Planning for Future Risk and Building Resilience

New Mexico Transportation Infrastructure Revenue Subcommittee Meeting

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Pew

The Pew Charitable Trusts

- Nonpartisan, not-for-profit philanthropic organization with more than 40 active, evidence-based research projects on public policy issues.

- Projects include a variety of state and local economic policy and government performance initiatives ranging from public safety, state tax incentives, rainy day funds, state-sponsored private retirement security initiatives, and state pension plans for the public sector workforce.

- All follow a common approach: data-driven, inclusive, and transparent.

State Fiscal Policy Project: Long-term Liabilities

- Since 2007, Pew has examined the bill coming due for states from public employee pension and retiree health benefits.
- While our work began with a fiscal lens, our research has covered plan design, retirement security, governance, investment practices, and tools to measure and manage risk.
- We've expanded our work to include a broader set of long-term liabilities that can have major impacts on state fiscal sustainability.
- Our recent research examines the bill coming due for deferred maintenance in investments needed to preserve and rehabilitate state infrastructure.

Overview

- Climate Risks to State Transportation System Assets
- New Mexico's Transportation Resilience Improvement Plan
- A Framework for Planning for Climate Costs and Building Resilience
- Managing Declining Fuel Taxes from an Electric Vehicle Transition

Climate Risks to State Transportation Assets

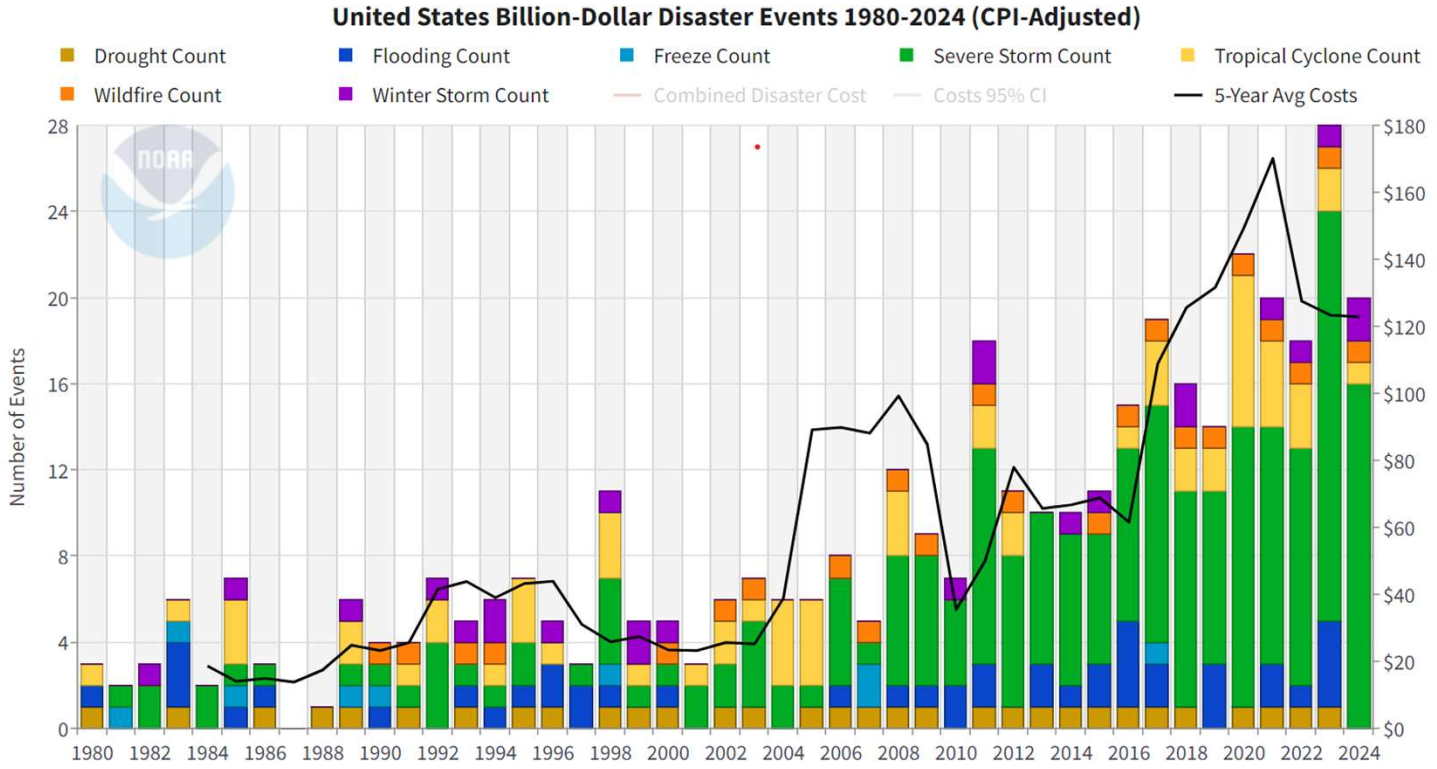
Climate Risks to Transportation Infrastructure

Aging infrastructure systems across the country are more vulnerable to a changing environment.

- In 2021, 43% of U.S. roads were in poor condition, contributing to a $435 billion maintenance and repair backlog (ASCE, 2021).
- Additionally, climate-related damages to paved roads could add up to $20 billion annually by the end of the century.
- States will need to address the combined effects of deferred maintenance and climate change, as more frequent and intense extreme weather will increasingly disrupt and damage their transportation infrastructure.
- Communities that have experienced underinvestment historically are more vulnerable to these impacts and face greater difficulties managing these costs.

Extreme Weather is Increasing in Frequency and Costs

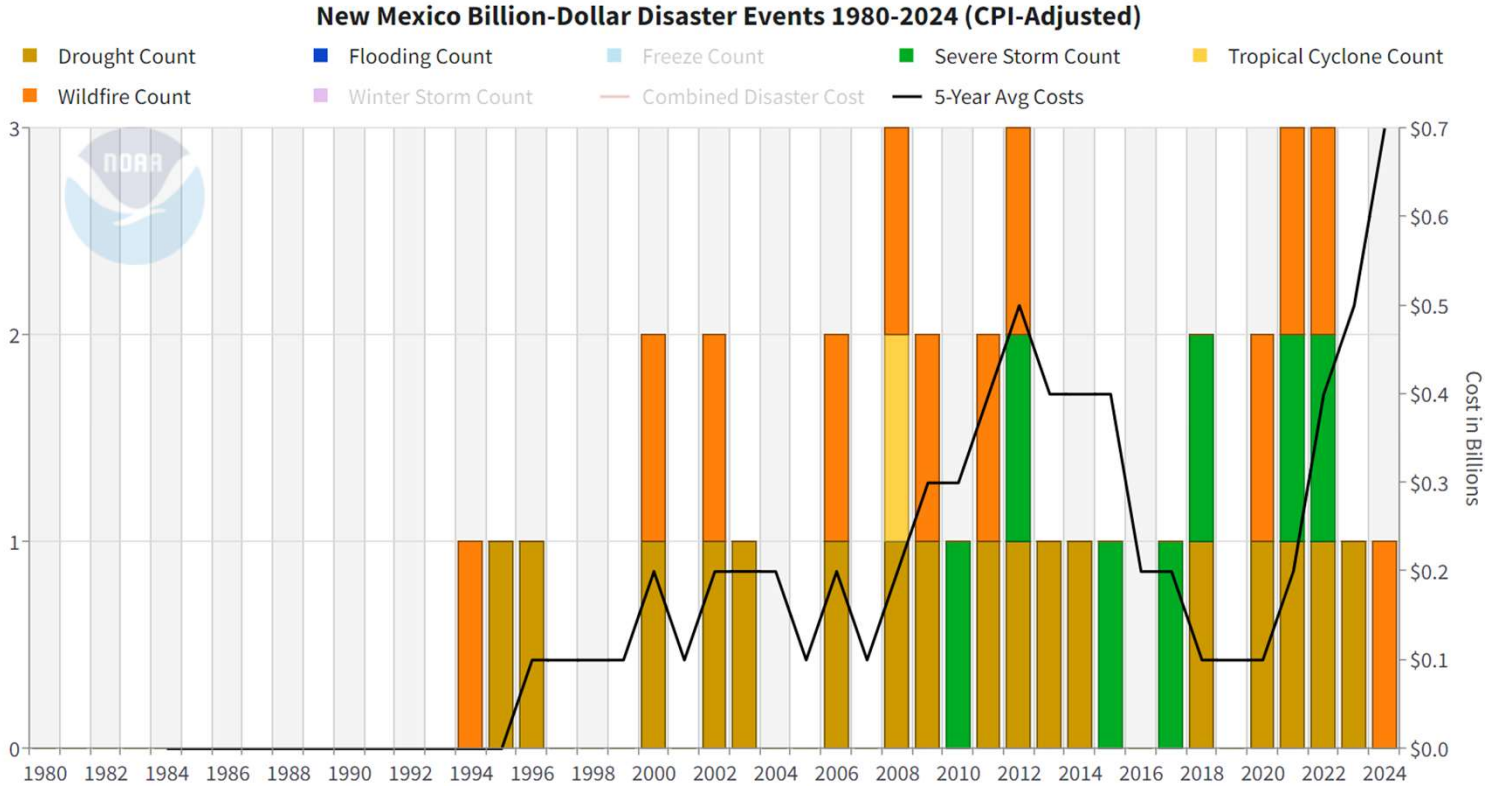
Share of billion-dollar weather event damage, by disaster type and costs, 1980-2023



Source: National Integrated Drought Information System, *Billion-Dollar Weather and Climate Disasters*, as of September 2024.

Rising Frequency and Costs of Extreme Weather Events in New Mexico

Share of billion-dollar weather event damage, by disaster type and costs, 1980-2023



Source: National Integrated Drought Information System, *Billion-Dollar Weather and Climate Disasters*, as of September 2024.

Financial Impacts of Climate on States Capital Spending

Measuring Economic Consequences of Climate Impacts

- **Physical risks:** Damage to people, assets, or income from severe weather and disasters.
- **Transition risks:** Costs or declines in revenue from climate policies or new technologies.

Implications for States' Transportation Budgets

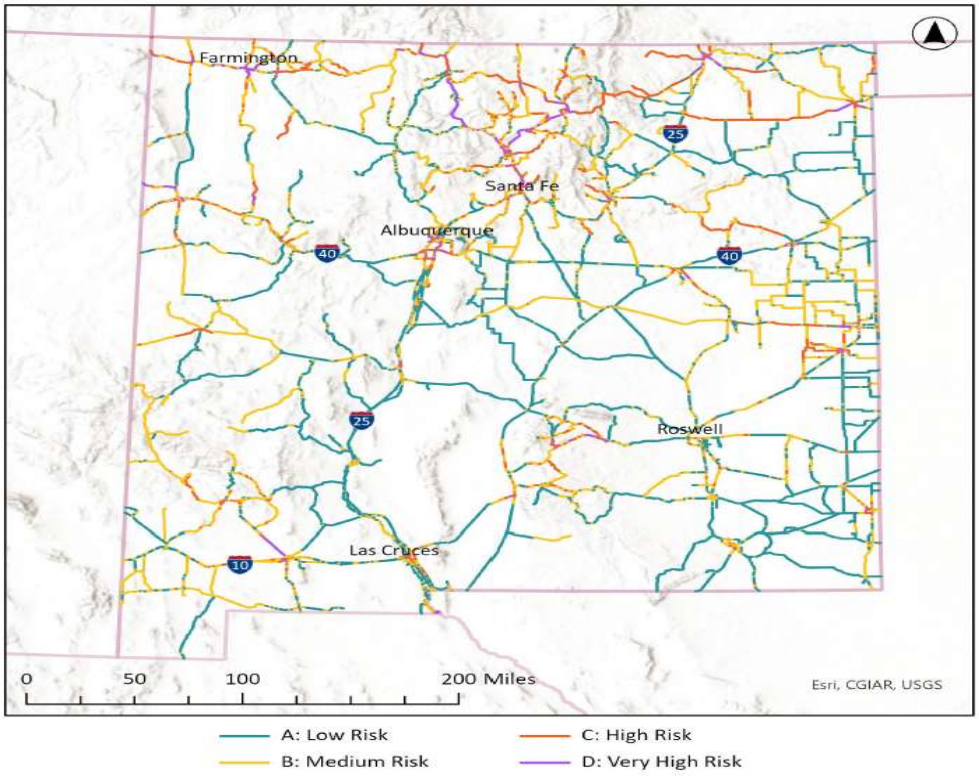
- **Acute physical risks:** Higher costs for emergency repairs and service disruptions from severe weather events and natural disasters.
- **Chronic physical risks:** More frequent maintenance, repair, and system redesigns needed to handle ongoing climate stressors.
- **Transition risks**: Added costs or revenue losses due to climate policies or new technologies, e.g., taxes on GHG emissions or reduced gas tax revenues due to electric vehicles.

New Mexico's Transportation Resilience Improvement Plan

Assessing Climate Risks: New Mexico

New Mexico DOT's Resilience Improvement Plan highlights risks to the state's transportation network which can help with prioritizing projects and investing to address at-risk infrastructure.

Figure 2. Statewide Map of Resilience Risk Results

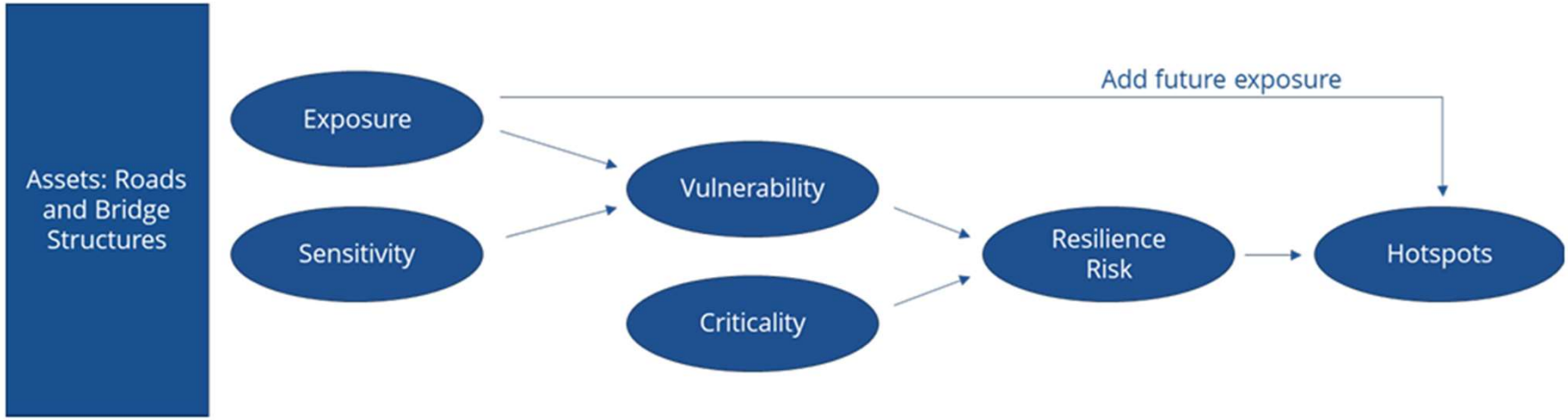


Source: New Mexico DOT Resilience Improvement Plan, 2024.

Assessing Climate Risks: New Mexico

Resilience risk hotspots are identified by examining exposure, sensitivity, and criticality to different current and future risks

Figure 1. Components of Analysis Methodology



Source: New Mexico DOT Resilience Improvement Plan, 2024.

Environmental Risks for Transportation Systems

Potential impacts on New Mexico's roads and bridges

Environmental Conditions	Climate Hazard	Impact on Roads and Bridges
Rising temperatures	Extreme heat	• Rutting, cracking, premature pavement. • softening or expanding, potholes, road crumbling. • Stress on bridge joints. • Construction activities are limited due to worker safety concerns, especially in humid areas.
Changes in the frequency and intensity of precipitation	Droughts	• Surface cracking and deterioration • Subsidence and sinkholes • Erosion and structural instability
	Flash flooding	• Damage to roadways and bridges • Shortening of life cycle and fidelity of roads and bridges • Bridge washouts
Increased winds and dust storms	Wildfires	• Heat damage, thermal cracking, or chipping. • Pavement softening, rutting, expanding, and crumbling. • Stress on bridge joints. • Erosion, landslides, or washouts, particularly if followed by heavy rains.
	Dust storms	• Reduce visibility. • Accelerated wear and shortening of life cycle and fidelity of roads and bridges from fine dust particles.

Sources: New Mexico DOT's *Resilience Improvement Plan*, 2024. James E. Neumann et al., Climate Change Risks to U.S. Infrastructure: Impacts on Roads, Bridges, Coastal Development, and Urban Drainage, Jan. 23, 2014; Allison R. Crimmins et al., Fifth National Climate Assessment, 2023; Steve Muench et al., Pavement Resilience: State of the Practice, 2023; Transportation Research Board, The Potential Impacts of Climate Change on U.S. Transportation, 2008

Assessing Climate Risks: New Mexico

Across New Mexico, about 20% of road and bridge miles are at high or very high tisk

District	A: Low Risk	B: Medium Risk	C: High Risk	D: Very High Risk	Grand Total
1	1,453	981	242	77	2,754
2	2,114	1,108	517	97	3,835
3	328	307	172	85	893
4	1,438	1,283	585	140	3,446
5	819	1,011	631	402	2,863
6	718	807	209	85	1,819
Statewide	**6,871**	**5,496**	**2,356**	**887**	**15,610**

Source: New Mexico DOT Resilience Improvement Plan, 2024.

Next Steps for Enhancing Transportation Resilience in New Mexico

The resilience project needs in New Mexico are greater than what can be addressed with PROTECT funding alone.

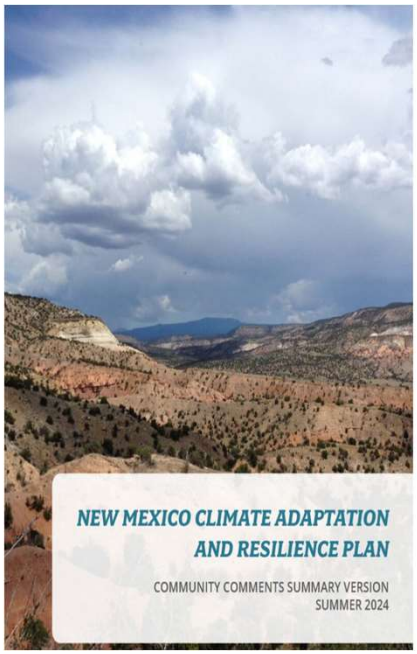
- NM 2024 Resilience Improvement Plan

- How can the state connect the needs for resilient roads and bridges with capital budgeting and fiscal decisions?
- How can the New Mexico DOT, stakeholders, and researchers build and improve upon the resilience risk methodology and the underlying research?
- Given funding needs, what is an affordable and sustainable approach to paying for resilience needs?

A Framework for Planning for Climate Costs and Building Resilience

Coordinating Statewide Action

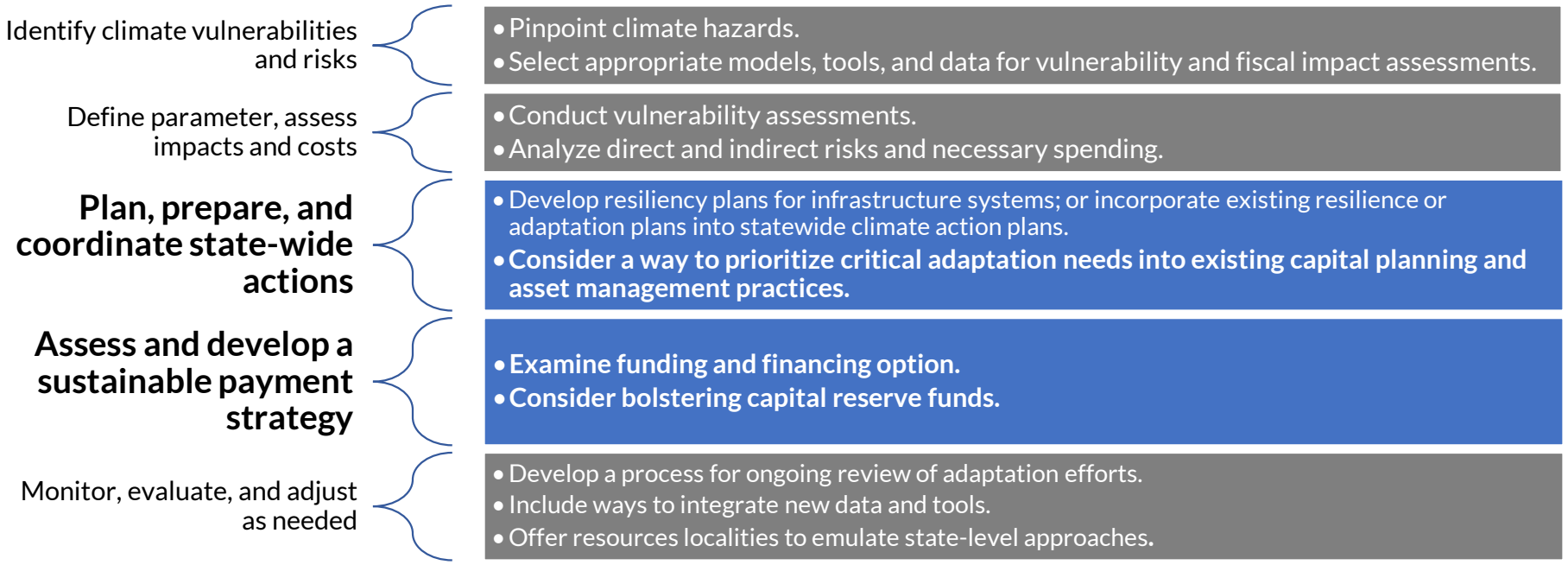
New Mexico is already engaging in coordination across state agencies for resilience planning



Source: New Mexico DOT Resilience Improvement Plan, 2024; and New Mexico's Climate Adaptation and Resilience Plan Draft (2024).

How State and Local Governments Can Make Cost-Effective Investments in Resilience

A framework for assessing and prioritizing infrastructure needs

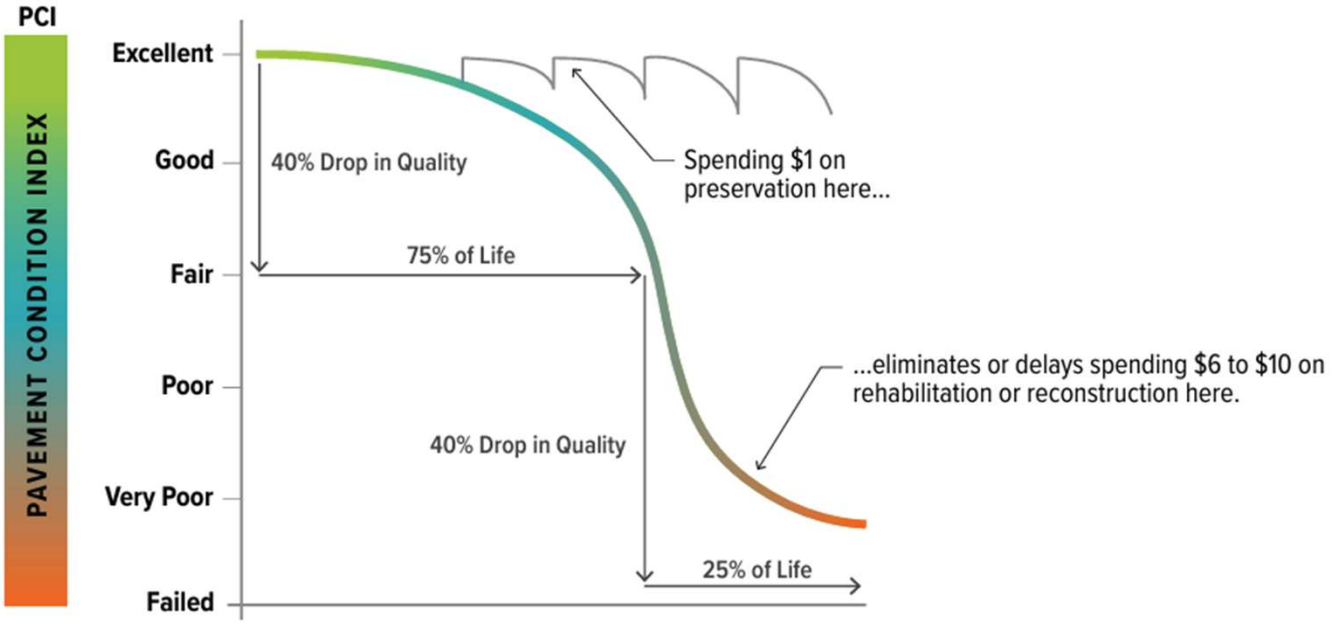


Sources: Rawlings Miller, *A Roadmap: Matching Climate Assessments to Decision Making*, Nov. 13, 2023; Robert Lempert et al., *Fourth National Climate Assessment*, Volume II, Chapter 28: Reducing Risks Through Adaptation Actions, 2018

Deferred Maintenance: Life-cycle Management

Long-term planning can identify opportunity to save money through timely investments in preservation.

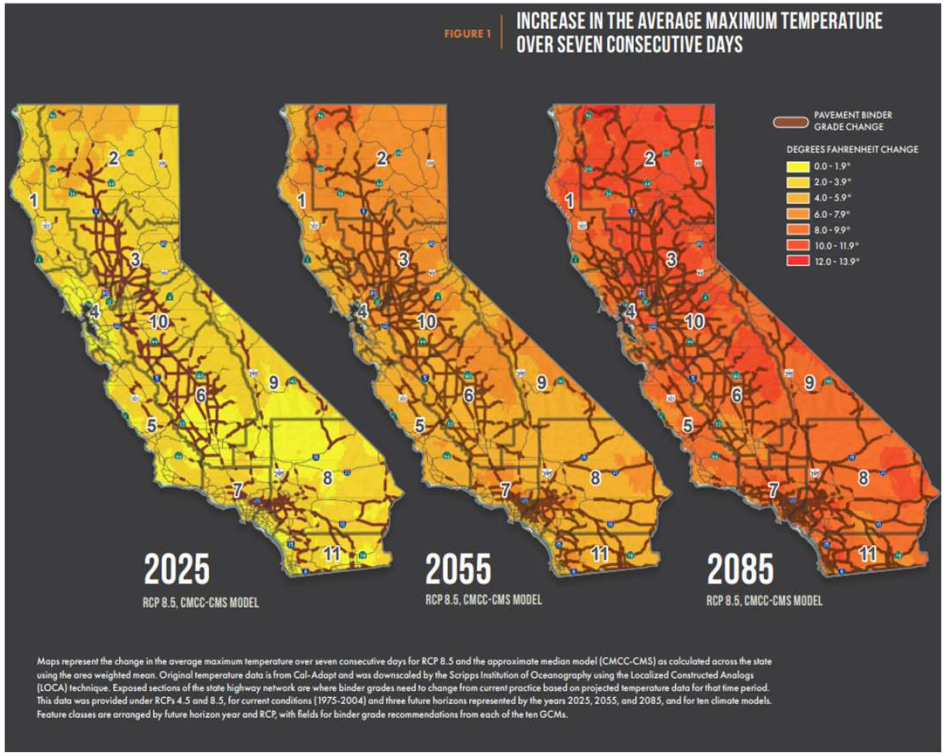
This illustration, from FHWA's Pavement Preservation Compendium II, shows the cost-effectiveness of pavement preservation treatments. Costs shown are not specific to CDOT.



Source: FHWA analysis included in the Colorado DOT 2022 Transportation Asset Management Plan

Assessing Risks and Developing a Payment Strategy: California

- In 2018, Caltrans began conducting vulnerability assessments across its 12 transportation districts to identify key climate risks in each area.
- By 2021, results were used to establish district-specific adaptation priorities.
- In response, The California Transportation Commission created the *Local Transportation Climate Adaptation Program(LTCAP)* to provide grants to address these local adaptation and resilience needs.
- As of 2023, LTCAP has awarded **$309.2 million** to 15 resilience-focused projects across the state.



Sources: California Transportation Commission, Local Transportation Climate Adaptation Program (LTCAP) (2024); Caltrans Climate Change Vulnerability Assessment Statewide Summary Report. (2021)

Additional Strategies to Fund Resiliency

States are leading the way in exploring several approaches to financing critical investments

- **Low-cost Loans and Debt Financing:**
  - **California** is proposing a $10 billion climate bond initiative to fund resiliency efforts.
  - **New York** passed a $4.2 billion bond in 2022 for infrastructure upgrades to withstand extreme weather.
  - **South Carolina** established a revolving fund offering low-interest loans and grants to localities for resiliency projects.
  - **Missouri, Vermont, and several others** are utilizing State Infrastructure Banks (SIBs) and Bond Banks to provide low-interest loans for municipalities to upgrade roads and improve resilience against climate impacts like flooding.
- **Superfund or "Polluters Pay" Programs:**
  - **California, Massachusetts, and Maryland** are implementing programs to charge companies based on their past carbon emissions to fund resiliency initiatives.
- **Dedicated Taxes and Fees:**
  - **Massachusetts** is exploring options such as property insurance fees, excise tax increases, general fund allocations, and setting aside a portion of rainy-day fund surpluses for adaptation and resiliency.

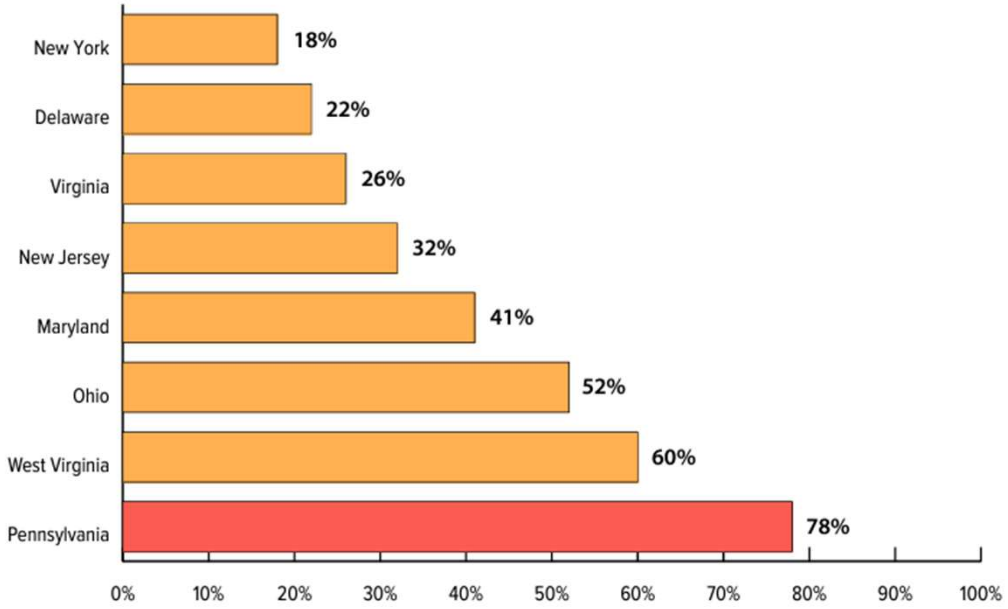
Managing Declining Fuel Taxes from an Electric Vehicle Transition

Managing the Fiscal Impacts of the EV Transition

- Federal and state fuel taxes pay for over a third of state highway funding.
- The growing usage of electric and hybrid vehicles will lead to stagnant or shrinking fuel taxes and a potential funding gap in many states.
- States can proactively assess current road and bridge conditions, identify current and future needs, project funding gaps, and explore potential funding and financing solutions.
- Pennsylvania's Transportation Revenue Option Commission offers a potential model. Other states that have formally examined transportation funding in recent years include Kansas, Maine, Missouri, Nevada, North Carolina, and Utah.

Pennsylvania's High Reliance on Fuel Taxes

Gas taxes as proportion of state transportation revenue

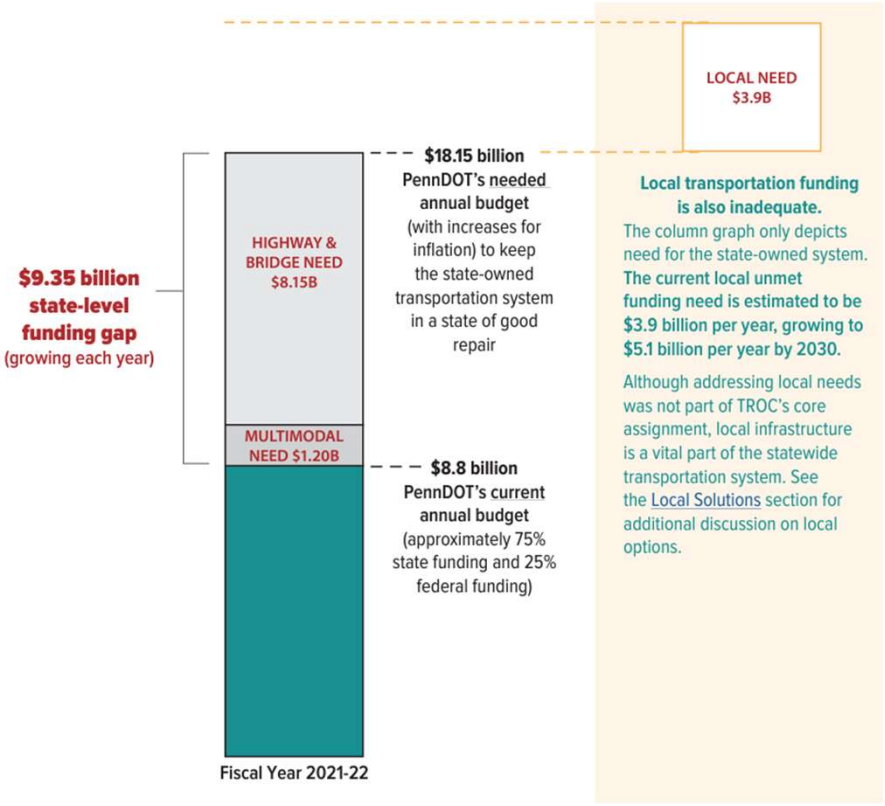


Source: Pennsylvania Transportation Revenue Option Committee Report, *Final Report and Strategic Funding Proposal (2021).*

Pennsylvania's Transportation Funding Gap

State transportation needs were twice the size of the annual PennDOT budget and unmet local needs adding nearly $4 billion in additional shortfalls.

Causes included increased emergency repair spending, the decline of the gas tax, more stringent Federal condition requirements, rising inflation in construction costs, and the additional cost of addressing past deferred maintenance.



Source: Pennsylvania Transportation Revenue Option Committee Report, *Final Report and Strategic Funding Proposal (2021).*

Assessing Unmet Needs Over Time

The TROC report found a more than $100 billion state shortfall over the next decade for roads, bridges, system modernization, and multimodal transportation.

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
National Highway System	$1,900	$1,995	$2,095	$ 2,199	$2,309	$2,425	$2,546	$2,673	$2,807	$2,948
System Modernization and Upgrades	$2,100	$2,205	$2,315	$2,431	$2,553	$2,680	$2,814	$2,955	$3,103	$3,258
Non-NHS and Maintenance and Operations	$4,100	$4,305	$4,520	$4,746	$4,984	$5,233	$5,494	$5,769	$6,058	$6,360
Facilities	$50	$53	$55	$58	$61	$64	$67	$70	$74	$78
Multimodal	$1,200	$1,260	$1,323	$1,389	$1,459	$1,532	$1,608	$1,689	$1,773	$1,862
Total State-Level Transportation Funding Need	**$9,350**	**$9,818**	**$10,308**	**$10,824**	**$11,365**	**$11,933**	**$12,530**	**$13,156**	**$13,814**	**$14,505**

Source: Pennsylvania Transportation Revenue Option Committee Report, *Final Report and Strategic Funding Proposal (2021).*

Finding a Replacement for Fuel Taxes

Pennsylvania's Transportation Revenue Option Committee (TROC) identified key revenue sources to address immediate funding needs and facilitate the phase-out of fuel taxes

	PHASE 1 (Years 1 and 2)	PHASE 2 (Years 3 and 4)	PHASE 3 (Year 5+)
PROPOSED REVENUE TYPE	ESTIMATED ADDITIONAL REVENUE		
Road User Charges (MBUF)	$2,000,000	$2,122,000	$8,932,316,000
Tolling	$0	$2,705,040,000	$2,543,716,000
Funding Redirection	$673,000,000	$609,000,000	$545,000,000
Fees	$1,712,420,000	$1,991,864,000	$2,072,438,000
Taxes	$635,167,000	$786,798,000	$992,343,000
Other	$450,000,000	$468,180,000	$487,095,000
Eliminate Gas Tax	$0	$0	-$4,088,301,000
TOTAL	**$3,472,587,000**	**$6,563,004,000**	**$11,484,607,000**

Source: Pennsylvania Transportation Revenue Option Committee Report, *Final Report and Strategic Funding Proposal (2021).*

Potential Responses to Fuel Tax Shortfalls

Strategy	Description	States Piloting Implemented Programs
Road user charges (RUCs)	• Car owners are charged for their use of a road system based on how many miles they travel. • Miles are tracked via GPS units in vehicles or annual reporting of miles.	Eight states have implemented or are piloting RUCs including: WA, CA, CO, DE, HI, OR, PA, and MN.
EV annual registration fee	• An annual charge to electric vehicle and other zero-emission vehicle owners. • Often, an additional fee on top of annual registration fees.	Thirty-two states have some form of annual EV additional fees.
Increase existing fuel tax	• States would increase the state-specific gasoline/gasohol/diesel fuel taxes on top of the federal fuel taxes.	• Illinois
Electricity sales tax	• Users of EV charging units would pay a tax on the electricity they use. • Measures road usage based on units of electricity used.	• Georgia • Iowa • Montana • Utah
Expand tolling	• Expand the number of miles of state highways and roads/bridges that charge tolls.	• Ohio • Pennsylvania

Source: Dynamic Sustainability Lab, "The Emerging Highway and Roads Revenue Gap" (2024)

Key Findings

- Climate risks to transportation networks are becoming more frequent and costly.
- Timely investments in maintenance and resilience can save states money in the long run, protect important assets, and maintain access to residents.
- New Mexico DOT's Resilience Improvement Plan includes a comprehensive vulnerability assessment of the statewide transportation network.
- Integrating these findings into capital planning and budgeting is crucial, along with securing funding for resilience initiatives.
- New Mexico must also address the impact of the EV transition on fuel tax revenues and transportation funding.

For more information:

https://www.pewtrusts.org/en/projects/state-fiscal-policy

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