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Real Science.
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CPRG Phase II City of Palm Bay





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Photocatalytic Pavement Preservation Treatments From Source to Sink



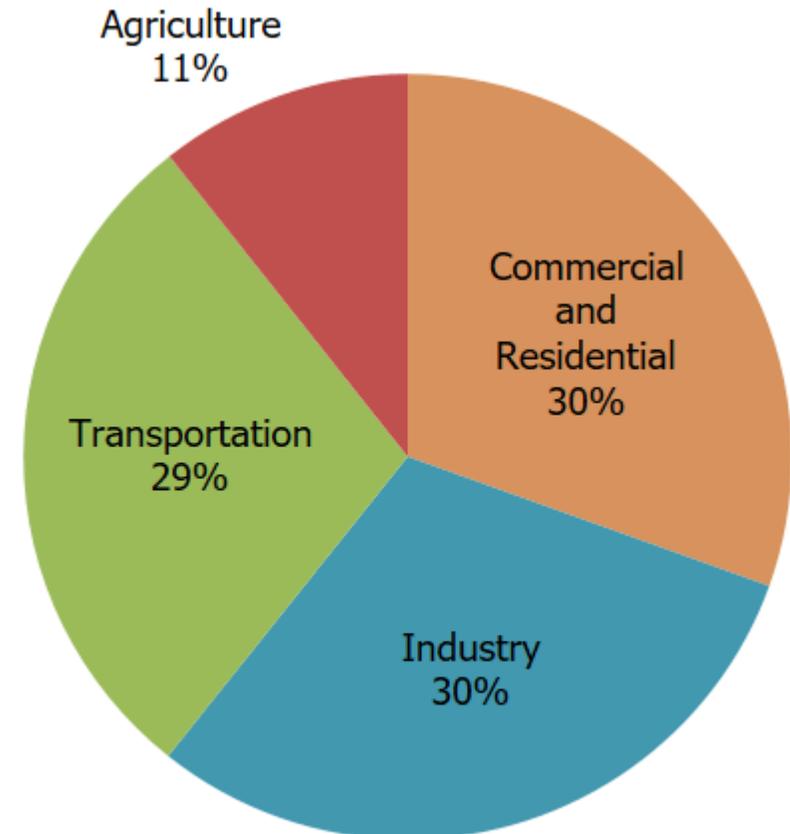
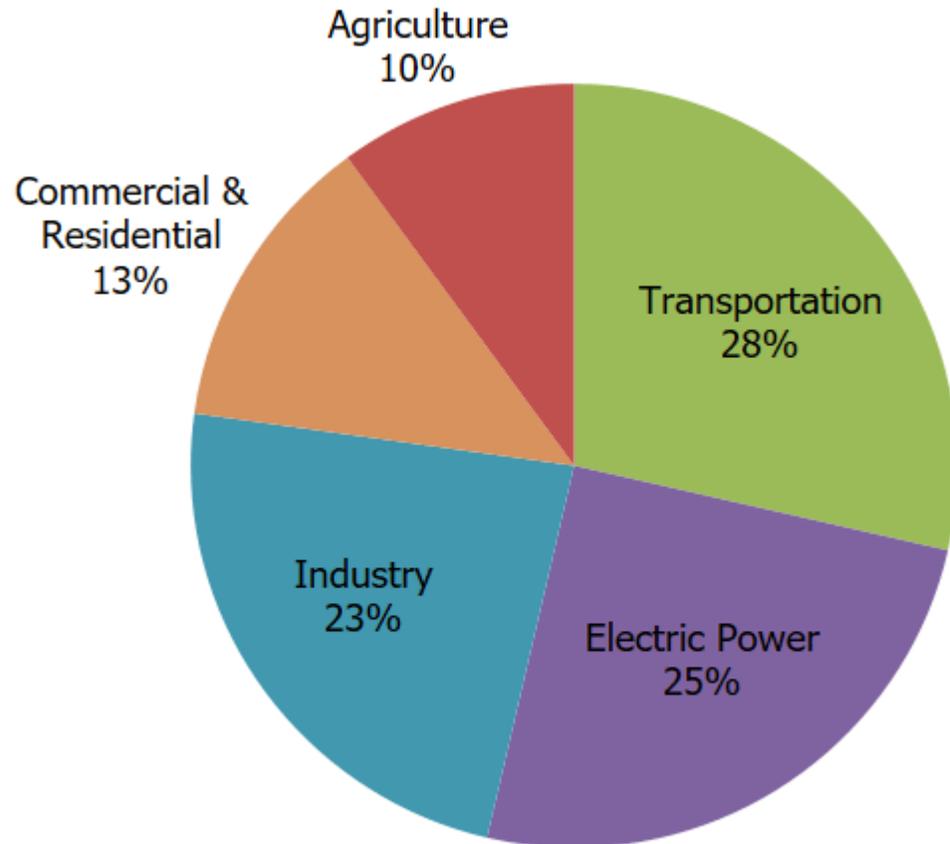




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From the source of the problem...



U.S. Environmental Protection Agency (2023). Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2021



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To the sink

What if the future is now?

Capture
Vehicular
Emissions

Mitigate
Heat
Islands

Double
Road Life

Decompose
Roadway
Microplastics

Accelerate
Water
Dispersion

The cost of the carbon footprint of America's roadways combined with pollution-producing vehicle emissions is nearly \$600 billion/year in CO₂ equivalents. With a target goal of net zero emissions, carbon reduction mandates are looming. Pavement Technology, Inc. has A Better Way to Get There. Introducing the PlusTi™ family of pollution-reducing, life-extending roadway penetrants.

www.smogeatingroads.com



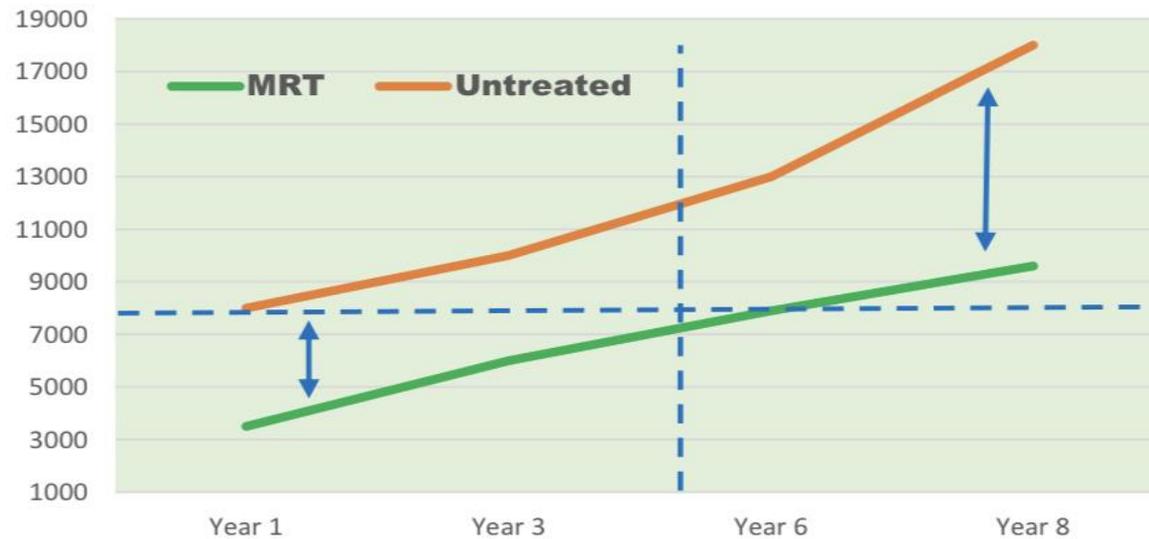
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Carbon Avoidance

**HELLO
I AM A...
PROBLEM
SOLVER**

Figure 5 – Maltene Rejuvenator (Reclamite) Study:
Eight Year Oxidation Rate Curves Charleston County (SC)³⁸ (in poises)³⁹



Source: Pavement Technology, Inc.; APART

**Molecular
Rejuvenation
Pioneers**

**Doubling
Pavement Life**



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World's First Retrofit Photocatalytic Technology for Pavements to Target Use Phase Emissions

Traditional Pavement Preservation Agents
Fortified with Photocatalytic Grade TiO_2



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Scalable

- ✓ Orlando
- ✓ Delray Beach FL
- ✓ Raleigh
- ✓ Charlotte
- ✓ Durham
- ✓ Cary NC
- ✓ Greenville SC
- ✓ Mass DOT
- ✓ DFW Intl Airport
- ✓ Charleston
- ✓ Greater Cleveland
- ✓ Cincinnati
- ✓ Phoenix
- ✓ Tucson
- ✓ Tempe
- ✓ FHWA 'Climate Challenge' (Purdue)
- ✓ Des Moines
- ✓ Prologis
- ✓ Orlando Intl Airport
- ✓ Vero Beach Reg Airport
- ✓ Austin
- ✓ San Antonio
- ✓ Edina MN (MnRoads)
- ✓ Nevada DOT
- ✓ Avondale AZ
- ✓ Yellowstone Natl Park
- ✓ Chandler AZ



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Why Road Construction Photocatalytic Solutions?



To Solve The Next Problems Facing Transportation Professionals

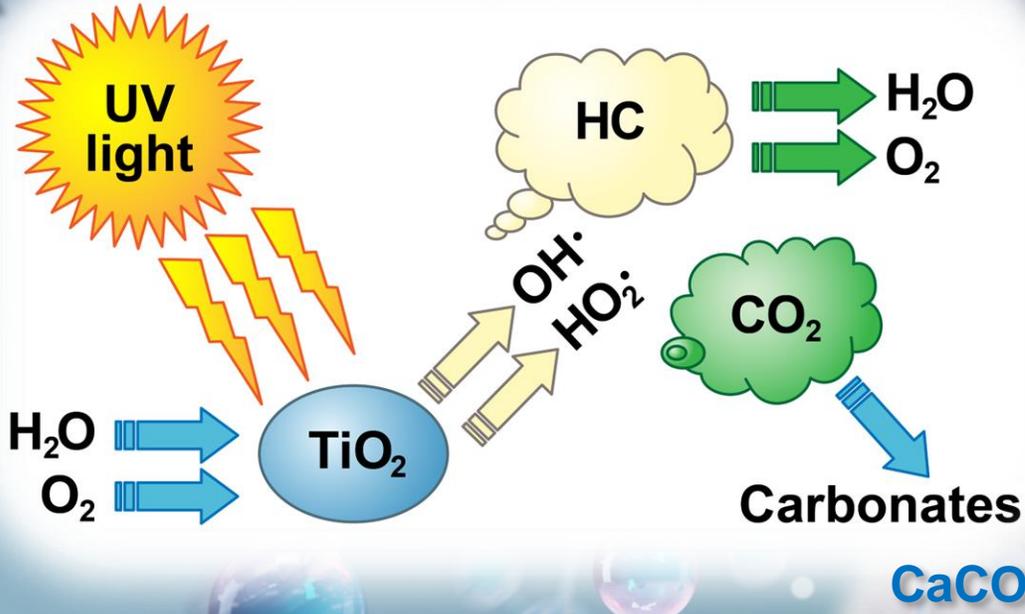


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The Photocatalytic Process

CDR



Natural Reduction by
Oxidation or Redox

100% Perpetual
Solar Powered
Decarbonization

CO_2 Capture & Decomposition



Field Tested – Tailpipe Emissions

Raleigh

NO Reduction Efficiency (%) *				
A.R.A.-1 Ti®	0.04 + 0.03 gsy	0.04 gsy	0.06 + 0.03 gsy	0.06 gsy
	47%	38%	50%	43%

Cincinnati

NO Reduction Efficiency (%)*				
A.R.A.-1 Ti®	0.08 gsy	0.08 gsy	0.07 gsy	0.07 gsy
	46%	45%	42%	44%

*ISO 22197-1 Photocatalytic
Materials Air Purification Test
Procedure



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Strategy to fund existing Pavement Preservation Program

Federal Government funding is here

- Potential to subsidize pavement preservation
- City is eligible
- Grants start at \$2M for lowest tier
- Funding requires \$0 match

AGENCY: ENVIRONMENTAL PROTECTION AGENCY (EPA)
TITLE: Climate Pollution Reduction Grants Program: Implementation Grants General Competition
ACTION: Notice of Funding Opportunity (NOFO): Request for Applications
FUNDING OPPORTUNITY NUMBER: EPA-R-OAR-CPRGI-23-07
ASSISTANCE LISTING NO: 66.046
FUNDING AVAILABLE: Approximately \$4.3 Billion

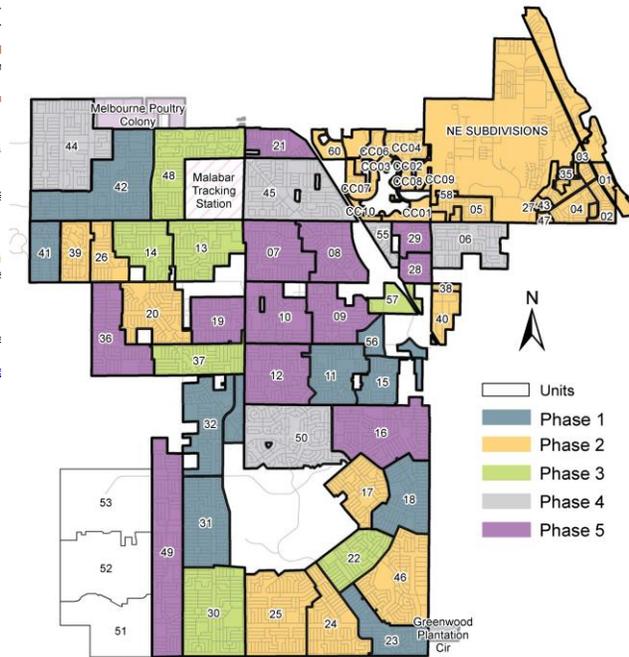
KEY DATES	
September 20, 2023	NOFO: REQUEST FOR APPLICATIONS ISSUANCE
February 1, 2024	OPTIONAL NOTICE OF INTENT TO APPLY IS DUE
March 15, 2024	DEADLINE FOR SUBMITTING QUESTIONS
April 1, 2024	NOFO CLOSES – APPLICATIONS DUE BY 11:59 PM (ET)
July 2024	ANTICIPATED NOTIFICATION OF FUNDING SELECTION
October 2024	ANTICIPATED AWARD

APPLICATION SUBMISSION DEADLINE: Application packages must be submitted electronically to EPA through [Grants.gov \(www.grants.gov\)](https://www.grants.gov) no later than **April 1, 2024, at 11:59 p.m. (ET)** in order to be considered for funding. Questions related to this NOFO should be submitted to CPRG@epa.gov. The deadline for submitting questions is **March 15, 2024**. EPA will not respond to questions submitted after that date.

NOTICE OF INTENT TO APPLY: To allow for efficient management of the competitive process EPA requests submittal of an Informal Notice of Intent (NOI) to Apply by **February 1, 2024** to CPRG@epa.gov. Please include in the body of the email the dollar amount of the anticipated funding request and one to two sentences about the scope and sector(s) of the greenhouse gas (GHG) reduction measures likely to be included in the potential implementation grant application. Additionally, if intending to apply as the lead applicant representing a coalition, please list all anticipated coalition members (coalition members must also be eligible applicants; see Section III.A for more details). Submission of an NOI is optional and non-binding; it is a process management tool that will allow EPA to better anticipate the resources required for efficient evaluation of submitted applications.

CONTRACTS AND SUBAWARDS: If the applicant intends to name a contractor (including an individual consultant or equipment vendor) or a subrecipient as a project partner or otherwise in the application, EPA recommends that applicants carefully review and comply with the directions contained in Section IV of this NOFO and at [EPA Solicitation Clauses](#). Refer to [EPA](#).

The City of **Palm Bay** Florida
Public Works Department
Proposed Road Pavement Program





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Proven to Reduce Exhaust Emissions by as much as 60% & NEE's by 98%

Invisible Pollution Scrubbing Subway

CO₂
NO_x
VOCs
Microplastics



TiO₂ Photocatalysis Creates Superoxide -OH & -O₂



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Perpetual Carbon Sink Research

Pavement Technology, Inc

Purdue University

achieve a remarkable **41.81% reduction in CO₂ concentration**. This corresponds to a substantial enhancement in the material's CO₂ reduction capabilities when employing TiIntroCME®.



THE PERSISTENT PURSUIT OF THE
NEXT GIANT LEAP

NEIL ARMSTRONG HALL OF ENGINEERING

application of the product, as well as an increase in the overall CO₂ uptake. This means that as time goes by, the samples are still being able to absorb and/or decompose CO₂ from the air, which is preferable, as it the material will potentially keep reducing the CO₂ concentration in the air, **without reaching a plateau.**

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TiO₂ Increases Solar Reflectance Index by 4X





City of Austin Cool Pavements Pilot

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EPA CPRG Basics

EPA's CPRG Program has 2 phases

- Phase 1 was considered the planning phase, ECFRPC received
- The planning phase included \$250M split between 46 states and 67 metro areas
- Territories and Tribes were also included





CPRG Discussion

Phase 2 – Implementation Grants

- Eligibility is automatic if you received a planning grant
- These entities are competing for \$4.3B in grants (\$300M is carved out for tribes/territories)

CPRG Implementation Grants

- On September 20, **EPA launched a \$4.3 billion competition** for states, local governments, tribes, and territories to fund policies and programs to cut climate pollution
- **EPA also launched \$300 million competition** for only tribes and territories to fund policies and programs to cut climate pollution
- These implementation grants build on \$250 million in CPRG planning grants EPA awarded this year





Funding & Eligibility

Types of GHG Reduction Measures



Applications may include multiple measures across one or more sectors.

EPA anticipates applications may seek funding for the following types of measures:

- A new, stand-alone GHG reduction measure that will be implemented solely through CPRG funding;
- An expansion of a GHG reduction measure that is already being implemented, where the expansion of the measure will be funded through CPRG funding; and,
- A new GHG reduction measure for which the applicant has already secured partial funding and needs additional funding from the CPRG program to secure the total funding needed to fully implement the measure.



Funding & Eligibility

Funding Availability – General Competition



Tier	Grant Ranges (million)	Funds Targeted for Each Tier (billion)	Anticipated Number of Grants to be Awarded
Tier A	\$200 to \$500	\$2	4-10
Tier B	\$100 to <\$200	\$1.3	6-13
Tier C	\$50 to <\$100	\$0.6	6-12
Tier D	\$10 to <\$50	\$0.3	6-30
Tier E	\$2 to <\$10	\$0.1	10-50
	TOTAL	\$4.3 billion	30-115

General Competition funds will be available across five funding tiers.

Applications will be evaluated and selected for award on a tier- by-tier basis.



Funding & Eligibility

Applications Must Implement GHG Measures in a Priority Climate Action Plan (PCAP)



Applications may be from:

- Lead organization for Planning Grant **OR**
- Other eligible applicant that did not receive a Planning Grant.

GHG measures in an implementation grant application under the general competition must be included in an applicable PCAP submitted to EPA by **March 1, 2024**.

- An applicable PCAP is one that geographically includes the applicant and contains the GHG reduction measures that can be implemented by the applicant.

Coordination and communication between lead organization and other eligible applicants is encouraged.

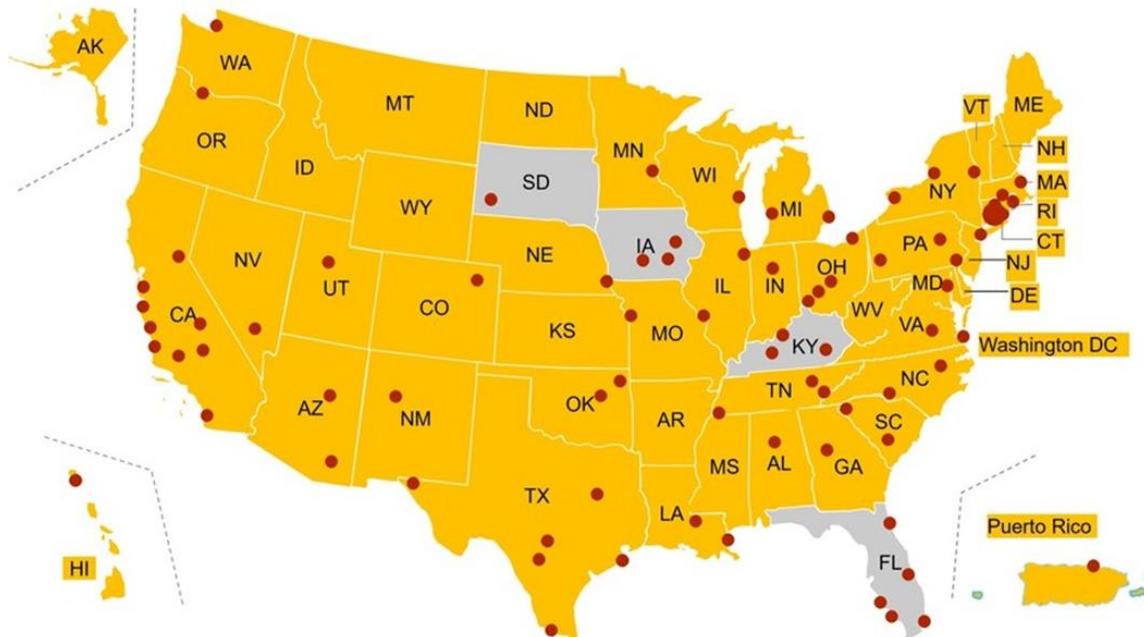
- Eligible applicants should participate in PCAP development process.
- Lead organizations should make draft PCAPs available as early as possible.



Funding & Eligibility

CPRG Planning Grantees

Eligible applicants can review a [complete list of CPRG planning grantees](#)



- States (+ DC, PR)
- Metropolitan Statistical Areas (MSAs)
- States that did not opt in

Additional Planning Grantees

- 4 territories
- 90 tribes and tribal consortia (covering ~225 tribes)



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Funding & Eligibility

Eligible Applicants – General Competition



State and territorial agencies, municipalities, air pollution control agencies, tribes/tribal consortia, and coalitions thereof.

Individual applicant

- Single entity leading design and implementation of the measures.

Coalition

- Two or more eligible applicants with strong and substantial commitment such that withdrawal by one member would fundamentally alter project outcomes.
- Coalition applications must include a Memorandum of Agreement (MOA) signed by all coalition partners demonstrating mutual commitment to project.



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Evaluation Criteria

Evaluation Criteria Summary – General Competition



EVALUATION CRITERIA SUMMARY	POINTS
1. Overall Summary and Approach	45
2. Impact of GHG Reduction Measures	60
3. Environmental Results - Outputs, Outcomes, and Performance Measures	30
4. Low-Income and Disadvantaged Communities	35
5. Job Quality	5
6. Programmatic Capability and Past Performance	30
7. Budget	45
TOTAL	250



Key Deadlines

Implementation Grants: Key Dates



Timeline for General Competition					
Sept 20, 2023	Feb 1, 2024	March 1, 2024	April 1, 2024	July 2024*	October 2024*
Notice of Funding Opportunity (NOFO) released	Optional Notice of Intent to Apply deadline	Priority Climate Action Plans due	Application deadline	Notification of Awards	Funds Awarded
Parallel Timeline for Tribes and Territories Competition					
September 20, 2023	March 1, 2024	April 1, 2024	May 1, 2024	September 2024*	December 2024*

*Anticipated Dates



Planning tools

The screenshot shows a web-based planning tool interface. On the left, there is a search bar with "palm bay, fl" and a search icon. Below the search bar are zoom controls (+ and -) and a list of states: 48, AK, HI, PR, GU, AS, MP, VI. The main map area shows a street grid with a blue-outlined tract highlighted. The tract is labeled "West Melbourne" and "Palm Bay". The map includes labels for various streets and landmarks, such as Henry Ave, Fellwood Estates, Tamarind Estates, Palm Bay Rd NE, and the Atlantic Ocean. On the right side, there is a sidebar with the following information:

Tract information
 Number: 12009071332
 County: Brevard County
 State: Florida
 Population: 14,535

Tract demographics
 Race / Ethnicity ([Show](#) v)
 Age ([Show](#) v)

Identified as disadvantaged?
YES

This tract is considered disadvantaged because it meets more than 1 burden threshold **AND** the associated socioeconomic threshold.

[Send feedback](#) ↗

Climate change +

Energy +

Health +

Housing +

Legacy pollution +

At the bottom of the sidebar, there is a yellow button that says "Help improve the tool" with a feedback icon.



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EPA Environmental Justice tools

EPA EJScreen EPA's Environmental Justice Screening and Mapping Tool (Version 2.2) EJScreen Website | Mobile | Glossary | Help

Please note: Territory data (except Puerto Rico) is not available as comparable to the US. It is only comparable to the territory itself by using the 'Compare to State' functionality. Likewise, some of the indicators may not be available for territories.

- Save Session
- Measure
- Side by Side Comparisons
- Add Shapefile
- Search Geoplatform
- Add Map Services
- Print
- Boundaries

Map Contents

- Socioeconomic Indicators
- Low Income (National Percentiles)
 - 95 - 100 percentile
 - 90 - 95 percentile
 - 80 - 90 percentile
 - 70 - 80 percentile
 - 60 - 70 percentile
 - 50 - 60 percentile
 - Less than 50 percentile
 - Data not available

EnviroMapper® FDEP, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, USDA, USFWS Powered by Esri



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Final Thoughts...

- Photocatalytic pavement preservation treatments extend pavement life
- Grants pay the entire cost of this type of technology
- Potential to lower cost of existing pavement preservation (\$1.8M in 2024)





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