



# THE DRIVE TO MEET CUSTOMER NEEDS

**AUDREY COPELAND**

*Northeast Asphalt User Producer Group Meeting  
Framingham, MA  
October 22-23, 2014*





# **Let's Talk About...**

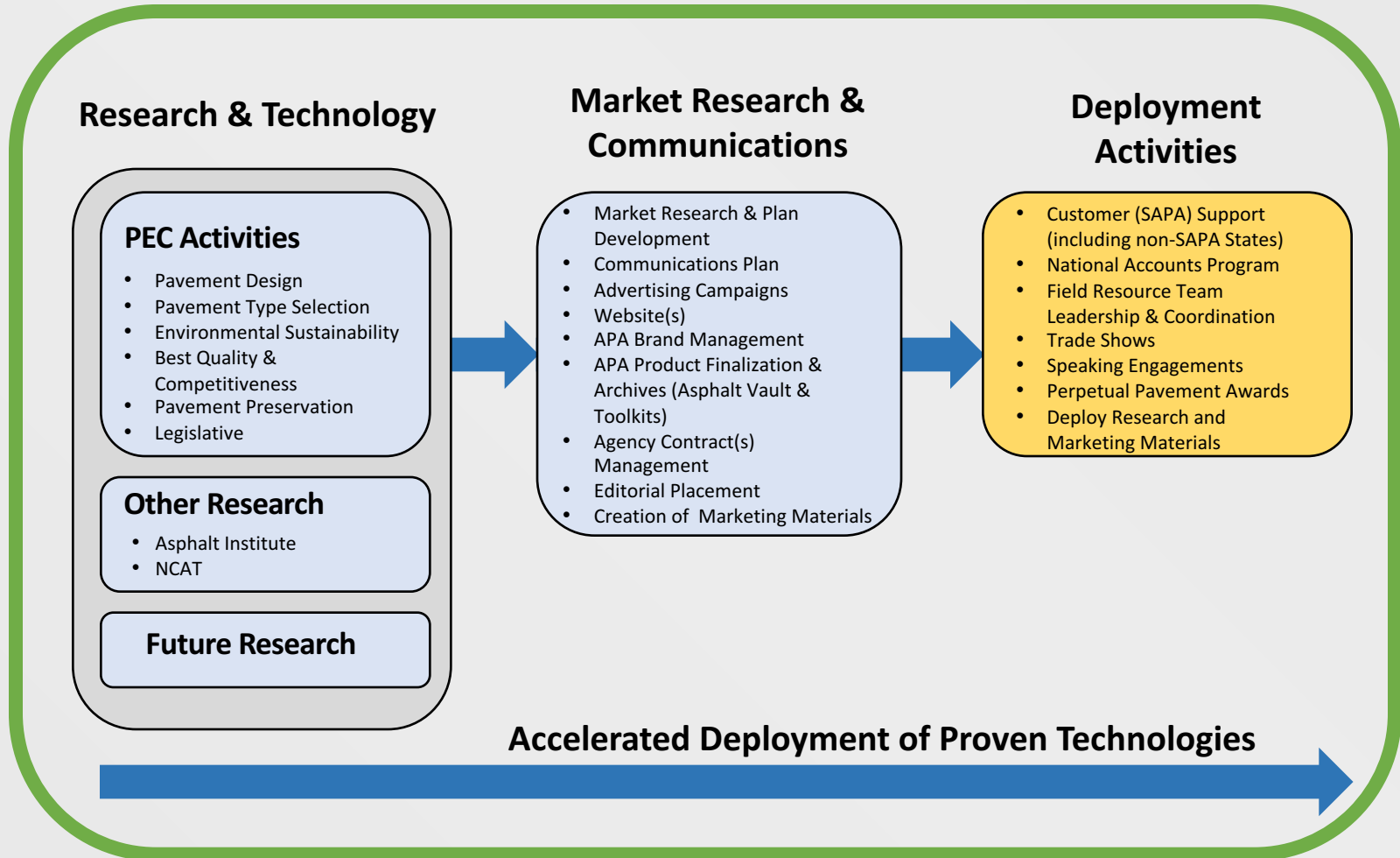
**What our customers want**

**Research projects and implementation**

**A partnership for innovation in asphalt pavements**



# Built Upon Science







# *A Survey of Pavement Officials And the Driving Public*

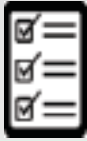
## *What Do Our Customers Want?*



The APA is a partnership of the Asphalt Institute, National Asphalt Pavement Association and the State Asphalt Pavement Associations.



# Survey Participants



## SURVEY



## WHO

**Driver Preference  
Survey**

**US Drivers,  
18+**

**Regional  
Oversamples**

**Trucker Oversample**

**Driver Survey**

**US Drivers, 18+ who drive  
50+ miles per week**

**In-Depth Interviews  
DOT's, Public Works**

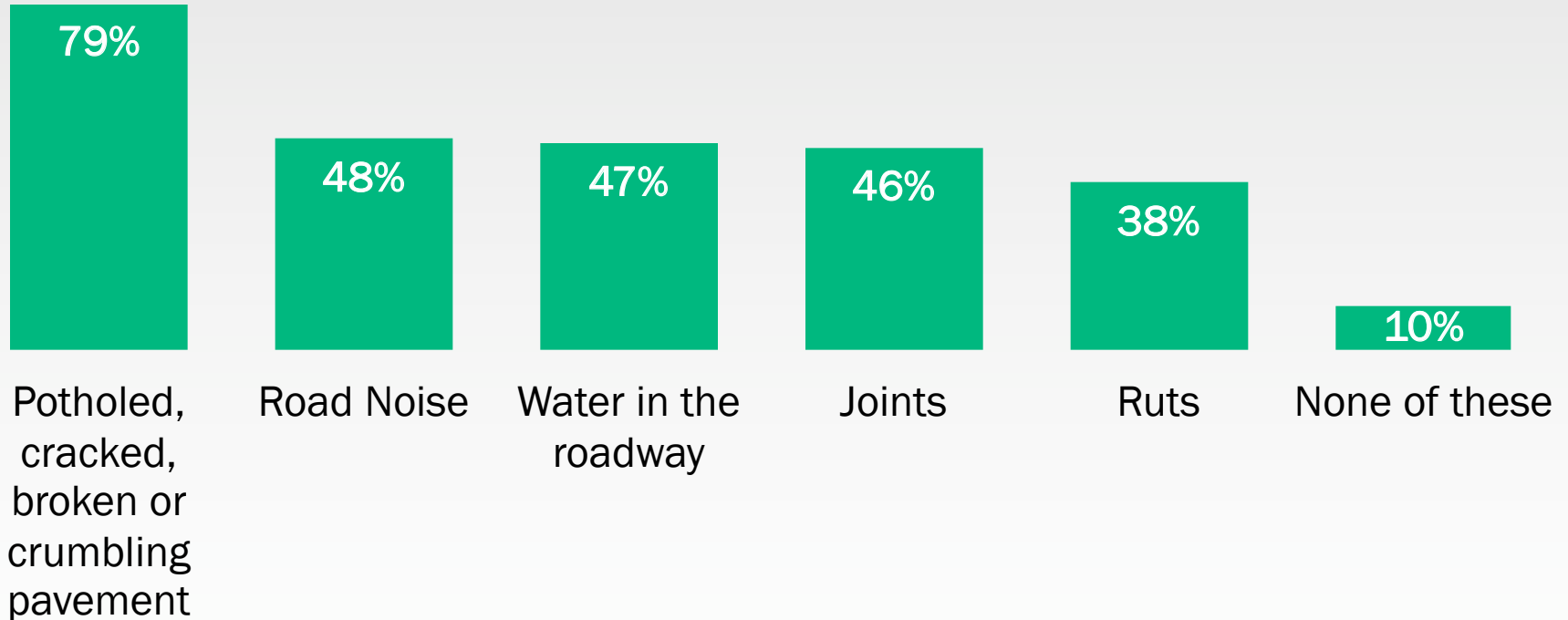
**Appointed Officials, Engineers,  
Architects, Developers, Owners  
and Concessionaries, and Other  
Key Stakeholders**

**Survey  
DOT's, Public Works**

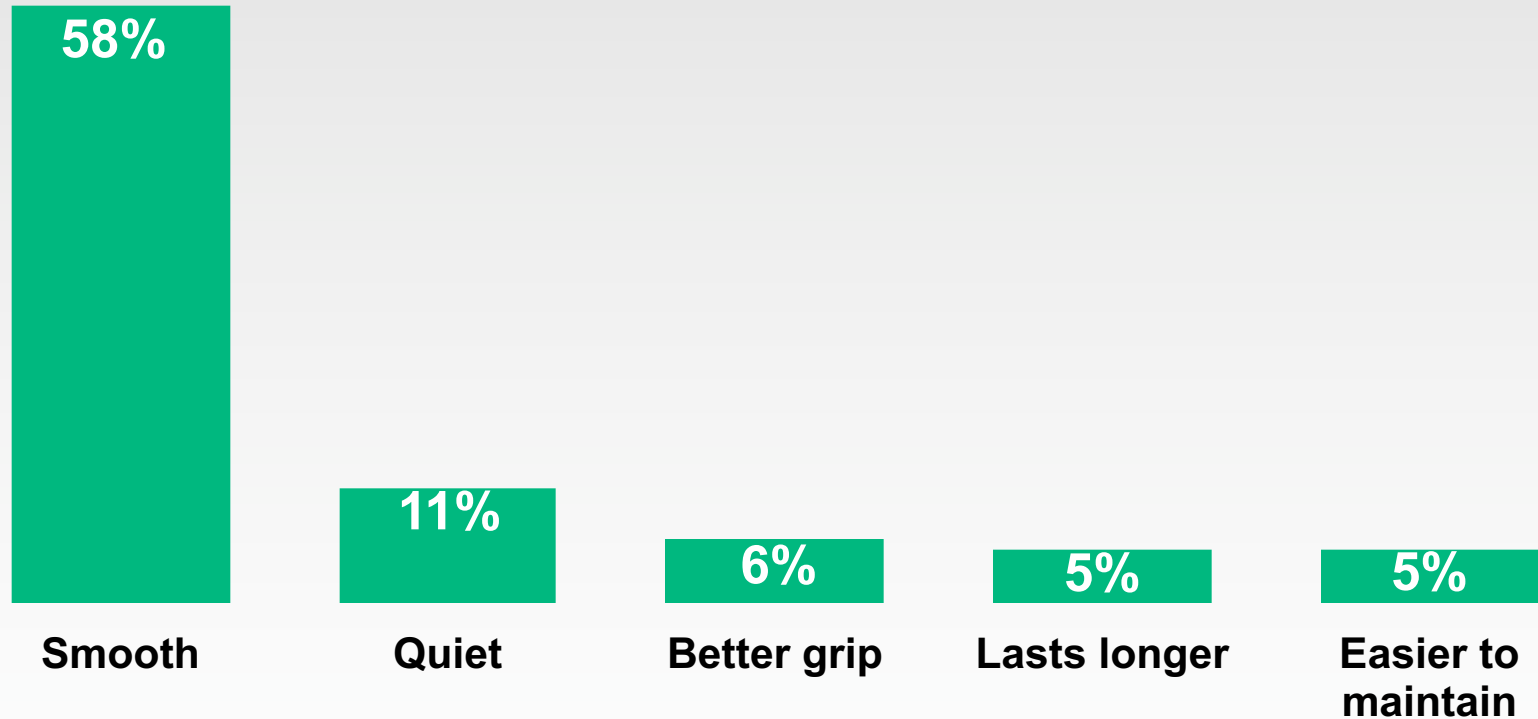


# WHAT MATTERS TO DRIVERS?

# Common Roadway Issues Experienced in the Past Year



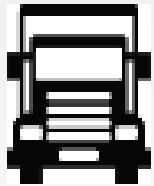
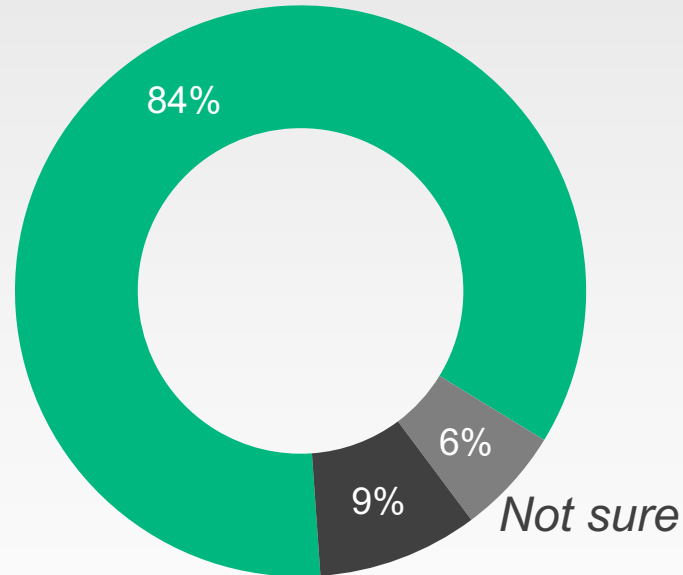
# Drivers – Satisfaction Indicators





# Maintenance Preferences

*Lanes receive repairs during off peak hours*



## Truckers

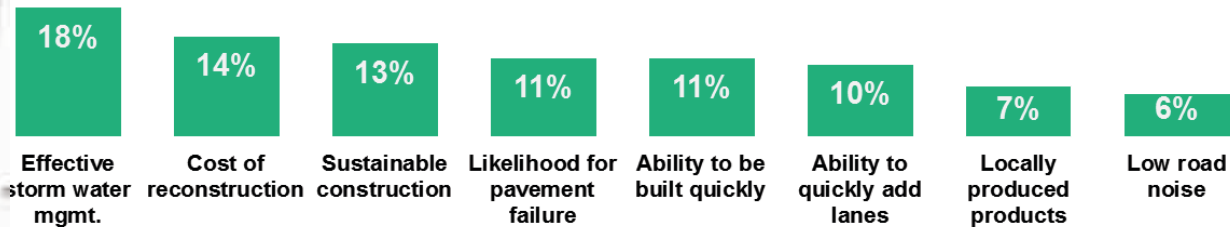
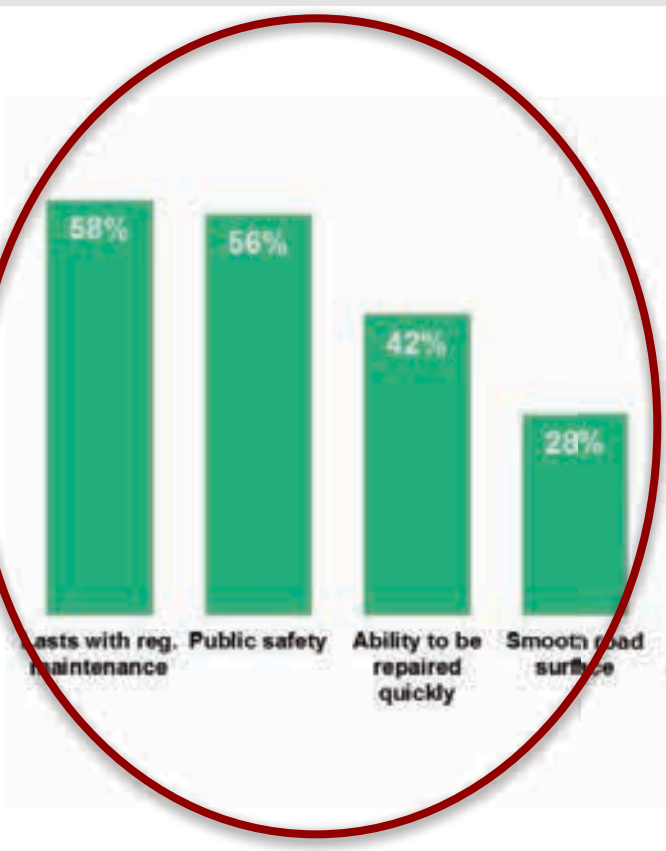
Off-peak repairs  
(73%)

Fully shut down  
(20%)

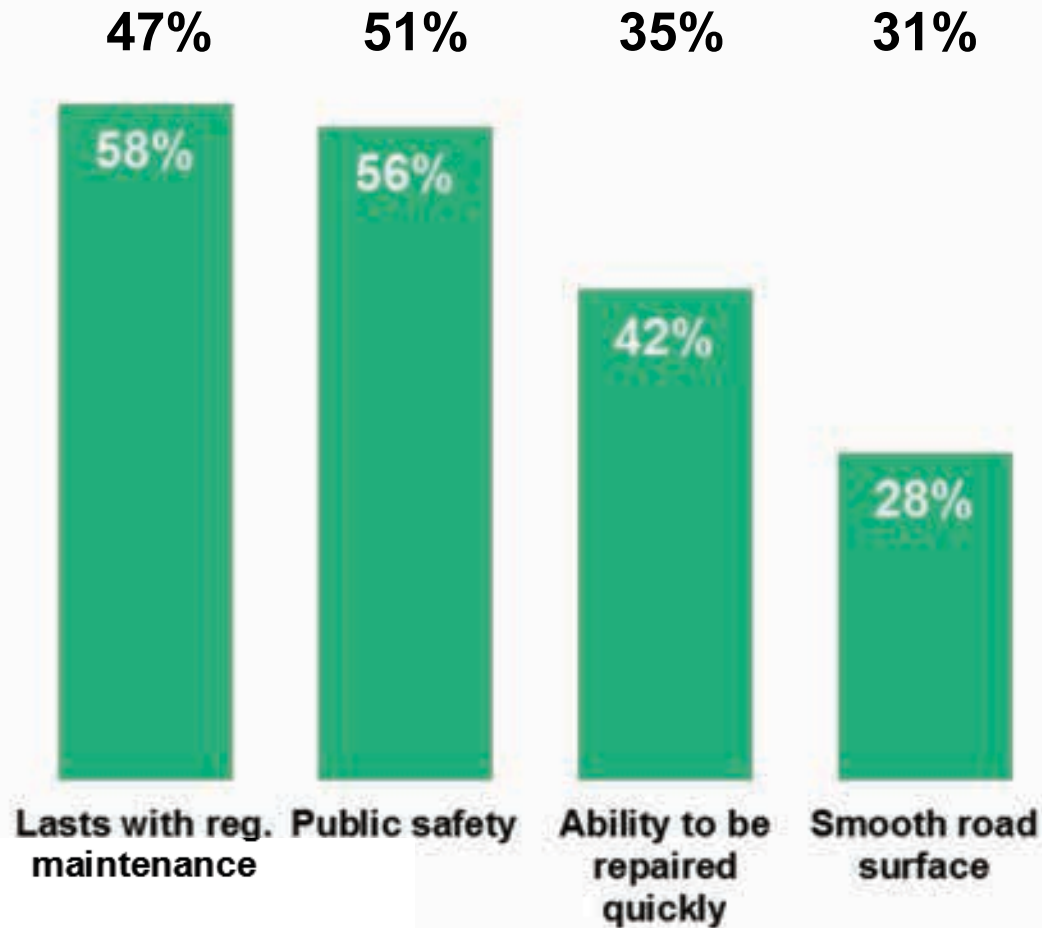
Not sure (6%)

*Lanes fully shut  
down for  
maintenance*

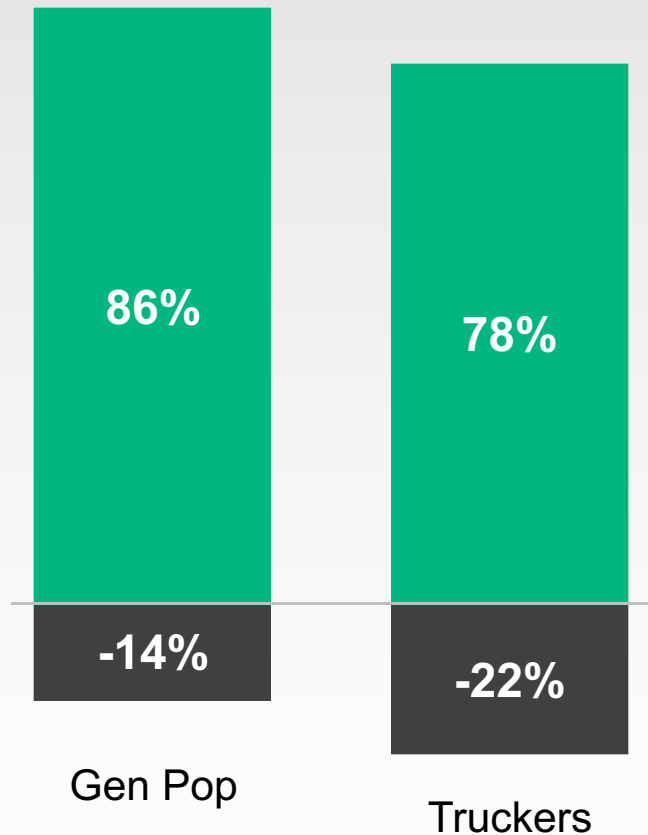
# Priorities When Building/Rebuilding Roads



# Priorities When Building/Rebuilding Roads



# Roadway Spending Priorities



## 1. PERFORMING MAINTENANCE & REPAIRS

*Gen Pop: 79% most important*

*Truckers: 68% most important*

## 2. INCREASING CAPACITY

*Gen Pop: 63% second most important*

*Truckers: 56% second most important*

## 3. BUILDING NEW ROADS

*Gen Pop: 68% least important*

*Truckers: 56% least important*

■ Maintaining Existing Roads ■ Building New Roads



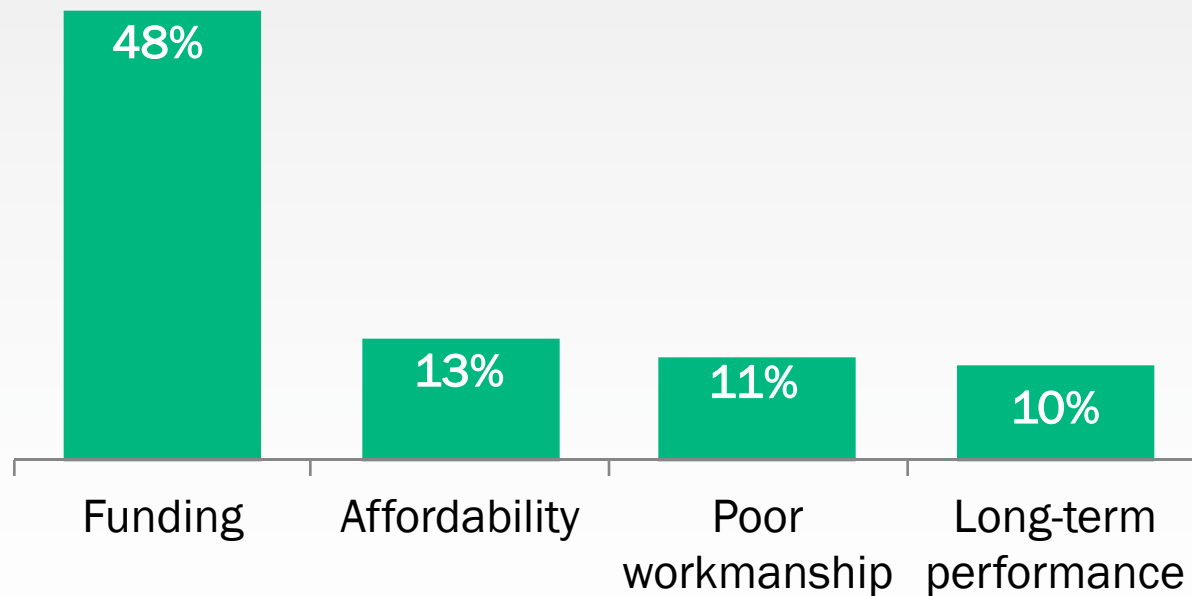
# WHAT MATTERS TO DECISION MAKERS?



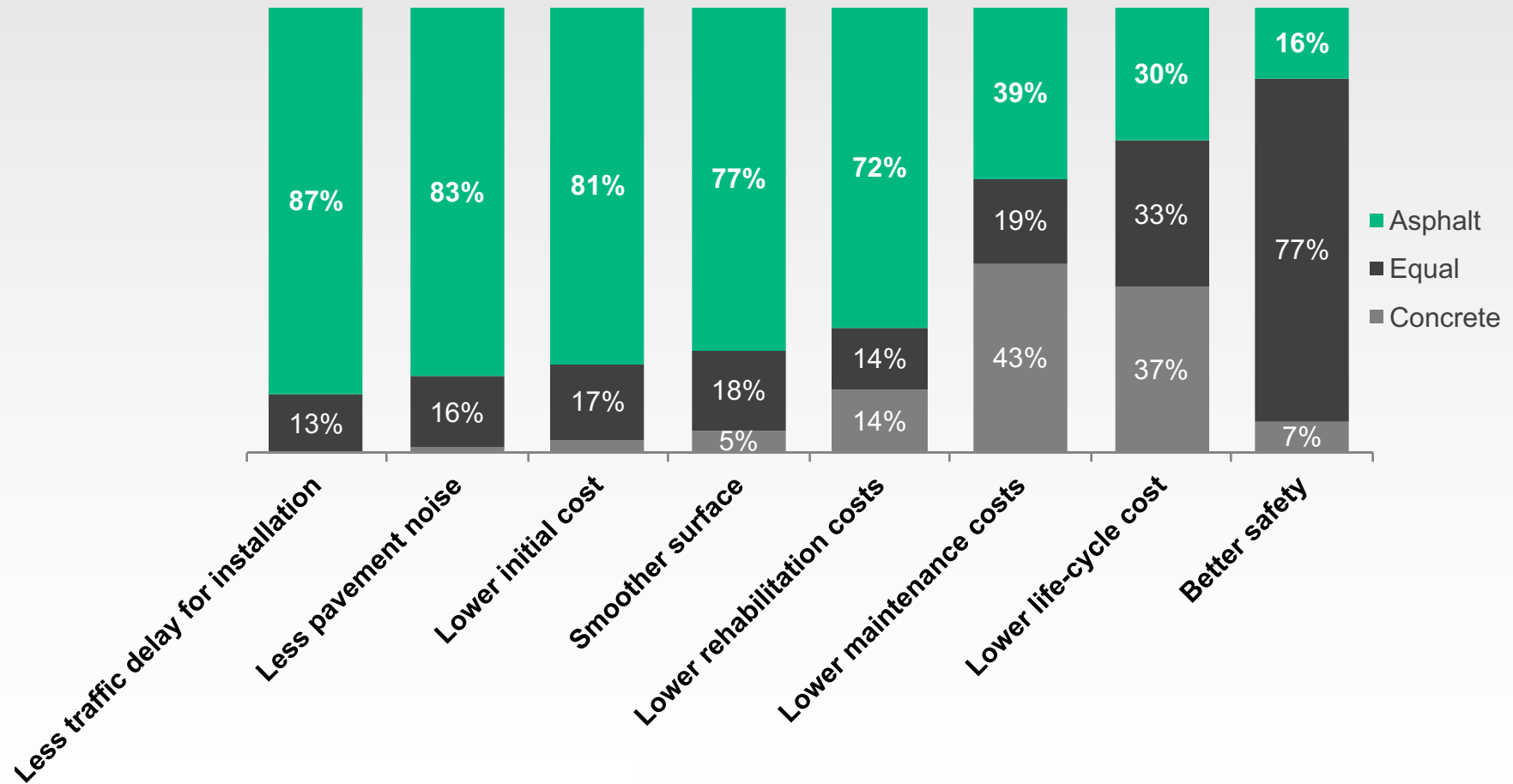
# Key Findings – In-Depth Interviews

- Shrinking infrastructure funding.
- Pavement innovation is key to reducing costs.
- Speed of construction was a primary asphalt differentiator.
- Pavement decision makers have positive perceptions of asphalt pavement industry.
- Agencies take into account driver and stakeholder opinions.

# Challenges to Meeting Priorities



# Pavement Attributes Associated With Drivability

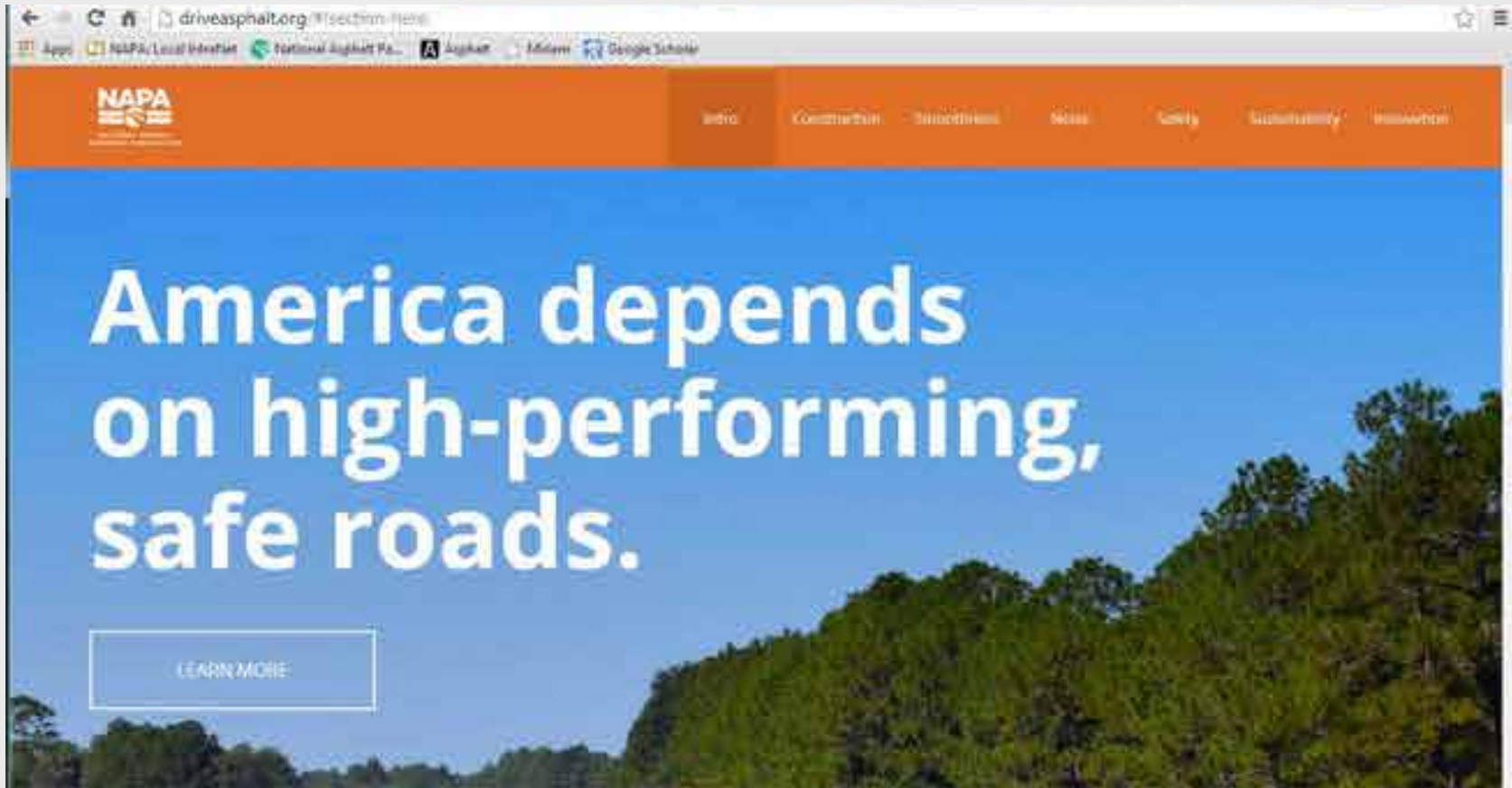


# Our Customers Want

- Durable, Long-Lasting pavements.
- Reduced Costs Through Pavement Innovations.
- A Smooth, Quiet and Safe Pavement that can be Maintained.
- To Minimize Construction-Related Delays.
- Funding for Maintenance and Capacity Expansion.



# Driveasphalt.org







# Asphalt Industry's Investment

## Six NAPA–SAPA Task Groups



Best Quality &  
Competitiveness



Environmental  
Sustainability



Legislative



Pavement  
Design



Pavement  
Preservation



Pavement  
Type  
Selection



# **LCCA Issues in Washington**

- **MAP-21**
  - **Mandate LCCA, Alternative Bid, and MEPDG**
- **Financial Services Appropriations Bill**
  - **Mandate Material-Specific Discount Rates**
- **Water Resources Development Act**
  - **Mandate LCCA on Corps Projects**
- **MAP-21 Reauthorization**
  - **LCCA on all Federal-Aid Highway Projects**
- **Ready Mixed Concrete Check-Off**



Legislative





# Pavement Type Selection & Pavement Design Deliverables

- Optimized Pavement Design & Materials Selection
- Determining Service Life based on Comparable IRI Values
- [www.ncat.us](http://www.ncat.us)







## Read Construction Updates

Donec id elit non mi porta gravida at eget metus. Fusce dapibus, tellus ac cursus commodo.

## Introduction

The rePAVE Scoping Tool and accompanying resources located here are the products of the SHOP 2 R23 study to develop Guidelines for Long Life Pavement Renewal. The study, Scoping Tool, and accompanying resources focus on long life options (30-50 years), not pavement preservation activities.

## Resources

Click on the button below to access the wealth of content and resource info that were developed as a result of this study. This includes a Pavement Assessment Manual, Best Practices for both Rigid and Flexible Pavement, Construction and Guide Specifications.

[View Resources](#)



AMERICA RIDES ON US Asphalt.



Pavement  
Design

## 1 Project Information

Project Information

## 2 Design Parameters

Design Parameters

## 3 Pavement Surface

Pavement Surface

## 4 Pavement Structure

Pavement Structure

## 5 Equation Results

Equation Results

### Pavement Surface (Asphalt)

Layer Coefficient (a):  [i](#)

Drainage Coefficient (m):  [i](#)

Minimum Thickness:  in. [i](#)

Surface

Structure

Base

[Back](#)

[Next](#)



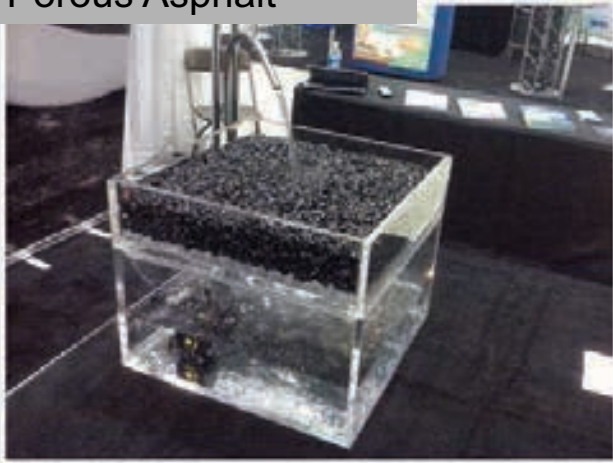
AMERICA RIDES ON US Asphalt.





# Sustainable Asphalt Technologies

Porous Asphalt



Reclaimed Asphalt Pavement (RAP)



Ground Tire Rubber (GTR)

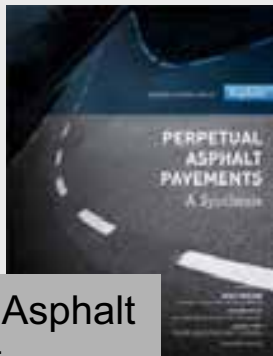
Warm Mix Asphalt (WMA)



Recycled Asphalt Shingles (RAS)



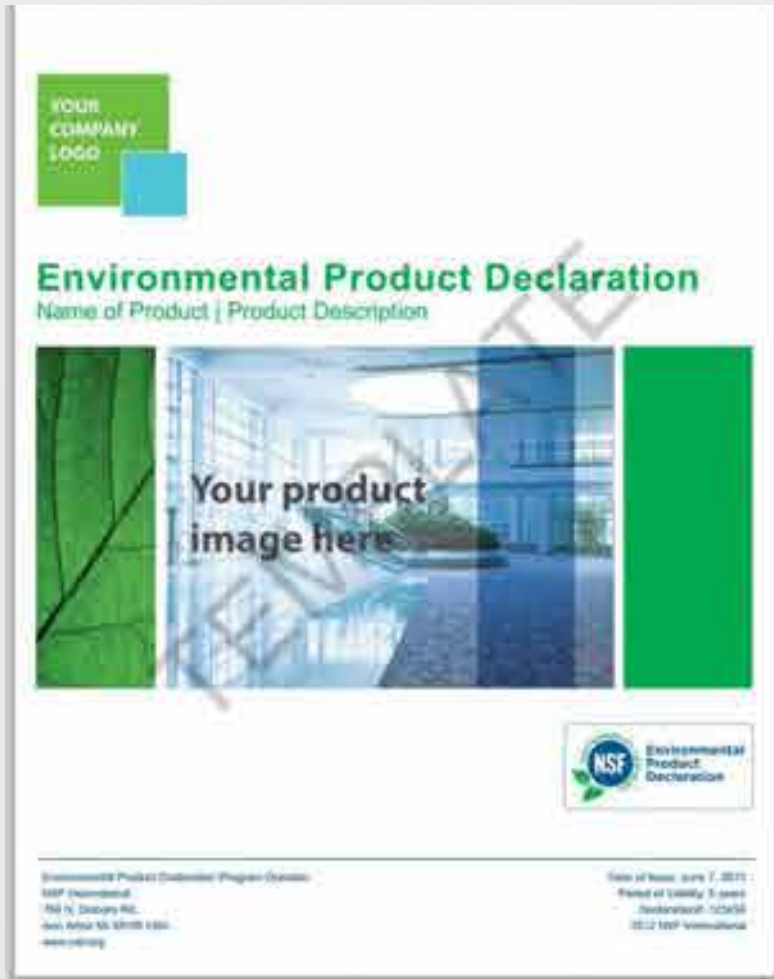
Perpetual Asphalt Pavement







# Environmental Product Declarations



## Environmental Facts

Functional unit: 1 metric ton of asphalt concrete

Primary Energy Demand [MJ]	$3.9 \times 10^3$
<i>Renewable [MJ]</i>	$3.9 \times 10^3$
<i>Non-Renewable [MJ]</i>	$3.5 \times 10^2$
Global Warming Potential [kg CO <sub>2</sub> -eq]	79
Acidification Potential [kg SO <sub>2</sub> -eq]	0.23
Eutrophication Potential [kg N-eq]	0.012
Ozone Depletion Potential [kg CFC-11-eq]	$7.3 \times 10^{-9}$
Smog Potential [kg O <sub>3</sub> -eq]	4.4

Boundaries: Cradle-to-Gate  
Company: XYZ Asphalt  
RAP: 10%

Source: PE International, Values are for illustration purposes only.

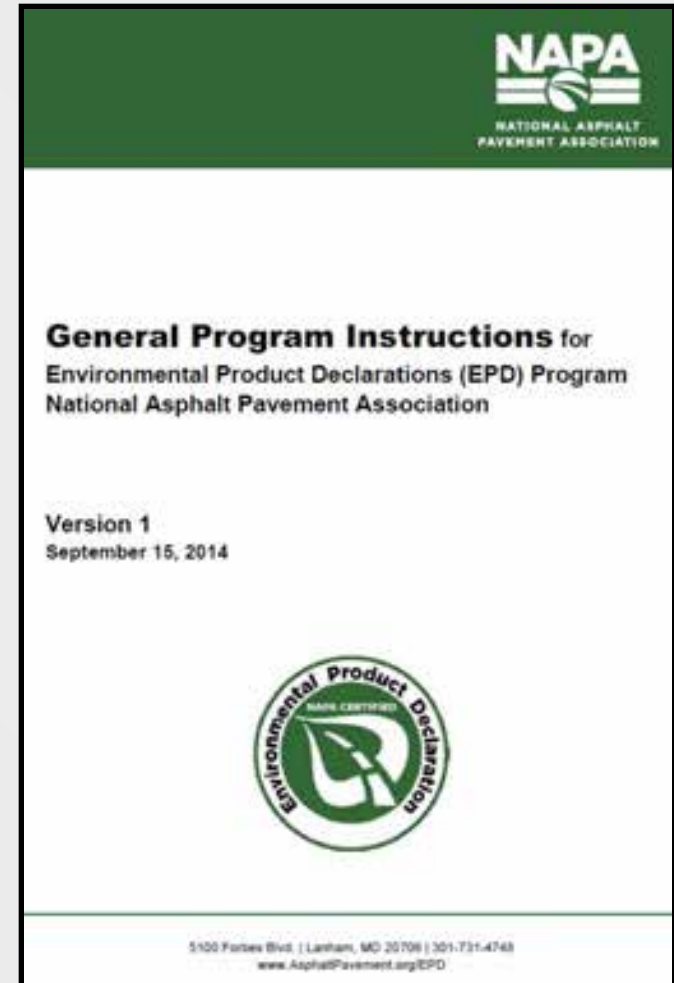


# Asphalt Industry EPD Program



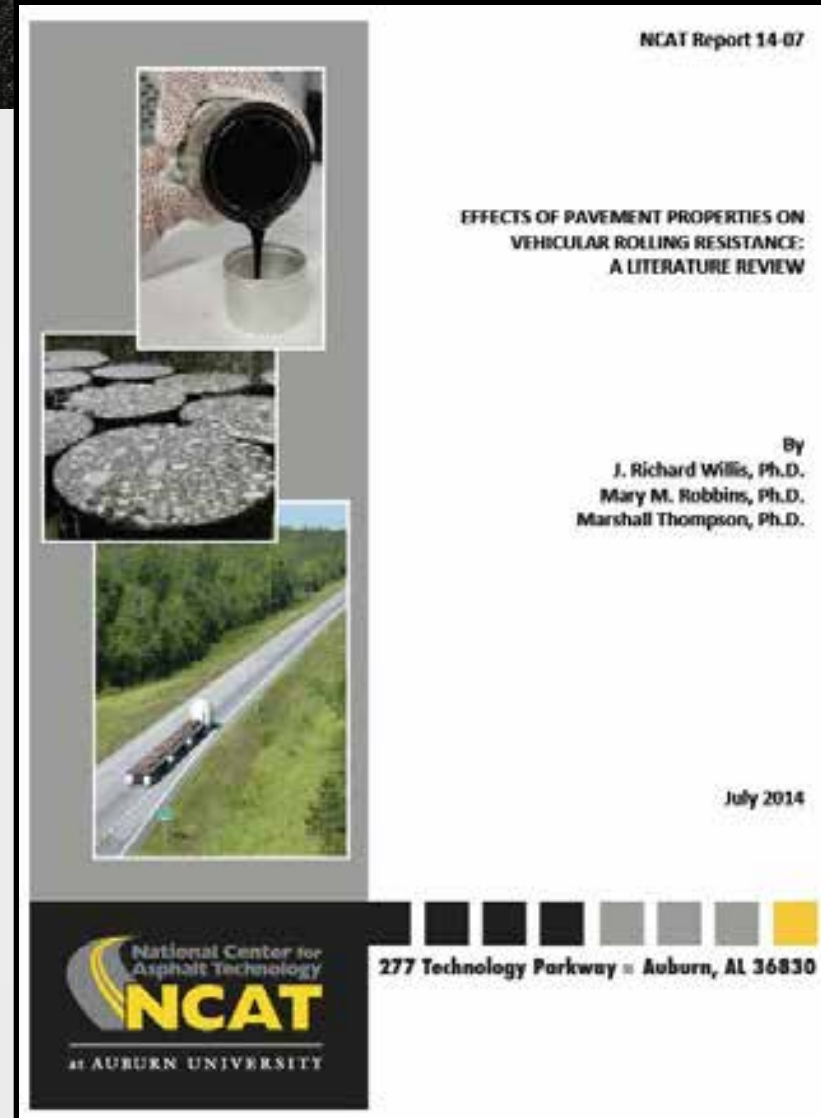
Learn more about:

- Program Goals and Objectives
- Product Category Rules
- PCRs Under Development by NAPA/SAPAs
  - Asphalt Mixtures



# PVI Analysis & Review

- Review of *Model-Based Pavement-Vehicle Interaction Simulation for Life Cycle Assessment of Pavements* from a Pavement Design Perspective
- NAPA Webinar: Where the Rubber Hits the Road: PVI Re-examined





# IRI Database for Smoothness & Emissions

Life Cycle Solutions

By Section

By Network

Custom Query

**Emissions Estimator**

Performance Overview

Explore Pavement IRI Performance

Welcome to IRI Explorer

Login

Emissions Estimator

The Project Emission Estimator (PEC) will have the capability of benchmarking life cycle emission estimator associated with construction, maintenance and use of the roadway. This page outlines the steps taken to illustrate the concept of a pavement life cycle along with the inputs needed to create one in PEC.

Calculator

General Information

Generalized Roadway Speed:  
☒ 55mph ☐ 70mph

Average Daily Traffic (ADT):

Project Length (in miles):

Number of Lanes:

Build Life Cycle

Instructions

1. Define the first intervention strategy

- This will define the initial construction (materials, batch plant, and hauling/construction equipment) and work zone emissions in year 1.
- currently, choices limited to any one of the reconstruction, rehabilitation, or maintenance projects investigated by researchers at Michigan Technological University (MTU).
- Duration days of the project will also be defined to estimate relative work zone traffic emissions.

2. Define the second intervention strategy (intervention year)

- repeat step two, until preservation strategy is achieved and end-of-life has been attained.
- use phase will be measured yearly throughout the life cycle and quantified in the life cycle emission report.

Job:

Job Type:  
HMA Cold Milling and Overlay

Intervention Year:

Project Duration:

Add Intervention

Year	Job Type	Type	Emissions per Lane-mile	Project Duration Days
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Output

Annualized Emissions

0

CO2 Emissions

Year

Total CO2 Emissions

Environmental Sustainability

27



# Reflective Pavements and Urban Heat Island

## *Do reflective pavement mandates make sense?*

Legislative efforts to mandate reflective pavements have been introduced in some areas, but the scientific evidence doesn't clearly support the use of reflective pavements to address the urban heat island effect. While these pavements do redirect some energy from a pavement's surface, much of it ends up interacting with buildings, pedestrians, and cars — leading to potential unintended negative consequences.

### **ROOFS**

MOST OF THE SCIENCE SURROUNDING REFLECTIVITY AND UHI FOCUSES ON ROOFS, WHICH ARE AT THE TOP OF THE URBAN ENVIRONMENT. PAVEMENTS ARE NOT ROOFS.

## Unintended Consequences

A Research Synthesis Examining the Use of Reflective Pavements to Mitigate the Urban Heat Island Effect

by Jiachuan Yang; Zhihua Wang, Ph.D.; and Kamil E. Kaloush, Ph.D., P.E.  
Arizona State University National Center of Excellence for SMART Innovations

### REFLECTIVE CONCRETE PAVEMENTS MIGHT NOT WORK AS CLAIMED TO

#### **SURFACE TEMPS**

DIFFERENCES IN SURFACE TEMPERATURES HAVE MINIMAL BEARING

#### **SUMMER**

REFLECTED RADIATION CAN INCREASE COOLING LOADS FOR SURROUNDING BUILDINGS IN THE SUMMER.

#### **WINTER**

LIGHT-COLORED PAVEMENTS REQUIRE MORE DEICING CHEMICALS IN WINTER TO CONTROL SNOW AND ICE.



Environmental  
Sustainability



October 2013





# Best Quality and Competitiveness Deliverables

- High Binder Replacement for Recycled Materials
  - Draft Synthesis
  - Webinar: Improved Sustainability & Performance with High RAP and RAS Usage
- Education and Training Program
  - LCCA and Innovative Technologies





# Pavement Preservation

# THINLAY

SAFE. SMOOTH. DURABLE.

# POSITION PAPER



NATIONAL ASPHALT PAVEMENT ASSOCIATION

5100 Forbes Boulevard, Lanham, MD USA 20706-4407

TF: 888.468.6499 PH: 301.731.4748 FX: 301.731.4621

[www.asphaltpavement.org](http://www.asphaltpavement.org)

**Thinlays: The Pavement Preservation Tool of Choice**  
*NAPA Position on Thin Asphalt Overlays for Pavement Preservation*

<http://www.asphaltpavement.org/ThinIsIn>



Pavement  
Preservation





# PEC Projects Summary



## Other PEC Projects

- Develop Thinlays with High Recycled Content
- Asphalt's Speed of Construction for Cost Effectiveness

Download a copy: <http://goaspha.lt/1grtLlj>

# *Partnership for Innovation in Asphalt Pavements*



**ADVANCED ASPHALT TECHNOLOGIES, LLC**  
Engineering Services for the Asphalt Industry







# Deliverables

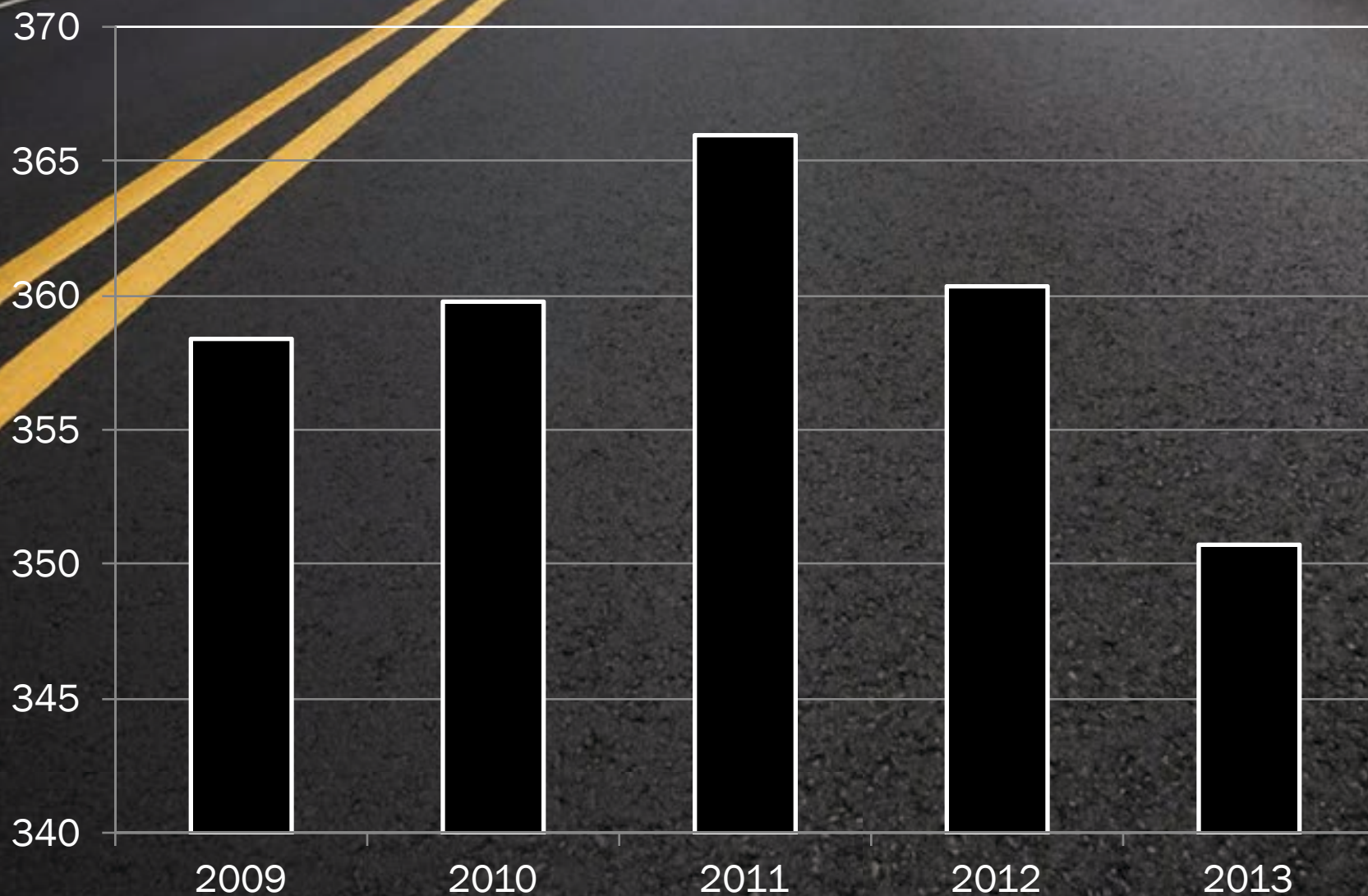
- FY2014–15 Deliverables Include
  - Recycled Materials & WMA Survey (2013)
  - RAP Management Best Practices
  - Recycled Tire Rubber Best Practices
  - High Binder Replacement Mixtures Synthesis
  - Pavement Economics & LCCA Webinar



# *The State of Reuse in our Roads*

*Industry Survey of  
Recycled Materials and WMA*

Tons (in millions) HMA/WMA Produced





A large, silver, cylindrical industrial tank, likely a storage silo, dominates the left side of the frame. It has horizontal rivet lines and a slightly weathered appearance. The background is a clear blue sky with some light clouds. In the bottom right, a smaller, dark-colored tank is partially visible.

# 21 MILLION.

The estimated barrels of  
asphalt conserved.

## ESTIMATED SAVINGS OF \$2.3 BILLION



# 106 MILLION.

The total tons of WMA  
placed in 2013.

THAT'S 22% MORE  
THAN THE LAST YEAR. OH,  
AND OVER 530% MORE THAN 2009



# WMA Usage

## *Percentage of Total Asphalt Production in US*





# Ground Tire Rubber

	2012	2013
Tons of Mix Using GTR	691,589	1,195,594
Tons of GTR Used	1,047	6,989



## Available Soon!

PaveXpress: A Simplified,  
Online Pavement Design Tool

## Available Online:

- LCCA for Pavements
- What, How, and Why of EPDs
- Porous Asphalt Pavement
- Thinlays for Pavement Preservation
- Sustainability 101:  
The What, Why, And How  
of Sustainability for the  
Asphalt Industry

The Brightest  
**Ideas**  
in Sustainable  
**Future**



**Asphalt Sustainability Conference**

November 4-5, 2014 • Omni Royal Orleans, New Orleans, LA  
[www.asphaltpavement.org](http://www.asphaltpavement.org)



**JUST ADDED:**  
**Tour the New Orleans Lager  
& Ale Brewing Co.**  
**- a Sustainable Brewery!**





**NAPA**  
NATIONAL ASPHALT  
PAVEMENT ASSOCIATION

**JANUARY 25-28, 2015  
MARCO ISLAND MARRIOTT  
MARCO ISLAND, FLA.**

# **DRIVING PERFORMANCE**

**FOR YOUR  
BUSINESS  
FOR YOUR  
CUSTOMERS  
FOR THE  
PUBLIC**

**60TH ANNUAL MEETING**



## **THE BASE OF INNOVATION**

**March 17-19, 2015 • Baltimore, MD, USA**





# THANK YOU

[asphaltpavement.org](http://asphaltpavement.org)

 @NAPATweets

[audrey@asphaltpavement.org](mailto:audrey@asphaltpavement.org)

 @AudreyRCopeland





# 2013 Industry Survey Results - Preliminary

- Total Estimated Tonnage: 351 million
- Tons of RAP Used in Asphalt Mixtures: 68 million
- National Average RAP Use: 20%
- Tons of RAS Used in Asphalt Mixtures: 2.3 million
- Tons of WMA: 106 million
  - Chemical Additive: 12%
  - Plant Foaming: 87%

# What do we value?

- **Decision Makers**

- **Cost over life-cycle**
- **Performance**
- **Long-life – quality of ride over life**

- **Driver Perception Survey**

- **Smooth, Safe, Quiet**
- **Service**
  - **Well-maintained**
  - **Delays & construction timing**
- **Quality of drive**



# THE BIG THINGS - NOW

- PAVEMENT TYPE SELECTION
- PAVEMENT DESIGN & MATERIALS
- SUSTAINABLE PAVEMENTS
- PRESERVATION