



MoDOT Carbon Reduction Strategy

November 2023

Contents

Message from the Director	1
Introduction	2
Carbon Emissions	3
Carbon Emissions: Sources and Measurement	3
Carbon Emissions in Missouri	4
Transportation-Related Carbon Emissions in Missouri	7
Statutory Drivers and Concurrent Initiatives	8
Focus on Bridges Program	8
Increase in Motor Fuel Tax	8
Infrastructure Investment and Jobs Act	8
Asset Management Deficit Programs.....	8
2023 Transportation Investments	9
Transportation Disadvantaged Populations in Missouri	10
Approach to Developing the CRS	14
Foundational Research	14
Plan Review	14
CRS Goals	15
Initiatives Connected to CRS Goals	16
Strategies.....	17
Missouri Funding Allocation and Planning Partners Coordination	18
CRP Apportionment.....	18
Internal Coordination	19
External Engagement	19
MPO and RPC Survey and Consultation Meeting Summaries	21
CRS and CRP: Implementation, Coordination, and Program Evaluation	28
CRS Approach	29
CRS Strategies	29
CRP Approach and Vision	35
Consensus Building.....	35

Aligned CRP Project Eligibilities.....	35
Connections to CRS/CRP Focus Areas, CRS Strategies, MPO/RPC priorities, and MoDOT Project Examples	37
Ongoing Coordination between MoDOT and MPOs/RPCs	41
Flexibility	41
Knowledge-sharing	41
Methods and Frequency of Program Evaluation.....	41
CRP Project Tracking.....	41
Monitoring Outcomes.....	41
Looking Forward.....	43
Plans for Future Updates to the CRS.....	43
Appendix	44

Table of Tables

Table 1: Initiatives Identified through Foundation Research.....	16
Table 2: Strategies Identified through Foundational Research	17
Table 3: Missouri’s CRP Apportionment.....	19

Table of Figures

Figure 1: Emission Sources.....	3
Figure 2: Carbon Emissions in Metric Tons – Unreported vs. Reported and Reported by Source (2021).....	4
Figure 3: Carbon Intensity of the Missouri Economy (2000-2021)	5
Figure 4: Carbon Intensity of the Missouri Energy Supply (1970–2021)	5
Figure 5: Energy-related CO ₂ Emissions (1970-2021).....	6
Figure 6: Missouri Energy-Related CO ₂ Emissions by Fuel Type	6
Figure 7: Missouri Energy-Related CO ₂ Emissions by Sector (1970-2021)	7
Figure 8: Missouri CO ₂ Emissions from Transportation Sector by Fuel Type (1970-2021)....	7
Figure 9: Disadvantaged Communities	10

Figure 10: Areas of Persistent Poverty 11

Figure 11: Transportation Insecurity in Missouri 13

Figure 12: MoDOT's Project Prioritization Process 21

Figure 13: CRS-Eligible Activities supported or implemented by MPOs and RPCs..... 23

Figure 14: MPO & RPC Survey Results – Project Criteria..... 24

Figure 15: MPO & RPC Survey Results – Co-benefits 24

Figure 16. Bracketology Exercise: Non-TMA MPOs 25

Figure 17: Bracketology Exercise: TMA MPOs 26

Figure 18: Bracketology Exercise: RPC Meeting #1..... 27

Figure 19: Bracketology Exercise: RPC Meeting #2..... 28

Figure 20: MoDOT's approach to implementing CRS Strategies and prioritizing CRP project within its existing transportation planning decision-making framework. 30

Figure 21. Alignment between CRS/CRP Focus Areas, MoDOT Goals, Performance Tracking and Strategies. 31

Figure 22. CRS Strategies and Aligned MPO, RPC, and MoDOT Initiatives – Energy Management 32

Figure 23. CRS Strategies and Aligned MPO, RPC, and MoDOT Initiatives – Non-Motorized Transportation..... 33

Figure 24: CRS Strategies and Aligned MPO, RPC, and MoDOT Initiatives – Traffic Flow Improvement 34

Figure 25: Alignment between CRS/CRP Focus Areas, MoDOT Goals, Eligible Projects, and Performance Tracking 36

Figure 26: CRS Strategies, Aligned CRP Eligible Project Types, MPO/RPC Priorities, and MoDOT Project Examples – Energy Management..... 38

Figure 27: CRS Strategies, Aligned CRP Eligible Project Types, MPO/RPC Priorities, and MoDOT Project Examples – Non-Motorized Transportation 39

Figure 28: CRS Strategies, Aligned CRP Eligible Project Types, MPO/RPC Priorities, and MoDOT Project Examples – Traffic Flow Improvement 40

Figure 29: Alignment between CRS/CRP Focus Areas and MoDOT Performance Tracking 42

Carbon Reduction Strategy

Message from the Director

The Missouri Department of Transportation (MoDOT) strives to maximize our investments to deliver efficient and effective transportation improvements. With approximately \$30 million of federal funding available annually in Missouri for transportation improvements that help reduce carbon emissions, the department will work with our planning partners to leverage these dollars to address transportation needs across the state. The Missouri Carbon Reduction Strategy (CRS) will build on some of our proven, successful strategies, such as improving energy efficiency of our infrastructure through the transition to light-emitting diode (LED) lighting and expanding transportation choices by improving pedestrian access along our roadways. The plan also allows flexibility at the regional level for us to explore new, innovative approaches to ensure we're fully utilizing these dollars.

I want to thank our Metropolitan Planning Organizations (MPOs) and Regional Planning Commissions (RPCs) for their thoughtful input. Their participation informed this CRS and will also allow us to better serve Missouri now and in the future.

With the implementation of the CRS, MoDOT will have another tool to help us deliver our mission to provide a world-class transportation system that is safe, innovative, reliable, and dedicated to a prosperous Missouri.

Thank you,



Patrick McKenna
Director, Missouri Department of Transportation

Introduction

The federal Infrastructure Investment and Jobs Act (IIJA) legislation created Carbon Reduction Program (CRP), which funds a wide range of eligible projects geared toward reducing transportation carbon dioxide emissions from on-road highway sources. The CRP provides \$6.4 billion in formula funding over five years for states and localities. Missouri is allotted approximately \$30 million in annual formula funding through the CRP. To access CRP funds, each state is required to develop a Carbon Reduction Strategy (CRS) that identifies projects and strategies that support the reduction in carbon emissions from on-road transportation and is suited to the density and context of the state.

In coordination with Metropolitan Planning Organizations (MPOs) and Regional Planning Commissions (RPCs), the Missouri Department of Transportation (MoDOT) has drafted this Carbon Reduction Strategy (CRS) to identify how the state will invest CRP dollars to reduce transportation emissions in Missouri.

In recognition that often the most successful initiatives do not seek to create a stand-alone process, but rather integrate into existing practices to allow for a more seamless implementation, the Missouri CRS focuses on incorporating carbon reduction strategies into the agency's long-standing and publicly vetted project planning and prioritization framework, through which MoDOT works in concert with MPOs and RPCs from needs identification through project delivery. By utilizing this existing process, MoDOT will prioritize strategies in these three focus areas:

- **Energy Management:** reduce Missouri's energy footprint by implementing new technologies such as smart lighting and electrification infrastructure.
- **Non-motorized Transportation:** provide people the opportunity to walk or bike to nearby destinations by constructing new and improved non-motorized facilities.
- **Traffic Flow Improvement:** promote better fuel economy through signal and intersection optimization projects that reduce delays and improve traffic flows.

The following sections outline the research, existing plans, policies, and engagement efforts that provided the foundation for this CRS and how MoDOT anticipates implementing it going forward.

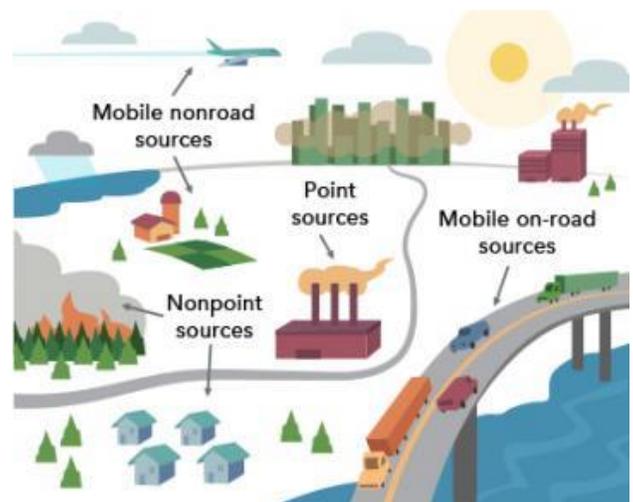
Carbon Emissions

Carbon Emissions: Sources and Measurement

Carbon dioxide (CO₂) emissions are created by a wide variety of sources, which can generally be grouped into four categories: point, non-point, mobile on-road, and mobile non.¹

- **Point emissions** come from large stationary sources, such as large industrial facilities electric power plants, airports, and smaller industrial, non-industrial and commercial facilities that typically emit more than 25,000 metric tons of CO₂ per year.
- **Non-point emissions** come from other stationary sources, such as residential heating, commercial combustion, asphalt paving, commercial and consumer solvent use, and fires.
- **Mobile on-road emissions** come from internal combustion engine vehicles produce emissions during operation on roads, movement on highway ramps, and idling.
- **Mobile non-road emissions** come from internal combustion engine off-road vehicles (e.g., locomotives, commercial marine vessels) and mobile engines (e.g., lawn and garden equipment, construction equipment, aircraft ground support equipment).

Figure 1: Emission Sources



Source: Missouri Department of Natural Resources

Each source emits carbon at different rates. Carbon emissions at point sources can be measured by using continuous emissions monitors (CEMs) and stack tests. For mobile sources, emissions are measured through engineering calculations and fuel use estimates.

The CRS is focused on reducing transportation-related CO₂ emissions from mobile on-road sources.

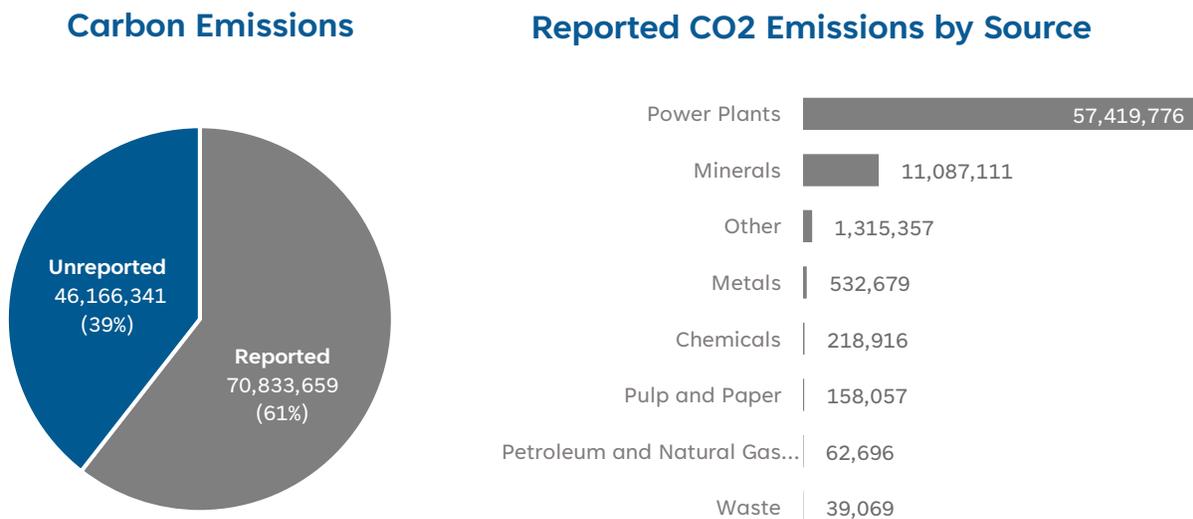
¹ <https://dnr.mo.gov/air/business-industry/air-emissions>

Carbon Emissions in Missouri

Missouri ranks 12th in carbon emissions, with a total of 117 million metric tons in 2021.² The Greenhouse Gas Reporting Program (GHGRP) reports that 71 million metric tons (61%) of carbon emissions come from 100 large stationary sources in Missouri.³ The remaining 46 million metric tons (39%) of unreported carbon emissions come from non-point emissions, mobile on-road emissions, and mobile non-road emissions. It's important to note that GHGRP focuses on large industrial emitters and does not account for emissions from every source.

Figure 2 shows the ratio of unreported to reported carbon emissions, as well as the breakdown of reported emissions by source.

Figure 2: Carbon Emissions in Metric Tons – Unreported vs. Reported and Reported by Source (2021)



Source: GHGRP

Carbon intensity is a measure of how much CO₂ is emitted to generate some product. The carbon intensity of the Missouri economy is a measure of how much CO₂ is emitted to generate one dollar (i.e., CO₂ produced per Gross Domestic Product (GDP) dollar). The carbon intensity of the Missouri energy supply is a measure of how much CO₂ is emitted to generate a unit of energy, such as a British thermal unit (Btu).

² <https://www.eia.gov/state/rankings/?sid=MO#/series/226>

³ <https://www.epa.gov/ghgreporting/ghgrp-emissions-location>

The carbon intensity of the Missouri economy has decreased by 27.4 percent from 560.3 in 1997 to 407.1 in 2021 (Figure 3).

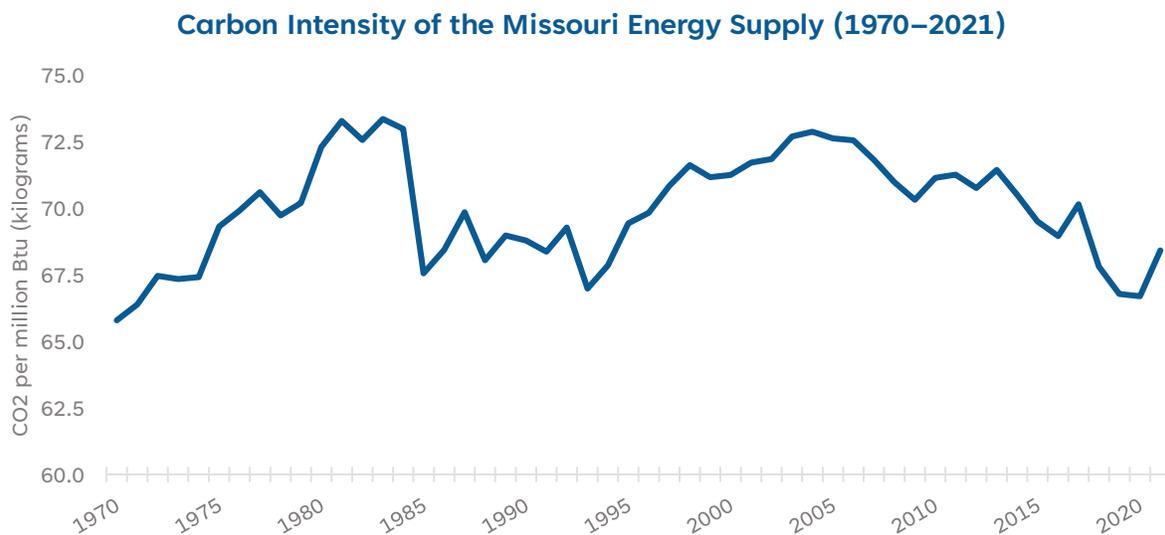
Figure 3: Carbon Intensity of the Missouri Economy (2000-2021)



Source: US Energy Information Administration (EIA)

The carbon intensity of the Missouri energy supply has increased by roughly 4 percent from 65.8 in 1970 to 68.4 in 2021 (Figure 4).

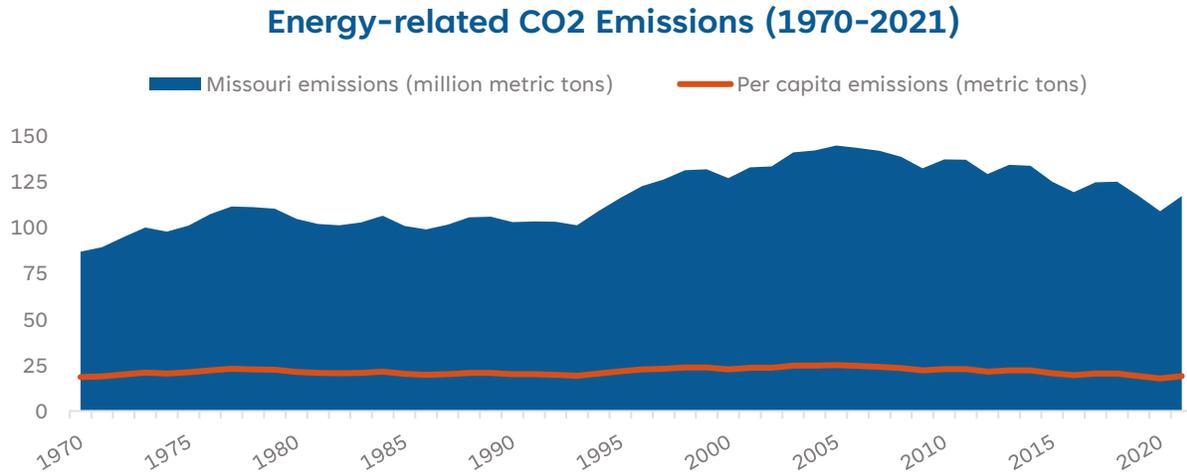
Figure 4: Carbon Intensity of the Missouri Energy Supply (1970–2021)



Source: EIA

In 2021, the average Missourian was responsible for 19 metric tons of carbon emissions. This rate has fluctuated between 18 and 25 metric tons over the last 50 years (Figure 5).

Figure 5: Energy-related CO₂ Emissions (1970-2021)

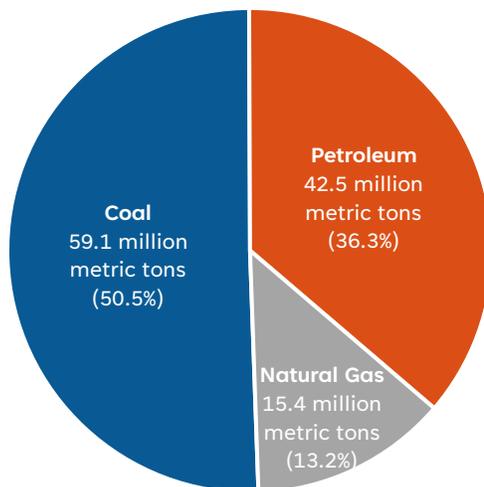


Source: EIA

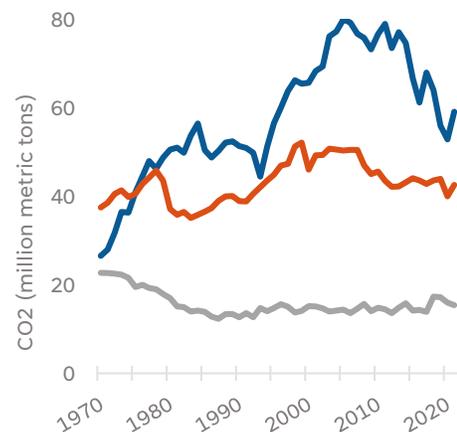
Carbon emissions come from three main fuel types: coal, petroleum, and natural gas. In Missouri, half of carbon emissions come from coal and over a third come from petroleum (Figure 6). After decades of steep increases, carbon emissions from coal have been decreasing since 2010. Carbon emissions from natural gas have remained somewhat steady since 1980 and carbon emissions from petroleum have fluctuated over the same time period.

Figure 6: Missouri Energy-Related CO₂ Emissions by Fuel Type

CO₂ Emissions by Fuel Type (2021)



CO₂ Emissions by Fuel Type (1970-2021)

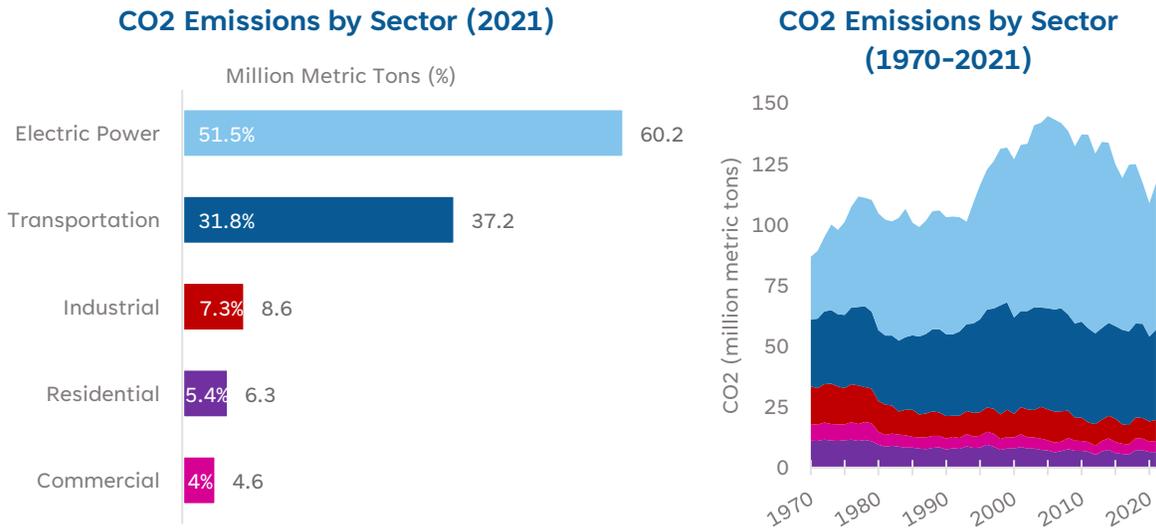


Source: EIA

Transportation-Related Carbon Emissions in Missouri

Missouri’s transportation sector is responsible for about a third of carbon emissions in the state. Emitting over 37 metric tons of CO₂ annually, the transportation sector ranks second among all economic sectors in the state (Figure 7).

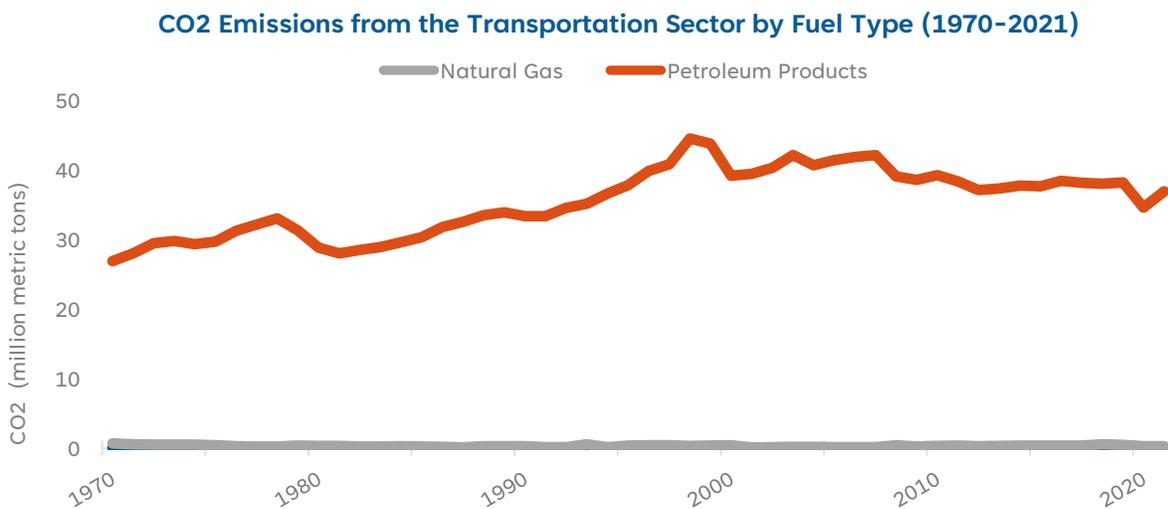
Figure 7: Missouri Energy-Related CO₂ Emissions by Sector (1970-2021)



Source: EIA

Petroleum products have been responsible for between 97.5 and 99.7 percent of CO₂ emissions in the transportation sector for the last fifty years (Figure 8).

Figure 8: Missouri CO₂ Emissions from Transportation Sector by Fuel Type (1970-2021)



Source: EIA

Statutory Drivers and Concurrent Initiatives

The Missouri General Assembly and Missouri Highways and Transportation Commission have worked together to deliver increased investment in Missouri's transportation system over the last four years. The following actions have been launched in recent years to expand transportation improvements across the state:

Focus on Bridges Program

In 2019, the Missouri General Assembly passed Governor Mike Parson's Focus on Bridges program in two phases. The first authorized \$50 million in general revenue to expedite the repair and replacement of 45 bridges that had already been identified as some of the state's top bridge priorities by local planning organizations. The second authorized \$301 million in bonding – to be repaid over seven years from general revenue – to repair or replace another 215 bridges that had been previously prioritized, contingent on Missouri receiving a federal INFRA Grant to replace the I-70 Missouri River Bridge at Rocheport.

Increase in Motor Fuel Tax

During the 2021 Missouri Legislative Session, Senate Bill 262 was passed and then signed by Gov. Parson increasing the state's motor fuel tax 2.5 cents per year for the next five years. In 2022 the General Assembly passed a transportation cost-share program, also a priority of Gov. Parson, which made \$75 million available for local community transportation priorities.

Gov. Parson signing legislation increasing Missouri's motor fuel tax by 2.5 cents in 2021.



Infrastructure Investment and Jobs Act

The federal reauthorization of the IJA in November 2021 also increased transportation revenues to the state of Missouri. It is estimated that Missouri will receive approximately a 25-percent increase in federal funding for five years, beginning in fiscal year 2022.

Asset Management Deficit Programs

In January 2022, the Missouri Highways and Transportation Commission approved an increase to the Asset Management Deficit program. The increase will fund \$25 million per year in State Transportation Improvement Program (STIP) allocation instituted by the Commission in 2017 to assist districts that are unable to meet MoDOT's asset management goals. In addition, the Maintenance Asset Management Deficit program will address low-volume routes in poor condition maintained by the department's operating budget. The

allocation was \$15 million in FY 2022, FY 2023, and FY 2024. This allocation is for districts with low-volume route conditions less than the statewide average.

The goal of both the Asset Management Deficit program and the Maintenance Asset Management Deficit program is to improve the pavement conditions of minor and low-volume routes so Missourians have similar driving experiences around the state. Approximately \$230 million is spent each year on pavements for various activities such as asphalt pavement repair, chip sealing, pothole patching, full-depth concrete pavement replacement, and striping.

2023 Transportation Investments

During the 2023 Missouri legislative session, the Missouri General Assembly addressed the top transportation need in the state, widening I-70. Missouri's FY 2024 budget from the General Assembly and supported by Gov. Parson provides General Revenue for the costs to plan, design, construct, reconstruct, rehabilitate, and repair three lanes in each direction on approximately 200 miles of I-70, from Blue Springs to Wentzville.

In addition to the I-70 project, the General Assembly also made several investments in other projects. These other projects are funded by General Revenue and the Budget Stabilization Fund and are to conduct environmental studies on future corridor enhancements, construct multimodal projects, and improve pavement conditions on routes with 1,000 or less vehicles per day.

Missouri State Capitol

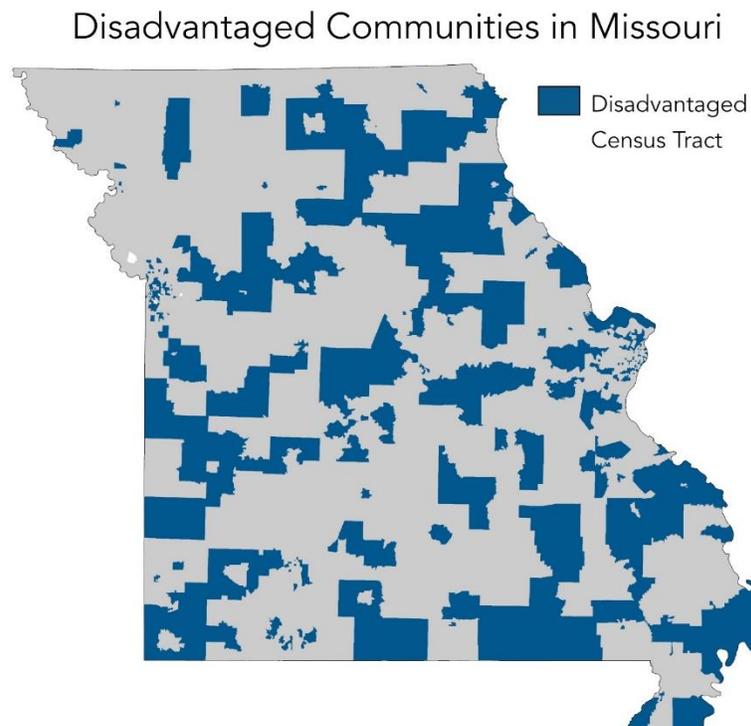


Transportation Disadvantaged Populations in Missouri

Transportation disadvantaged populations are socially vulnerable, low-income, have limited access to affordable transportation, experience high levels of exposure to pollutants, have high risk of climate disaster, or experience a combination of these factors. In Missouri, areas throughout the state – both rural and urban – can be described as transportation disadvantaged. These disadvantaged populations are disproportionately burdened by the impacts of climate change and are predisposed to benefit from targeted investment. To address this, the IJJA created the Justice40 initiative, which aims to deliver 40 percent of benefits to transportation disadvantaged communities that are marginalized, underserved, and overburdened by pollution.

The US Department of Transportation’s (US DOT) Equitable Transportation Community (ETC) explorer illustrates transportation disadvantage data at the census tract level. The ETC has identified 447 disadvantaged census tracts in Missouri based on five key components: transportation insecurity, environmental burden, health vulnerability, social vulnerability, and climate and disaster risk burden (Figure 9).

Figure 9: Disadvantaged Communities

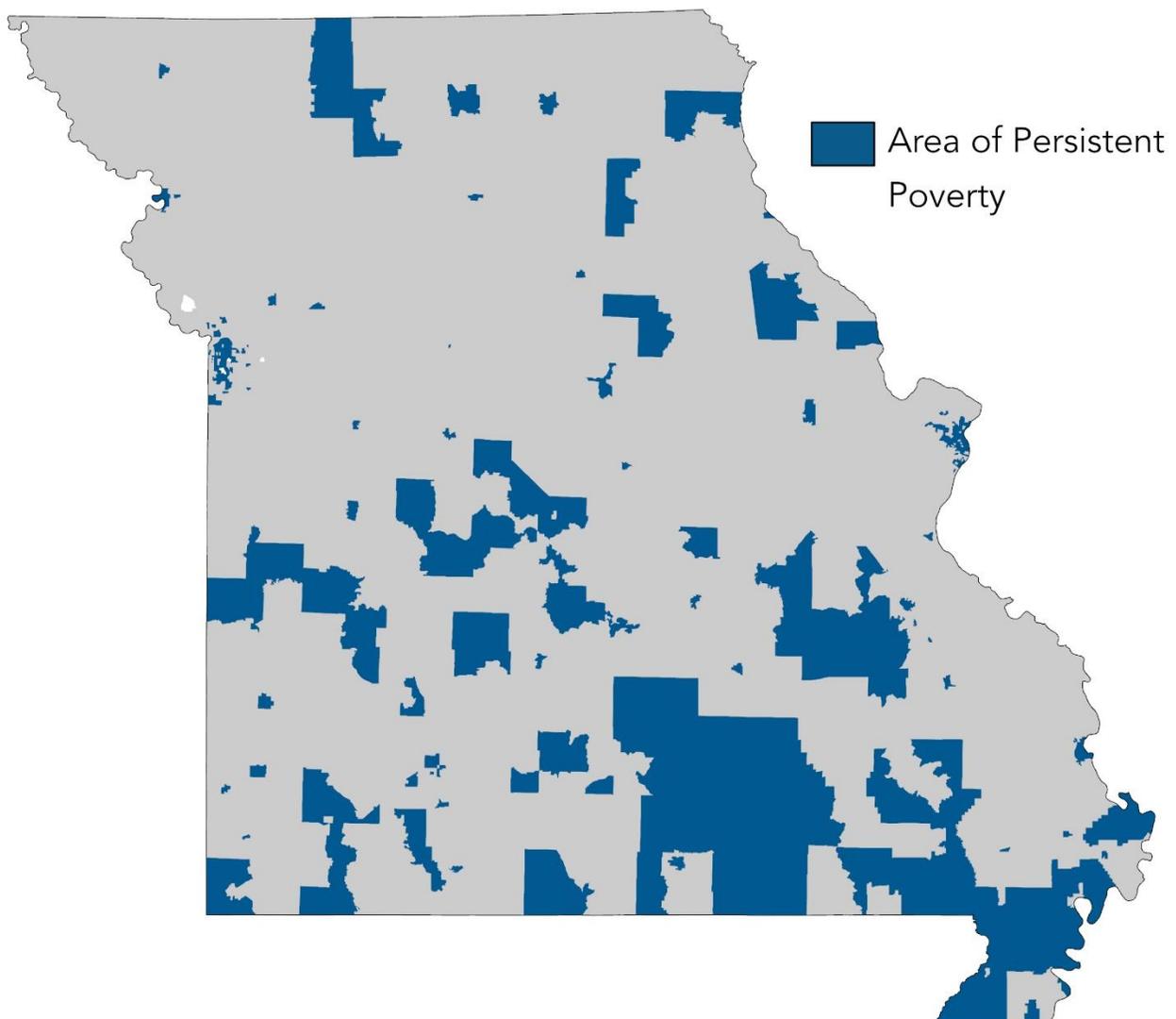


Source: ETC

Areas of persistent poverty are census tracts with a poverty rate of at least 20 percent as measured by the 2014–2018 5-year data series available from the American Community Survey of the Bureau of the Census. There are 402 areas of persistent poverty (Figure 10) in Missouri.

Figure 10: Areas of Persistent Poverty

Areas of Persistent Poverty in Missouri



Source: ETC

As defined by the ETC⁴, Transportation insecurity occurs when people are unable to get to where they need to go to meet the needs of their daily life regularly, reliably, and safely. Transportation insecurity is a contributing factor to persistent poverty. Transportation security is built upon three components:

- **Transportation Access** – commute time and ease of traveling via cars, walking and transit. Long commuting times and limited access to personal vehicles or transit can create significant barriers to employment and resources.
 - Data: *percent of households with no car, average commute time to work, frequency of transit services per square mile, jobs within a 45-minute drive, estimated average driving time to points of interest, estimated average walk time to points of interest*
- **Transportation Cost Burden** – percent of household income spent on transportation. Spending a higher percentage of household income on transportation leaves less money for housing, healthcare, and food. This can lead to substandard housing conditions with higher rates of health issues.
 - Data: *Calculated annual cost of transportation as a percent of household income, cost of gas, cost of transit, time value of money, time to work, median income, vehicle miles traveled, vehicle finance charges, cost of maintenance, insurance costs*
- **Transportation Safety** – the number of motor vehicle-related fatalities.
 - Data: *traffic fatalities per 100,000 people*

Missouri traffic fatalities in 2022.



2022 Missouri Crash Statistics

FATALITIES

1,057

NOT WEARING SEAT BELT

60%

Source: MoDOT

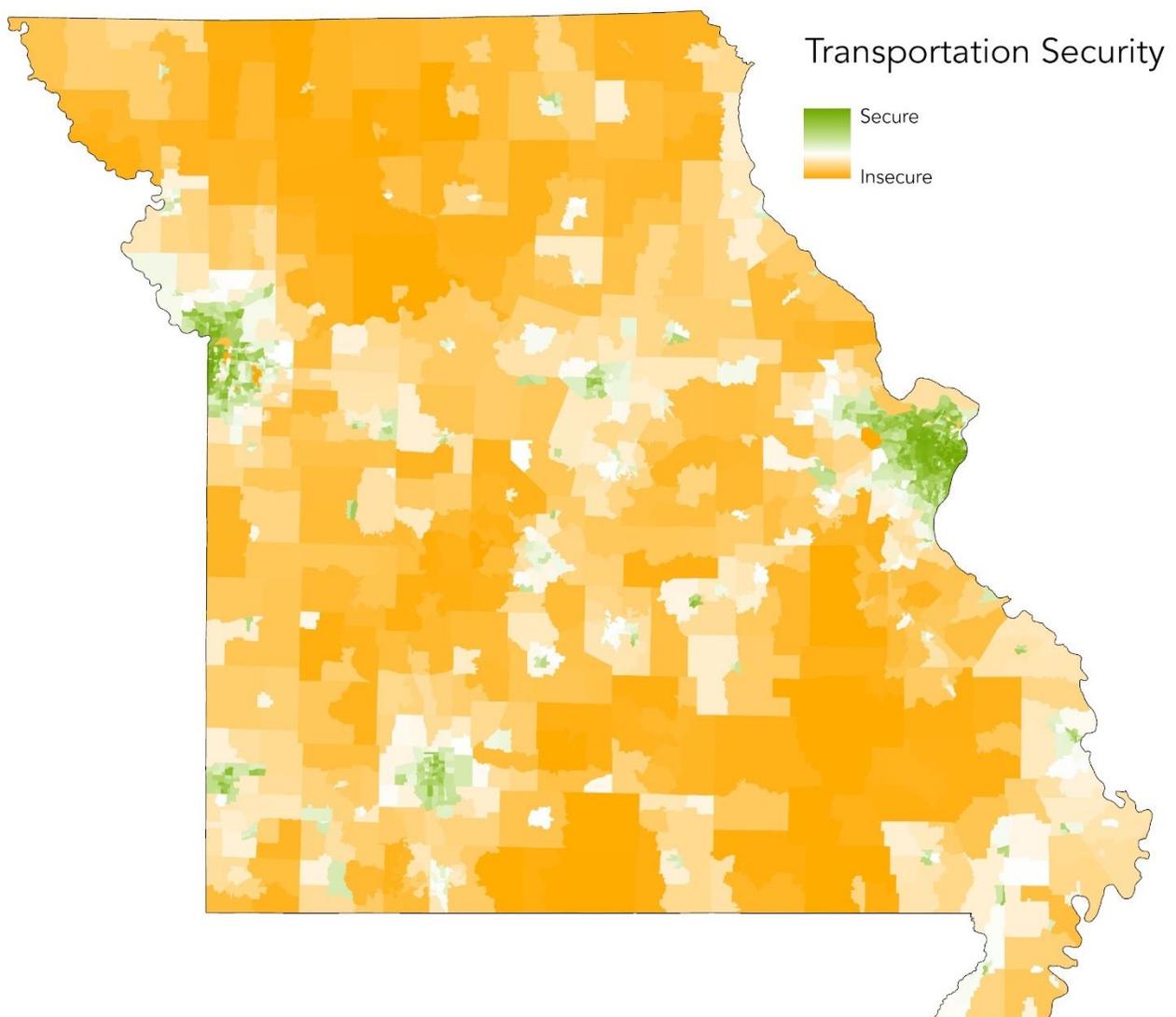
⁴ <https://experience.arcgis.com/experience/0920984aa80a4362b8778d779b090723/page/Understanding-the-Data/>

Figure 11 shows transportation insecurity in Missouri by location. Transportation is most secure in the large urban centers, Kansas City and St. Louis, as well as in smaller urban areas such as Springfield, Joplin, Jefferson City, and Columbia.

Across the state, there are 161,815 households without vehicles, and 86 percent of census tracts score below average on the Environmental Protection Agency’s (EPA) Walkability Index.

Figure 11: Transportation Insecurity in Missouri

Transportation Insecurity in Missouri



Source: ETC

Approach to Developing the CRS

Foundational Research

To ensure the development of a compliant CRS, the project team underwent a foundational research process. The foundational research process consisted of document review, a leadership advisory committee meeting, and goals and evaluation criteria development.

Plan Review

Missouri Long Range Transportation Plan (2018)

The Long Range Transportation Plan (LRTP) is a performance-based policy plan which evaluates future trends that will impact Missouri's transportation system, updates the state's transportation goals, objectives and performance measures, and examines transportation system needs and anticipated revenues over the next 25 years.

The LRTP notes that Missouri is experiencing increasing urbanization. Missouri's population is growing older, and commuters overwhelmingly prefer to drive alone in private automobiles. However, younger residents are not as interested in driving and want more modal choices. MoDOT also anticipates growth in truck freight and increased vehicle miles traveled (VMT). Increasing urbanization and growth in demand for active transportation are both trends that support carbon reduction.

2024-2028 STIP (2023)

Since transportation needs greatly outweigh funding available, the challenge is determining the optimal projects to fund that provide the greatest return on investment to taxpayers. With the priority of maintaining the existing system, MoDOT has developed asset management plans for each district with the goal to maintain current pavement and bridge conditions. The asset management plans focus on preventive maintenance improvements to keep good roads and bridges in good condition.

Specifically, planned projects include work on 2,057 lane miles of interstate pavements, 3,620 miles of major route pavements, and 9,316 miles of minor route pavements during this timeframe of the STIP.

Of the 10,424 bridges in the state, 804 are currently in poor condition and 935 are weight restricted. As bridges age, approximately 102 will fall into poor condition each year. From 2024-2026, the STIP invests in approximately 815 bridges (over 15 million square feet) with the goal of keeping the state's number of poor condition bridges below 900.

The emission reduction strategies and policies listed in the STIP are focused on reducing NOx and particulate emissions and do not mention carbon reduction as a goal. However, it does include strategies that have the potential to reduce carbon emissions, despite not explicitly indicating that the strategy aims to reduce CO₂.

Show Me ZERO – Driving Missouri Toward Safer Roads (2021)

In 2017, Missouri received an “F” from the National Safety Council and an overall road safety ranking of 49 out of 51. The report labeled Missouri as “off-track” in seat belt use, child passenger safety, distracted driving, speeding, teen driving requirements and in protecting vulnerable road users. Lack of seat belt use along with speed, distraction, and impairment account for more than three quarters of traffic fatalities in Missouri.

MoDOT aims to reduce traffic deaths on Missouri roads with a goal of zero deaths. The Show Me ZERO Plan⁵ identifies two potential approaches to addressing traffic fatalities: reduce the amount of travel or reduce the prevalence of risky behaviors. Reduction in high-speed driving not only improves the safety of roadways, but also reduces carbon emissions. According to the National Resources Defense Council, the sweet spot for carbon emissions per mile traveled is between 35 and 65 miles per hour. Speeds over 65 miles per hour emit more carbon due to engine strain and aerodynamic inefficiencies. Speeds under 25 miles per hour typically lose efficiency as those trips are associated with being caught in stop-in-go traffic. By keeping traffic at or below a 65 mile per hour speed limit where applicable, Missouri can also help reduce carbon emissions.

CRS Goals

Based on the foundational research, it became apparent that aligning the CRS goals to the Missouri LRTP was essential to ensure CRS projects are incorporated into the existing planning frameworks and prioritization process. More than 7,700 stakeholders participated in the development of Missouri’s LRTP. Recognizing that the goals developed by that process have been crafted by Missourians to best serve the state’s unique needs, the Missouri CRS has adopted those same five goals:

- Take care of the transportation system and services we enjoy today.
- Keep all travelers safe, no matter the mode of transportation.
- Invest in projects that spur economic growth and create jobs.
- Give Missourians better transportation choices.
- Improve reliability and reduce congestion on Missouri’s transportation system.

⁵ <https://www.savemolives.com/mcrs/show-me-zero>

Initiatives Connected to CRS Goals

The following initiatives, which are associated with the CRS goal areas, were identified based on foundational research.

Table 1: Initiatives Identified through Foundation Research

Goal	Initiatives
Safety	MoDOT is using a new enhanced pedestrian crossing system at locations across the state. The new crossing makes it easier for pedestrians to safely get across busy roads at locations that are not at signalized intersections. It also minimizes traffic and delays because it only operates when a pedestrian activates it.
Multimodal Choices	The MoDOT Reduce Your Carbon Footprint Tool ⁶ encourages Missourians to consider alternate modes of transportation and choose those that are locally available and will reduce their carbon footprint.
	MoDOT’s multimodal projects are identified in Section 7b – SFY 2024 Multimodal Legislatively Designated and Funded Initiatives – Legislative Designated Projects ⁷ and Multimodal Operations Program – Multimodal Projects List ⁸
Reliability and Congestion	Emissions Testing in the St. Louis Region: Vehicles registered in the City of St. Louis, and the counties of St. Charles, St. Louis, and Jefferson is subject to emissions inspection requirements. ⁹
	The FHWA’s Missouri Transportation Performance Management Dashboard ¹⁰ , reports Missouri’s progress at meeting federal performance targets, including reliability and emission reduction.
Economic Growth	The State of Missouri is a beneficiary of the Volkswagen Diesel Emissions Environmental Mitigation Trust, better known as the Volkswagen Trust Fund. ¹¹ As the lead agency, MDNR developed a 10-year Beneficiary Mitigation Plan for awarding more than \$41 million to Missouri-specific projects by October 2027. Eligible applicants include government entities and private business owners with diesel vehicles and equipment from model years 2009 to 2016. In addition, funding is available for electric vehicle charging infrastructure installations.
	MoDOT analyzed current national trends and existing internal state efforts regarding autonomous and connected vehicle technology. It is important Missouri considers these technologies and how they may impact investments in things like new highways, shoulders, and equipment.

⁶ <https://www.modot.org/reduce-your-carbon-footprint>

⁷ <https://www.modot.org/sites/default/files/documents/2024MultimodalLDFI.pdf>

⁸ <https://www.modot.org/sites/default/files/documents/24-28%20Multimodal%20Projects%20List%20%28003%29.pdf>

⁹ <https://dnrservices.mo.gov/gatewayvip/>

¹⁰ <https://www.fhwa.dot.gov/tpm/reporting/state/state.cfm?state=Missouri>

¹¹ <https://dnr.mo.gov/air/what-were-doing/volkswagen-trust-funds>

Goal	Initiatives
System Quality	Missouri received an \$81.2 million INFRA Grant in July 2019. As of April 2023, all 250 Focus on Bridges project contracts have been awarded and 229 have been completed.
	Community Impact Assessments of transportation activity on local communities and minimizing or mitigating disproportionately high and adverse human health and environmental effects on minority populations and low-income populations.

Strategies

The strategies, which are associated with the goal areas, were identified in the three plans examined during the document review (Table 2).

Table 2: Strategies Identified through Foundational Research

Goal	Strategies
Safety	Invest in safety improvements that reduce roadway fatalities and serious injuries.
	Provide safe, secure links and connection points between various transportation modes.
	Upgrade safety infrastructure for pedestrian walking and biking areas.
	Partner with safety advocates across the state to identify and implement safety improvements.
	Expand use of innovative work zone warning and protection devices.
	Partner with law enforcement to enforce moving violations (e.g., distracted driving, impaired driving, aggressive driving, speeding, not wearing a seatbelt).
	Support the expansion of new vehicles with advanced driver assistance systems and safety standards.
Multimodal Choices	Provide lower carbon emission transportation options, such as public transit and micro mobility.
	Provide flexible and diversified transportation options.
	Expand and improve air and passenger rail travel.
	Expand, modernize, and improve the accessibility of public transportation and active transportation.
	Improve the connections between transportation modes.
	Plan for mixed-use, car-light neighborhoods.
	Increase regional involvement when identifying and prioritizing projects.
Reliability and Congestion	Consider implementing congestion pricing.
	Take a practical approach to highway system capacity expansion, given financial constraints.
	Eliminate freight bottlenecks at key locations.
	Facilitate the movement of people and goods across the system during traffic flow incidents.
	Improve the connectivity and mobility of the freight system.
	Support the efficiency of rail, waterways, and airports.
	Support increased public transit use.
	Utilize advanced technology to monitor and improve traffic congestion.
	Monitor emissions through control facilities.
Implement programs to manage emissions.	

Goal	Strategies
Economic Growth	Increase partnerships with local communities, businesses, service providers, and other sectors to identify transportation projects that can better support local economies.
	Identify and improve intermodal connectors that link the state’s rivers, rails, roads, and runways.
	Provide reliable and accessible transportation options to get commuters to work and customers to businesses.
	Consider implications of alternatively fueled vehicles and autonomous and connected vehicles in the design of the transportation system and funding of projects.
	Support automated and connected vehicle technology advancements.
	Support the use of lower carbon emission fuels and vehicles.
	Explore purchasing lower emission fleet vehicles and equipment and optimize department operations to reduce emissions.
	Deploy infrastructure based intelligent transportation systems capital improvements.
	Reduce energy consumption and carbon footprint.
System Quality	Secure reliable, long-term funding to support the maintenance and operation of the current system, provide services for each mode of transportation, and address transportation priorities.
	Establish condition and service goals for components of Missouri’s transportation system.
	Explore technology and business practices that lower costs and stretch funding.
	Preserve the existing system while avoiding and mitigating negative environmental impacts.
	Use environmentally friendly construction methods to deliver projects.
	Reduce project costs and minimize delays in the project development and delivery process.
	Evaluate the impact to transportation modes during project development.

Missouri Funding Allocation and Planning Partners Coordination

CRP Apportionment

Missouri received approximately \$30,467,074 for its 2022 CRP apportionment (Table 3). Nearly, one third of funds were distributed to Transportation Management Areas (TMAs) directly to utilize for CRP projects within their boundaries based on their own strategies and priorities. MoDOT will coordinate with the non-TMA MPOs and RPCs to prioritize projects for the funds designated for their areas. More information about this process is provided in the [External Engagement](#) section.

Table 3: Missouri's CRP Apportionment

Total 2022 CRP Apportionment	65% Suballocated Apportionment				35% Apportionment Available for Any Area
	Urbanized Areas Over 200K	50K ≤ Urbanized Areas ≤ 200K	5K ≤ Urban Areas < 50K	Areas < 5K	
	Fayetteville-Springdale-Rogers \$7	Alton \$261			
	Kansas City \$2,830,236	Cape Girardeau \$173,903			
	St. Louis \$5,878,691	Columbia \$412,504			
	Springfield \$905,124	Jefferson City \$193,551			
		Joplin \$273,712			
		Lee's Summit \$281,338			
		St. Joseph \$260,595			
\$30,467,074	\$9,614,058	\$1,595,864	\$2,162,768	\$6,430,908	\$10,663,476

Internal Coordination

Recognizing that delivering successful CRS projects requires collaboration among multiple work units, agency leadership, and central (headquarters), and district (field) staff, an ongoing internal engagement effort informed this process. At the inception, a Leadership Advisory Panel was established to shape the overall strategy and ensure the CRS maintained consistency with existing agency priorities. A kick-off meeting was held with the panel explaining the CRS requirements and the planned engagement effort with MPOs and RPCs. Panel members were invited to attend MPO and RPC meetings to listen to stakeholder feedback and continued to receive updates on progress throughout the effort. Additionally, as the CRS was near finalization the Leadership Panel had the opportunity to review and provide feedback. Given how essential MoDOT district staff are for working with the RPC and MPOs to prioritize projects, they were also invited to participate in the MPO and RPC meetings. Following the MPO and RPC meetings, a meeting was held with district staff to summarize the feedback from planning partners and seek district staff's input on the approach for CRS implementation.

External Engagement

Missouri's geographic diversity gives rise to a wide spectrum of needs, priorities, and considerations. To gain a comprehensive understanding of these diverse perspectives in the context of CRP and CRS, MoDOT conducted a two-phase series of meetings. This series began with an introductory kickoff meeting aimed at setting a common foundation, followed by four in-depth meetings.

These in-depth meetings encompassed one session dedicated to non-TMA MPOs, another for TMA MPOs, and two for RPCs. The primary objective of these in-depth meetings was twofold: first, to discern the priorities that stakeholders considered most significant, and second, to delve into potential disparities among these priorities and the underlying thought

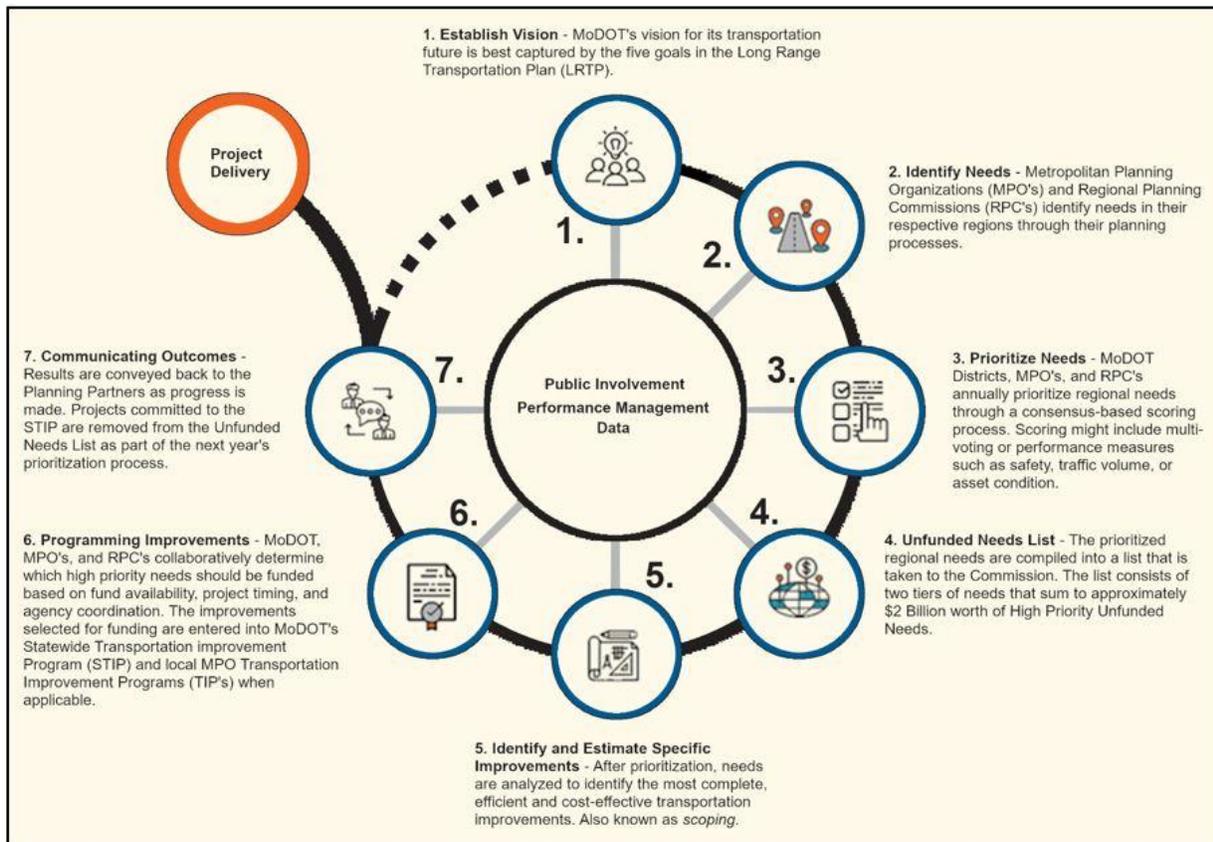
processes guiding them. The in-depth meetings also served as an opportunity for MoDOT to articulate its approach to CRP and CRS building from the previous kick-off meeting.

MoDOT's vision for transportation planning is bottom-up, with a focus on addressing unique regional needs. MoDOT aims to involve the right stakeholders and gather valuable input to guide our efforts effectively. MoDOT views CRP and CRS as additional tools to incorporate within this structure which is best expressed through the current transportation project prioritization process between MoDOT and MPOs/RPCs, which include the following steps:

- 1. Identification of Regional Needs:** MPOs and RPCs identify the transportation needs within their respective regions through their planning processes.
- 2. Consensus-Based Prioritization:** MoDOT Districts, MPOs, and RPCs annually prioritize regional needs using a consensus-based scoring process.
- 3. Compilation of Prioritized List:** The prioritized list of unfunded needs is compiled into a comprehensive list.
- 4. Analysis and Scoping:** After prioritization, needs are carefully analyzed to identify the most comprehensive, efficient, and cost-effective transportation improvements. This process is known as scoping.
- 5. Programming:** MoDOT, MPOs, and RPCs collaborate to determine which high-priority needs should receive funding. This decision considers fund availability, project timing, and agency coordination. The selected improvements are then entered into the STIP and local MPO Transportation Improvement Programs.
- 6. Communication:** The outcomes of this process are communicated to our planning partners, and projects are removed from the unfunded needs list as they are included in the STIP.
- 7. Project Delivery:** Projects outlined in the STIP are subsequently delivered.

MoDOT recognizes the connection between the introduction of a new program, such as CRP, and the ability for the current prioritization process (Figure 12) to serve as a clearinghouse between competing needs and differences in regional priorities.

Figure 12: MoDOT's Project Prioritization Process



Source: MoDOT

MPO and RPC Survey and Consultation Meeting Summaries

The following sections delve into each consultation meeting, offering a high-level summary of the discussions that transpired. Additionally, the outcomes of these meetings informed MoDOT's approach to prioritize CRP projects situated outside of the TMA MPO planning area boundaries, along with the development of carbon reduction strategies.

MPO and RCP Consultation Kick-off Meeting | August 23, 2023, 10:00 AM

The purpose of this meeting was to help level set MPO and RPC staff representatives about what the CRP and CRS is and MoDOT's approach to developing both components. The key difference between TMA MPOs, non-TMA MPOs, and RPCs was described based on the apportionment and related policies associated with CRP funding and corresponding designated populations. However, it was made clear that all stakeholders had equal footing regarding providing input into developing carbon reduction strategies. The following key themes summarize meeting outcomes:

- **Integration with LRTP Goals:** MoDOT's approach to the CRP and CRS is rooted in aligning them with their LRTP goals. This integration will occur within the existing "bottom-up" project prioritization process.

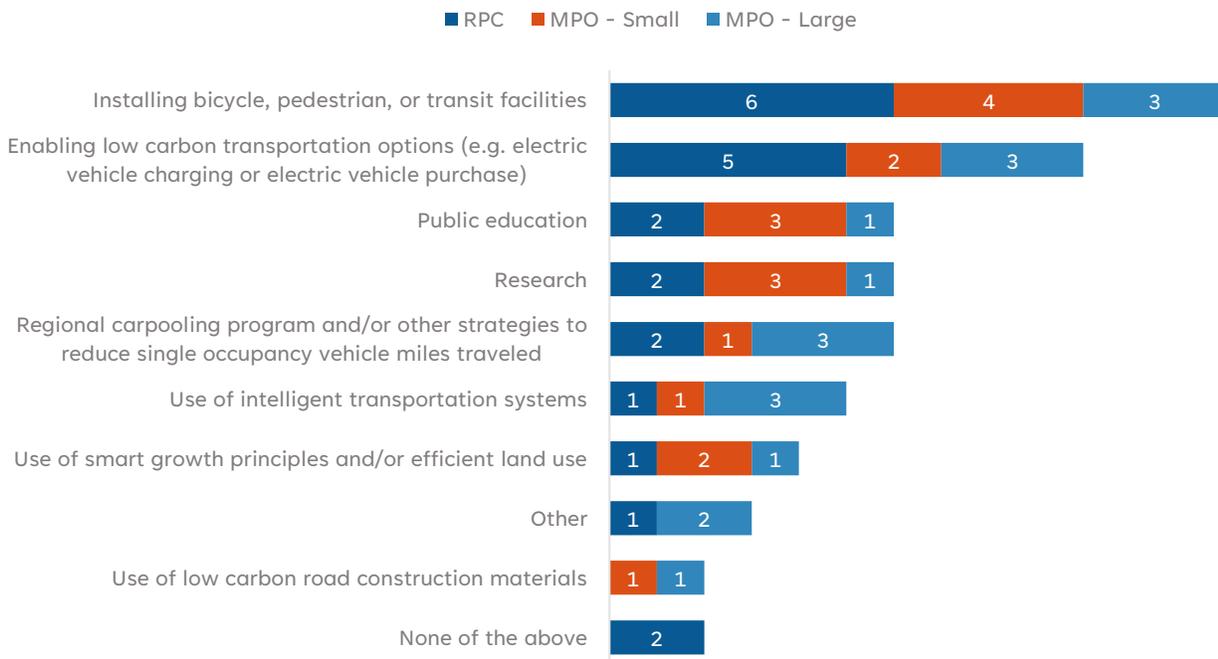
- **Active Stakeholder Involvement:** Representatives from the Mid-America Regional Council (MARC) and Columbia Area Transportation Study Organization (CATSO) actively engaged with MoDOT, expressing their interest in shaping the CRS. MARC, in particular, emphasized the need to connect transportation initiatives with broader societal and environmental considerations.
- **Resourceful Use of MoDOT's Land Resources:** MARC highlighted the potential for transit and carbon sequestration by leveraging MoDOT's land resources, underlining the importance of creative solutions in carbon reduction efforts.
- **Retaining CRP Funds:** MARC advocated for retaining CRP funds within the program and preventing their reallocation to other programs that might inadvertently increase carbon emissions.
- **Coordination and Collaboration:** Stakeholders sought clarification on coordination between Missouri's Climate Pollution Reduction Grant Program and MoDOT's CRS development process. They were interested in understanding how the CRS would impact CRP project prioritization and how it would address the evolving Justice40 requirement, including quantifying carbon reductions.
- **MoDOT's Openness and Flexibility:** MoDOT demonstrated its willingness to collaborate, receive input, and adapt to evolving requirements. They emphasized their openness to broader discussions and collaborations beyond FHWA guidance, highlighting the evolving correlation between the CRS and CRP funding selection.
- **Consideration of State Activities:** MoDOT underscored the importance of considering all state activities, including operational aspects, within the context of carbon reduction.

MPO & RPC Survey

Following the kick-off meeting, MoDOT distributed a survey to all MPOs and RPCs in the state. Respondents provided a list of any CRS eligible activities their organizations had supported or implemented. This allowed MoDOT to have an inventory of the activities currently underway in the state (Figure 13).

Figure 13: CRS-Eligible Activities supported or implemented by MPOs and RPCs

Implemented and Supported Carbon Reduction Initiatives



Additionally, respondents weighed in on what they saw as the biggest opportunities and challenges for implementing carbon reduction strategies in Missouri and what co-benefits of these projects they would most like to be captured. Respondents indicated what their three top criteria would be for potential project criteria for the use of CRP funds. Survey responses were used to inform discussion material for the upcoming MPO and RPC meetings, which allowed the conversation to advance from what are your priorities to why do you value those specifically. For example, the survey results about project criteria were used to build an interactive discussion tool for the upcoming meetings. In the survey, respondents ranked cost-effectiveness, equity, and carbon reduction as the top criteria for prioritizing CRP funding. See Figure 14 for the complete list of rankings. These rankings were used to create a bracket which would pair the top ranked criteria against the lower ranked criteria and ask respondents to discuss if they had to choose between the two, which one would they choose and why. For example, cost-effectiveness was paired against project readiness in a first-round match up. This became known as the “bracketology exercise”, and it would be used in all four MPO and RPC consultation meetings to better understand

the thinking behind participants priorities and to see if priorities shifted once participants had the opportunity to hear from organizations across the state. In each usage, participants would be informed the results of the bracketology exercise would not eliminate any criteria rather it was simply for discussion purposes.

Figure 14: MPO & RPC Survey Results – Project Criteria

Project Criteria for CRP Funds Rankings

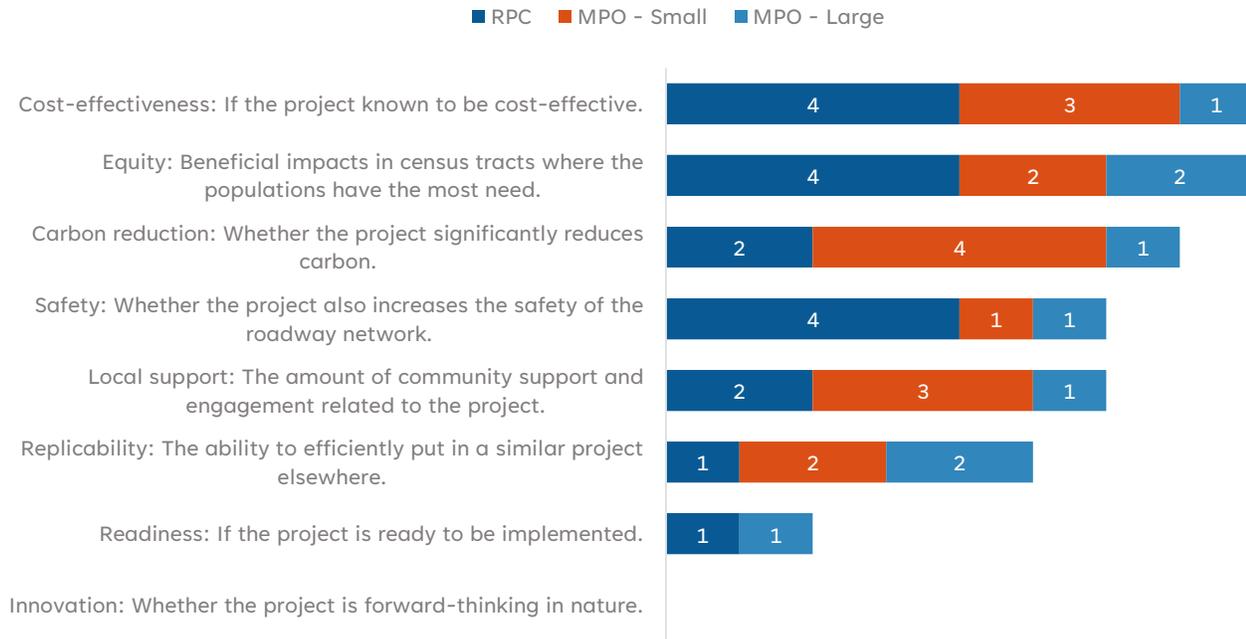
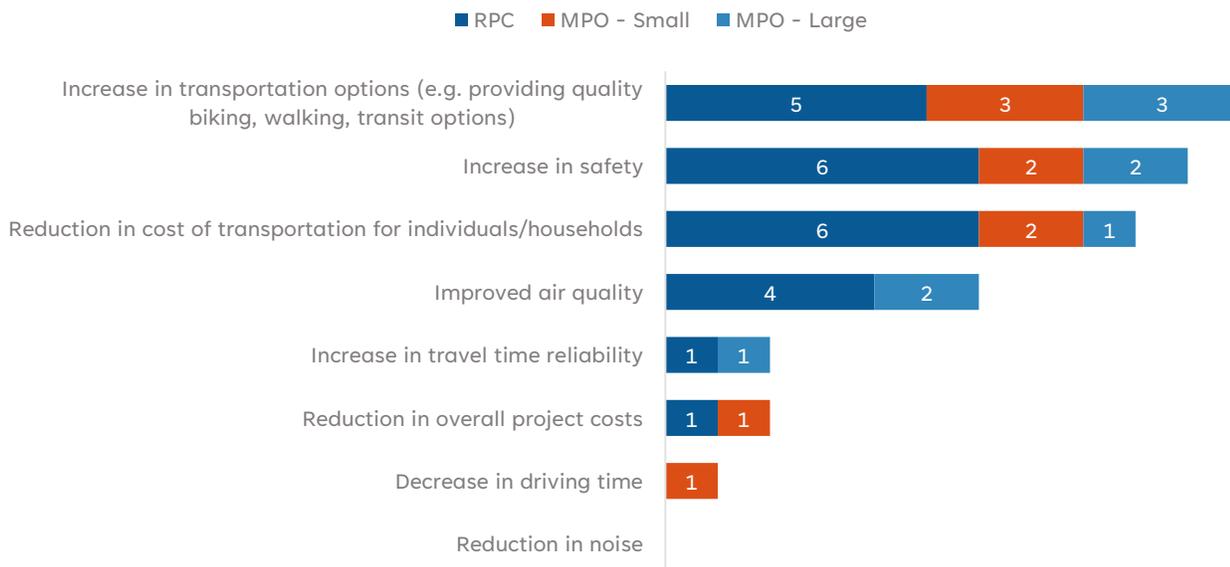


Figure 15: MPO & RPC Survey Results – Co-benefits

Co-benefits to Capture with CRP Funding Rankings



Non-TMA MPO In-depth Consultation Meeting | September 13, 2023, 10:00 AM

The MoDOT CRS Non-TMA MPO Input Session gathered valuable insights from stakeholders representing MPOs with population areas less than 200,000. The session was conducted to ensure specific feedback on priorities was collected to inform MoDOT approach to developing CRS strategies and prioritizing CRP projects.

Bracketology, the interactive project criteria prioritization exercise, was conducted. Criteria such as cost-effectiveness, carbon reduction, equity, innovation, safety, replicability, local support, and readiness were considered. During the meeting, participants identified several essential considerations for distinguishing project priorities. Cost-effectiveness and safety emerged as top priorities in this context. Participants stressed the importance of projects that provide maximum value for the resources invested while also ensuring safety for users.

Figure 16: Bracketology Exercise: Non-TMA MPOs

Project Criteria Discussion - Smaller MPO results



CRP was highlighted as a funding source that encompasses a wide range of projects. This includes multimodal project types that are typically sought after by local governments. MoDOT explained that CRP funding is not directly administered by non-TMA MPOs. Instead, funding for non-TMA MPOs will be available through MoDOT districts, following the existing prioritization process.

Participants discussed opportunities and challenges related to carbon reduction efforts. Opportunities included enhancing connectivity, investing in alternative fuels and cleaner energy, expanding multimodal infrastructure, and raising awareness about the climate crisis. Challenges included garnering support, developing strategies suitable for the entire state, gathering local input, and addressing resource and information constraints.

TMA MPO In-depth Consultation Meeting | September 14, 2023, 10:00 AM

The MoDOT CRS Input Sessions with TMA MPOs gathered input about the priorities of the major urban centers in the state. This session placed greater emphasis on understanding how TMAs are prioritizing their CRP funds to allow for coordination and expanding on current successes.

Meeting participants cited cost-effectiveness and equity as their top priorities during the bracketology exercise, with ultimately cost-effectiveness ending up on top. Participants indicated that the other factors are ultimately incorporated into how effective a project will be and cost must always be considered to maximize the impact of dollars.

Figure 17: Bracketology Exercise: TMA MPOs

Project Criteria Discussion-Larger MPO results



During the opportunities and challenges discussion, participants noted that the Buy American provisions have impacted their ability to purchase EVs and contradicts the funding timeline required by FHWA. While participants saw many opportunities with these dollars, acquiring EVs may prove to be challenging.

Participants also identified some big picture or long-term strategies and actions they would like to see explored or considered. For example, the installation of solar panels within right-of-way to help reduce the state’s reliance on coal power or more carbon sequestration efforts by leveraging MoDOT’s landholdings. Participants noted that MoDOT’s LRTP goals do not include any environmental or resiliency related goals and that’s something they would like to see incorporated in the future. They would like to see a deeper examination of current goals and priorities to allow for carbon reduction to be considered at every level in every project.

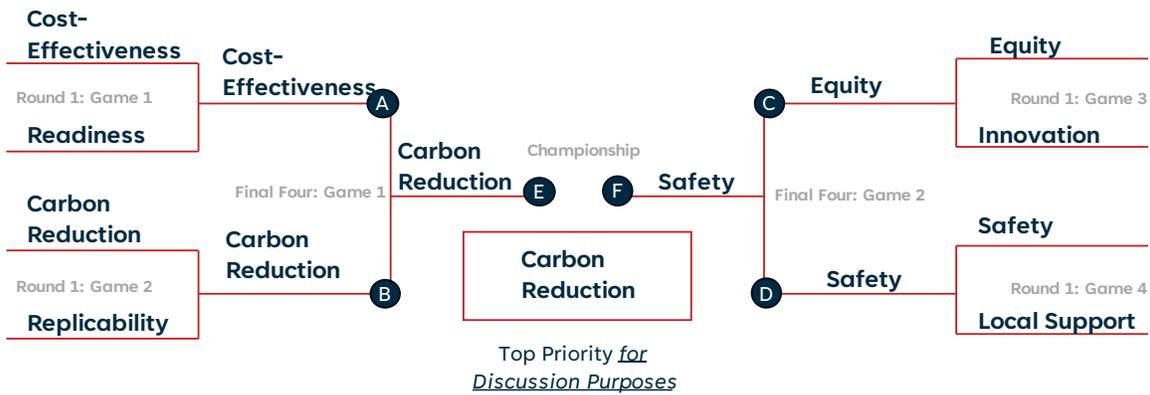
RPC In-depth Consultation Meeting #1 | September 14, 2023, 3:00 PM

The MoDOT CRS RPC Input Session collected feedback from RPCs representing more rural portions of the state. The session was held to gather targeted input regarding priorities, which will be used to shape MoDOT's approach for developing the CRS strategies and determining the priority of CRP projects.

Meeting participants identified safety and carbon reduction as primary considerations when distinguishing project priorities. Safety was particularly emphasized due to the potential controversy associated with some carbon reduction projects.

Figure 18: Bracketology Exercise: RPC Meeting #1

Project Criteria Discussion – RPC – Meeting 1



Participants raised concerns regarding project readiness favoring expansion projects, which may not always align with the goals of the CRP program. This highlighted the need to carefully evaluate readiness criteria to ensure they align with carbon reduction objectives. Participants discussed using speed limit reduction as a benchmark to showcase the benefits of safety and carbon reduction, even if such measures were not ultimately implemented. It was important to emphasize the co-benefits associated with carbon reduction efforts participants noted.

The importance of inclusivity was discussed, with an example of communities like the Amish who do not use carbon-emitting technologies. The suggestion was to ensure that even non-motorized improvements benefit communities that do not contribute to carbon emissions.

RPC In-depth Consultation Meeting #2 | September 15, 2023, 10:00 AM

The project team conducted a second MoDOT CRS RPC Input Session where the team also collected feedback from RPCs representing more rural portions of the State. The session was held to gather targeted input regarding priorities, which will be used to shape MoDOT's approach for developing the CRS strategies and determining the priority of CRP projects.

Safety rose as a top priority, but participants also noted the importance of equity and replicability. They noted that innovative projects could be costly and might not always achieve their intended outcomes while projects that are easily replicated may have a more sustained desired impact and can be refined over time.

Figure 19: Bracketology Exercise: RPC Meeting #2

Project Criteria Discussion – **RPC – Meeting 2**



Participants identified several challenges to implementing carbon reduction projects including garnering local public support. To overcome this challenge, building awareness was identified as a need. Developing common statewide strategies was also viewed as a challenge given Missouri’s urban and rural composition.

During the discussion, participants showed a strong interest in the electric vehicle (EV) landscape, emphasizing the importance of incentives for EV adoption. They stressed the need to assess both immediate advantages and long-term costs associated with EVs, while also prioritizing equity considerations to benefit diverse communities. However, the conversation also delved into concerns about potential unintended consequences of the EV transition, such as continued reliance on coal power, which could counteract environmental gains. Participants additionally raised worries about the loss of revenue for transportation due to reduced gas taxes as more vehicles transitioned to electric power. The conversation highlighted the intricate balance needed when navigating the transition to electric vehicles, considering environmental, economic, and equity factors.

CRS and CRP: Implementation, Coordination, and Program Evaluation

MoDOT’s current project prioritization process described previously serves as the foundation for distributing CRP funds to projects that reduce carbon emissions but also

address existing transportation needs across the state. This ‘bottom-up’ approach is highly process driven with defined outcomes only known after robust coordination with regional stakeholders. This section describes how MoDOT’s approach to CRS and CRP fits into its existing transportation planning decision-making process.

MoDOT’s goals and performance tracking can be viewed as bookends with carbon reduction strategies and consensus building around CRP project priorities taking place between them. MoDOT goals provide early guidance while performance tracking measure outcomes. Over time, MoDOT, MPOs, and RPCs can optimize this approach to achieve the best return on investment.

The following sections provide detailed information on how MoDOT envisions and how it will approach implementing its carbon reduction strategies and CRP prioritization process. By incorporating this process, as part of the agency's existing performance measurement and management efforts and utilizing the planning framework for implementation, ensures that there will be opportunity for ongoing discussions and potential updates for the CRS based on lessons learned throughout implementation. More recommendations from planning partners may be added as the process continues to evolve.

CRS Approach

MoDOT’s CRS approach aligns with its current goals and builds upon its current carbon reducing initiatives. Through internal coordination and the MPO and RPC consultation process, MoDOT was able to identify CRS strategies that aligned with their needs but also incorporate considerations voiced by MPOs and RPCs.

CRS Strategies

MoDOT’s comprehensive approach to carbon reduction includes looking internally as well as externally towards beneficial impacts on the state’s transportation system. Some strategies can be applied both internally as an agency and through their project delivery efforts that impact the transportation system. Through the CRS development and consultation process, three focus areas emerged including:

- Energy Management
- Non-Motorized Transportation
- Traffic Flow Improvement

These three focus areas are aligned with MoDOT goals, are supported by the CRS strategies, and can be tracked through performance measures as noted in Figure 21.

Figure 20: MoDOT's approach to implementing CRS Strategies and prioritizing CRP project within its existing transportation planning decision-making framework.

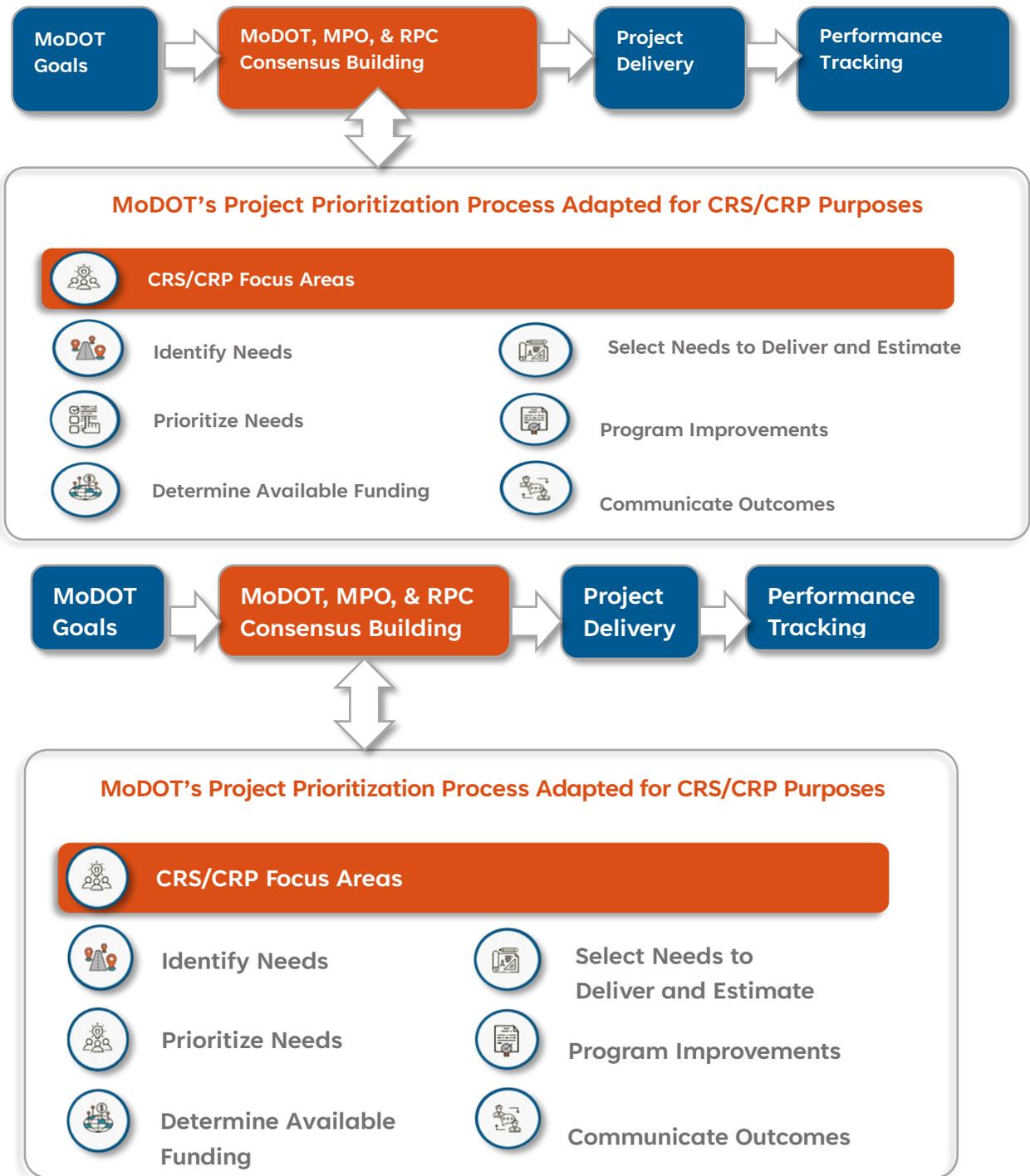


Figure 21: Alignment between CRS/CRP Focus Areas, MoDOT Goals, Performance Tracking and Strategies.



Figure 22: CRS Strategies and Aligned MPO, RPC, and MoDOT Initiatives – Energy Management

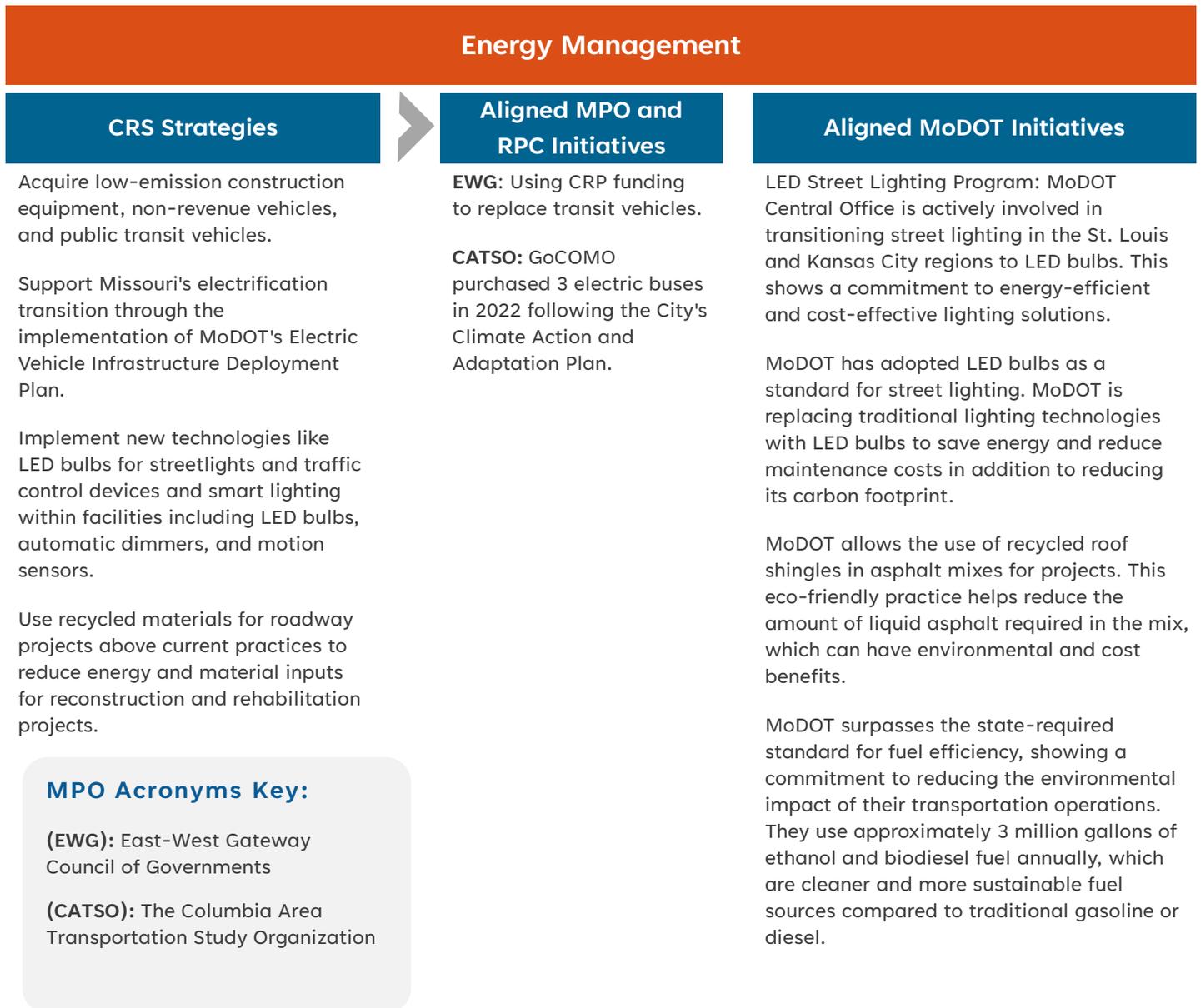


Figure 23: CRS Strategies and Aligned MPO, RPC, and MoDOT Initiatives – Non-Motorized Transportation

Non-Motorized Transportation

CRS Strategies

Provide people with the option to walk or bike to nearby destinations by constructing new and improved non-motorized facilities.

Aligned MPO* and RPC Initiatives

MARC: Expanding facilities for non-motorized transportation.

OTO: Incorporating trails and sidewalks on all MoDOT projects.

CAMPO: Encourage active transportation via the Capital Area Active Transportation Plan and the Wayfinding Plan.

SEMPO: Supports development and implementation of Regional Bicycle and Pedestrian plan.

SEMPO, Bootheel RPC, and Mark Twain Regional COG: Support development of TAP applications.

SJATSO: Encourage investment to help make communities walkable and bikeable.

Pioneer Trails RPC: Spirit Trail for bicyclists commuting from Warrensburg to Whiteman Air Force Base.

SMCOG: Encourage alternative modes of transportation to reduce the number of vehicles on the roadway.

Aligned MoDOT Initiatives

MoDOT's ADA Transition Plan was 28% complete in 2020. MoDOT is working towards 100% completion by 2027.

MoDOT has a Bicycle and Pedestrian Mobile Classroom which is a resource to promote pedestrian and bicycling safety through hands on activities that schools often lack the ability to do on their own.

MoDOT is implementing enhanced pedestrian activated crossing signals. These new crossings make it easier for pedestrians to safely get across busy roads at locations that are not at signalized intersections.

Show Me ZERO is MoDOT's plan to eliminate roadway crash fatalities by targeting improvements that reduce risk experienced by vulnerable roadway users.

MPO Acronyms Key:

MARC: Mid America Regional Council

OTO: Ozark Transportation Organization

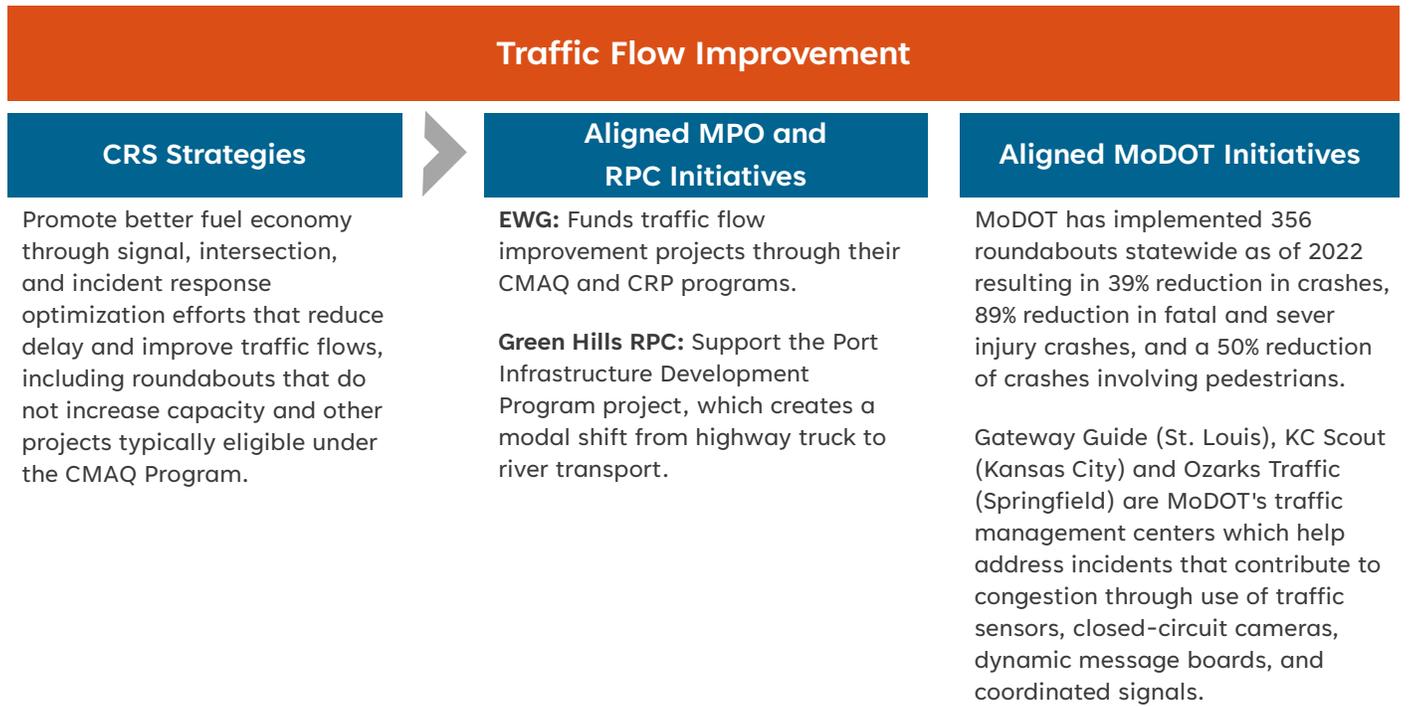
CAMPO: Capital Area Metropolitan Planning Organization

SEMPO: Southeast Metropolitan Planning Organization

SJATSO: St. Joseph Area Transportation Study Organization

SMCOG: Southwest Missouri Council of Governments

Figure 24: CRS Strategies and Aligned MPO, RPC, and MoDOT Initiatives – Traffic Flow Improvement



City of Fulton Roundabout (Houze and Hembree Road Intersection) Ribbon Cutting Ceremony.



CRP Approach and Vision

Consensus Building

While MoDOT's goals offer initial guidance, a comprehensive understanding of the decision-making process requires consideration of the following factors:

- **Unique Needs and Priorities:** It is essential to account for the diverse needs and priorities of Missouri's regions. Each region has distinct differences that must be addressed in the decision-making process.
- **CRP Requirements and Focus Areas:** Collaboration with MPOs and RPCs was instrumental in helping MoDOT define its CRS/CRP focus areas.

MoDOT has identified the CRP eligible project types that best align with its goals, the CRS/CRP focus areas, and expressed needs priorities of MPOs and RPCs, all of which can be measured through MoDOT's performance tracking measures. MoDOT views CRP project implementation as part of a comprehensive approach to advancing its CRS strategies previously illustrated.

Map of MoDOT's seven districts.



Aligned CRP Project Eligibilities

Similar to the identification of CRS strategies that align with MoDOT's goals and MPO/RPC consultation outcomes, MoDOT has also pinpointed specific CRP eligible project types that best align with its requirements and the needs and priorities of regional stakeholders.

While MoDOT views these as the CRP project types that best support overall objectives developed through the CRS development process, they are meant to provide guidance and not be prescriptive. MoDOT wants its approach towards CRP prioritization to help inform its 'bottom up' transportation planning decision-making framework rather than prescribing specifics before coordination between MoDOT Districts and MPOs/RPCs takes place. Figure 25 shows how the specific CRP eligible project types identified through the CRS development process align with the CRS/CRP focus areas, L RTP goals and MoDOT's performance tracking.

Figure 25: Alignment between CRS/CRP Focus Areas, MoDOT Goals, Eligible Projects, and Performance Tracking

CRS and CRP Focus Areas		
Energy Management	Non-Motorized Transportation	Traffic Flow Improvement
Aligned MoDOT Goals		
<p>Goal 1: Take care of the transportation system and services we enjoy today.</p>	<p>Goal 2: Keep all travelers safe, no matter the mode of transportation.</p> <p>Goal 3: Invest in projects that spur economic growth and create jobs.</p> <p>Goal 4: Give Missourians better transportation choices.</p>	<p>Goal 1: Take care of the transportation system and services we enjoy today.</p> <p>Goal 5: Improve reliability and reduce congestion on Missouri's transportation system.</p>
Aligned CRP Eligible Project Types		
<p>Replace street lighting and traffic control devices with energy-efficient alternatives.</p> <p>Support deployment of reduced emission fuel vehicles, construction equipment, and related fueling infrastructure.</p> <p>Micromobility and electric bike projects, including charging infrastructure.</p> <p>Advanced truck stop electrification systems.</p> <p>Sustainable pavements technologies that reduce carbon related to highway projects could be eligible for CRP if a lifecycle assessment (LCA) demonstrates substantial reductions in CO₂ compared to the implementing Agency's typical practices.</p>	<p>A transportation alternatives (TA) project as described in 23 U.S.C. 101(a)(29), including the construction, planning, and design of on-road and off-road trail facilities for pedestrians, bicyclists, and other nonmotorized forms of transportation.</p> <p>Projects that maximize the existing right-of-way for accommodation of nonmotorized modes and transit options that increase safety, equity, accessibility, and connectivity, and projects that separate motor vehicles from pedestrians and bicyclists.</p>	<p>Projects that improve traffic flow and do not add capacity are eligible under the CMAQ program.</p> <p>Support congestion pricing, shifting travel demand to nonpeak hours or other transportation modes.</p> <p>Reduce the negative impacts of freight movement.</p> <p>A project described in 23 U.S.C. 149(b)(4) to establish or operate a traffic monitoring, management, and control facility or program.</p> <p>A public transportation project eligible for assistance under 23 U.S.C. 142, including eligible capital projects for the construction of a bus rapid transit corridor or dedicated bus lanes.</p> <p>Advanced transportation and congestion management technologies. 23 U.S.C. 503(c)(4)(E)</p>
Aligned MoDOT Performance Tracking		
<p>Condition of Fleet</p> <p>Operating Cost of Fleet</p> <p>NEVI Plan Implementation progress</p> <p>Maintenance Work Plan Progress</p> <p>Condition of State Highways</p> <p>Economic Return from Transportation Investment</p>	<p>Number and Rate of Fatalities</p> <p>Bike/Pedestrian and ADA Transition Plan Improvements</p>	<p>Number and Rate of Fatalities</p> <p>Cost and Impact of Traffic Congestion</p> <p>Reliability of Major Routes</p>

Connections to CRS/CRP Focus Areas, CRS Strategies, MPO/RPC priorities, and MoDOT Project Examples

MoDOT Districts are responsible for engaging in annual discussions with MPOs and RPCs as MoDOT develops its program of projects, culminating in the STIP. MoDOT highly values the input from regional partners in determining investments in state facilities. CRP funding is just one of the many financial sources that facilitate these investments. Maintaining awareness of CRP requirements and focus areas is vital to ensuring alignment and the best possible outcomes measured through MoDOT's performance tracking.

The CRS consultation process with MPOs and RPCs led to the creation of feedback summaries tailored to each MoDOT District. These summaries provide MoDOT District staff with valuable insights into the unique needs and priorities communicated by regional partners. By using this information, MoDOT District staff can proactively anticipate the specific types of projects and project components that hold a high priority within these regions.

Likewise, the consultation process informed MPOs and RPCs of MoDOT's approach to allocating CRP funding and CRP focus areas important to them. It is through these CRP focus areas that connections are made to the jointly developed CRS strategies.

Bicycle and pedestrian attachment to the Missouri River bridge in Jefferson, MO.



Figure 26: CRS Strategies, Aligned CRP Eligible Project Types, MPO/RPC Priorities, and MoDOT Project Examples – Energy Management

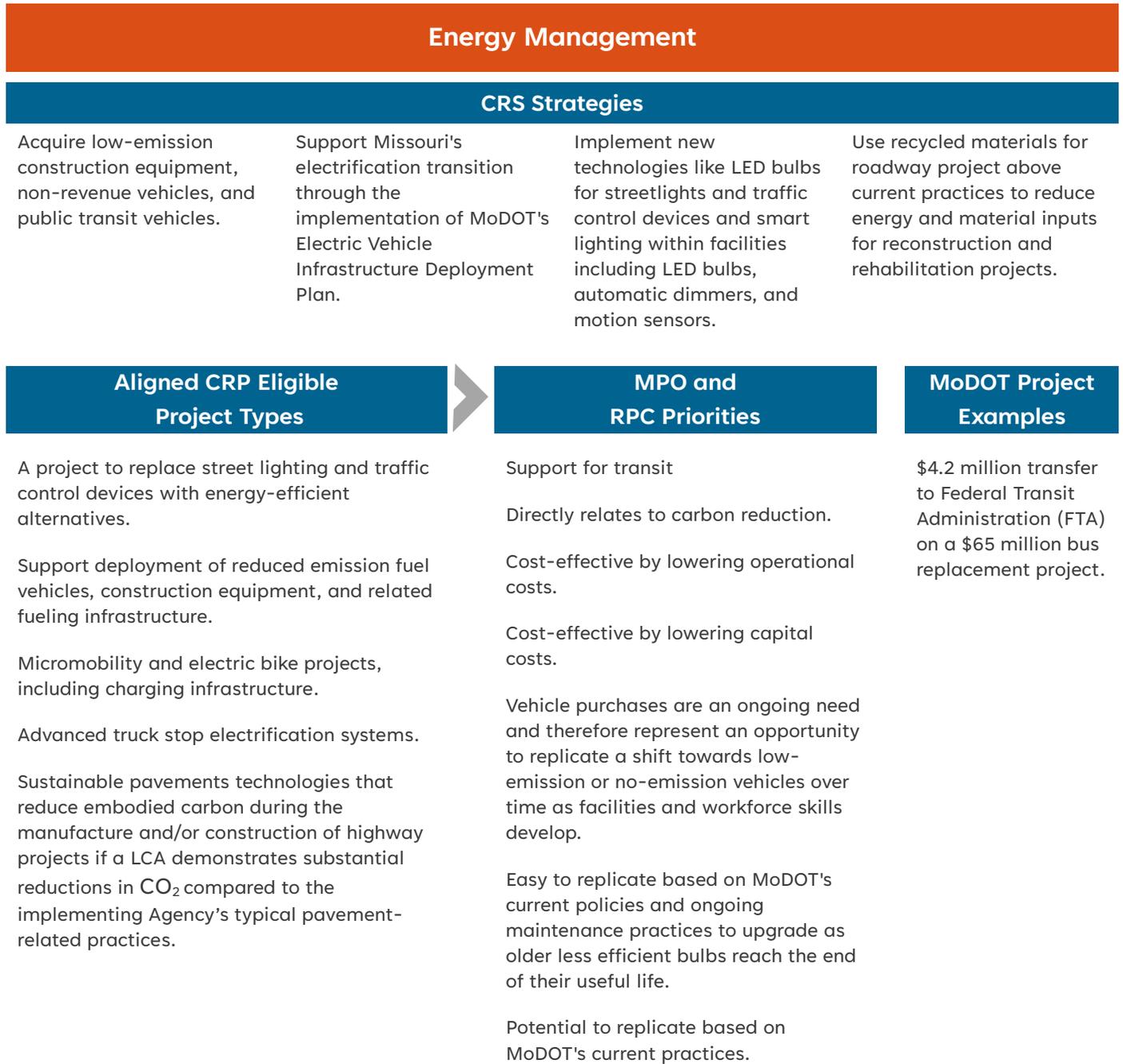


Figure 27: CRS Strategies, Aligned CRP Eligible Project Types, MPO/RPC Priorities, and MoDOT Project Examples – Non-Motorized Transportation

Non-Motorized Transportation

CRS Strategies

Provide people with the option to walk or bike to nearby destinations by constructing new and improved non-motorized facilities.

Aligned CRP Eligible Project Types

A TA project as described in 23 U.S.C. 101(a)(29), including the construction, planning, and design of on-road and off-road trail facilities for pedestrians, bicyclists, and other nonmotorized forms of transportation.

Projects that maximize the existing right-of-way for accommodation of nonmotorized modes and transit options that increase safety, equity, accessibility, and connectivity, and projects that separate motor vehicles from pedestrians and bicyclists.



MPO and RPC Priorities

Improves safety for vulnerable roadway users.

Directly relates to carbon reduction by promoting mode shift.

Cost effective by reducing the cost share burden for local governments to implement non-motorized projects or project elements.

Using CRPs funds to reduce current cost share hurdles could be a replicable approach statewide.

MoDOT Project Examples

Various pedestrian upgrade locations on Route 76 and Route 376 in Stone County and various state routes in Lawrence County.

The Greene County Route M from Farm Road 160 to Route 60 road relocation, railroad grade separation and corridor scoping project will add new sidewalks and determine the feasibility of rail crossing improvements which would improve safety.

The Meramec River Greenway Bridge connection over the Meramec River along I-44 in St. Louis County.



Figure 28: CRS Strategies, Aligned CRP Eligible Project Types, MPO/RPC Priorities, and MoDOT Project Examples – Traffic Flow Improvement

Traffic Flow Improvement

CRS Strategies

Promote better fuel economy through signal, intersection, and incident response optimization efforts that reduce delay and improve traffic flows, including roundabouts that do not increase capacity and other projects typically eligible under the CMAQ Program.

Aligned CRP Eligible Project Types

Certain types of projects to improve traffic flow are eligible under the CMAQ program, and that do not involve construction of new capacity.

A project or strategy designed to support congestion pricing, shifting transportation demand to nonpeak hours or other transportation modes, including electronic toll collection and TDM strategies and programs.

Efforts to reduce the environmental and community impacts of freight movement.

A project described in 23 U.S.C. 149(b)(4) to establish or operate a traffic monitoring, management, and control facility or program.

A public transportation project eligible for assistance under 23 U.S.C. 142, including eligible capital projects for the construction of a bus rapid transit corridor or dedicated bus lanes.

A project described in section 23 U.S.C. 503(c)(4)(E) for advanced transportation and congestion management technologies.



MPO and RPC Priorities

Can improve safety.

Can be cost-effective through time and fuel savings.

Similar outcomes can be expected for similar design approach's replicated and applied to other similar existing conditions.

MoDOT Project Examples

A roundabout at Route CC and Route 109 in St. Louis County (supported by EWG CRP funding).

MoDOT added 155 CCTV cameras to cover gaps in the existing camera network in the East-West Gateway region. These cameras are connected to the Gateway Guide Traffic Management Center and help monitor congestion and incidents, allowing for better responses to traffic flow disruptions.

Ongoing Coordination between MoDOT and MPOs/RPCs

Flexibility

The foundation laid through the CRS development process has led MoDOT to integrate carbon reducing considerations within its existing transportation planning decision-making framework. Accomplishing this produces several benefits including:

- An approach that can evolve and be optimized over time as needs and priorities shift, and as new technologies come online.
- MoDOT can continue to be responsive to the different needs and priorities of rural and urban regions throughout the state.

Armed with baseline guidance and a framework to work within, MoDOT Districts, MPOs, and RPCs can shape what the CRS and CRP focus area mean to them and how best to implement.

Knowledge-sharing

Another benefit to MoDOT's flexible approach is that it will allow regions to develop unique applications and methods towards prioritizing CRP funding and implementing CRS strategies. Novel solutions can be shared with partners across the state for their own consideration, adaptation, and possible use.

Methods and Frequency of Program Evaluation

CRP Project Tracking

MoDOT will track CRP projects through its STIP and Financial Services systems based on the funding category.

Monitoring Outcomes

To effectively monitor the performance outcomes of the strategies included in the CRS and CRP approach, it will be critical to leverage the existing monitoring frameworks and tools. Integrating the CRS performance outcomes into the current performance monitoring and measurement approach ensures alignment with other performance management criteria and organizational goals. Existing performance tracking areas are detailed in Figure 29.

Figure 29: Alignment between CRS/CRP Focus Areas and MoDOT Performance Tracking

CRS and CRP Focus Areas		
Energy Management	Non-Motorized Transportation	Traffic Flow Improvement
Aligned MoDOT Performance Tracking		
Condition of Fleet	Number and Rate of Fatalities	Number and Rate of Fatalities
Operating Cost of Fleet	Bike/Pedestrian and ADA Transition	Cost and Impact of Traffic Congestion
NEVI Plan Implementation progress	Plan Improvements	Reliability of Major Routes
Maintenance Work Plan Progress		
Condition of State Highways		
Economic Return from Transportation Investment		

ADA crosswalk for pedestrians.



Looking Forward

Plans for Future Updates to the CRS

While it was not possible to implement every idea suggested to MoDOT, capturing the concepts and concerns expressed during our engagement and coordination efforts allows MoDOT to continue discussions about what is important to our partners in environmental policy. Fully incorporating this process as part of the agency's existing performance measurement and management efforts and utilizing the planning framework for implementation ensures that there will be opportunity for ongoing discussions and potential updates for the CRS based on lessons learned throughout implementation. Moving forward, potential areas of consideration may include:

- **Coordination with future planning activities and work products:** As transportation planning work product development efforts are conducted, the CRS/CRP approach can be reviewed. The completed CRS can inform the development of these work products to ensure alignment and to establish concerns or considerations which should be evaluated with the next CRS development effort. These work products may include such activities as:
 - The National Electric Vehicle Infrastructure Plan
 - The Transportation Asset Management Plan
 - The Long Range Transportation Plan
 - The development of a Resiliency Plan
- **Coordination with other Missouri State Agencies:** As Missouri and the state agencies related to environmental considerations continue to consider carbon reduction, the evolving process and associated discussions can inform the decision-making process during future update cycles of the CRS. This may include consideration of alignment with a statewide Climate Action Plan, or other associated work products.

Appendix

Comprehensive Approach to CRS & CRP

Aligned MoDOT Goals	CRP and CRS Focus Areas	CRS Strategies	Aligned MoDOT Initiatives	MoDOT Project Examples	Aligned CRP Eligibility	MPO and RPC Priorities	Aligned MPO and RPC Initiatives	Aligned MoDOT Performance Tracking Criteria Evaluation Criteria	
Goal 1: Take care of the transportation system and services we enjoy today	Energy Management	Acquire low-emission construction equipment, non-revenue vehicles, and public transit vehicles.	LED Street Lighting Program: MoDOT Central Office is actively involved in transitioning street lighting in the St. Louis and Kansas City regions to LED bulbs. This shows a commitment to energy-efficient and cost-effective lighting solutions.	\$4.2 million transfer to FTA on a \$65 million bus replacement project	A project to replace street lighting and traffic control devices with energy-efficient alternatives.	Provides support for transit through purchasing new low or no-emissions buses. Directly relates to carbon reduction. Cost-effective by lowering operational costs. Cost-effective by lowering capital costs. Vehicle purchases are an ongoing need and therefore represent an opportunity to replicate a shift towards low-emission vehicles over time as facilities and workforce skills develop. Easy to replicate based on MoDOT's current policy and ongoing maintenance practices to upgrade as older less efficient bulbs reach the end of their useful life. Potential to replicate based on MoDOT's current recycled materials practices.	EWG & OTO: Using CRP funding to replace transit vehicles CATSO: GoCOMO purchased 3 electric buses in 2022 following the City's Climate Action and Adaptation Plan.	Condition of Fleet	
		Support Missouri's electrification transition through the implementation of MoDOT's Electric Vehicle Infrastructure Deployment Plan.	MoDOT has adopted LED bulbs as a standard for street lighting. MoDOT is replacing traditional lighting technologies with LED bulbs to save energy and reduce maintenance costs in addition to reducing its carbon footprint.		Support deployment of reduced emission fuel vehicles, construction equipment, and related fueling infrastructure.			Micromobility and electric bike projects, including charging infrastructure.	Operating Cost of Fleet
		Implement new technologies like LED bulbs for streetlights and traffic control devices and smart lighting within facilities including LED bulbs, automatic dimmers, and motion sensors.	MoDOT allows the use of recycled roof shingles in asphalt mixes for projects. This eco-friendly practice helps reduce the amount of liquid asphalt required in the mix, which can have environmental and cost benefits.		Advanced truck stop electrification systems.			Sustainable pavements technologies that reduce embodied carbon during the manufacture and/or construction of highway projects could be eligible for CRP if a lifecycle assessment (LCA) demonstrates substantial reductions in CO2 compared to the implementing Agency's typical pavement-related practices.	NEVI Plan Implementation progress
		Use recycled materials for roadway project above current practices to reduce energy and material inputs for reconstruction and rehabilitation projects.	MoDOT surpasses the state-required standard for fuel efficiency, showing a commitment to reducing the environmental impact of their transportation operations. They use approximately 3 million gallons of ethanol and biodiesel fuel annually, which are cleaner and more sustainable fuel sources compared to traditional gasoline or diesel.		Maintenance Work Plan Progress				



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<p>Goal 2: Keep all travelers safe, no matter the mode of transportation.</p> <p>Goal 3: Invest in projects that spur economic growth and create jobs</p> <p>Goal 4: Give Missourians better transportation choices.</p>	Non-Motorized Transportation	Provide people with the option to walk or bike to nearby destinations by constructing new & improved non-motorized facilities.	<p>MoDOT's ADA Transition Plan was 28% complete in 2020. MoDOT is working towards 100% completion by 2027.</p> <p>MoDOT has a Bicycle and Pedestrian Mobile Classroom which is resource to promote pedestrian and bicycling safety through hands on activities that schools often lack the ability to do on their own.</p> <p>MoDOT is implementing enhanced pedestrian activated crossing signals. These new crossings make it easier for pedestrians to safely get across busy roads at locations that are not at signalized intersections.</p> <p>Show Me ZERO is MoDOT's plan to eliminate roadway crash fatalities by targeting improvements that reduce risk experienced by vulnerable roadway users.</p>	<p>Various pedestrian upgrade locations on Route 76 and Route 376 in Stone County and various state routes in Lawrence County.</p> <p>The Greene County Route M from Farm Road 160 to Route 60 road relocation, railroad grade separation and corridor scoping project will add new sidewalks and determine the feasibility of rail crossing improvements which would improve safety.</p>	<p>A transportation alternatives project as described in 23 U.S.C. 101(a)(29), including the construction, planning, and design of on-road and off-road trail facilities for pedestrians, bicyclists, and other nonmotorized forms of transportation.</p> <p>Projects that maximize the existing right-of-way for accommodation of nonmotorized modes and transit options that increase safety, equity, accessibility, and connectivity, and projects that separate motor vehicles from pedestrians and bicyclists.</p>	<p>Improves safety for vulnerable roadway users.</p> <p>Directly relates to carbon reduction by promoting mode shift.</p> <p>Cost effective by reducing the cost share burden for local governments to implement non-motorized projects or project elements.</p> <p>Using CRPs funds to reduce current cost share hurdles could be a replicable approach statewide.</p>	<p>MARC: Expanding facilities for non-motorized transportation.</p> <p>OTO: Incorporating trails and sidewalks on all MoDOT projects.</p> <p>CAMPO: Encourage active transportation via the Capital Area Active Transportation Plan and the Wayfinding Plan.</p> <p>SEMPO: Supports development and implementation of Regional Bicycle and Pedestrian plan.</p> <p>SEMPO, Bootheel RPC, and Mark Twain Regional COG: Support development of TAP applications.</p> <p>SJATSO: Encourage investment to help make communities walkable and bikeable.</p> <p>Pioneer Trails RPC: Spirit Trail for bicyclists commuting from Warrensburg to Whiteman Air Force Base.</p> <p>SMCOG: Encourage alternative modes of transportation to reduce the number of vehicles on the roadway.</p>	<p>Number and Rate of Fatalities</p> <p>Bike/Pedestrian and ADA Transition Plan Improvements</p>



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Goal 1: Take care of the transportation system and services we enjoy today	Traffic Flow Improvement	Promote better fuel economy through signal, intersection, and incident response optimization efforts that reduce delay and improve traffic flows,	MoDOT has implemented 356 roundabouts statewide as of 2022 resulting in 39% reduction in crashes, 89% reduction in fatal and sever injury crashes, and a 50% reduction of crashes involving	A roundabout at Route CC and Route 109 in St. Louis County (supported by EWG CRP funding).	Certain types of projects to improve traffic flow that are eligible under the CMAQ program, and that do not involve construction of new capacity.	Can improve safety. Can be cost-effective through time and fuel savings.	East West Gateway: Funds traffic flow improvement projects through their CMAQ and CRP programs. Green Hills RPC: Support the	Number and Rate of Fatalities Cost and Impact of Traffic Congestion



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Goal 5: Improve reliability and reduce congestion on Missouri's transportation system		including roundabouts that do not increase capacity and other projects typically eligible under the CMAQ Program.	pedestrians. Gateway Guide (St. Louis), KC Scout (Kansas City) and Ozarks Traffic (Springfield) are MoDOT's traffic management centers which help address incidents that contribute to congestion through use of traffic sensors, closed-circuit cameras, dynamic message boards, and coordinated signals.	MoDOT added 155 CCTV cameras to cover gaps in the existing camera network in the East-West Gateway region. These cameras are connected to the Gateway Guide Traffic Management Center and help monitor congestion and incidents, allowing for better responses to traffic flow disruptions.	<p>A project or strategy designed to support congestion pricing, shifting transportation demand to nonpeak hours or other transportation modes, including electronic toll collection and travel demand management strategies and programs</p> <p>Efforts to reduce the environmental and community impacts of freight movement</p> <p>A project described in 23 U.S.C. 149(b)(4) to establish or operate a traffic monitoring, management, and control facility or program</p> <p>A public transportation project eligible for assistance under 23 U.S.C. 142, including eligible capital projects for the construction of a bus rapid transit corridor or dedicated bus lanes.</p> <p>A project described in section 23 U.S.C. 503(c)(4)(E) for advanced transportation and congestion management technologies.</p>	Similar outcomes can be expected for similar design approach's replicated and applied to other similar existing conditions.	Port Infrastructure Development Program project, which creates a modal shift from highway truck to river transport.	Reliability of Major Routes



February 20, 2024

In Reply Refer To:
HEPN-30

Mr. Patrick K. McKenna
Director
Missouri Department of Transportation
105 West Capitol Avenue
Jefferson City, MO 65102

Subject: Certification of Missouri Carbon Reduction Strategy

Dear Director McKenna:

The Federal Highway Administration (FHWA) has completed our review of the Missouri Carbon Reduction Strategy required under 23 USC 175. Based on the review, FHWA certifies that the Missouri Carbon Reduction Strategy meets the statutory requirements.¹

Certification of this strategy does not indicate FHWA approval or authorization of any specific project. Please continue to coordinate with your FHWA division office on the implementation of programs and projects identified within your Carbon Reduction Strategy.

As a reminder, updates to Carbon Reduction Strategies are required no less frequently than every four years.² The FHWA will follow up with States on specific opportunities for improvement in future year strategies and will continue to provide technical assistance and guidance as States continue implementation.

Sincerely,

Emily Biondi
Associate Administrator
Office of Planning, Environment and Realty

cc: Missouri Division Office

¹ 23 USC 175(d)(1) and 175(d)(2)

² 23 USC 175(d)(3)