello Paving Inc.
- Lagan Construction, LLC
- Luck Stone
- Marsh McLennan Agency
- Piedmont Asphalt
- RDM International Inc.
- Resurface Inc.
- S.L. Williamson Co. Inc.
- Short Paving Div.
- The Kauffman Group Inc.
- Tibbs Paving Inc.
- Virginia Paving Co. a Div. of Eurovia Atlantic Coast
- W-L Construction & Paving Inc. A CRH Co.



The Road Forward

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



An Industry-Wide Vision

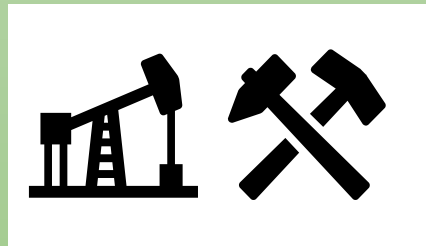
1. Production & construction



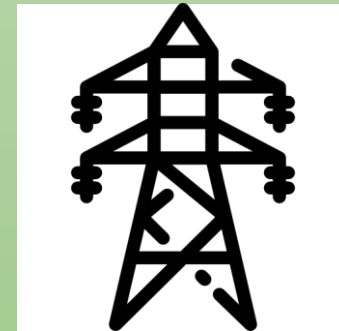
2. Eco-efficient Pavements



**Net Zero
Strategy**

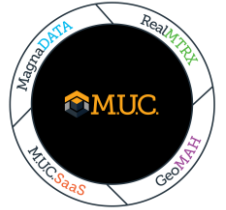


3. Supply Chain



4. Electricity

THE ROAD FORWARD PARTNERS



What is an Environmental Product Declaration?

What is an EPD?

Environmental Product Declaration

- Quantify the environmental impact of a product
- EPDS are based on industry LCA & Product Category Rules (PCR):
 1. Plant & Mix Design Specific
 2. “Cradle to Gate”
 3. To be comparable Products shall fulfill the **same function*** AND the **same specification.**
- 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 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: EPDs from different Product Categories should NOT be compared to each other.

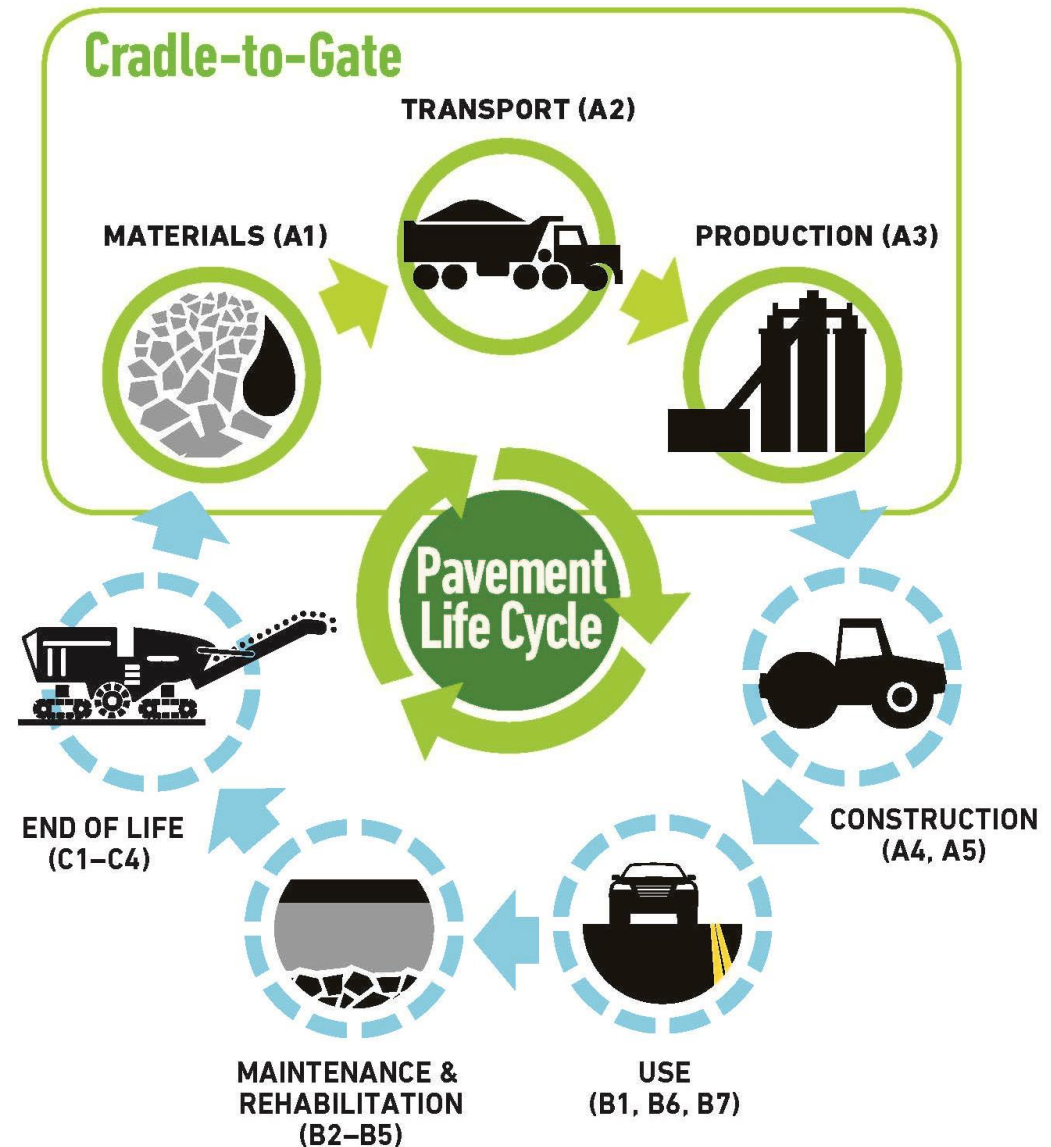
Life Cycle Assessment and EPDs

Cradle-To-Grave LCA

LCA  PAVE

EPDs

Emerald
ECO LABEL

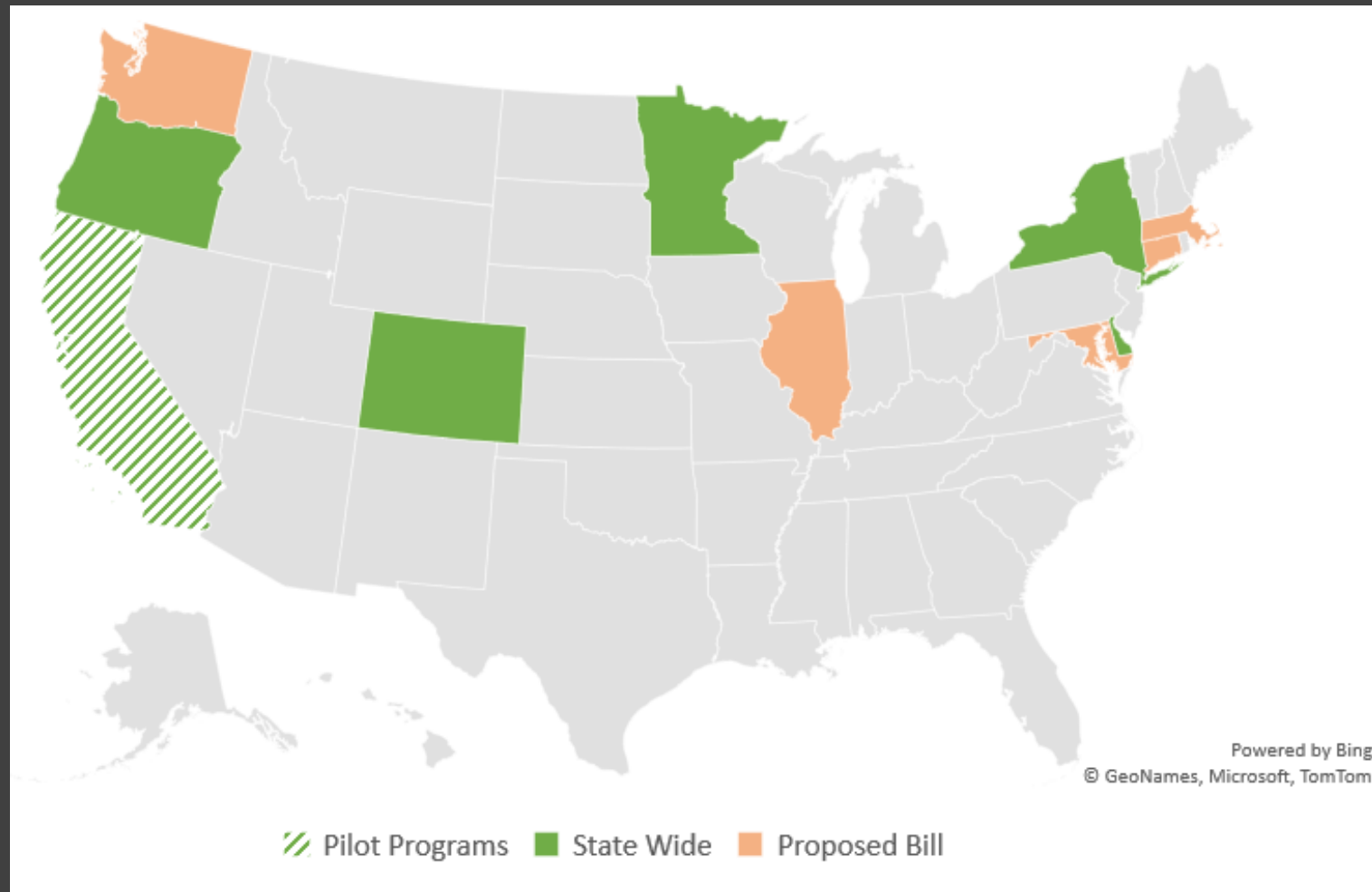


The Rapidly Changing Policy Environment

State Buy Clean Policies

General Policy Structure:

- Contractor submits EPDs to agency
- Agency develops global warming potential (GWP) limits for each mix type
- Policy options:
 - Go/No-Go
 - Incentives or differential costs
 - Data collection only





Inflation Reduction Act

EPA

- \$250 million to standardize EPDs and help industry develop EPDs
- \$100 million to develop “low-embodied carbon construction material labeling program”

Low Carbon Construction Material Procurement

- **FHWA** – \$2 billion in grant funding to state, local, and federal agencies
- **GSA** – \$2.15 billion for federal building projects
- **FEMA** – Grants can include additional costs for low carbon materials



Inflation Reduction Act

EPA Interim Determination of Substantially Lower Embodied Carbon

- **Best performing 20%** of similar materials/products
 - If not available locally, then best performing 40%
 - If not available locally, then better than estimated industry average
 - **GSA and FHWA will define these thresholds** based on published EPDs
- Also, report **ENERGY STAR** Energy Performance Score (currently under development for asphalt plants)

<https://www.epa.gov/inflation-reduction-act/inflation-reduction-act-programs-fight-climate-change-reducing-embodied>



Low Carbon Material Pilot Program

- Federal office buildings, courthouses, and land ports of entry

| 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 |
| 55.4 | 64.8 | 72.6 |

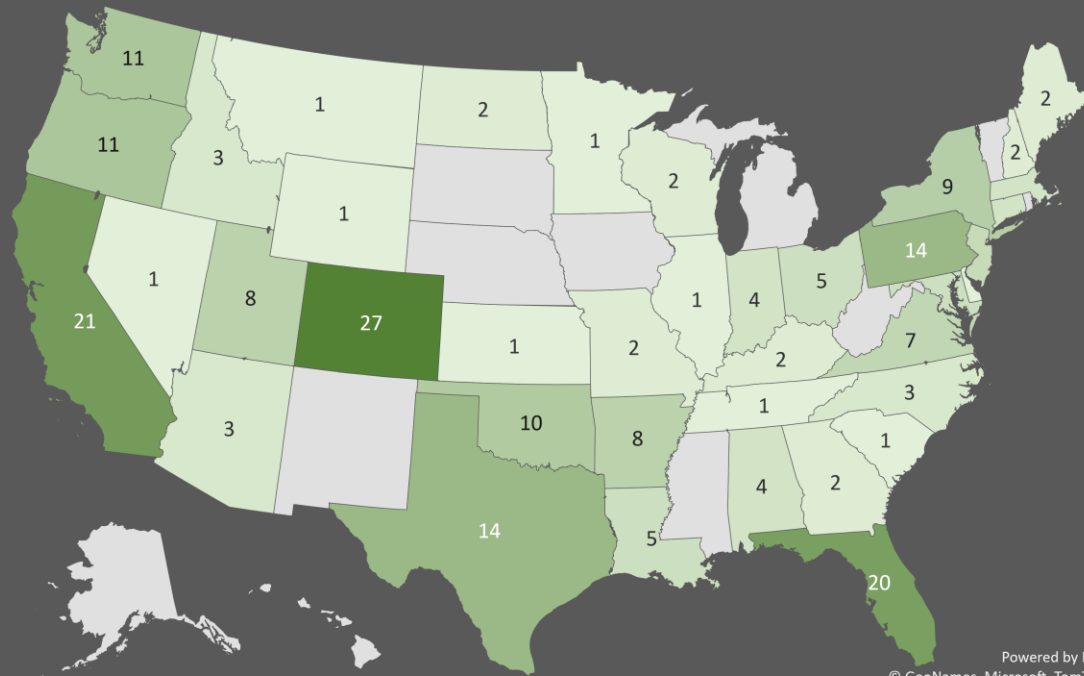
<https://www.gsa.gov/about-us/newsroom/news-releases/gsa-pilots-buy-clean-inflation-reduction-act-requirements-for-low-embodied-carbon-construction-materials-05162023>

Benchmarking Initiative

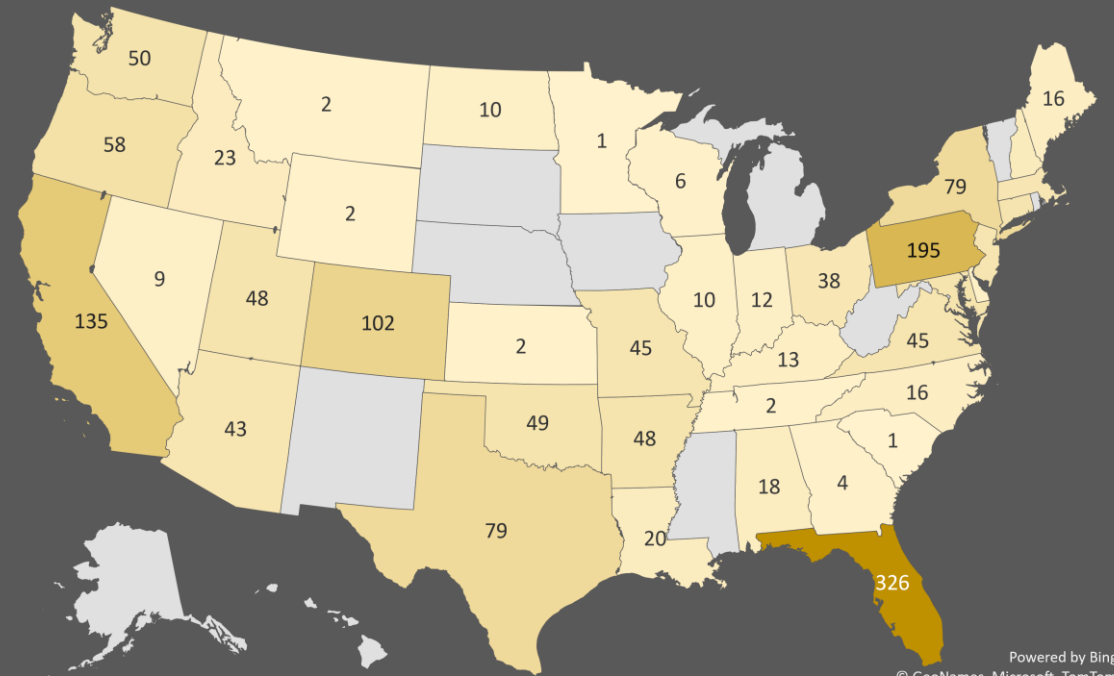
Published EPDs in October 2023

- 229 plants with 1,718 EPDs across 39 states

Number of Plants

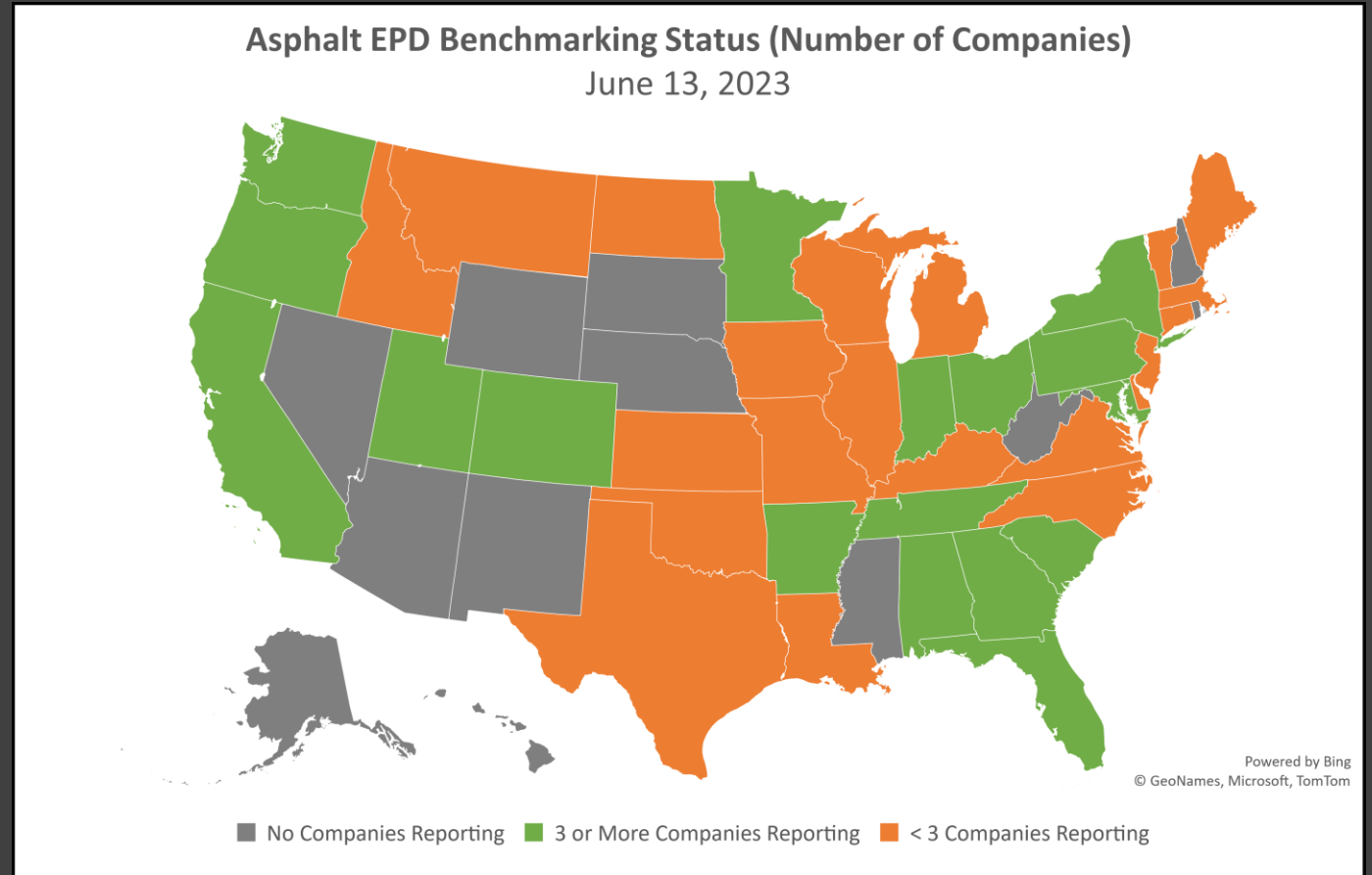


Number of EPDs



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
- *This is an interim solution*



Benchmarking data collection **November 6 – January 8**

How to Participate?

Go to the Emerald Eco-Label Registration Process page:

<https://www.asphaltpavement.org/programs/napa-programs/emerald-eco-label/registration-process>

1. Watch the recorded training webinar: [Building an Industry Average for EPDs](#)
2. Compile benchmarking data Use the benchmarking worksheet in the [EPD Data Gathering Spreadsheet v5](#)
3. If you are not an existing user Create your Organization(s) and Plant(s) in the software
4. Enter your operational and benchmarking data for each asphalt plant
5. Submit data for benchmarking

Inflation Reduction Act (IRA) Benchmarking

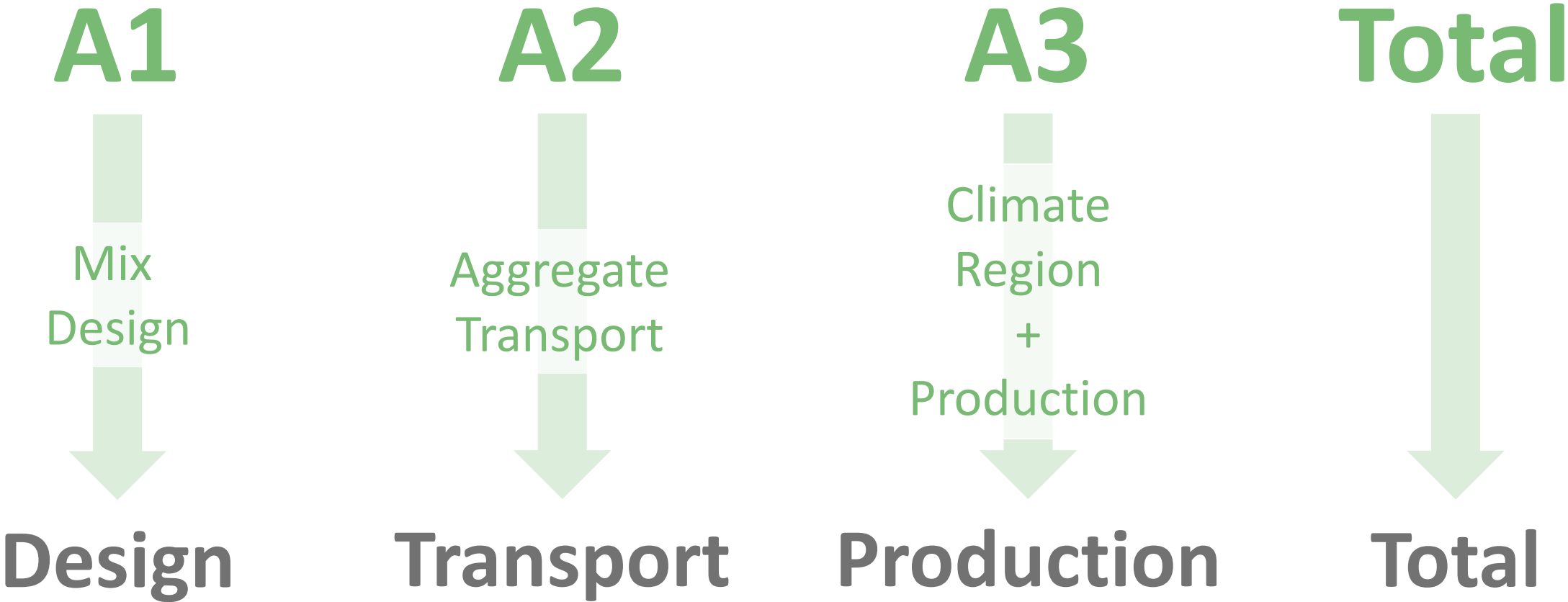
| Reclaimed Asphalt Pavement (RAP) | |
|-----------------------------------------|-------------------------------------------------|
| % | Average RAP Content (%) |
| tons | Total RAP (short tons) |
| Aggregates | |
| <u>Most Used Quarry/Pit</u> | |
| tons | Approximate Quantity Purchased From This Source |
| miles | Truck Distance |
| miles | Train Distance |
| miles | Barge Distance |
| miles | Ocean Distance |
| <u>Second Most Used Quarry/Pit</u> | |
| tons | Approximate Quantity Purchased From This Source |
| miles | Truck Distance |
| miles | Train Distance |
| miles | Barge Distance |
| miles | Ocean Distance |
| Asphalt Binder | |
| miles | Truck Distance |
| miles | Train Distance |
| miles | Barge Distance |
| miles | Ocean Distance |

Data Entries

Energy Performance Indicator (EPI) Benchmarking

| EPI Plant Information | |
|------------------------------|------------------------------------------|
| | Plant Type |
| tons/hr | Manufacturer's Rated Capacity |
| ft | Drum Diameter |
| | |
| | Production Details |
| hours | Total Operating Hours |
| no. of months | Production Months per Year |
| days/week | Production Days per Week |
| hours/day | Production Hours per Day |
| | |
| tons | Polymer or Rubber Modified Mix Produced. |
| | |
| | Electricity Metering |
| | |
| | Natural Gas Metering |

NAPA Approach: Deconstruct the Benchmark by Life Cycle Phase



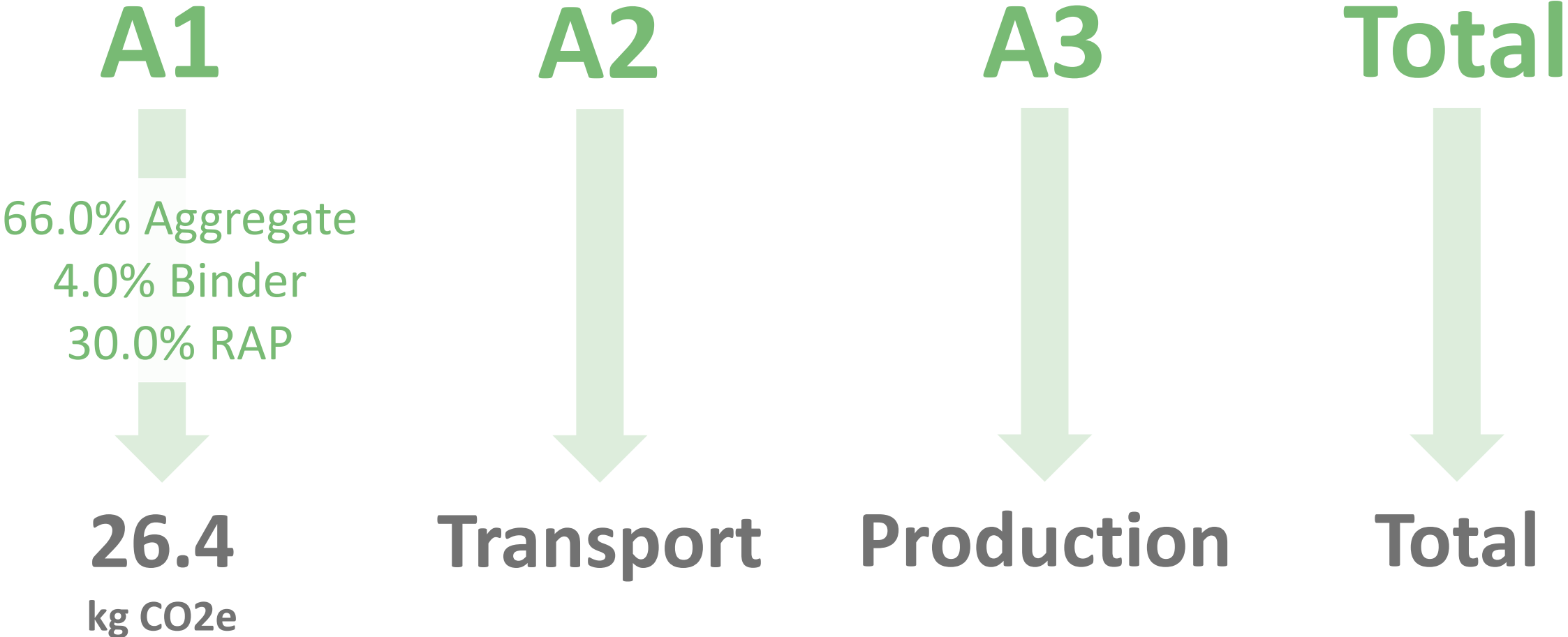
A1: Impact of *Mix Specifications* on GWP

Starting Point: **36.6** kg CO₂e/tonne mix (94.5% Aggregate – 4.5% Binder)

Use adjustment factors

| A1 Material | Mass balanced with | GWP Intensity kg CO ₂ e/tonne ingredient (* /shtn) | Adjustment factor for using ingredient for additional 1% of mixture by mass kg CO ₂ e/tonne mixture (* /shtn) |
|----------------------------------|-------------------------|---------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| Neat Binder | Aggregate | 631.51 (573.06) | +6.30 (+5.71) |
| 3.5% SBS Modified Binder | Aggregate | 758.71 (688.49) | +7.57 (+6.86) |
| Lime | Aggregate | 1389.0 (1259.9) | +13.87 (+12.58) |
| RAP | Aggregate + Neat Binder | 0.781 (0.710) | -0.357 (-0.325) |
| Aggregate (USLCI, prescribed) | Neat Binder | 1.94 (1.761) | -6.30 (-5.71) |

9.5mm Superpave: Virginia: +30% RAP



A2: Transportation Impact of *Aggregate Availability* on GWP

Some states have different benchmarks

| A2 by State | Florida kg CO ₂ e/tonne (kg CO ₂ e/shtn) | Louisiana kg CO ₂ e/tonne (kg CO ₂ e/shtn) | All Others kg CO ₂ e/tonne (kg CO ₂ e/shtn) |
|-------------|----------------------------------------------------------------------|------------------------------------------------------------------------|-------------------------------------------------------------------------|
| 20% | 3.3 (3.0) | 15.7 (14.2) | 0.21 (0.18) |
| 40% | 18.7 (17.0) | 24.0 (21.8) | 1.4 (1.2) |
| 50% | 36.9 (33.5) | 28.7 (26.0) | 2.5 (2.2) |
| Average | 41.3 (37.5) | 28.9 (26.2) | 3.9 (3.5) |

9.5mm Superpave: Virginia +30% RAP, US Average A2

A1

93.5% Aggregate
5.5% Binder
1% Hydrated Lime

26.4
kg CO2e

A2

3.9
kg CO2e

A3

Production

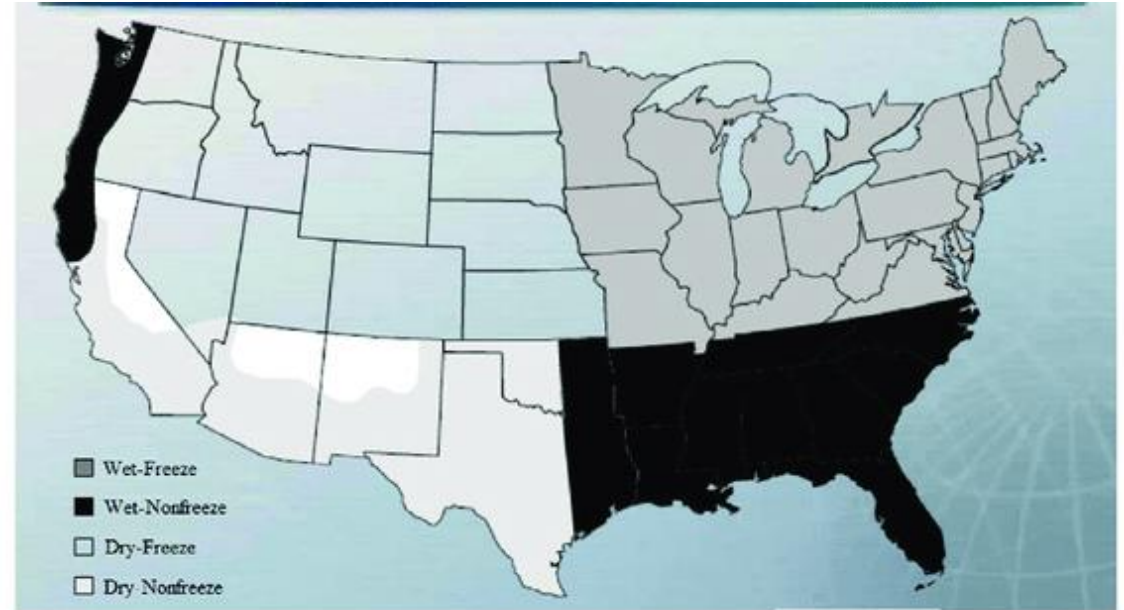
Total

Total

A3: Impact of Climate Region on GWP

4 Climate Regions

- Wet Freeze
- Wet No-Freeze
- Dry Freeze
- Dry No-Freeze



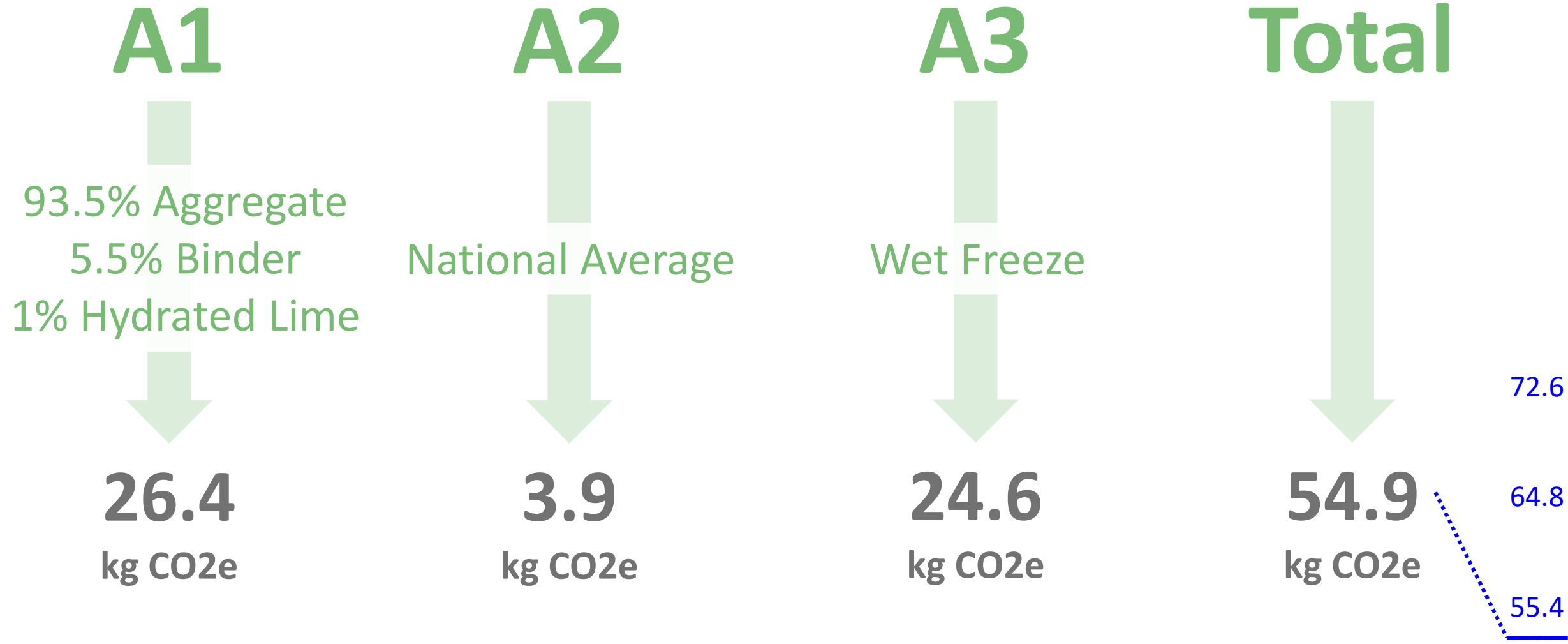
A3: Impact of Plant Operations in Wet Freeze Region

A3: Impact of *Climate* on GWP

Benchmarks differ by climate region

| A3 by AASHTO Region | Wet No freeze kg CO2e/tonne (kg CO2e/shtn) | Wet Freeze kg CO2e/tonne (kg CO2e/shtn) | Dry No freeze kg CO2e/tonne (kg CO2e/shtn) | Dry Freeze kg CO2e/tonne (kg CO2e/shtn) |
|---------------------|--------------------------------------------------|-----------------------------------------------|--------------------------------------------------|-----------------------------------------------|
| 20% | 23.2 (21.0) | 20.9 (19.0) | 17.5 (15.9) | 21.9 (19.9) |
| 40% | 25.4 (23.0) | 22.8 (20.6) | 20.0 (18.1) | 23.6 (21.4) |
| 50% | 26.1 (23.7) | 23.6 (21.4) | 21.8 (19.8) | 25.8 (23.4) |
| Average | 27.5 (25.0) | 24.6 (22.3) | 23.0 (20.8) | 27.1 (24.6) |

9.5mm Superpave: Virginia +30% RAP, US Average A2, Wet Freeze Average A3



9.5mm Superpave: Virginia 30% RAP Mix

+30% RAP Mix Design, US Average A2, Wet Freeze Average A3

| [all values in kg CO2 e. / tonne] | A1 (Baseline Mix) | A2 (National Benchmark) | A3 (Wet Freeze) | A1-A3 Total (Proposed Method) | Current A1-A3 GSA Thresholds |
|-----------------------------------|-------------------|-------------------------|-----------------|-------------------------------|------------------------------|
| 20% | 26.4 | 0.2 | 20.9 | 47.5 | 55.4 |
| 40% | | 1.4 | 22.8 | 50.6 | 64.8 |
| 50% | | 2.5 | 23.6 | 52.5 | x |
| Average | | 3.9 | 24.6 | 54.9 | 72.6 |

Interested in learning more?

Please contact Joseph Shacat
jshacat@asphaltpavement.org

Benchmarking data collection ends **January 8**

Thank You!