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NJTPA NORTH JERSEY TRANSPORTATION PLANNING AUTHORITY

APPENDIX J: Carbon Reduction Strategy

INTRODUCTION

Transportation activity in the NJTPA region generates significant carbon and other emissions, contributing to poor air quality. In 2021, on-road transportation in the region was responsible for an estimated 26 million metric tons (MMT) of CO2e (carbon dioxide equivalent), accounting for approximately 26 percent of total statewide emissions from all sectors. There is a general scientific consensus that carbon dioxide primarily contributes to the warmer temperatures and increasingly extreme and unpredictable weather. These extreme weather events, including more frequent and severe storms, heavy precipitation events, extreme heat, droughts, wildfires, and rising sea levels, threaten the region's mobility and transportation infrastructure. Therefore, the NJTPA recognizes the need to reduce carbon dioxide emissions in the region and do its part in lowering transportation emissions.

The NJTPA has been aware of this issue and actively trying to address it for many years. In 2011, the NJTPA prepared its first comprehensive regional emissions report, which calculated emissions from all sectors. In 2013, the NJTPA published a regional transportation emissions mitigation plan, which included updated on-road transportation emissions data along with modeled strategies that the region could implement to reduce on-road transportation emissions. In 2021, the NJTPA released its updated Long Range Transportation Plan, *Plan 2050: Transportation. People. Opportunity*, which included key strategies for reducing emissions. The NJTPA also continues to track on-road transportation emissions, as well as develop and implement strategies. Additionally, there are many NJTPA programs that directly and indirectly reduce emissions, such as the Congestion Mitigation and Air Quality (CMAQ) program and municipal planning programs aimed at increasing walking and biking.

Much attention has also recently been given to the issue at the national level. In 2021, the Investment Infrastructure and Jobs Act (IIJA) was passed, which established several programs aimed at electrifying vehicles and reducing emissions, such as the Federal Highway Administration's National Electric Vehicle Infrastructure (NEVI) Formula Program, Charging and Fueling Infrastructure (CFI) Discretionary Grant Program and the Carbon Reduction Program (CRP), which provides funding for transportation projects that reduce carbon emissions. In 2022, the federal government published The US National Blueprint for Transportation Decarbonization, which outlines how to reduce emissions from the transportation sector. Also, that year, the Inflation Reduction Act created the US EPA's Climate Pollution Reduction Grant (CPRG) Program, which provided funding to states, entities in Metropolitan Statistical Areas (MSAs), and tribes to do climate action planning. As part of that program, New York City, in collaboration with the NJTPA and the New York Metropolitan Transportation Council (NYMTC), prepared a Priority Climate Action Plan (PCAP) for the NY-NJ MSA in 2023. The PCAP has a significant focus on transportation. A Comprehensive Climate Action Plan (CCAP) is being developed and expected to be completed by fall 2025.

This 2025 Carbon Reduction Strategy document builds on these previous efforts and identifies and clarifies the key strategies the NJTPA will focus on to reduce on-road transportation emissions in our region. While not exhaustive, it aims to provide direction on planning and funding activities to reduce emissions.

What is the Carbon Reduction Program and how is it related to this CRS?

The 2021 Infrastructure Investment and Jobs Act (IIJA)/Bipartisan Infrastructure Law (BIL) established the FHWA Carbon Reduction Program (CRP). Over five years, this program will provide $6.4 billion in formula funding to states and metropolitan planning organizations (MPOs) for projects that reduce carbon emissions in designated urban areas. The states and MPOs direct how the funding is spent through the Transportation Improvement Program (TIP) and STIP process. To learn more about the CRP, visit the US FHWA's Factsheet.

The total amount apportioned to New Jersey over the five years is $154,483,918. The amount apportioned and suballocated to each urbanized area varies yearly based on population. Here is the amount apportioned to New Jersey and suballocated to the urbanized area in the NJTPA region for the years with available information.[1]

Area	2022	2023	2024	2025
New Jersey	$29,685,382	$30,279,089	$30,884,671	$31,502,364
New York--Jersey City--Newark Urbanized Area	$13,518,130	$13,788,492	$14,083,449	$14,365,119
Allentown--Bethlehem Urbanized Area	$71,202	$72,626	$67,283	$68,629

As part of the CRP, state DOTs were required to develop a Carbon Reduction Strategy (CRS). The New Jersey Department of Transportation published its CRS in November 2023.

The primary strategies in the NJ CRS include: Promote Electric and Zero-Emission Vehicles, Use of Mass Transit and Active Modes, Support Efficient Roadway Operations, Incorporate efficient Construction and Maintenance, and Enable Innovative Solutions.

MPOs also had the option to develop a CRS. The NJTPA developed strategies specific to the region, which are presented in this document.

[1] https://www.fhwa.dot.gov/infrastructure-investment-and-jobs-act/funding.cfm

THE NJTPA CARBON REDUCTION STRATEGIES

The priority strategies are divided into two main categories to guide the NJTPA in future planning activities and funding projects aimed at reducing emissions.

CATEGORY 1: Transition to Cleaner Vehicles, Equipment, and Fuels

Installing the necessary fueling infrastructure, replacing higher-emission internal combustion engine (ICE) vehicles with zero-emission vehicles (ZEVs), plug-in hybrid electric vehicles (PHEVs) or other lower-emission vehicles, and cleaning the energy used to operate vehicles are highly effective ways to reduce emissions from the transportation sector. ZEVs include battery electric vehicles (BEVs) and hydrogen fuel cell vehicles (HFCVs). Other low-emission vehicles could include hybrid electric vehicles (HEVs) or other alternative-fueled vehicles (AFVs) such as those powered by biofuels, natural gas, or propane.

Replacing ICE light-duty/passenger vehicles with BEVs is one of the most effective ways to reduce emissions. BEVs produce zero tailpipe emissions, and when accounting for the electricity used to power them, a typical passenger BEV in New Jersey currently produces 87 percent fewer emissions annually than a typical ICE vehicle.[2] When accounting for the entire lifecycle of a typical passenger vehicle in the US, BEV sedans produce 66-70 percent fewer emissions than comparable ICE vehicles, and BEV SUVs produce 71-74 percent fewer emissions than comparable ICE vehicles.[3] As the industrial process and electric grid decarbonize, the production and use of BEVs will result in fewer emissions and a reduced overall environmental impact.

Replacing ICE medium- and heavy-duty (MHD) vehicles with ZEV MHD vehicles is also an effective way to reduce emissions. MHD vehicles emit significantly more emissions per mile than light-duty vehicles; therefore, replacing one ICE MHD vehicle with a ZEV MHD vehicle will result in substantially lower emissions per vehicle. However, in some cases, MHD ZEV options are unavailable or not economically feasible, so hybrid or other AFVs could be used as a transitional measure. Similarly, retrofitting existing highly polluting vehicles that are not yet ready for decommissioning to be cleaner helps reduce emissions and improve air quality. Replacing high-emitting equipment with low-emission versions is also a significant way to decarbonize the sector.

Strategies to encourage the transition to cleaner vehicles and equipment include:

> **INSTALL ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE)** - Access to EV charging infrastructure is essential for transitioning to EVs; therefore, the number of stations needs to increase. Public property, multi-family residential units, and highly urban areas where people don't have access to a personal charger should be prioritized.
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> **REPLACE ICE VEHICLES WITH ZEVS AND PHEVS** - Replacing fully ICE vehicles with ZEVs and PHEVs will significantly reduce emissions. Governments, schools, transit agencies and private companies own many ICE vehicles that can be transitioned to ZEVs and PHEVs. However, current incentives may

[2] https://afdc.energy.gov/vehicles/electric-emissions
[3] https://theicct.org/wp-content/uploads/2024/07/ID-180-%E2%80%93-US-GHGs_brief_final.pdf

be insufficient for certain vehicles; therefore, providing additional funding is crucial to allow and incentivize entities to purchase EVs.

REPLACE CERTAIN ICE MHD VEHICLES WITH LOW-EMISSION HYBRIDS OR OTHER AFVS - While ZEVs are increasingly becoming the primary alternative to ICE vehicles, in some cases, MHD ZEV options are unavailable or not economically feasible. Those vehicles where ZEVs and PHEVs are not an option could be replaced with HEVs or other AFVs until replacing them with a ZEV or PHEV version becomes more practical.

RETROFIT EXISTING HIGH-EMITTING ICE VEHICLES TO BE CLEANER - Many existing MHD vehicles are highly polluting, but replacing them with a new vehicle can be cost-prohibitive. Retrofitting these vehicles may be a cost-effective and high-impact solution.

REPLACE HIGH-EMITTING EQUIPMENT WITH LOW-EMISSION VERSIONS - Construction and maintenance equipment used in transportation projects, airports, and at Port facilities emits considerable emissions. They should be replaced with low-carbon alternatives.

CATEGORY 2: Reduce Vehicle Miles Traveled (VMT)

Reducing the amount of driving, or VMT, is another critical way to reduce emissions. When vehicles are driven less, fewer emissions occur. Improving and expanding active transportation infrastructure and public transit supports the reduction of VMT, as well as smart growth planning, updating zoning, and real estate development that provides amenities and housing locally, allowing people to walk, bike, and take public transit for their daily needs instead of driving. Other strategies include parking reform and management, as well as providing carshare vehicles for people to use when they need a car. Reducing VMT also offers numerous co-benefits, including reduced traffic congestion, cost savings, improved safety, decreased air pollution, and an enhanced quality of life. A recent analysis by the Rocky Mountain Institute demonstrated that reducing vehicle miles traveled (VMT) by 20 percent in New Jersey would result in savings of 79 million metric tons between now and 2050, saving the average household $2,254 per year, avoiding 167 crash-related deaths per year, and preventing 1,219 air quality-related deaths per year.[4]

Strategies to support reducing VMT include:

IMPROVE AND EXPAND ACTIVE TRANSPORTATION - Enhancing and building active transportation infrastructure and facilities is one of the primary strategies to support reducing automobile usage and promote low- or no-carbon active transportation modes, such as walking and biking. This involves improving streetscapes, implementing Complete Streets, constructing micromobility/bike lanes and trails, as well as creating facilities and programs to increase the use of micromobility.

IMPROVE AND EXPAND PUBLIC TRANSIT - Enhancing the experience, increasing service, and reducing the cost of public transit increases its appeal, improves the lives of those dependent on it, and reduces VMT and emissions.

SMART GROWTH PLANNING, ZONING, AND DEVELOPMENT - Creating complete communities that are walkable, bikeable, and well-served by public transit can reduce VMT and emissions. This is

[4] https://rmi.org/states-can-quantify-the-benefits-of-climate-friendly-transportation-options-with-rmis-smarter-modes-calculator/

achieved through smart growth planning, updating zoning, and real estate development that creates a mix of land uses, building types, housing options, and amenities. The area around transit stations and stops is ideal for creating mixed-use, walkable, and bikeable complete communities.

OTHER STRATEGIES TO REDUCE VMT - Additional ways to encourage people to drive less include parking reform and management, providing carshare vehicles in specific areas, and utilizing telematics and fleet optimization.

Additional Strategies

The NJTPA recognizes that additional strategies reduce transportation emissions; however, they do not all have the same impact. While the agency will focus primarily on Category 1 and 2 strategies, the following are additional focus areas and their corresponding strategies.

Improve Traffic Flow and System Efficiency

Idling in standstill and stop-and-go traffic creates emissions from internal combustion engine (ICE) vehicles. Improving traffic flow and system efficiency can reduce emissions, which can be achieved through improved road design and advanced traffic management technologies. However, it is essential to consider that improving traffic flow in the short term may lead to "induced demand," resulting in increased driving and longer-term traffic congestion. Therefore, this strategy should be deployed strategically and coupled with strategies that reduce VMT.

Strategies to improve traffic flow and make the system more efficient include:

IMPROVE ROAD DESIGN – Poor road design can lead to congestion and increased emissions. Improving road design, such as converting signalized intersections to traffic circles, providing dedicated turn lanes, eliminating left turns in travel lanes that can cause traffic congestion, and utilizing shoulders as additional lanes for buses during peak traffic, can enhance trip efficiency and reduce emissions.

TRANSPORTATION AND CONGESTION MANAGEMENT TECHNOLOGIES – Certain intelligent transportation systems (ITS) technologies can alleviate congestion, including traffic signal optimization, adaptive traffic signals, variable message signs, and coordination with navigation applications. These measures can decrease emissions by reducing stop-and-go traffic.

Innovative Strategies

Innovative strategies harness existing technologies in new ways or create alternative approaches to achieving established goals. These strategies have the potential to significantly impact lifestyles, car ownership, driving habits, and associated emissions. As new advancements emerge, additional solutions may arise. It is essential to explore and develop innovative approaches to further reduce emissions.

Examples of expected innovative strategies include:

AUTONOMOUS ELECTRIC SHUTTLES AND TAXIS – Requesting on-demand autonomous shuttles and taxis via a mobile phone app may enable affordable and convenient car-free or car-light living in urban areas where mass transit is unavailable, inconvenient, impractical, or amenities are further away. These autonomous electric shuttles and taxis will not only reduce emissions but also enable households to reduce their need for multiple cars and drive less.

INTERNET OF THINGS – Along with autonomous electric shuttles and taxis, the "Internet of Things" (IoT) will enable vehicles to communicate with streetlights, other vehicles, parking spaces, and information systems, which could facilitate a more stable flow of movement and reduce the need for parking.

DELIVERY ROBOTS – Recent reports indicate that robots can be utilized for deliveries, thereby reducing the number of delivery trucks on the road and the need for people to drive to stores.

CONCLUSION

Reducing on-road transportation-related carbon and other emissions in the NJTPA region is critical for a healthy region. Given that carbon dioxide from transportation accounts for the largest portion of the state's emissions, the NJTPA region must do its part to reduce emissions.

As discussed in this memo, the NJTPA identified several key strategy categories to reduce emissions, transition to cleaner vehicles, equipment, and fuels, reduce VMT, and additional strategies such as improving system efficiency and innovative strategies. By selecting and implementing these strategies, the NJTPA is taking proactive steps toward a cleaner, more efficient transportation system and meeting our emission reduction goals.