

ARKANSAS DEPARTMENT OF TRANSPORTATION

# CARBON REDUCTION STRATEGY

As required by 23 U.S.C. 175 (the Carbon Reduction Program)

OCTOBER 2023





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The Infrastructure Investment and Jobs Act (IIJA) created the Carbon Reduction Program (CRP) to provide funding for projects that are designed to reduce transportation emissions, defined as carbon dioxide (CO<sub>2</sub>) emissions from on-road highway sources. For federal fiscal years 2022 through 2026, Arkansas will receive an estimated \$87 million in CRP funding. The Arkansas Department of Transportation (ARDOT) developed this Carbon Reduction Strategy (CRS) in consultation with the state’s eight metropolitan planning organizations (MPO) and in compliance with published federal guidance, while reflecting Arkansas’ specific context and ARDOT’s strategic goals and priorities.

In the United States, transportation emissions represent an estimated 37 percent of all carbon emissions (with most transportation carbon emissions coming from on-road vehicles). Similarly, in Arkansas, the transportation sector is responsible for approximately 27 percent of the state’s carbon emissions. Given transportation’s large contribution to carbon emissions, there is a significant federal policy initiative to measure, report, and reduce emissions in support of the goal of net-zero carbon emissions by 2050.

The strategic framework for this CRS was informed by ARDOT’s strategic planning documents and refined through consultation with internal stakeholders and MPO partners. This effort produced six goal areas that align with and support carbon reduction, as shown in [Table ES-1](#).

**TABLE ES-1. CARBON REDUCTION GOAL AREAS**

GOAL AREA	GOAL
 <b>Environmental Sustainability</b>	Enhance the performance of the transportation system while avoiding, minimizing, and/or mitigating impacts to natural resources.
 <b>Infrastructure Condition</b>	Maintain and preserve existing transportation facilities to keep the system working efficiently.
 <b>Multimodal System</b>	Provide an integrated multimodal transportation system to support the efficient movement of people and goods.
 <b>Active Transportation</b>	Support the development of pedestrian, bicycle, and transit systems.
 <b>Management, Operations, and Technology</b>	Optimize performance using modern and innovative approaches, such as Transportation Systems Management and Operations solutions and Intelligent Transportation Systems.
 <b>Energy Efficiency</b>	Implement strategies that improve the energy efficiency of the transportation system and agency operations.

To advance these goal areas, specific projects and strategies that support carbon reduction were identified by ARDOT and the MPOs. Those projects and strategies are organized into six general categories, as shown in [Table ES-2](#).

**TABLE ES-2. PRIORITY CARBON REDUCTION PROJECTS AND STRATEGIES**

CATEGORY	PROJECTS AND STRATEGIES
 <b>Traffic and Congestion Management</b>	Travel Demand Management, Traffic Incident Management, Multimodal Coordination, and Operational Improvements
 <b>Transit Enhancements</b>	Transit System Expansion, Service Coordination, and Alternative Fuel Transit Vehicles
 <b>Bicycle and Pedestrian Improvements</b>	Bicycle and Pedestrian Safety, Planning, and System Expansion
 <b>Energy and Fuel Saving Initiatives</b>	Energy Efficiency and Electric Vehicle Infrastructure
 <b>Technology Solutions</b>	Traffic Management Centers, Transportation Systems Management and Operations, and Intelligent Transportation Systems
 <b>Other</b>	Planning, Policy Development, and Transportation Asset Management

This CRS represents a significant milestone in understanding how ARDOT, the MPOs, and other transportation stakeholders can support the reduction of transportation-related carbon emissions in Arkansas. It is noteworthy that implementation of the project types and strategies identified in this CRS not only support the reduction of carbon emissions, but also support other statewide and regional transportation goals and priorities. ARDOT is committed to working with partners to deliver a modern transportation system to enhance safety and quality of life in Arkansas and acknowledges this Carbon Reduction Strategy as a means of delivering on that commitment while reducing transportation carbon emissions.

The Infrastructure Investment and Jobs Act (IIJA)<sup>1</sup> created the Carbon Reduction Program (CRP), which requires each state to develop a Carbon Reduction Strategy (CRS). The Arkansas Department of Transportation (ARDOT) developed this CRS in consultation with the state’s eight metropolitan planning organizations (MPO) and in compliance with published federal guidance, while reflecting Arkansas’ specific context and ARDOT’s strategic goals and priorities.

**1.1 FEDERAL AND STATE POLICY CONTEXT**

This section details the federal and state policy framework surrounding carbon reduction and the policies and programs that are relevant to the reduction of transportation carbon emissions.

**1.1.1 CARBON REDUCTION PROGRAM OVERVIEW AND REQUIREMENTS**

The IIJA created the CRP to provide funding for projects that are designed to reduce transportation emissions, defined as carbon dioxide (CO<sub>2</sub>) emissions from on-road highway sources.<sup>2</sup> For federal fiscal years (FFY) 2022 through 2026, Arkansas will receive an estimated \$87 million in CRP funding ([Table 1](#)).

**TABLE 1. CARBON REDUCTION PROGRAM FUNDING IN ARKANSAS**

Total	2022*	2023*	2024	2025	2026
<b>\$87.0M</b>	<b>\$16.7M</b>	<b>\$17.1M</b>	<b>\$17.4M</b>	<b>\$17.7M</b>	<b>\$18.1M</b>

*\*Actual, all other years are estimated.*

*Source: Federal Highway Administration (FHWA), FFY 2022–2026 Estimated Highway Apportionments under the IIJA (accessed March 2023)*

The IIJA allocates 65 percent of CRP funds to urban areas<sup>3</sup> in accordance with their relative share of the state population.<sup>4</sup> ARDOT has the flexibility to allocate the remaining 35 percent of CRP funds in any area of the state.<sup>5</sup> [Figure 1](#) illustrates the suballocation detail for the estimated FFY 2024 apportionment, and the locations of urban areas with a population of 5,000 or above, as identified in the 2020 Census.<sup>6</sup> Of the 48 urban areas in Arkansas, three have a population that exceeds 200,000 (Little Rock, Fayetteville/Springdale/Rogers, and West Memphis<sup>7</sup>), five have a population between 50,000 and 200,000 (Fort Smith, Jonesboro, Conway, Texarkana,<sup>8</sup> and Hot Springs), and 38 have a population between 5,000 and 50,000. As of 2020, Arkansas had just two urban areas – Sheridan and Dumas – with populations below 5,000. The CRP requires each state to prepare a CRS in consultation with MPOs, to submit the CRS to the

<sup>1</sup> Enacted as the Infrastructure Investment and Jobs Act, Pub. L. 117-58 (Nov. 15, 2021), § 11403; 23 U.S.C. 175

<sup>2</sup> 23 U.S.C. 175(a)(2)

<sup>3</sup> To qualify as an Urban Area the territory must encompass at least 2,000 housing units or have a population of at least 5,000.

<sup>4</sup> 23 U.S.C. 175(e)(1)(A)

<sup>5</sup> 23 U.S.C. 175(e)(1)(B)

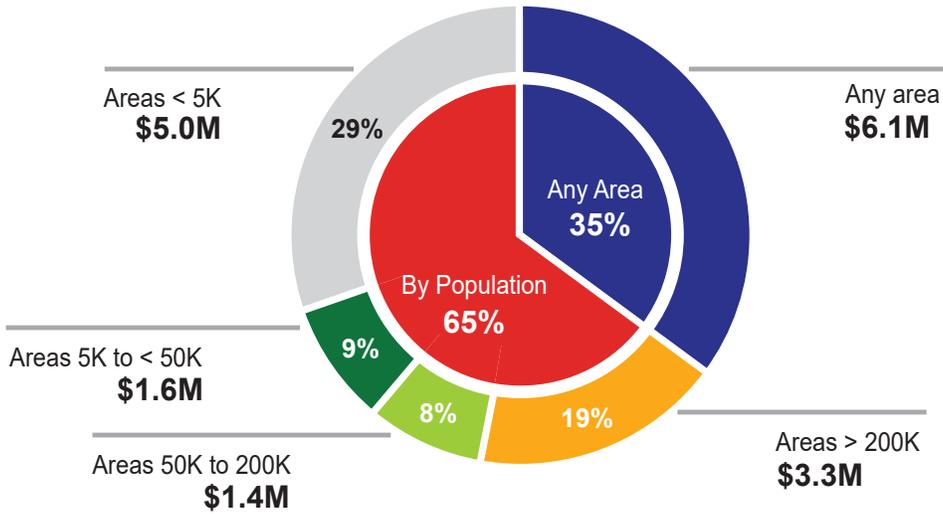
<sup>6</sup> FFY 2022 and FY 2023 suballocations were based on 2010 Census population data, but FFY 2024 through FFY 2026 are expected to be based on the 2020 Census population.

<sup>7</sup> The West Memphis urban area is considered a part of the larger Memphis urban area, which has a population that exceeds 200,000.

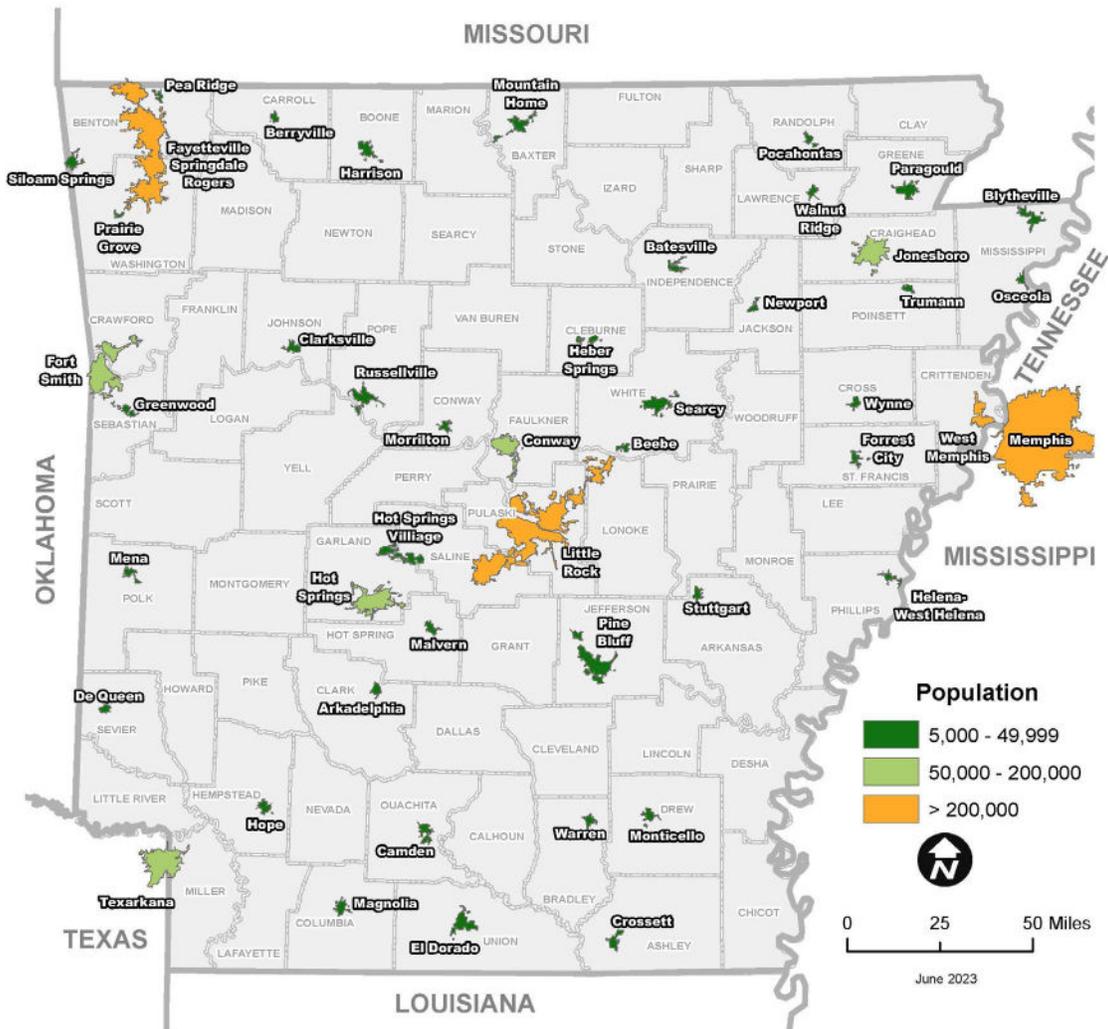
<sup>8</sup> The Texarkana urban area population is inclusive of persons living within both Texas and Arkansas.

### FIGURE 1. CRP FUNDING SUBALLOCATION<sup>9</sup> DETAILS

Suballocation (by Population) of Estimated FFY 2024 CRP Funding (\$17.4 Million Total)



### URBAN AREAS IN ARKANSAS



<sup>9</sup> 23 U.S.C 175(e)

Federal Highway Administration (FHWA) no later than November 15, 2023, and to update the CRS at least every four years. In accordance with 23 U.S.C. 175(d)(2), each CRS is required to:

- Support efforts to reduce transportation emissions;
- Identify projects and strategies to reduce transportation emissions, which may include projects and strategies for safe, reliable, and cost-effective options to:
  - Reduce traffic congestion by facilitating the use of alternatives to single-occupant vehicle trips, including public transportation, pedestrian and bicycle facilities, and shared or pooled vehicle trips.
  - Promote the use of vehicles or travel modes that result in lower transportation emissions per person-mile traveled compared to existing vehicles and modes.
  - Facilitate approaches to the construction of transportation assets that result in lower transportation emissions compared to existing approaches.
- Support the reduction of the state’s transportation emissions;
- Quantify, at the discretion of the state, the total carbon emissions from the production, transport, and use of materials used in the construction of transportation facilities within the state; and
- Be appropriate to the population density and context of the state and its MPOs.

[Appendix A](#) details how this CRS meets each requirement. At this time, ARDOT does not intend to quantify the total carbon emissions from the production, transport, and use of materials in the construction of transportation facilities within the state; therefore, that topic is not addressed in this CRS.

### 1.1.2 OTHER FEDERAL POLICY RELEVANT TO CARBON REDUCTION

In addition to the CRP, the IIJA created or expanded several programs and policies that support the reduction of transportation emissions around the goal of reaching net-zero carbon emissions by 2050. Relevant programs include those identified in [Table 2](#).

**TABLE 2. OTHER FEDERAL PROGRAMS RELATED TO CARBON REDUCTION**

Federal Program	Funds/Type	Description or Use
<b>National Electric Vehicle Infrastructure (NEVI) Formula Program<sup>10</sup></b>	\$5 billion/ formula funds	For states to build out a national electric vehicle (EV) charging network.
<b>Charging and Fueling Infrastructure Discretionary Grant Program<sup>11</sup></b>	\$2.5 billion/ competitive funding	For states and local governments to deploy EV charging and hydrogen, propane, and natural gas fueling infrastructure along designated alternative fuel corridors and in communities.
<b>Congestion Relief Program<sup>12</sup></b>	\$250 million/ competitive funding	To advance innovative, multimodal solutions to reduce congestion and related economic and environmental costs in the most congested metropolitan areas.

<sup>10</sup> [https://www.fhwa.dot.gov/bipartisan-infrastructure-law/nevi\\_formula\\_program.cfm](https://www.fhwa.dot.gov/bipartisan-infrastructure-law/nevi_formula_program.cfm)

<sup>11</sup> <https://www.fhwa.dot.gov/bipartisan-infrastructure-law/charging.cfm>

<sup>12</sup> [https://www.fhwa.dot.gov/bipartisan-infrastructure-law/congestion\\_relief.cfm](https://www.fhwa.dot.gov/bipartisan-infrastructure-law/congestion_relief.cfm)

Federal Program	Funds/Type	Description or Use
<b>Reduction of Truck Emissions at Port Facilities Program</b> <sup>13</sup>	\$400 million/ competitive funding	To reduce truck idling and emissions at ports.
<b>Promoting Resilient Operations for Transformative, Efficient, and Cost-Saving Transportation (PROTECT) Formula Program</b> <sup>14</sup>	\$7.3 billion/ formula funds	To help states and communities plan and prepare for extreme weather, invest in improvements that will increase transportation infrastructure resilience, improve evacuation routes and community resilience, and enhance at-risk coastal infrastructure.
<b>PROTECT Discretionary Grant Program</b> <sup>15</sup>	\$1.4 billion/ competitive funding	To help states, MPOs, local governments, and others make surface transportation more resilient to natural hazards, including climate change, sea level rise, flooding, extreme weather events, and other natural disasters through support of planning activities, resilience improvements, community resilience and evacuation routes, and at-risk coastal infrastructure.
<b>Federal Transit Administration (FTA) Low or No Emission Vehicle Program</b> <sup>16</sup>	\$5 billion/ competitive funding	For the purchase or lease of zero- and low-emission transit buses.
<b>Transportation Alternatives Set-Aside</b> <sup>17</sup>	\$7.2 billion/ formula funds	To implement pedestrian and bicycle infrastructure projects.
<b>FTA Transit-Oriented Development Program</b> <sup>18</sup>	\$69 million/ competitive funding	For local communities to fund the integration of land use and transportation planning with new fixed guideway or core capacity transit capital investment projects.

In addition to these programs, overarching policy aimed at reducing carbon emissions is reflected in the following guidance documents:

- Consistent with **Executive Order (E.O.) 13990, Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis**, the Council on Environmental Quality (CEQ) has issued interim **National Environmental Policy Act (NEPA) Guidance on Consideration of Greenhouse Gas Emissions and Climate Change**.<sup>19</sup> This guidance was developed to assist agencies in analyzing the greenhouse gas (GHG) and climate change effects of their proposed actions under NEPA.

<sup>13</sup> <https://www.fhwa.dot.gov/bipartisan-infrastructure-law/rtep.cfm>

<sup>14</sup> [https://www.fhwa.dot.gov/bipartisan-infrastructure-law/protect\\_fact\\_sheet.cfm](https://www.fhwa.dot.gov/bipartisan-infrastructure-law/protect_fact_sheet.cfm)

<sup>15</sup> <https://www.fhwa.dot.gov/bipartisan-infrastructure-law/promote.cfm>

<sup>16</sup> <https://www.transit.dot.gov/lowno>

<sup>17</sup> <https://www.fhwa.dot.gov/bipartisan-infrastructure-law/ta.cfm>

<sup>18</sup> <https://www.transit.dot.gov/TOD>

<sup>19</sup> [https://ceq.doe.gov/guidance/ceq\\_guidance\\_nepa-ghg.html](https://ceq.doe.gov/guidance/ceq_guidance_nepa-ghg.html)

- The FHWA published a **Notice of Proposed Rulemaking, Assessing Performance of the National Highway System, Greenhouse Gas Emissions Measure**,<sup>20</sup> which proposes to amend regulations governing national performance management measures and requires state departments of transportation (DOTs) and MPOs to establish declining CO<sub>2</sub> emissions targets.
- The **U.S. National Blueprint for Transportation Decarbonization**<sup>21</sup> is a joint strategy developed by the U.S. Environmental Protection Agency (EPA), along with the U.S. Department of Energy, U.S. Department of Transportation (USDOT), and U.S. Department of Housing and Urban Development. The strategy calls for net-zero GHG emissions from the transportation sector by 2050; sets out a comprehensive, system-level perspective of the entire transportation system across all modes and fuels; and identifies strategies to achieve decarbonization.
- The **Long-Term Strategy of the United States, Pathways to Net-Zero Greenhouse Gas Emissions by 2050**,<sup>22</sup> published by the U.S. Department of State and the Office of the President, proposes steps to reach net-zero GHG emissions by 2050. The plan identifies pathways to net-zero emissions, which includes decarbonizing electricity, electrifying end uses, switching to other clean fuels, cutting energy waste, reducing methane and other non-carbon emissions, and others.

ARDOT will continue to monitor federal policy and funding programs for opportunities that support the implementation of this CRS.

### 1.1.3 ARKANSAS CARBON REDUCTION POLICY CONTEXT

This CRS documents the alignment between ARDOT's priorities and strategic plans and the goal of reducing transportation-related carbon emissions. The planning framework and associated projects and strategies are documented in [Section 4](#). Arkansas has not enacted legislation with the intent of regulating transportation carbon emissions.

## 1.2 GENERAL ROLES AND RESPONSIBILITIES OF ARDOT

Under the direction of the Arkansas State Highway Commission, ARDOT is responsible for planning, designing, constructing, operating, and maintaining the State Highway System (SHS), which includes Arkansas' portions of the Interstate and National Highway Systems, the Arkansas Primary Highway Network (APHN), and other highways. ARDOT is responsible for more than 16,400 centerline miles of state highways and more than 7,300 bridges that carry approximately 70 percent of vehicle miles traveled in Arkansas.

ARDOT prepares a comprehensive array of strategic, performance-based, and multimodal transportation plans to guide the development of a safe, efficient, and environmentally sustainable transportation system. These planning documents – such as the *Strategic Plan*, *Long Range Intermodal Transportation Plan*, and *Strategic Highway Safety Plan* – provide a framework for agency decision-making and project selection. All regionally significant and federally funded projects are identified in ARDOT's *Statewide Transportation Improvement Program* (STIP), which describes the anticipated impacts of those investments on critical performance indicators, such as safety, state of good repair, system reliability, and select air quality measures.

<sup>20</sup> <https://www.federalregister.gov/documents/2022/07/15/2022-14679/national-performance-management-measures-assessing-performance-of-the-national-highway-system>

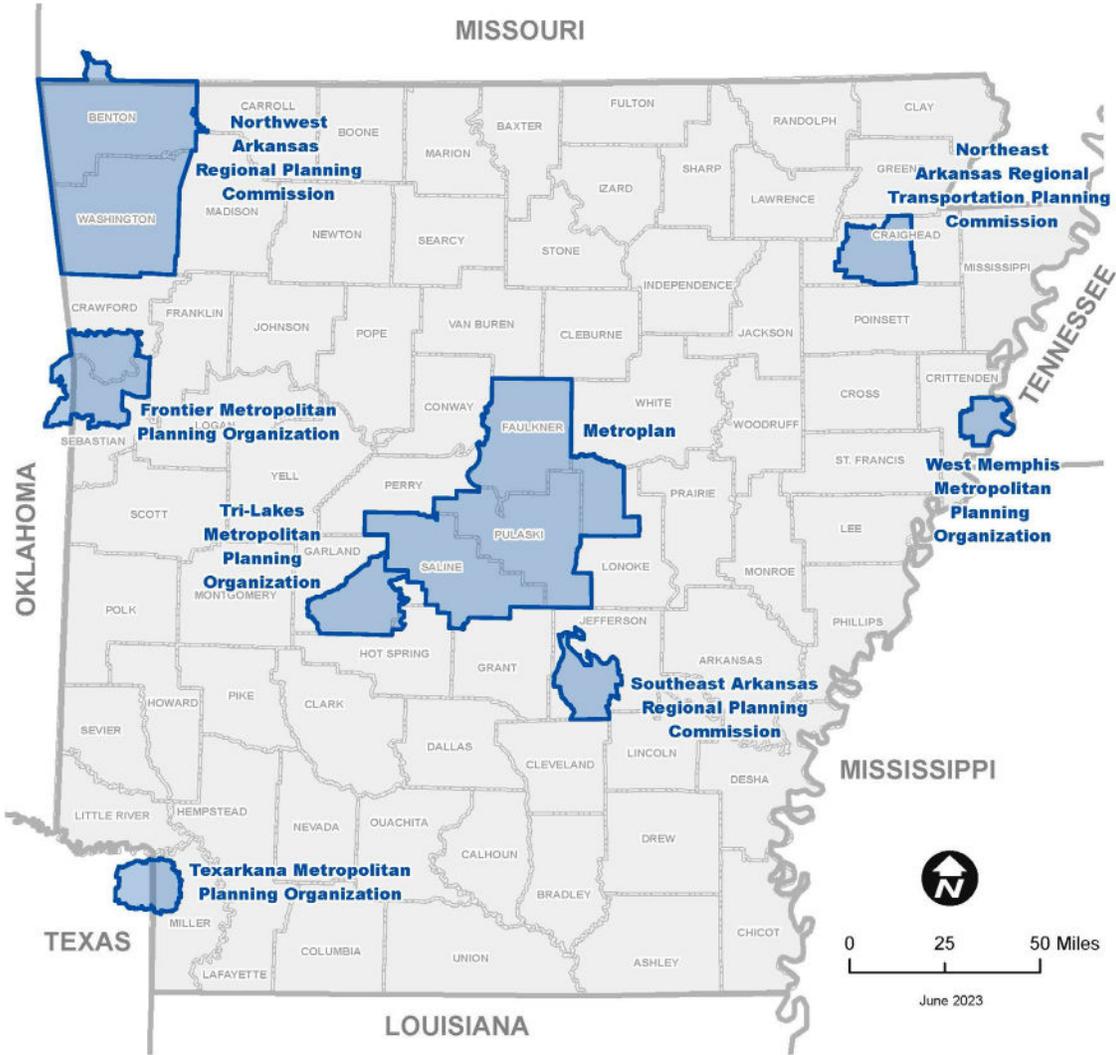
<sup>21</sup> <https://www.energy.gov/sites/default/files/2023-01/the-us-national-blueprint-for-transportation-decarbonization.pdf>

<sup>22</sup> <https://www.whitehouse.gov/wp-content/uploads/2021/10/US-Long-Term-Strategy.pdf>

### 1.3 GENERAL ROLES AND RESPONSIBILITIES OF MPOS

An MPO is a body of locally elected officials and transportation agency representatives that implement a metropolitan transportation planning process. Federal law requires the formation of an MPO in all urban areas with populations greater than 50,000. MPOs must implement a continuing, cooperative, and comprehensive (3C) planning process for their respective planning areas, a process that emphasizes regional needs and priorities, public engagement, and consensus-based decision making. Arkansas has eight MPOs, as illustrated in [Figure 2](#).

FIGURE 2. MPOS IN ARKANSAS



Like ARDOT, the MPOs prepare an array of interconnected plans that provide a framework for developing, managing, and operating a region’s multimodal transportation system. Central among those plans is the *Metropolitan Transportation Plan (MTP)*, which documents the vision and goals for the multimodal transportation system, demand for transportation and relevant trends, priority projects and projected funding, and related topics. In air quality non-attainment or maintenance areas (such as the West Memphis MPO area), the MTP must also address air quality issues and conform to air quality improvement goals. To be included in an MPO’s list of federally funded projects, known as a *Transportation Improvement Program*, a project must be consistent with that MPO’s MTP.

This section discusses key concepts in carbon reduction, factors that influence carbon production and reduction in the transportation sector, and relevant trends and conditions in Arkansas.

## 2.1 TRANSPORTATION CARBON EMISSIONS

The CRP defines transportation emissions as *CO<sub>2</sub> emissions from on-road highway sources*.<sup>23</sup> On-road vehicles come in a variety of sizes and weight classes, from light-duty passenger vehicles weighing up to 8,500 pounds (class 1–2A), to medium-duty commercial vehicles from 8,501 to 19,500 pounds (class 2B–5), and heavy-duty vehicles from 19,501 to 80,000 pounds (class 6–8B), each with their unique emissions profiles based on fuel economy and EPA regulated emissions standards.<sup>24</sup> On-road transportation is responsible for two categories of emissions: life-cycle and tailpipe.<sup>25</sup>

- **Life-Cycle Emissions** result from the extraction (or cultivation), production, transport, distribution, and use of goods and materials, including fuel. The concept of life-cycle emissions also applies to the production and use of construction materials for transportation infrastructure, such as concrete and asphalt.
- **Tailpipe Emissions** result from the direct combustion of fuel (e.g., gasoline or diesel) in vehicle engines causing direct emissions through the vehicle exhaust system or “tailpipe.” Hydrogen and electric powered vehicles have no tailpipe emissions, which is why they are referred to as zero-emission vehicles, but they do have associated life-cycle emissions from production and distribution processes.

Transportation agencies can support the reduction of transportation emissions in both categories. Construction and asset management practices that focus on reducing embodied carbon from transportation assets can be implemented to reduce life-cycle emissions, and strategies that support less carbon intensive modes of transportation can lead to reductions in tailpipe emissions.

## 2.2 CARBON EMISSIONS DATA

[Figure 3](#) and [Figure 4](#) depict the shares of total carbon emissions by sector for the U.S. and Arkansas, respectively. As the figures illustrate, the transportation sector is a significant source of total carbon emissions at both the national (36.7 percent) and state (26.6 percent) levels. For the U.S., most transportation emissions come from highway vehicles, such as cars and trucks.

[Figure 5](#) illustrates that most vehicles registered in Arkansas (92.6 percent) are personal vehicles (cars and pickups). While passenger vehicles do make a large contribution to carbon emissions, it should be noted that passenger vehicles emit less carbon than many commercial motor vehicles (CMV). For instance, while medium- and heavy-duty (MD/HD) trucks represent only 4.0 percent of registered vehicles in the state, they likely account for far more than 4.0 percent of total emissions, as

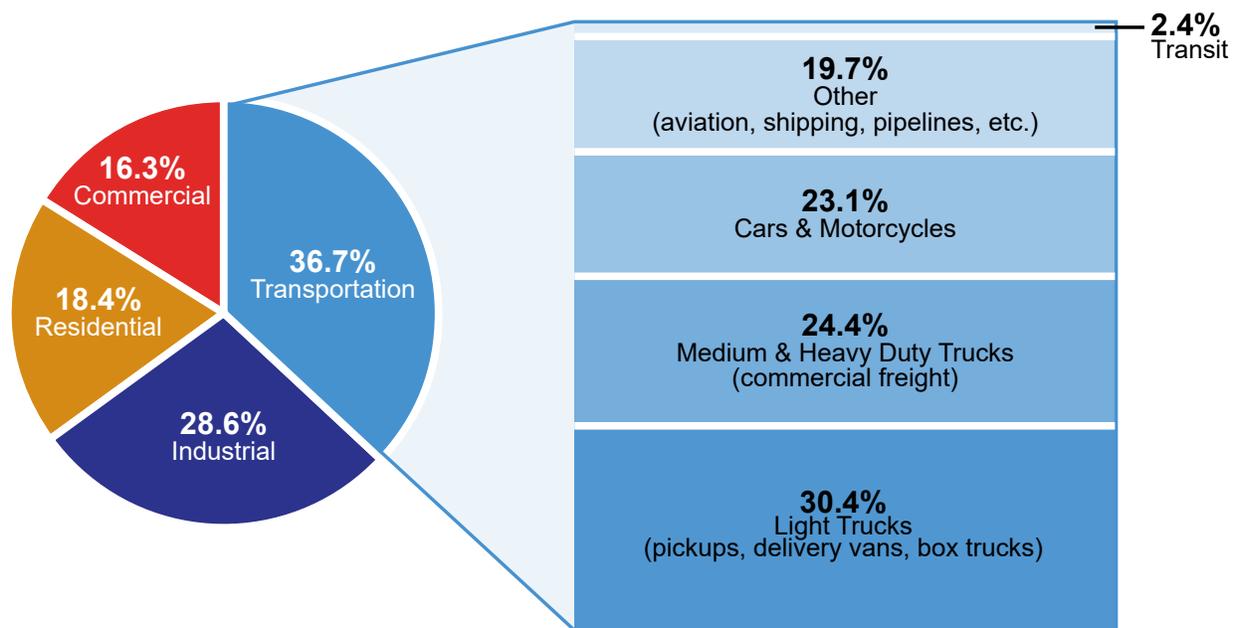
<sup>23</sup> 23 U.S.C 175(a)(2)

<sup>24</sup> US Department of Energy, Alternative Fuel Data Center, Vehicle Weight Classes, <https://afdc.energy.gov/data/10381>

<sup>25</sup> US Department of Energy, Alternative Fuel Data Center, “Direct, Well-to-Wheel, and Cradle-to-Grave Emissions,” [https://afdc.energy.gov/vehicles/electric\\_emissions.html](https://afdc.energy.gov/vehicles/electric_emissions.html)

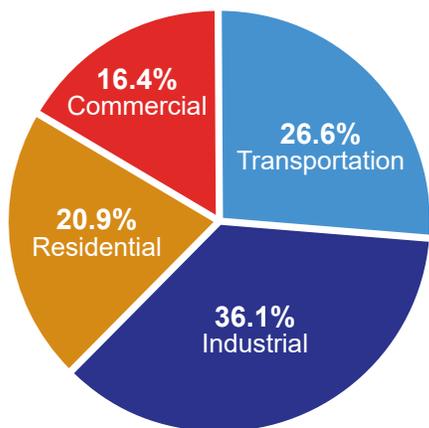
MD/HD trucks emit more per mile and are typically driven more miles per year than a passenger vehicle. MD/HD trucks that move through the state (specifically those not registered in Arkansas) can also be an important source of emissions that is not reflected in registered vehicle data. For example, portions of Interstates 30 and 40 carry in excess of 20,000 MD/HD trucks per day, many of which represent pass-through trips.

**FIGURE 3. U.S. CARBON EMISSIONS BY SECTOR AND SOURCE**



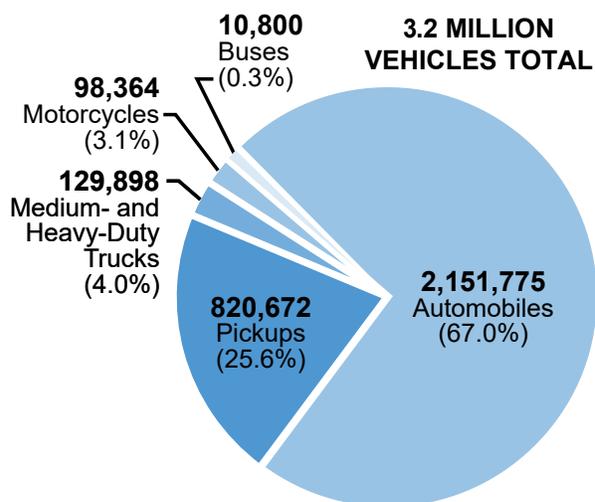
Source: U.S. Energy Information Administration (EIA), U.S. Carbon Emissions by Source and Sector, 2021 (edited for simplicity)

**FIGURE 4. ARKANSAS CARBON EMISSIONS BY SECTOR**



Source: U.S. EIA, State Energy Profile, 2021

**FIGURE 5. ARKANSAS ON-ROAD VEHICLES BY TYPE**



Source: ARDOT, based on information provided by the Arkansas Department of Finance, 2022

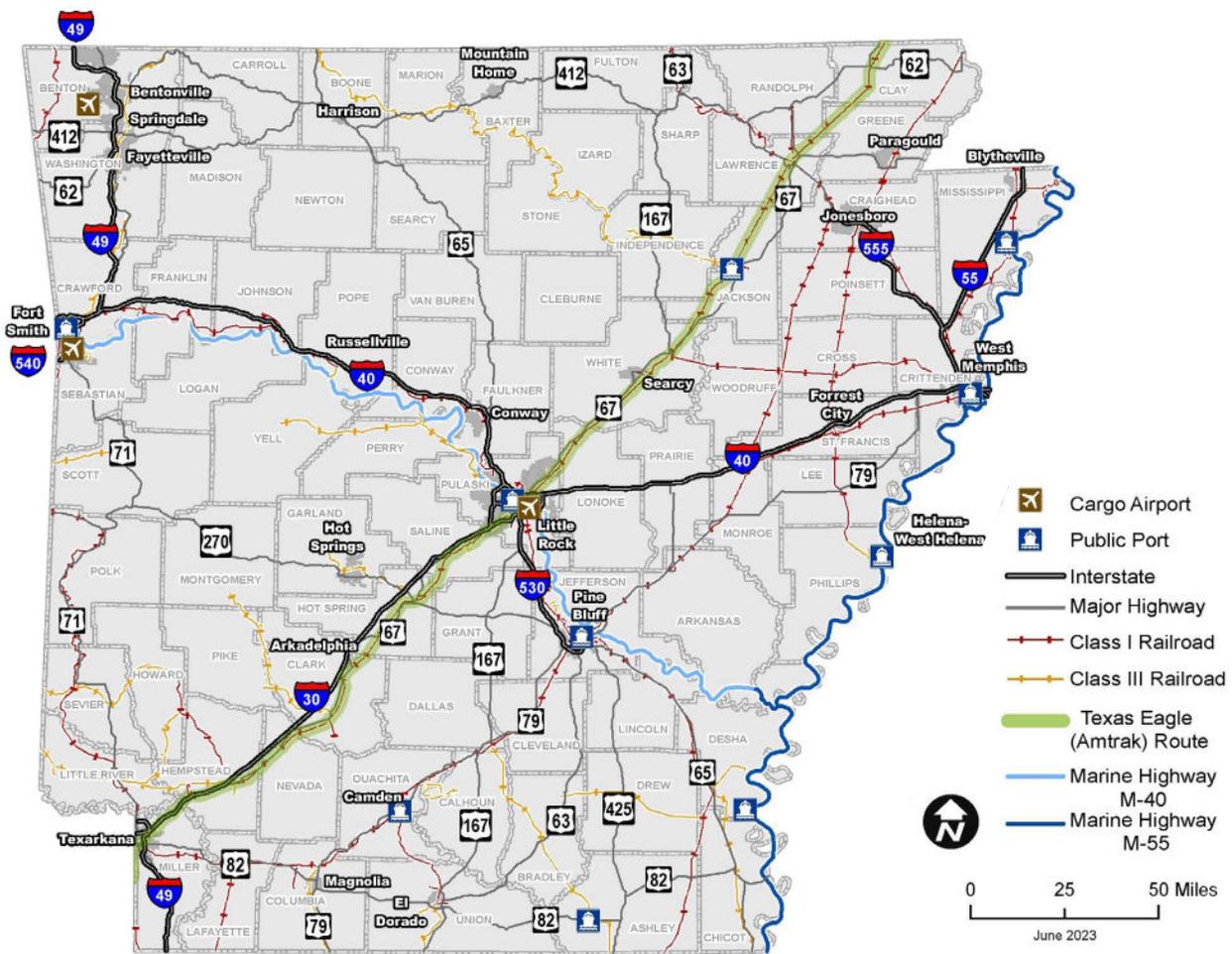
## 2.3 FACTORS INFLUENCING TRANSPORTATION CARBON EMISSIONS

Many factors influence transportation carbon emissions, including the availability of transportation infrastructure, land use, personal transportation choices, travel behaviors, and the movement of freight. While some of these factors are beyond the control or influence of ARDOT and other transportation agencies (see [Section 2.4](#)), they can inform the selection of agency goals and influence the achievement of those goals.

### 2.3.1 INFRASTRUCTURE AND LAND USE

Major transportation infrastructure in Arkansas is illustrated in [Figure 6](#). Over the past 100 years, significant investments were made in all modes of transportation infrastructure, but especially in the highway mode, which supports local, regional, and statewide movement of people and goods. Arkansas has over 100,000 miles of public roadways, approximately 2,700 miles of rail, more than 1,800 miles of navigable waterways, and two national airports.<sup>26</sup> While ARDOT is responsible for approximately 16,400 miles of highways, it should be noted that other transportation infrastructure (including local streets and roads, railroads, airports, ports, and waterways) are owned and operated by other entities, some public and some private. The availability of transportation infrastructure impacts the selection of transportation mode, which has implications for transportation carbon emissions.

FIGURE 6. MAJOR TRANSPORTATION INFRASTRUCTURE IN ARKANSAS



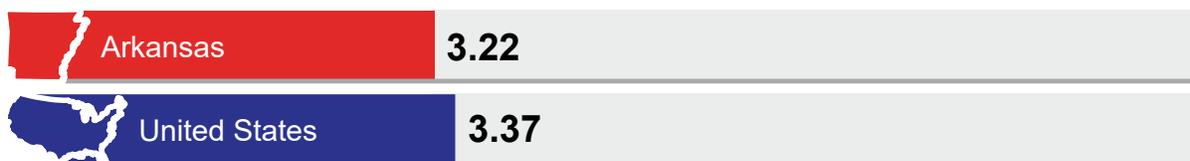
<sup>26</sup> Arkansas State Freight Plan (2022), <https://www.ardot.gov/wp-content/uploads/2022-Arkansas-State-Freight-Plan.pdf>

Population shifts influence travel patterns and offer opportunities for carbon-efficient infrastructure investments. From 2010 to 2020, the population of Arkansas grew by 3.3 percent, from 2.9 million to over 3.0 million. Urban areas grew at a faster rate, with the Little Rock urban area experiencing a population increase of 7 percent over the same period and the Fayetteville/Springdale/Rogers urban area experiencing an almost 27 percent increase. Growth in urban population creates an opportunity for changes in local land use policy that can increase the choice of walking, bicycling, or transit modes. This can be accomplished by increasing the density of development and mixing land uses to offer a variety of destinations in close proximity.

### 2.3.2 PERSONAL TRANSPORTATION AND TRAVEL BEHAVIOR

As shown in [Figure 7](#), a typical Arkansan makes slightly fewer trips than the national average. More important in the context of carbon reduction, a typical Arkansan travels significantly fewer miles per day than the national average, as shown in [Figure 8](#).

**FIGURE 7. TRIPS PER PERSON PER DAY (2017)**



Source: USDOT Bureau of Transportation Statistics (2020)<sup>27</sup>

**FIGURE 8. MILES PER PERSON PER DAY (2017)**



Source: USDOT Bureau of Transportation Statistics (2020)<sup>28</sup>

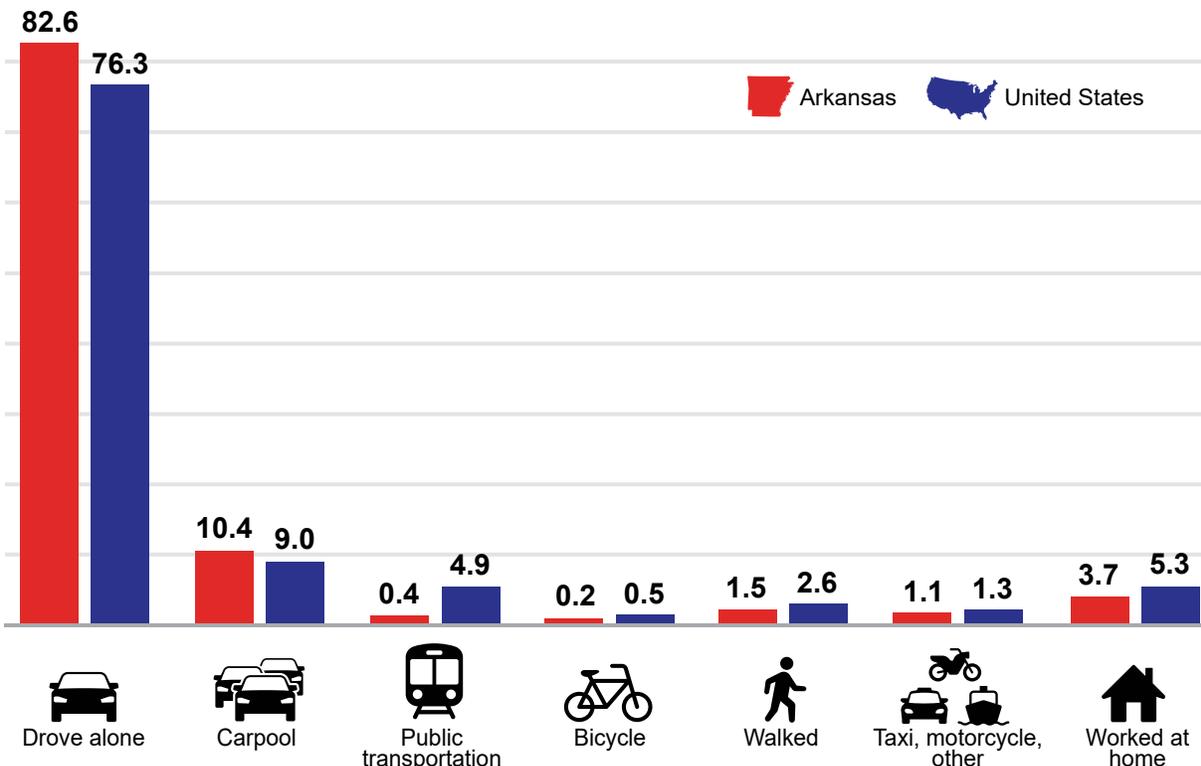
As illustrated in [Figure 9](#), driving alone is the preferred mode of travel for most work trips in Arkansas (82.6 percent), with carpooling a distant second (10.4 percent). Investments in EV infrastructure (such as the NEVI program) will support lower emission options for personal vehicle travel. As of June 2023, the Arkansas Department of Finance and Administration reported 4,000 EVs registered in the state, including plug-in hybrid electric vehicles (PHEV) and dedicated battery electric vehicles (BEV). While growing rapidly, EVs represent less than 0.2 percent of all on-road vehicles registered in Arkansas.

Walking and bicycling are the least carbon-intensive modes of personal transportation, but they only represent a small percentage of work trips in Arkansas (1.5 and 0.2 percent, respectively). Transit is the next least carbon-intensive form of passenger transportation, but few work trips (0.4 percent) are taken on public transportation in Arkansas. The choice of mode is influenced by many factors, including development pattern (such as land use), personal income, and the availability of transportation infrastructure and transit services.

<sup>27</sup> <https://www.bts.dot.gov/sites/bts.dot.gov/files/states2020/Arkansas.pdf>

<sup>28</sup> <https://www.bts.dot.gov/sites/bts.dot.gov/files/states2020/Arkansas.pdf>

**FIGURE 9. HOW ARKANSANS GET TO WORK (PERCENT OF WORKERS OVER AGE 16)**



Source: USDOT Bureau of Transportation Statistics (2020)<sup>29</sup>

Note: Percentages may not total 100 due to rounding.

Various social and technological forces are also shaping travel behavior, such as the ability to work from home and the popularity of online shopping. These changes in travel behavior may reduce the number of personal vehicle miles traveled (hence reducing carbon emissions from personal vehicles), while increasing CMV miles traveled (hence increasing carbon emissions from CMVs). The full impact of recent and anticipated social and technological changes on travel behaviors is a subject of ongoing research.

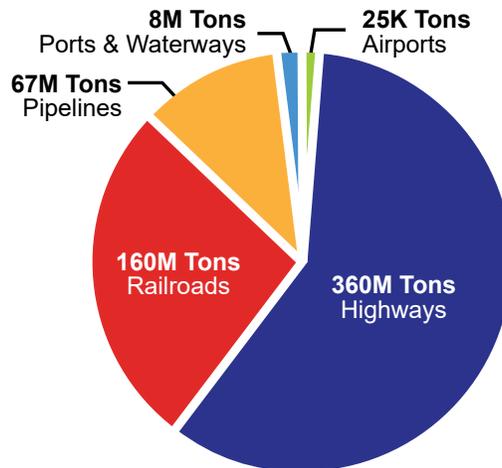
### 2.3.3 FREIGHT TRANSPORTATION

Freight is critical to the economy of Arkansas. In 2019, freight-intensive sectors represented 44 percent of the state’s total economic output. More freight is moved across the state by CMVs on highways than all other modes (rail, waterways, pipelines, and airports) combined ([Figure 10](#)).

Carbon emissions from CMVs (particularly MD/HD trucks) are typically higher per ton mile than shipping by water or rail ([Figure 11](#)). While it is noted that many CMV trips cannot be replaced by water or rail, shippers do consider modal alternatives for long-distance freight movements, and many regions are exploring the development of intermodal facilities that would capitalize on the efficiencies provided by multiple modes. It is also noted that the CMV industry is exploring options to transition their fleets to lower carbon fuels (such as biodiesel) and zero emission vehicles (such as BEVs). ARDOT’s NEVI plan will be siting NEVI-compliant charging stations on the key interstates that see the majority of freight truck volume, and ARDOT recognizes the opportunity to design solutions with both motorists and freight in mind.

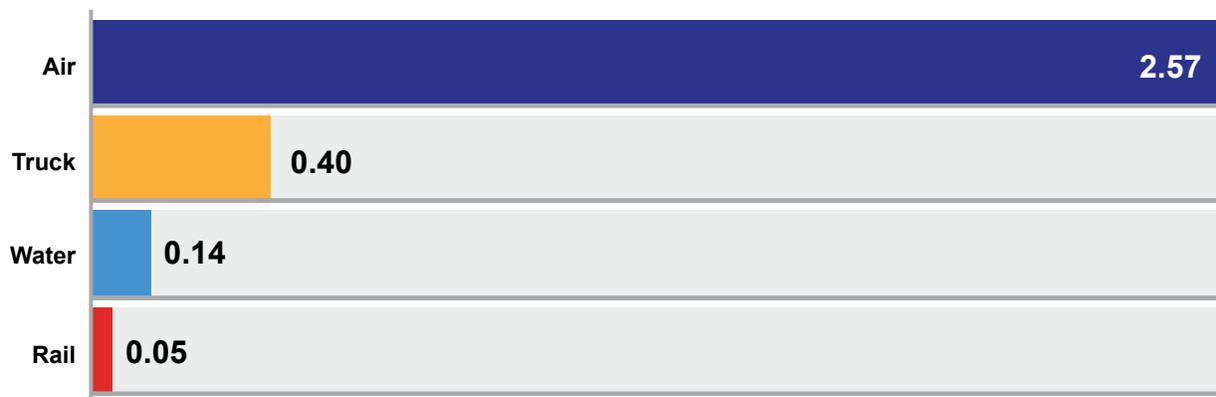
<sup>29</sup> <https://www.bts.dot.gov/sites/bts.dot.gov/files/states2020/Arkansas.pdf>

**FIGURE 10. FREIGHT TRANSPORTATION TONNAGE BY MODE IN ARKANSAS**



Source: Arkansas State Freight Plan, Executive Summary, 2022<sup>30</sup>

**FIGURE 11. AVERAGE CARBON EMISSIONS PER TON-MILE BY TRANSPORTATION MODE IN THE U.S. (2019)**



Source: Emissions of Carbon Dioxide in the Transportation Sector, Congressional Budget Office, December 2022

The second most used freight mode in Arkansas is rail. Rail is the least carbon-intensive of all freight modes, and recent technological advances (such as the development of battery-electric locomotives) demonstrate the potential for carbon reduction. Intermodal investments that improve connectivity between highway and rail infrastructure could support the movement of more goods via rail, which could reduce total carbon emissions from freight.

The movement of goods via waterways can also support reductions in transportation carbon emissions. Arkansas’ ports and waterways provide an efficient and economical shipping option for bulk products from manufacturing, agriculture, and production and extraction industries. Barges, the primary freight transportation vehicle for inland waterways, are ideal for hauling oversized or overweight equipment. One barge can move the same tonnage as 16 train cars or 70 truck trailers. Improving intermodal connectivity between inland ports and roadway or rail networks presents an opportunity for competitive transportation solutions that alleviate congestion on Arkansas’ roadways and railways while reducing carbon emissions.

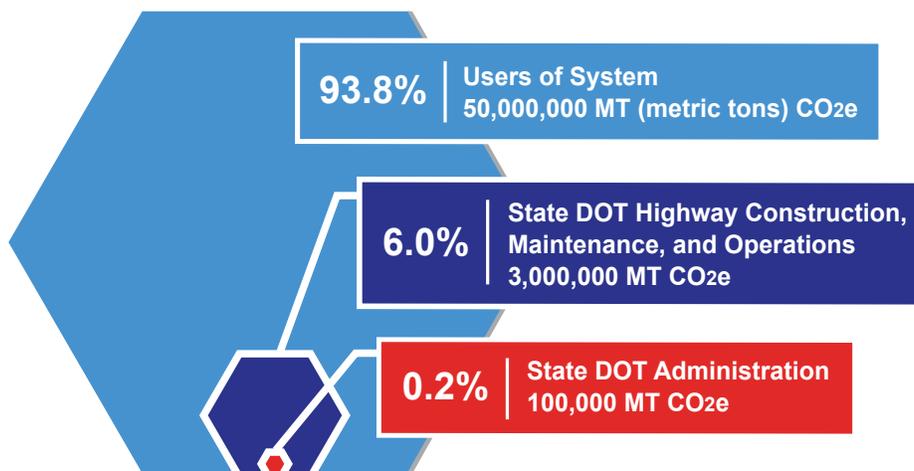
<sup>30</sup> <https://www.ardot.gov/wp-content/uploads/2022-Arkansas-State-Freight-Plan-Executive-Summary.pdf>

## 2.4 ROLES IN TRANSPORTATION CARBON REDUCTION

While the CRP provides state DOTs and large MPOs with funding to implement projects that support the reduction of on-road transportation emissions, it is important to consider the roles of each transportation agency within the transportation system. Likewise, it is important to understand the needs and priorities of partner agencies and other transportation stakeholders, as well as the broader context of policies, funding, and transportation system users. All parties must collaborate to effectively reduce carbon emissions from the transportation system.

The Transportation Research Board (TRB) has published a National Cooperative Highway Research Program (NCHRP) Report titled, “Methods for State DOTs to Reduce Greenhouse Gas Emissions from the Transportation Sector.” This study compiled data from nine states to illustrate the relative carbon emissions from users of the transportation system compared to a typical state DOT’s highway construction, maintenance, and operations and state DOT administration (buildings and light-duty fleets). As shown in [Figure 12](#), for a typical state DOT, approximately 6 percent of emissions<sup>31</sup> are generated from materials and fuels used in the construction, maintenance, and operation of a state’s highway infrastructure, and approximately 0.2 percent of emissions are generated in the administration of a typical state DOT.

**FIGURE 12. RELATIVE TRANSPORTATION SYSTEM CARBON EMISSIONS**



Source: TRB NCHRP “Methods for State DOTs to Reduce Greenhouse Gas Emissions from the Transportation Sector,” 2022<sup>32</sup>

This information highlights that achieving meaningful reductions in transportation carbon emissions cannot be accomplished by state DOTs acting alone. Rather, reducing emissions will require a concerted effort among all levels of government, advances in transportation technologies, and changes in the behaviors of transportation system users. In this context, [Table 3](#) provides brief descriptions of the three major categories of actions and related partnerships that are required to reduce transportation carbon emissions, including examples of actions that can be taken.

<sup>31</sup> Measured as carbon dioxide equivalent (CO<sub>2</sub>e), which is used to compare various emission sources based on their warming potential.

<sup>32</sup> Available as NCHRP WebResource 1 at: <https://crp.trb.org/nchrpwebresource1/>

**TABLE 3. TRANSPORTATION CARBON EMISSIONS – ROLES AND ACTIONS**

**DOT Roles and Actions**

ARDOT is responsible for planning, constructing, operating, and maintaining over 16,400 miles of highways and for making decisions about agency-owned facilities, fleet vehicles, and equipment. Each of those responsibilities presents opportunities for carbon reduction.

<b>EXAMPLES</b>	ARDOT can make decisions about the construction and maintenance of assets in ARDOT’s right-of-way, such as selecting construction methods that reduce on-road transportation emissions and using materials with lower life-cycle emissions.	ARDOT can direct projects and strategies on the SHS that reduce emissions by improving the efficiency of the transportation system, such as ITS improvements and real-time information services for travelers.	ARDOT can plan and implement strategies to reduce carbon emissions from ARDOT-owned buildings or fleet vehicles by transitioning to energy-efficient equipment and low or zero emission vehicles.
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**DOT Roles and Actions in Partnership with Other Agencies and Stakeholders**

ARDOT is collaborating with other roadway authorities, planning agencies, local governments, and transportation system users on strategies and projects that support the reduction of transportation carbon emissions, as outlined in [Section 4](#).

<b>EXAMPLES</b>	ARDOT can coordinate with other transportation agencies (such as MPOs) to implement an efficient, multimodal transportation system that crosses jurisdictional boundaries.	ARDOT can coordinate with municipalities to support the use of active modes of transportation by investing in bicycle and pedestrian infrastructure.	ARDOT can create opportunities for public-private partnerships to install electric vehicle charging infrastructure (e.g., NEVI).
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**Other Roles and Actions Supporting Transportation Emissions Reductions**

Production and reduction of transportation carbon emissions can be influenced by a broad range of public- and private-sector actions.

<b>EXAMPLES</b>	Public- and private-sector decisions relating to funding priorities, energy production/consumption, technology adoption, and others all influence transportation system emissions.	Local land use policies influence the feasibility of walking, cycling, transit, and shared-ride alternatives.	Employers can offer opportunities for remote work or incentives for carpooling or using transit, walking, or biking.
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# 3 CRS DEVELOPMENT PROCESS

The timeline for the development of this CRS is illustrated in [Figure 13](#). The development process was informed by four primary sources: (1) a review of ARDOT’s existing statewide and strategic plans, (2) feedback from internal stakeholders, (3) consultation with the state’s eight MPOs, and (4) public comments.

**FIGURE 13. CRS DEVELOPMENT TIMELINE**



## 3.1 STATEWIDE AND STRATEGIC PLAN REVIEW

In developing this CRS, ARDOT’s statewide and strategic planning documents were reviewed to identify areas of alignment and synergy with carbon reduction. ARDOT’s planning documents outline the agency’s priorities for advancing a safe and efficient transportation system that promotes economic vitality and quality of life across Arkansas. Key documents include:

- The **2023-2028 Strategic Plan (2023)**<sup>33</sup> provides a framework for advancing ARDOT’s priorities over the next five years, with a focus on delivering a modern transportation system to enhance safety and quality of life. The Strategic Plan identifies Safety, Trust, Excellence, Accountability, and Modern (Safety first, working as a TEAM) as the agency’s core values and documents strategic goals and objectives in alignment with those values.
- The **Statewide Long Range Intermodal Transportation Plan (2017)**<sup>34</sup> is a performance-based, long-range plan that details the goals, objectives, policies, investment strategies, and performance measures guiding future transportation investments. It examines all aspects of the state’s multimodal transportation system, including highways, bridges, public transportation, rail, active modes, transit, ports, waterways, and aviation.

<sup>33</sup> <https://www.ardot.gov/wp-content/uploads/Strategic-Plan-Full-STEAM-Ahead.pdf>

<sup>34</sup> <https://www.ardot.gov/wp-content/uploads/2021/02/1-12-137-Arkansas-Long-Range-Intermodal-Transportation-Plan-OCR.pdf>

- The **Statewide Bicycle and Pedestrian Transportation Plan (2017)**<sup>35</sup> highlights the benefits of active transportation on the economy and quality of life. It supports the development of local and statewide bicycle and pedestrian transportation networks and emphasizes ARDOT's core value of providing a safe transportation system.
- The **State Freight Plan (2022)**<sup>36</sup> describes the state's multimodal freight system, including highways, rail, air, waterways, and pipelines; reports freight system trends; identifies needs and issues; describes the policies, strategies, and performance measures that guide freight investment decisions; and documents a freight investment plan for high-priority freight projects.

**Other relevant planning documents that were considered include:**

- State Rail Plan (2015)<sup>37</sup>
- Electric Vehicle Infrastructure Deployment (EVID) Plan (2022)<sup>38</sup>
- Strategic Highway Safety Plan (2022)<sup>39</sup>
- Transportation Asset Management Plan (2022)
- Statewide Transit Coordination Plan (2018)<sup>40</sup>

The outcome of this review was a preliminary list of CRS goal areas (see [Section 4](#)) that were vetted through internal and external stakeholders, as discussed below.

### 3.2 FEEDBACK FROM INTERNAL STAKEHOLDERS

Two meetings were convened to brief ARDOT personnel on the CRP, to develop a strategic framework for the CRS, and to identify potential projects and strategies that support carbon reduction. Participants included leadership and staff from across the Department. Feedback from internal stakeholders on the strategic framework, priority projects, and proposed strategies was incorporated into this CRS.

### 3.3 CONSULTATION WITH MPOS

This CRS was developed in consultation with Arkansas' eight MPOs ([Figure 2](#)) through two virtual meetings, a survey, and written correspondence. The MPOs provided feedback on the strategic framework for this CRS, identified their priority projects and strategies, and reviewed the draft CRS.

### 3.4 PUBLIC COMMENT PERIOD

The draft CRS was released for public comment on September 17, 2023, and public comments were accepted through October 6, 2023. Advertising for the Public Comment Period included news releases (both English and Spanish) distributed to media and posted on ARDOT's website, as well as newspaper display ads (both English and Spanish).

<sup>35</sup> <https://www.ardot.gov/wp-content/uploads/2021/02/1-12-116b-Arkansas-Bike-Ped-Plan-2017-OCR.pdf>

<sup>36</sup> <https://www.ardot.gov/wp-content/uploads/2022-Arkansas-State-Freight-Plan.pdf>

<sup>37</sup> [https://www.ardot.gov/wp-content/uploads/2020/11/AR\\_StateRailPlan\\_Final\\_with\\_Summary.pdf](https://www.ardot.gov/wp-content/uploads/2020/11/AR_StateRailPlan_Final_with_Summary.pdf)

<sup>38</sup> <https://www.ardot.gov/divisions/transportation-planning-policy/electric-vehicle-infrastructure/>

<sup>39</sup> <https://www.ardot.gov/wp-content/uploads/2022/09/2022-SHSP-Final-09-07-22.pdf>

<sup>40</sup> <https://www.ardot.gov/wp-content/uploads/2020/10/ARDOT-Transit-Coordination-Plan-2018-2.pdf>

# 4 PLANNING FRAMEWORK, PROJECTS, AND STRATEGIES

While this CRS represents ARDOT’s first documented strategy for reducing carbon emissions, the review of existing plans in [Section 3.1](#) highlights the alignment of ARDOT’s core values, strategic goals, and priorities with the aim of carbon reduction. The result is six carbon reduction goal areas, as documented in [Table 4](#).

**TABLE 4. CARBON REDUCTION GOAL AREAS**

GOAL AREA	GOAL
 <b>Environmental Sustainability</b>	Enhance the performance of the transportation system while avoiding, minimizing, and/or mitigating impacts to natural resources.
 <b>Infrastructure Condition</b>	Maintain and preserve existing transportation facilities to keep the system working efficiently.
 <b>Multimodal System</b>	Provide an integrated multimodal transportation system to support the efficient movement of people and goods.
 <b>Active Transportation</b>	Support the development of pedestrian, bicycle, and transit systems.
 <b>Management, Operations, and Technology</b>	Optimize performance using modern and innovative approaches, such as Transportation Systems Management and Operations (TSMO) solutions and Intelligent Transportation Systems (ITS).
 <b>Energy Efficiency</b>	Implement strategies that improve the energy efficiency of the transportation system and agency operations.

To advance these carbon reduction goal areas, ARDOT and its MPO partners identified projects and strategies for implementation ([Section 3.3](#)). Those projects and strategies can generally be grouped into one of six categories, as shown in [Figure 14](#).

**FIGURE 14. CARBON REDUCTION PROJECT AND STRATEGY CATEGORIES**



In Sections 4.1 through 4.6, each of these general categories is expanded upon to identify specific projects and strategies that support carbon reduction. ARDOT and its partners are implementing (or envision implementing) some of these projects and strategies with CRP funding and others with different types of funding as it becomes available. Specific examples are included to illustrate each project and strategy, along with a general indication of the timeframe for implementation, as follows:

-  **Recent** (recently implemented)
-  **Ongoing** (ongoing implementation)
-  **Planned** (anticipated with potential funding available)
-  **Envisioned** (substantially supported idea without currently identified funding)

These projects and strategies support the reduction of transportation emissions while also advancing one or more goals from [Table 4](#).

## 4.1 TRAFFIC AND CONGESTION MANAGEMENT



**Transportation Demand Management (TDM)** is the application of various strategies to manage traffic demand by offering travelers different choices (route, travel time, or mode) or by dynamically adjusting infrastructure according to varying capacity needs.

<p><b>Managed Lanes</b></p>	<p>ARDOT recently completed the first managed lanes project in Arkansas, installing dynamic signage, weather probes, detection equipment, and other ITS elements to permit peak-hour hard-shoulder running on Interstate 430 between Highway 10 and Highway 100 in Pulaski County.</p>	
<p><b>Congestion Management Process</b></p>	<p>In 2022, the Northwest Arkansas Regional Planning Commission (NWARPC) updated their Congestion Management Process (CMP), which establishes numerous objectives relating to congestion reduction, alternative modes of transportation, emissions reduction, and other priorities. Metroplan plans to update its CMP in 2024.</p>	 

**Transportation Demand Management (TDM)** continued.

<p><b>Personnel Policies and Practices</b></p>	<p>ARDOT provides remote work opportunities for applicable office staff and incentivizes carpooling with preferred parking. Division-specific practices that reduce state vehicle emissions include carpooling to, and consolidation of, site visits. In addition, ARDOT utilizes technology to reduce the need for site visits, including the Multimedia Highway Information System (MMHIS) and other Geographic Information System (GIS) tools.</p>	
<p><b>Contracting Practices</b></p>	<p>ARDOT uses a variety of contracting techniques to minimize congestion in work zones, including cost-plus-time bidding and lane closure time restrictions.</p>	

**Traffic Incident Management (TIM)** is the application of planned and coordinated response strategies for detecting, responding to, and clearing traffic incidents to quickly restore safe and efficient traffic operations.

<p><b>TIM Training</b></p>	<p>ARDOT partnered with the Arkansas State Police on the construction of their new TIM training facility. Since the TIM Committee was established in 2017, more than 10,000 first responders have been trained in TIM.</p>	
<p><b>Arkansas TIM Committee</b></p>	<p>ARDOT participates in a statewide coalition of first responders, towing and recovery operators, transportation agencies, and other disciplines who coordinate TIM strategies.</p>	
<p><b>Safety Service Patrols</b></p>	<p>ARDOT is exploring the possibility of using Safety Service Patrols to manage incidents in areas with high levels of congestion.</p>	

**Multimodal Coordination** helps integrate transit, bicycle, and pedestrian modes into the overall transportation network and reduce demand for trips by personal vehicle.

<p><b>Multimodal Coordination</b></p>	<p>ARDOT coordinates with MPOs and other agencies in the development and implementation of statewide multimodal transportation plans. This coordination leads to improvements in connectivity between active modes (such as bicycling and walking) and public transit to increase mobility and access without the use of a personal vehicle – an MPO priority.</p>	 
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**Operational Improvements** help improve the flow of traffic, resulting in reduced idling, fuel consumption, and transportation emissions.

<p><b>Roundabouts</b></p>	<p>Roundabouts are a safe and efficient alternative to other forms of traffic control. In Northwest Arkansas, twenty-seven roundabouts are planned for a series of construction projects to improve the Highway 112 corridor between Fayetteville and Bentonville. Roundabouts are eligible for funding under ARDOT's Intersection Improvement Program.</p>	
<p><b>Traffic Signal Improvements</b></p>	<p>Poor signal timing and coordination are significant contributors to poor traffic operations in urban areas. Addressing this performance need is a high priority for many MPOs, including the Northeast Arkansas Regional Transportation Planning Commission (NARTPC) and Tri-Lakes MPO. The NWARPC awarded CRP funding for multiple projects to make operational-efficiency improvements to signal systems for FFY 2022/2023.</p>	

## 4.2 TRANSIT ENHANCEMENTS



**Transit System Expansion and Service Coordination** improve mass mobility options, which has the potential to reduce per-trip carbon emissions.

<p><b>Transit Planning</b></p>	<p>In 2020, the NWARPC approved Connect Northwest Arkansas, a 10-year transit development plan for the region. The plan includes a phased and prioritized implementation plan for improving regional transit service, which is provided by two transit agencies – Razorback Transit and Ozark Regional Transit. Building on this effort, in 2023 the NWARPC received an Areas of Persistent Poverty Grant for bus stop improvements in Benton and Washington counties.</p>	 
<p><b>Transit Programs</b></p>	<p>Urban transit services are provided by eight urban transit providers who receive funding directly from the FTA. ARDOT administered Federal transit funding is limited to the FTA Bus and Bus Facilities Program (Section 5339), Enhanced Mobility for Seniors and Individuals with Disabilities Program (Section 5310), and Rural Areas Formula Program (Section 5311), which provide funding for a variety of transit services (fixed-route and specialized), expenses (capital and operating), and settings (rural, urban, and human services). ARDOT also administers two state programs – the TransLease Program, which provides interest-free vehicle financing, and the State Transit Trust Fund, which provides operating assistance to transit providers.</p>	

**Alternative Fuel Transit Vehicles** represent an opportunity to reduce carbon emissions from transit vehicles through the regular vehicle replacement cycle.

<p><b>Fleet Conversions</b></p>	<p>In 2021, Rock Region METRO (the transit provider for Pulaski County) was awarded an FTA grant under the Low or No Emission Vehicle program to purchase battery electric buses. The agency plans to retire its remaining diesel buses by 2025. In 2022, the City of Jonesboro was awarded an FTA grant under the same program to purchase five trolley-style buses to replace older diesel buses and help improve air quality. The City plans to apply for additional funding under this program in the future. Similarly, in 2022 the City of Fort Smith purchased six compressed natural gas buses in support of its sustainability goals.</p>	 
<p><b>EV Infrastructure Deployment</b></p>	<p>Ozark Regional Transit (the transit provider for Benton and Washington counties) plans to pursue grant funding to deploy 17 shared-use charging stations to serve transit vehicles and the general public.</p>	

### 4.3 BICYCLE AND PEDESTRIAN IMPROVEMENTS



**Bicycle and Pedestrian Safety** removes barriers to active transportation, encouraging the use of zero-emission modes. Improving safety for bicyclists and pedestrians is an emphasis area of ARDOT's *Strategic Highway Safety Plan* and a top priority for many MPOs.

<p><b>Safely Share the Road Campaign</b></p>	<p>Across the nation, including Arkansas, the number of serious injury and fatal crashes involving bicyclists and pedestrians increased dramatically over the last decade. ARDOT encourages all road users to safely share the road.<sup>41</sup></p>	
<p><b>Safety Action Planning</b></p>	<p>Two MPOs (Metroplan and the NWARPC) and one additional MPO area (Fort Smith) were among six Arkansas recipients of FFY 2023 Safe Streets for All (SS4A) grants to prepare Comprehensive Safety Action Plans. Bicycle and pedestrian safety will be an emphasis area for many of these plans. Similarly, bicycle and pedestrian safety are emphasis areas in Frontier MPO's recently completed safety action plan. Several cities in Northwest and Northeast Arkansas applied for implementation grants under the FFY 2024 SS4A opportunity.</p>	 

<sup>41</sup> <https://www.ardot.gov/sharetheroad/>

**Bicycle and Pedestrian Planning** provides a roadmap for local, regional, and statewide efforts to implement bicycle and pedestrian improvements.

<p><b>USBR Designation and Planning</b></p>	<p>Working in collaboration with the University of Arkansas for Medical Sciences (UAMS), local governments, and other stakeholders, ARDOT secured the designation of United States Bicycle Route (USBR) 80 from Little Rock to West Memphis in late 2022. USBR 80 is the first designated USBR in Arkansas, and it represents a significant milestone in the development of a statewide bicycle network. Future USBR designations are anticipated, including USBR 51, which would follow Highway 71 and the Razorback Greenway from the Missouri State line to Alma, and an extension of USBR 80 from Little Rock to the Fort Smith area.</p>	 
<p><b>Regional Planning</b></p>	<p>Metroplan’s <i>Regional Greenways Plan</i> will guide the planned investment of \$55 million in regional greenways over a 10-year period. Other MPOs, such as the NWARPC, Frontier MPO, and Tri-Lakes MPO, are in various stages of updating their regional bicycle and pedestrian transportation plans. Multiple cities and counties in Northwest and Central Arkansas are designated Bicycle Friendly Communities by the League of American Bicyclists.</p>	 

**Bicycle and Pedestrian System Expansion** includes the construction of bicycle and pedestrian facilities along roadways and the expansion of trail systems.

<p><b>Emissions Reduction Projects</b></p>	<p>The West Memphis MPO receives Congestion Mitigation and Air Quality (CMAQ) Improvement Program funds that must be used to reduce criteria pollutants from on-road sources. The MPO has leveraged CMAQ funding to implement a variety of project types, including several projects to construct and improve the Big River Trail.</p>	
<p><b>Regional Trails</b></p>	<p>Regional trail construction has become a priority for many MPO areas. For the Tri-Lakes MPO, trail investments represent an opportunity to attract tourism, encourage active transportation, and improve the health and equity of the region. In 2022, the City of Conway, a member of Metroplan, received a Rebuilding American Infrastructure with Sustainability and Equity (RAISE) grant to continue the development of their trail network.</p>	

**Bicycle and Pedestrian System Expansion** continued.

<p><b>Local Projects</b></p>	<p>ARDOT administers the Transportation Alternatives Program (TAP) and Recreational Trails Program (RTP), which provide competitive funding to local governments, transit agencies, and other eligible sponsors to implement smaller-scale pedestrian and bicycle projects. Metroplan, the NWARPC, and the West Memphis MPO receive suballocations of TAP funding for use in their regions.</p>	
<p><b>Partnering Projects</b></p>	<p>ARDOT partners with cities, counties, and other sponsors to include enhanced bicycle and pedestrian accommodations in major construction projects. For example, in Northwest Arkansas, regional stakeholders have proposed including a 12-foot-wide sidepath in the reconstruction of approximately 20 miles of Highway 112 from Fayetteville to Bentonville. ARDOT included the proposed sidepath in the designs for the corridor and is partnering with the NWARPC and local agencies to fund the construction work.</p>	
<p><b>Corridor Redevelopment Partnerships</b></p>	<p>The Texarkana MPO is coordinating with ARDOT, the Texas DOT, and the cities of Texarkana, Arkansas and Texarkana, Texas to reconstruct Highway 71 (State Line Road). The proposed work includes enhanced bicycle and pedestrian accommodations, pedestrian lighting, and placemaking improvements through downtown Texarkana, with connectivity to the Amtrak terminal at Union Train Station.</p>	

## 4.4 ENERGY AND FUEL SAVING INITIATIVES



**Energy Efficiency** reduces the overall carbon emissions associated with operating transportation assets. In many cases, converting to energy efficient alternatives can also reduce operating costs.

<p><b>Energy Efficient Facilities</b></p>	<p>ARDOT is evaluating facility needs at the central office campus in Little Rock. In connection with that effort, ARDOT will consider opportunities for using energy efficient design, lighting, and equipment. Moreover, ARDOT will be utilizing consultant services to perform an energy audit of existing facilities.</p>	
<p><b>Energy Efficient Roadway Lighting</b></p>	<p>As a Transportation Management Area (TMA),<sup>42</sup> the NWARPC receives a suballocation of CRP funding. For FFY 2022/2023, the NWARPC awarded multiple CRP-funded projects, including an award to the City of Fayetteville to upgrade 125 street lights with energy efficient lighting. ARDOT takes advantage of energy-efficient roadway lighting and is considering the replacement of remaining high-pressure sodium lighting maintained by the agency (such as the lighting in the Bobby Hopper Tunnel).</p>	

**Electric Vehicle Infrastructure** investments support the transition to less carbon intensive electric vehicles. The NEVI Program will provide approximately \$54 million in funding to Arkansas over the next five years to strategically deploy EV charging infrastructure across the state.

<p><b>EV Planning</b></p>	<p>The deployment of EV charging infrastructure is a high priority for several MPOs, and they are actively engaged in EV planning activities. As examples: Frontier MPO is participating in the Department of Energy's Clean Energy to Communities (C2C) Program to develop a Charging and EV strategy for the area, and the NWARPC successfully nominated U.S. Highway 412 as an EV Pending Corridor under the Alternative Fuel Corridors program.</p>	
<p><b>Initial NEVI Deployment</b></p>	<p>ARDOT is implementing a competitive procurement program to award NEVI funding to fully build out Arkansas' Interstate Highways and FHWA-designated EV alternative fuel corridors to NEVI standards.</p>	
<p><b>Future NEVI Deployment</b></p>	<p>After ARDOT achieves the primary goal of fully building out a NEVI-compliant network on Interstate Highways and other EV Alternative Fuel Corridors, ARDOT intends to expand eligibility for NEVI funding to other regional routes of significance.</p>	

<sup>42</sup> A TMA is an urban area with a population over 200,000 as defined by the Census Bureau and designated by the Secretary of the USDOT.

## 4.5 TECHNOLOGY SOLUTIONS



**Traffic Management Centers (TMC)** serve as hubs for remotely monitoring, detecting, and responding to incidents and performance issues that affect the transportation system. TMCs utilize a combination of dedicated and highly trained personnel, technology solutions, and response strategies.

<p><b>Real-time Surveillance</b></p>	<p>ARDOT operates more than 300 cameras at strategic locations across the SHS to provide real-time surveillance of transportation assets and traffic operations. ARDOT’s rollout of traffic cameras will continue, with a focus on monitoring additional locations on Interstate Highways and select U.S. Highways.</p>	
<p><b>Regional Traffic Management</b></p>	<p>The NWARPC’s Regional TSMO Plan recommends developing a regional TMC to improve the monitoring and management of the metropolitan transportation system, portions of which are owned by the Missouri DOT, ARDOT, three counties, two transit agencies, and 35 cities.</p>	

**Transportation Systems Management and Operations (TSMO)** is a multidisciplinary approach to optimizing the performance of the existing transportation system. TSMO strategies include TIM, traveler information systems, traffic signal systems coordination, work zone management, managed lanes, and others (many of which have the potential to reduce carbon emissions).

<p><b>Regional TSMO Planning</b></p>	<p>In 2023, the NWARPC adopted its first regional TSMO plan, which establishes a strategic vision for TSMO in Northwest Arkansas, prioritizes strategies and actions to implement TSMO throughout the region, and emphasizes efficiency and emissions reduction (among other goals and objectives).</p>	
<p><b>Statewide TSMO Planning</b></p>	<p>ARDOT is currently developing the agency’s first statewide TSMO plan. The plan will include strategic, programmatic, and tactical elements with the goals of mainstreaming TSMO across ARDOT and capitalizing on TSMO’s potential to maximize the safety and efficiency of the SHS.</p>	

**Intelligent Transportation Systems (ITS)** include a variety of technologies (such as cameras, dynamic message signs, and traveler information systems) that facilitate active traffic and safety management and provide users with current information about travel conditions.

<p><b>ITS Planning</b></p>	<p>In 2023, the NWARPC updated its <i>Regional ITS Architecture and Deployment Plan</i>. The plan establishes a strategic vision for ITS in Northwest Arkansas, prioritizes strategies and actions to implement ITS throughout the region, and emphasizes efficiency and emissions reduction (among other goals and objectives). Metroplan’s 2024–2025 Unified Planning Work Program includes funding to update its Regional ITS Architecture and Deployment Plan with an emphasis on urban arterial deployments.</p>	 
<p><b>Corridor ITS Deployment</b></p>	<p>Over the next two years, ARDOT will begin two major ITS projects along the Interstate 40/Highway 70 corridor between Little Rock and West Memphis. Using a combination of dynamic message boards, wrong-way detection, real-time volume reporting, and other ITS elements, ARDOT will have the ability to actively manage the safety, efficiency, and resiliency of the corridor. Over the next four years, ARDOT plans to leverage CRP funding for other small- and large-scale ITS deployments.</p>	
<p><b>Advanced Technology Strategies</b></p>	<p>ARDOT is exploring new technology approaches to manage the transportation system. As an example, ARDOT is evaluating competitive funding opportunities to deploy a truck-parking notification system that would use detector systems in public truck parking areas to provide live parking availability information on variable display signage on Interstate Highways. ARDOT is also exploring the possibility of using dynamic message boards to provide additional traveler information, such as urban area travel times.</p>	

## 4.6 OTHER



Planning and Policy Development by ARDOT and the MPOs has the potential to support carbon reduction directly and indirectly, as highlighted by the following examples.

<p><b>Model Codes</b></p>	<p>In 2022, Metroplan released its Unified Development Ordinance and Multimodal Infrastructure Guidelines as tools for municipalities, planners, engineers, and others in Central Arkansas to build safe, efficient, healthy, and economically viable communities and transportation systems.</p>	
<p><b>Regional Planning</b></p>	<p>In 2022, the NARTPC adopted the Regional Emissions Action Plan that emphasizes the value of active transportation, public transportation, and the adoption of EVs to reducing transportation emissions. The City of Jonesboro leveraged this plan to receive an FTA award under the Low or No Emission Vehicle Program. In 2023, the Arkansas Department of Energy and Environment suballocated a portion of its award under the Climate Pollution Reduction Grant Program to Metroplan, the NWARPC, and the City of Fort Smith to develop regional energy and environment plans. The Open Space Plan adopted by the NWARPC dovetails with other regional planning efforts that support carbon reduction.</p>	 
<p><b>Complete Streets Policy Development</b></p>	<p>ARDOT is currently developing a Complete Streets Policy to ensure safe and adequate accommodation of all users of the transportation system, including pedestrians, bicyclists, public transportation users, children, older individuals, individuals with disabilities, motorists, and freight vehicles. Additionally, various cities and MPOs (such as Frontier MPO) have adopted their own Complete Streets Policies.</p>	 

**Transportation Asset Management** reflects a strategic and systematic process of operating, maintaining, and improving physical assets to achieve and sustain a desired state of good repair over the life cycle of those assets at a minimum cost. ARDOT’s commitment to asset management is documented in the *Transportation Asset Management Plan (2022)*. The selection of materials and treatment techniques can impact not only the life-cycle cost of an asset, but also its life-cycle carbon emissions.

<p><b>Pavement Preservation</b></p>	<p>Rough pavements decrease fuel efficiency, which increases tailpipe carbon emissions. The FFY 2023-2026 STIP identifies nearly 500 pavement preservation projects ARDOT plans to implement over a four-year period. Moreover, ARDOT anticipates developing additional projects in the coming years to remove weight restrictions on various highways.</p>	
<p><b>Bridge Replacement and Preservation</b></p>	<p>Weight-restricted structures create inefficiencies in the highway freight network, leading to indirect routes that increase fuel consumption and tailpipe carbon emissions. The current STIP schedules more than 200 bridges (many of which are weight restricted) for replacement and provides additional funding for bridge preservation activities.</p>	

## 5 CONCLUSION

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This CRS represents a significant milestone in understanding how ARDOT, the MPOs, and other transportation stakeholders can support the reduction of transportation-related carbon emissions in Arkansas. It is noteworthy that implementation of the project types and strategies identified in this CRS not only support the reduction of carbon emissions, but also support other statewide and regional transportation goals and priorities. ARDOT is committed to delivering a modern transportation system to enhance safety and quality of life in Arkansas and acknowledges this CRS as a means of delivering on that commitment while reducing transportation carbon emissions.



# APPENDIX A: CARBON REDUCTION PROGRAM COMPLIANCE

Title 23	Requirement	Compliance Notes
§ 175 (d)(1)	IN GENERAL. - Not later than 2 years after the date of enactment of the Surface Transportation Reauthorization Act of 2021, a State, in consultation with any metropolitan planning organization designated within the State, shall develop a carbon reduction strategy in accordance with this subsection.	<p>This CRS was developed in consultation with all eight MPOs, as discussed in <a href="#">Section 3</a>.</p> <p>This CRS is scheduled to be completed and submitted to the FHWA prior to the November 15, 2023, deadline.</p>
§ 175 (d)(2)	<i>The carbon reduction strategy of a State developed under paragraph (1) shall-</i>	
§ 175 (d)(2)(A)	support efforts to reduce transportation emissions;	<p>This CRS provides the background for understanding the context for transportation carbon emissions in Arkansas, as stated in <a href="#">Section 2</a>.</p> <p>This CRS also details ARDOT's CRS planning framework, and projects and strategies that can be implemented by ARDOT and the MPOs in support of carbon reduction, as stated in <a href="#">Section 4</a>.</p>
§ 175 (d)(2)(B)	identify projects and strategies to reduce transportation emissions;	<p>This CRS identifies projects and strategies that ARDOT and the MPOs can implement to reduce transportation emissions, as stated in <a href="#">Section 4</a>.</p>
§ 175 (d)(2)(C)	support the reduction of transportation emissions of the State;	<p>This CRS describes how ARDOT can reduce the state's transportation emissions (e.g., implementation of energy efficiency retrofits in ARDOT equipment or facilities), and it identifies additional opportunities to support the reduction of the state's transportation emissions (e.g., deployment of technology solutions to improve system resiliency and operations), as stated in <a href="#">Section 4</a>.</p>

Title 23	Requirement	Compliance Notes
§ 175 (d)(2)(D)	at the discretion of the State, quantify the total carbon emissions from the production, transport, and use of materials used in the construction of transportation facilities within the State; and	ARDOT is not quantifying the total carbon emissions from the production, transport, and use of materials in the construction of transportation at this time.
§ 175 (d)(2)(E)	be appropriate to the population density and context of the State, including any metropolitan planning organization designated within the State.	This CRS was developed in consultation with Arkansas' eight MPOs, and it considered the general transportation context of the state, including travel behaviors, freight system trends, planning roles and responsibilities, and other factors, such as the generally rural character of the state, as stated in <a href="#">Section 2</a> .



# CARBON REDUCTION STRATEGY