# Rethinking Sustainability

NAPA
NATIONAL ASPHALT
PAVEMENT ASSOCIATION

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NAPA
NATIONAL ASPHALT PAVEMENT ASSOCIATION

*Our mission:*

To **advance the asphalt pavement industry** through leadership, stewardship, and member engagement.

*Our vision:*

Sustainable transportation infrastructure that paves the way for thriving communities and commerce.

# Industry Pillars of Success

## Strategic Plan for 2023-2025

### LEADERSHIP

- Foster increased Federal investment
- Advocate for and achieve fair, competitive, science-based legislation and policies
- Be the trusted, go-to organization for members, decision makers, and stakeholders

### STEWARDSHIP

- Champion the advantages of asphalt pavements
- Shepherd the industry's commitment to net zero carbon emissions pavement
- Demonstrate members' commitment to value and excellence

### MEMBERSHIP

- Engage and grow membership
- Facilitate member advancement
- Improve and streamline association governance and operations

# Let’s Take a Moment

# Do You Clearly Understand What Sustainability Is?

# My Sustainability Journey

# How Do I Know What Is Sustainable

https://www.gspeakers.com/our-speakers/gro-harlem-brundtland/


https://online.hbs.edu/blog/post/what-is-the-triple-bottom-line

# The Four Pillars of Sustainability?

- Environment
- Economics
- Social (community)
- ?????

# A Word on Performance

# An Industry-Wide Vision

# NAPA NATIONAL ASPHALT PAVEMENT ASSOCIATION PARTNERS

The Road Forward




































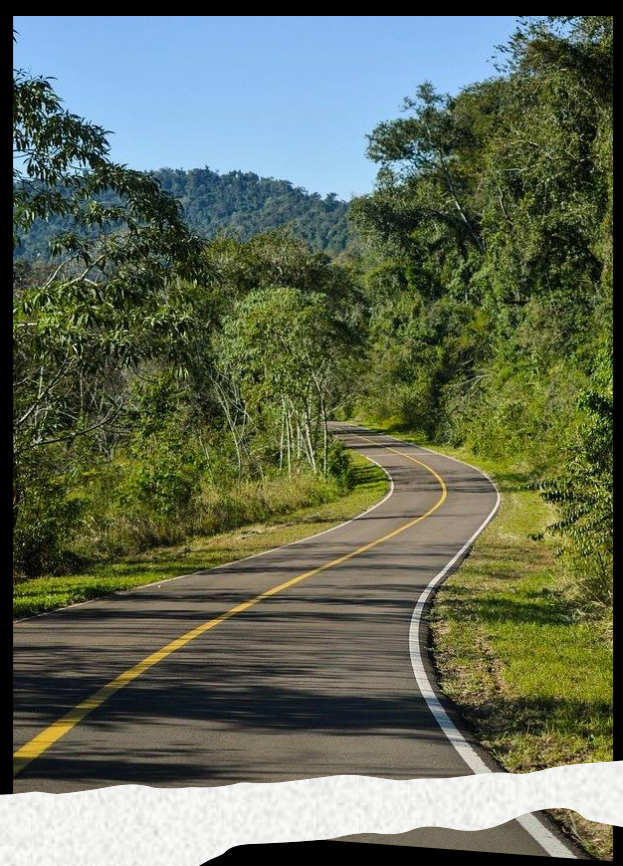

# Industry Goals

OPERATIONAL TIPS:
THE ROAD FORWARD TO LOWER EMISSIONS AND HIGHER PROFITS

# INSULATING TO PREVENT LOSS OF THERMAL ENERGY, REDUCE FUEL USE, AND REDUCE COST

The Road Forward
AsphaltPavement.org/Forward

Win-win situations abound on the asphalt pavement industry's road toward reducing carbon emissions. To reach net zero carbon, the industry must understand, identify, and continue to reduce both the carbon intensity of materials used in, and energy consumption associated with, the production of asphalt pavement mixtures. As stewards of finite resources and an industry committed to reaching net zero carbon emissions by 2050, we can take immediate actions to help meet our reduction goals while also increasing a company's profitability and competitiveness.

**By insulating its pipes, Granite Construction reduced the energy intensity for its hot oil systems to an average of**

**450K BTUS**

**per hour, reducing energy consumption by**

**55%**

One method to reduce carbon emissions is to improve your company's energy efficiency, or the amount of energy consumed per unit of production. For an asphalt plant, energy comes in the form of electricity and fuel consumption, causing either indirect emissions (at the power plant), or direct emissions (stack and tailpipe emissions). These emissions have a direct impact on operations by increasing both your operating cost and your business's environmental impact. One great tip to implement is installing insulation around pipes, storage tanks, and drums to prevent loss of thermal energy and reduce fuel usage. Just as insulation works in homes to reduce heating and cooling costs while improving comfort, insulation of hot oil pipes at asphalt plants can increase safety, lower costs, and conserve energy.

In 2011, Granite Construction Inc. headquartered in Watsonville, Calif. conducted a sustainability audit and calculated that within 1-year the investment in insulation of hot oil pipes at an asphalt plant would result in 100% payback of the initial cost, recovered from the lower energy bills. After the audit, Granite Construction decided to pilot the project at ten of its asphalt plants and insulated all hot oil pipes bigger than 1-inch in diameter. The cost to insulate the hot oil heater pipes was $15,000 per plant in 2011.

Upon review of the pilot plant's initial cost and energy savings data, which turned out better than originally estimated with a payback period of 180 days, Granite Construction led a companywide initiative and, over the next 24 months, installed insulation at all fifty of the


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OPERATIONAL TIPS:
THE ROAD FORWARD TO LOWER EMISSIONS AND HIGHER PROFITS

# ELECTRIC HEATED TANK FARM LOWERS ENERGY USAGE

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Reaching net zero greenhouse gas (GHG) emissions by 2050 can seem daunting. Luckily, existing technologies and new innovations can be leveraged to assist the industry in exploring ways to answer the call while keeping an eye on the margin. Orlando Paving Company, which is owned by VINCI Construction, is meeting the challenge with the electrification of its Landstreet asphalt plant tank farm, replacing the traditional hot oil system to deliver on both corporate sustainability goals and public commitments to reduce energy consumption.

**VINCI calculated that electrifying thermal processes can reduce carbon emissions from natural gas usage of 342 pounds per kWh to 1.6 pounds of carbon per kWh for electric, a reduction of**

**99.5%**

Located in Orange County, Orlando Paving Company's operation is surrounded by a vibrant community where tourists from around the world come to see iconic skyscrapers, arenas, theatres, galleries, shopping, and attractions. As a local business, ensuring a positive relationship with neighbors is core to Orlando Paving Company's mission.

The asphalt pavement industry can use two methods to reduce GHG emissions: reducing consumption of raw materials and reducing energy consumption. On average, asphalt facilities use 88 kilowatt hours (kWh) per ton (equivalent to approximately 300,000 Btu/ton). Orlando Paving Company set a goal to reduce energy consumption by 20% to 70 kWh/ton to reduce its environmental footprint and cut operating costs.

VINCI Construction, Orlando Paving's parent company, completed an extensive analysis of the benefits of using electric at its asphalt facilities. VINCI calculated that electrifying thermal processes can reduce carbon emissions from natural gas usage of 342 pounds per kWh to 1.6 pounds of carbon per kWh for electric, a 99.5% reduction. Practically, not all components can utilize electricity; therefore the burner at Landstreet uses natural gas to dry the aggregate, reducing emissions over alternative fuel sources.


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OPERATIONAL TIPS:
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# PAVING UNDER STOCKPILES PAYS OFF ENVIRONMENTALLY & ECONOMICALLY

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Contractors are continuously searching for the latest technical innovations that will make their plants more efficient and cost-effective to operate. Governments and citizens, especially young people, want transparency, and are calling for companies to be greener and develop sustainability goals. With new industry goals centered around carbon neutrality in 2050, it is fortunate that increasing profitability and reducing emissions often go together.

**~ 50%**

**of the energy required to produce asphalt mixtures is is to remove water.**

**Reducing moisture by 1% can reduce fuel consumption by**

**~ 10%**

One of the most impactful asphalt plant efforts is reducing aggregate moisture, and one way to do this is to pave the stockpile area. According to Greg Renegar, President, Astec Industries, approximately 50% of the energy required to produce asphalt mixtures is to remove water. Reducing moisture by 1% can reduce fuel consumption by approximately 10%. In addition, a 1% moisture reduction can also increase production - by approximately 12%. Finally, a paved stockpile area will decrease aggregate loss by preventing aggregate contamination caused by stockpiled material being comingled with the underlying material. Unpaved stockpiles can result in a 3% aggregate loss per year.

Michigan Paving & Materials, A CRH Co., had leftover mix after conducting trial runs and decided to use it to pave under a portion of their stockpile area at their Grand North asphalt plant in Comstock Park, Mich. For comparison purposes, the company left unpaved a similar aggregate stockpile at a plant eight miles away in Grand Rapids. Since the plants are geographically close together, both experience the same levels of precipitation annually.

The fine aggregate in the stockpile that was paved accounts for about 20% (80,000 tons) of the plant's annual production. Michigan Paving measured the moisture in the stockpile from April through November 2020 and found that the percentage of moisture in the paved stockpile was 4.6% while the unpaved stockpile averaged 5.2% moisture. A detailed analysis found that the lower moisture content resulted in a 14,400 BTU per ton reduction in natural gas fuel usage, saving the company $0.13 per ton, for a total of $10,165 annually. Paving under the


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# PRIORITIZING RAP
## SAVES ROAD OWNERS MONEY, REDUCES EMISSIONS, AND IMPROVES PERFORMANCE

How to capture the highest value from infrastructure investments

**Introduction**
Reclaimed asphalt pavement (RAP) is a valuable material sourced from processes like milling or the removal of asphalt pavements. By detailing the economic, environmental, and performance advantages of RAP, this paper illustrates both the importance of giving priority to RAP utilization in new asphalt mixture production and why using RAP in aggregate replacement and shoulder construction provides a lower return on investment to the road owner.

**Cost-Efficiency through Aggregate and Asphalt Binder Replacement**
The incorporation of RAP in asphalt mixture production yields substantial cost savings. The aggregate and asphalt binder within RAP can efficiently replace virgin materials, resulting in reduced financial and environmental burdens associated with acquiring these natural resources.

Compared side by side, the savings achieved using one ton of RAP in a common asphalt surface mixture against the use of RAP as shoulder gravel are overwhelming.

**Table 1:** Costs of Virgin Materials (NAPA)

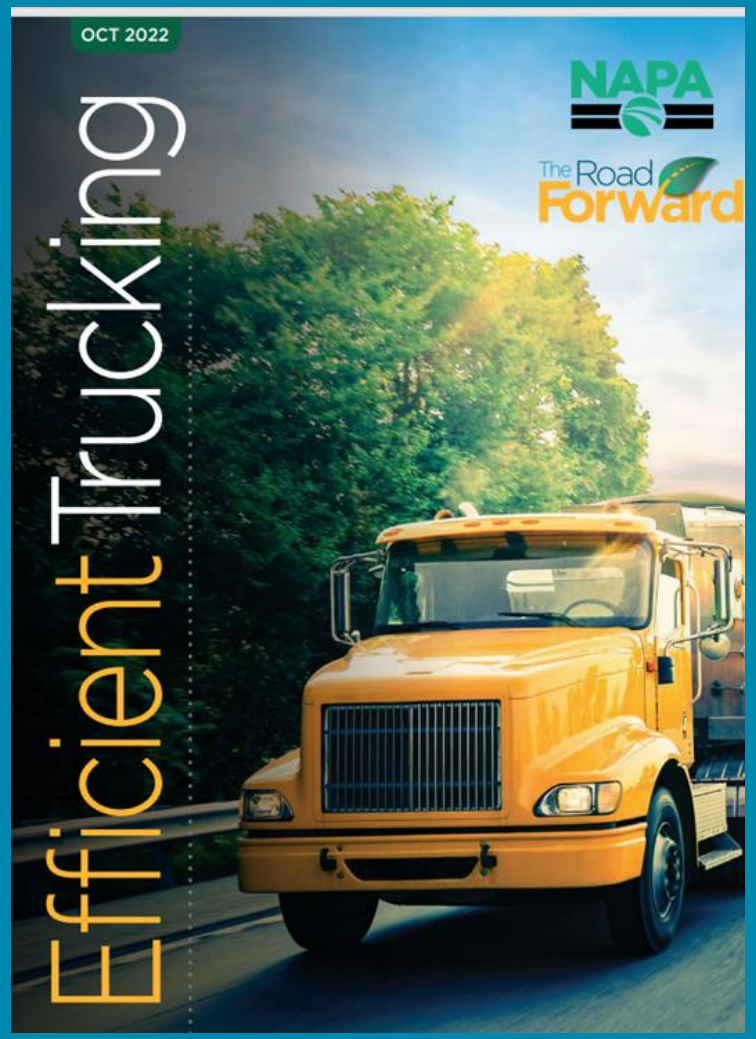
| | Material | % of Market | Cost/Ton 2021 |
|---|---|---|---|
| Asphalt Binder | Unmodified | 90 | $490.65 |
| | Modified | 10 | $614.01 |
| | Weighted Average* | | $519.45 |
| Aggregate | Crushed Stone | 90 | $11.79 |
| | Sand and Gravel | 10 | $8.98 |
| | Weighted Average | | $11.51 |

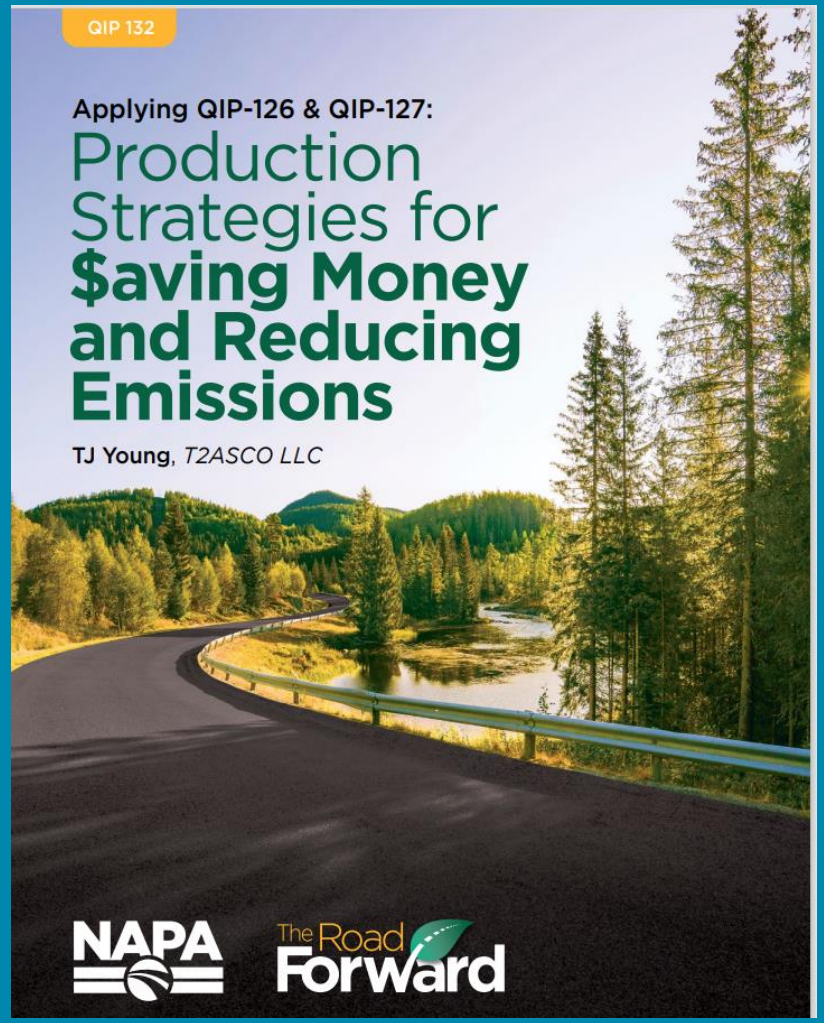
**The asphalt binder weighted average calculation takes into account that 37 states provide unmodified binder index pricing, while only 5 states provide both modified and unmodified binder pricing.*

The comparisons demonstrate how impactful capturing the asphalt binder replacement value of RAP is when utilized in the production of asphalt mix. As shown in Table 2, road owners save three times more by using RAP in a mix (valued at a cost equivalent to replacing *both* virgin aggregate and virgin asphalt binder in a new asphalt mixture) compared to using it as aggregate alone.

**Table 2:** Cost Savings of One Ton of RAP, Based on Use (Williams et al, 2023)

| Material | % Agg. | % AC | Aggregate Cost Savings, $/Ton | Asphalt Binder Cost Savings, $/Ton | Total Cost Savings, $/Ton |
|---|---|---|---|---|---|
| RAP in Asphalt Mix | 95 | 5 | $10.93 | $25.97 | $36.90 |
| RAP in Aggregate | 100 | 0 | $11.79 | $0 | $11.79 |

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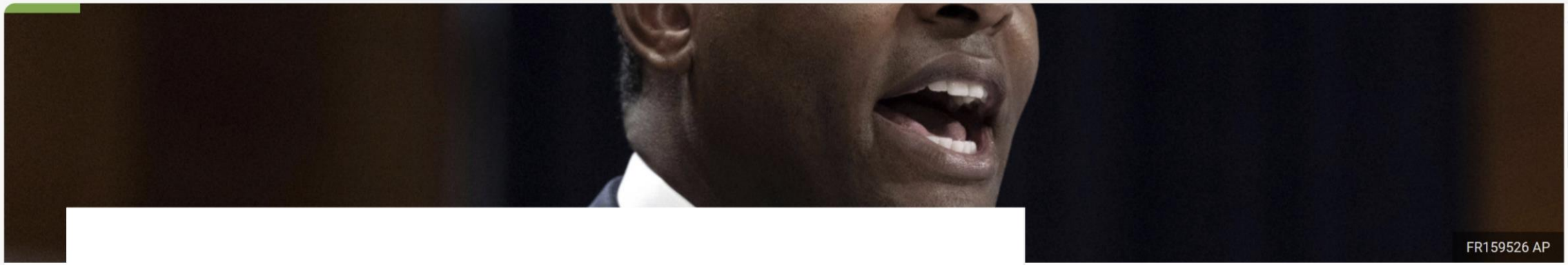
# The Full Life-cycle Question

https://www.realclearenergy.org/articles/2024/10/09/nutrition_facts_for_emissions_why_e...




# 'Nutrition Facts' for Emissions: Why EPA Must Account for the Whole Life Cycle in Low Carbon Labels

By Hessam Azarijafari & Ipek Bensu Manav , Andrew Laurent
October 09, 2024

We've all stood in the grocery store aisle deciding between "Low Sugar" and "Low Carb." While these labels advertise one product characteristic, the


# Pavement LCA vs Walker

# The Key Is Partnership!