9. Transportation

Draft New York State Energy Plan

July 2025

Key Findings

- **Investment in multiple different modes of transportation is necessary to support diverse travel needs and provide affordable, accessible options for all New Yorkers.** These investments should recognize the diversity of land use patterns that exist throughout the State. Supporting transit-oriented development (TOD) that provides reliable access to public transportation and active transportation while linking clean transportation networks through options like shared mobility (carsharing and bike sharing) and vehicle charging hubs will make more diverse travel options viable and affordable for New Yorkers in all types of communities while reducing overall emissions and reliance on personal vehicles. These investments support broader initiatives that promote energy efficient land use patterns, such as Smart Growth and TOD.

- **Continued public and private investment will help make zero-emissions vehicles (ZEVs) a more affordable and reliable option for New York drivers and fleet operators.** Investment in public and semi-public charging infrastructure in priority locations will help reduce electric vehicle (EV) "range anxiety" by making access to charging more reliable and increasing convenience, and investment in hydrogen supply and fueling options will help develop clean long-range trucking and non-road options. Policies and regulations alongside incentives that make zero-emission passenger vehicles, medium- and heavy-duty vehicles, and non-road equipment more available and affordable for New Yorkers can help ZEVs reach price parity and widespread consumer and fleet adoption.

- **Collaboration between state agencies, local governments, and other entities is vital to the success of transportation investments.** Government coordination is particularly important for the advancement of active transportation projects and transit projects while collaboration with private industry is a key component for the build-out of infrastructure supporting zero-emission vehicles.

- **Minimizing the costs to electric ratepayers associated with transportation electrification is important and requires multiple approaches.** Managed charging can reduce the impact of EVs on the electric grid and the need for additional infrastructure, and it will grow in importance as more New Yorkers drive and charge EVs. Ensuring that utility infrastructure can be built in time to support the build-out of ZEV infrastructure is critical to ensuring a smooth and reliable transition to clean transportation options.

- **Continued investment in workforce development within the transportation sector is needed.** Workforce development investments are necessary to both maintain the current transportation system and support the maintenance of a zero-emission transportation system in the future. These investments should address recruitment, training, and retention in both the public and private sectors. There should also be targeted efforts to ensure that workforce development programs benefit individuals from disadvantaged communities.

- **Investment in other alternative fuels can play a role in the reduction of transportation greenhouse gas emissions and diversify fuel supply.** While a shift to zero-emission fuels

(electricity and hydrogen) is the sector priority, other fuels like renewable diesel and other biofuels can be an effective option in harder-to-electrify market segments and provide a transitionary pathway to accelerate the inclusion of more subsectors in achieving emissions reductions as more complex long-term ZEV solutions such as hydrogen and advanced electrification evolve.

Key Terms

- **Active Transportation:** Active Transportation is both human-powered modes of transportation—walking, bicycling, and operating a wheelchair—along with small-scale electric vehicles such as e-bikes and e-scooters (also known as "micromobility")
- **Electric Vehicles (EVs):** Vehicles powered by electricity from an external source stored onboard in a battery, including both battery-electric vehicles (BEVs), which run exclusively on electricity, and plug-in hybrid electric vehicles (PHEVs), which run exclusively on electricity for a limited range and then are powered by an internal combustion engine.
- **Light-Duty Vehicles:** On-road vehicles under 8,500 lbs. gross vehicle weight rating (GVWR), Class 1 and 2a, per the U.S. Environmental Protection Agency (US EPA) classification system.
- **Managed Charging:** The practice of controlling the speed and/or time at which an EV is charged for the purpose of minimizing charging during times of peak electricity usage and minimizing charging costs for the EV driver.
- **Medium- and Heavy-Duty Vehicles:** On-road vehicles over 8,500 lbs. gross vehicle weight rating, Class 2b through 8, per the U.S. Environmental Protection Agency classification system.
- **Micromobility:** Any low-speed, human or electric-powered transportation device, including bicycles, scooters, electric-assist bicycles (e-bikes), electric scooters (e-scooters), and other small, lightweight, wheeled conveyances.
- **Transit-Oriented Development (TOD):** Dense, pedestrian-oriented, mixed-use development located near (usually within a quarter- or half-mile radius of) direct transit access. Transit-oriented development integrates multiple mobility modes, including walking, biking, micromobility, and various forms of public transit, to provide residents with convenient and efficient transportation options beyond personal vehicles.
- **Transportation Systems Management and Operations (TSMO):** Focuses on operational improvements that can maintain and even restore the performance of the existing transportation system before extra capacity is needed.
- **Transportation Demand Management (TDM):** Managing demand is about providing travelers, regardless of whether they drive alone, with travel choices, such as work location, route, time of travel and mode. In the broadest sense, demand management is defined as providing travelers with effective choices to improve travel reliability.
- **Vehicle-Grid Integration:** Vehicle-to-Grid (V2G) technology allows EVs to both draw electricity from the electric grid to charge the EV's battery and also discharge the EV's battery to sell power back to the electric grid.
- **Vehicle Miles Traveled (VMT):** The amount of travel for all vehicles in a geographic region; calculated by adding up all miles driven by all motorized vehicles.
- **Zero-Emissions Vehicles (ZEVs):** Vehicles powered by energy sources that result in no tailpipe emissions, such as battery-electric vehicles (BEVs) and hydrogen fuel cell electric vehicles (FCEVs). Plug-in hybrid electric vehicles (PHEVs), which run exclusively on electricity for a limited range and then are powered by an internal combustion engine, are also considered ZEVs under certain regulations.

1. Overview

New York's robust transportation system strengthens the health, safety, economic vibrancy, livability, and sustainability of communities throughout New York State. It allows New Yorkers to get where they need to go, supporting critical activities ranging from emergency response and commerce to recreation and social connectivity. The transportation sector accounts for roughly 40 percent of final energy use in the state, as well as the majority (80 percent) of the statewide consumption of petroleum products in the form of motor gasoline, aviation fuel, and diesel. It is also one of the largest sources of greenhouse gas (GHG) emissions in the state and is a major contributor to local air pollution, with transportation sector emissions accounting for 43 percent of total fuel combustion GHG emissions in 2022.

Different modes of transportation have different energy and emission intensities, with transportation sector emissions dominated by fossil-fueled mobile source (i.e., sources that can move) road users including passenger cars and trucks, commercial light-duty trucks, motorcycles, buses, and heavy-duty trucks. "Active transportation" modes (e.g., walking, biking, and rolling [using a wheelchair or scooter to get around]) represent travel options that do not contribute to emissions. Non-road transportation includes aviation, marine, rail, and equipment and mobile generators used for agriculture, construction, commercial, industrial, home and landscaping use, recreation, and more.

Fuel economy improvements and greater adoption of zero-emission vehicles (ZEVs) reduce the energy demand of individual vehicles, but increases in vehicle miles traveled (VMT) from both passenger vehicles and freight can offset increasing efficiency over time.[1] Strategies that reduce VMT and encourage a switch to ZEVs and equipment are thus necessary to achieve long term emission reductions while also improving local air quality and providing New York travelers with a greater variety of affordable, reliable transportation options.

2. Snapshot of New York's Current Transportation Network

2.1. Extent of the Transportation Network

New York State has one of the largest and most diverse multimodal transportation networks in the nation, reflective of the large population and highly variable land use patterns statewide. This variation in land use patterns and transportation needs in turn causes variation in the transportation system's energy demand, fuel use, and air pollutant emissions throughout the State. The New York City metropolitan area (which includes New York City, Long Island, and the Lower Hudson Valley) is home to almost two-thirds of New Yorkers and is characterized by high population density and a heavily built environment, with many downstate communities highly reliant on walking, biking, and robust public transportation systems. Meanwhile, other areas of the State have more variation in land use patterns and population densities compared to downstate, containing a mix of urban, suburban, and rural areas. Many mid-sized cities and villages were planned in a pedestrian-oriented manner, while their surrounding suburbs have grown in a manner reliant on vehicular travel to access traditional downtowns

[1] U.S. Energy Information Agency, *Annual Energy Outlook 2023*, March 16, 2023, https://www.eia.gov/outlooks/aeo/narrative/index.php.

and employment centers. Upstate transit authorities serve these mid-sized cities through a mix of fixed- and flex-route services.

Workday commutes, short trips, and the movement of freight comprise most of the daily travel statewide. New York State's transportation network supports more than 115 billion annual vehicle miles of travel (as of 2022), countless pedestrian, bicycle, and other human-powered active transportation trips, 1.8 billion annual public transportation trips (as of 2023), and almost 50 million annual passenger enplanements (as of 2022).[2] More than 11 million on-road vehicles are registered in New York State, the large majority of which are passenger vehicles.[3]

The transportation network also moves 936.5 million tons (valued at over $1.2 trillion) of freight goods annually (as of 2021) via truck, rail, plane, and ship.[4] As of 2023, the freight network includes 1,730 interstate miles, 3,795 active rail miles, 8 major ports, and 6 major air cargo facilities.[5] The maritime transportation sector, which includes ports, terminals, and vessels, supports the State's energy goals by providing energy-efficient freight transportation. It is also a sector that is actively pursuing emissions reduction, electrification, and decarbonization through innovation and heavy investment from federal and State sources. The transportation network also plays a vital role in supporting incident management statewide, allowing police, national defense, healthcare workers, firefighters, and other emergency responders to quickly and efficiently mobilize wherever needed.

2.2. Maintaining and Improving the Transportation Network

Continuing maintenance, rehabilitation, replacement, and modernization of this transportation network ensures that transportation investments address future societal needs, improve resiliency, and align with the state's emission reduction and overall energy goals. These efforts depend on the cooperation of municipal, regional, and State level decision makers, who each have responsibilities for certain portions of the network. The New York State Department of Transportation (DOT) works with federally mandated Metropolitan Planning Organizations (MPOs) in New York's 14 metropolitan areas with over 50,000 residents and consults with local decision makers in rural areas not covered by an MPO to ensure a coordinated planning approach across the state. The transportation system is also dependent on the availability of a skilled private and public sector workforce that includes diverse roles such as road maintenance crews, mechanics, engineers, planners, snowplow operators, truck drivers, transit workers, and many others. With the emergence of electric vehicles (EVs) there is a pressing need to develop a workforce to attend to the planning, installation, and maintenance of charging infrastructure.

As the transportation network has expanded and grown in complexity, maintenance needs and associated costs have grown in parallel. New York State gained approximately 129,000 acres of

[2] New York State Department of Transportation (DOT) (June 2025). Draft Transportation Master Plan 2050. nystransportationmasterplan.com

[3] DMV registration database, as accessed on Open NY, June 2025, https://data.ny.gov/Transportation/Vehicle-Snowmobile-and-Boat-Registrations/w4pv-hbkt/about_data

[4] DOT, New York State Freight Plan, August 2024, https://www.dot.ny.gov/portal/page/portal/content/delivery/Main-Projects/projects/P11618881-Home/P11618881-repository/New_York_State_Freight_Plan_2024.pdf.

[5] Ibid.

developed land between 2001–2021, yet nearly one-third of this development was in counties that experienced population decline from 2000–2020. This trend is particularly pronounced in Upstate New York, where population only grew by 1.8% from 2000–2020 yet approximately 105,000 acres were developed.[6] New land development necessitates the creation of new transportation infrastructure to support it, and maintenance needs of this new infrastructure place additional strain on already limited transportation funding. These challenges highlight the need to prioritize multimodal transportation investments that support not only emissions reductions, but also the efficient use of funding and sustainable land use patterns.

2.3. Meeting Energy Planning Goals in the Transportation Sector

DOT's Statewide Transportation Master Plan (Draft) lays out a vision where transportation strengthens the health, safety, economic vibrancy, livability, and sustainability of communities throughout New York State.[7]

Consistent with this vision, the State will work with public and private stakeholders to accelerate a shift toward a transportation system that minimizes and reduces GHG emissions while providing affordable, reliable, and healthy transportation options to all members of the travelling public and promoting sustainable land use patterns. Continued public and private investment in active transportation, public and private EV infrastructure, public transportation, reducing congestion, and shared mobility are all actions that are intended to help achieve this vision. These actions will be targeted to address specific barriers to broader adoption of clean transportation technologies as well as broader sector-wide policies that align market incentives. The GHG reduction achieved by each of these approaches will depend on the land use context within which they are implemented, necessitating alignment with municipal policies and private sector engagement.

Achieving emissions reductions and reduced energy use will also require major public and private investments in new technologies. Since 2010, when the first commercially available EVs reached the market, New York has enacted policies, statutes, and regulations and committed nearly $3 billion in investments to encourage further adoption of these cleaner vehicles. In 2024, EVs made up nearly 10 percent of new vehicle registrations in the state, with battery-electric vehicles (BEVs) making up the majority (61%) of EV registrations and plug-in hybrid EVs (PHEVs) making up the balance (39%).[8] Regulations that New York has adopted will require all new light-duty vehicle (LDV) sales to be zero-emission by 2035, with zero-emission vehicles also making up an increasing percentage of medium- and heavy-duty vehicle sales by 2035. Accompanying public and private investments in charging infrastructure, electric utility capacity, and vehicle incentives to reduce the upfront cost of these vehicles to consumers will be needed to realize the desired emission reductions.

[6] "National Land Cover Database Class Legend and Description." National Land Cover Database Class Legend and Description. Accessed March 8, 2025. https://www.mrlc.gov/data/legends/national-land-cover-database-class-legend-and-description.
[7] DOT (June 2025). Draft Transportation Master Plan 2050. nystransportationmasterplan.com
[8] EValuateNY dashboard, accessed June 2025, https://atlaspolicy.com/evaluateny/.

In accordance with the Climate Act, at least 35% of the State's clean energy and energy efficiency programs, projects or investments must benefit disadvantaged communities (DACs).[9] Investments in public transportation, active transportation, and ZEV infrastructure can substantially improve air quality, workforce opportunities, and overall quality of life within communities across the State. This is especially true in DAC areas, which experience disproportionate exposure to vehicle emissions.

New York State is working to provide people of all ages, abilities, incomes, and backgrounds living, working or visiting New York State with access to more travel choices that enable travelers to avoid wear and tear on personal vehicles and save money on transportation.

3. State of the Sector

Roadway travel is typically expressed in Vehicle Miles traveled (VMT). VMT includes all roadway traffic, including trucks, buses, and personal vehicles regardless of trip purpose. In essence, VMT is a measure of transportation system use, demonstrating the vehicular movement of people and goods and the energy used to support that movement. As population and travel demand increases, VMT increases. Higher VMT is often also associated with greater economic resources.

New York State's roadway system is used extensively on a daily basis. According to estimates derived from DOT's statewide traffic count system, in 2022, about 321 million vehicle miles were driven on New York roads every day. As reflected in Figure 1, Daily VMT (DVMT) steadily increased until about 2007, when it peaked and began declining. After 2011 and until the COVID-19 pandemic in April 2020, DVMT leveled off. Notably, the COVID-19 pandemic impacted travel significantly as the majority of residents faced travel restrictions and had to work remotely. Going forward, travel trends and policies related to telecommuting, freight delivery, and public transportation will continue to impact roadway travel.

[9] Environmental Conservation Law 75-0117.

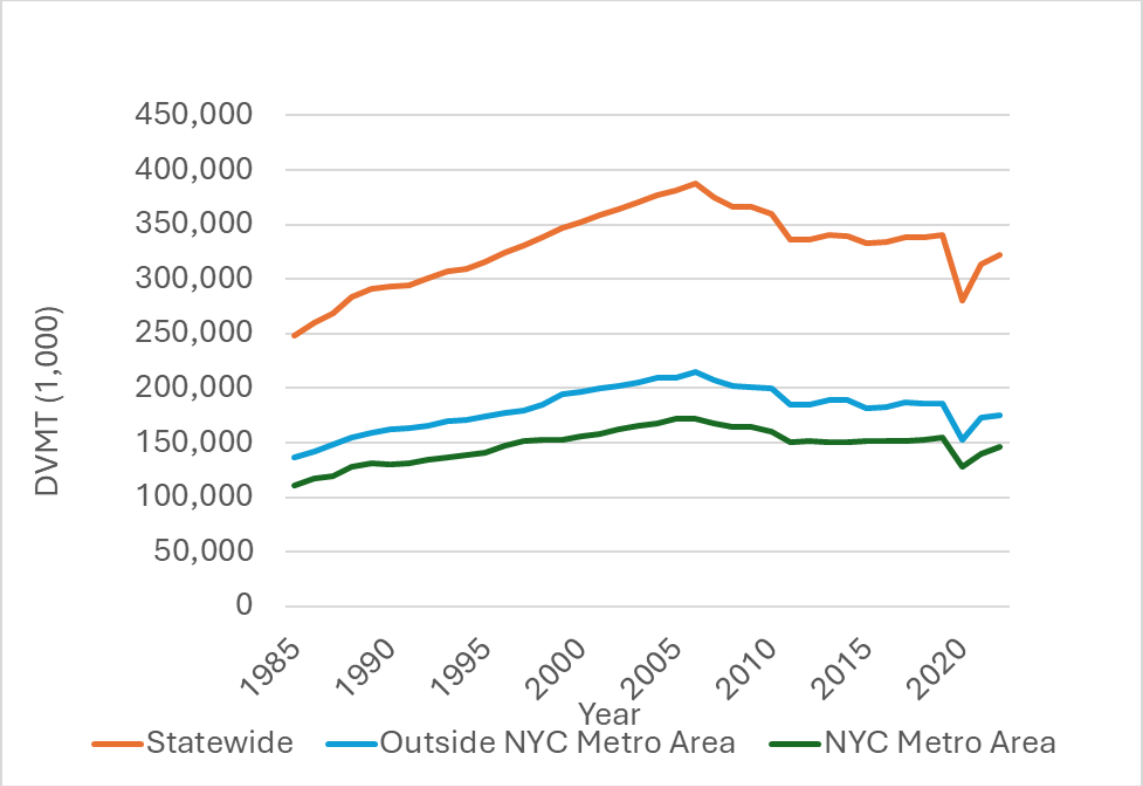

Figure 1: Daily Vehicle Miles (DVMT) New York State 1985-2022

Source: DOT Highway Data Services Bureau

Consistent with trends in VMT, transportation sector emissions in New York State were 1% higher in 2022 than they were in 1990, but they have fallen nearly 18% since 2005.[10] Transportation sector emissions accounted for 43% of total fuel combustion emissions in 2022. Additionally, 2022 transportation emissions increased 13% relative to 2020, representing a return to historic trends as the economy recovered from the impacts of the COVID-19 pandemic. Burning petroleum-based fuels made up the majority (51%) of New York fuel combustion emissions in 2022; these are the main fuels used in transportation.

Transportation fuels used in New York include motor gasoline, diesel, electricity, compressed natural gas (CNG), and blended biofuels (ethanol and biodiesel). Gasoline use in New York State peaked at approximately 140 million barrels per year in 2006; through 2022, usage is down 22 percent, to 109 million barrels.[11]

Reducing energy use and GHG emissions from transportation, both on an absolute basis and on a per-mile basis, can be achieved through multiple strategies, including: providing travel options that use more

[10] 2024 NYS Greenhouse Gas Emissions Report, NYS Department of Environmental Conservation, https://dec.ny.gov/sites/default/files/2024-12/sr1energynysghgemissionsreport.pdf, accessed June 2025

[11] Patterns & Trends – New York State Energy Profiles 2008-2022, NYSERDA, https://www.nyserda.ny.gov/About/Publications/Energy-Analysis-Reports-and-Studies/Patterns-and-Trends, accessed June 2025

efficient transportation modes, including transit and active transportation; improving overall system efficiency by implementing strategies that include land use planning, transportation system design, and goods movement management; and transitioning to low- and zero-emission vehicles.[12]

One program that is currently aiming to reduce single-occupant vehicles (SOVs), VMT, and GHG emissions is DOT's Statewide Mobility Services Program which provides resources, tools and information on sustainable transportation options such as carpooling, vanpooling, transit trip planning, and micromobility services throughout New York.[13] The program works closely with employers, universities, local mobility programs and initiatives, organizations, and individuals to find easy, affordable, reliable, and safe alternatives to driving alone. On an annual basis it has been estimated that that the program helps eliminate approximately 1,400,000 SOV trips, equating to 14,000,000 VMTs.

While the State will continue to support a range of transportation preferences, strategic decisions should be made in consideration of both individual community needs and other emerging trends affecting the transportation system. For example, investments in improving the resiliency of the transportation system have become increasingly important as New York experiences more frequent extreme weather events. Identifying where each strategy will achieve the greatest outcome while effectively meeting the transportation needs of each community is essential to achieving sustainable results.

3.1. Smart Growth

Smart Growth is a holistic, community-centered planning and development approach that emphasizes efficient and strategic land use practices with the goal of creating livable, sustainable, and resilient communities with multiple transportation options. The dense land use patterns of communities in the Metropolitan New York City area enable more efficient mobility options such as public transportation, but a majority of the State (and U.S. as a whole) is typified by sprawling, low-density land use patterns that foster personal car use. New York State began officially addressing this challenge with the passage of the Smart Growth Infrastructure Policy Act in 2010, which established "Smart Growth Criteria" focused on sustainable development, community-based planning, and the provision of mobility choices. Additional criteria and "model local laws" for Smart Growth were introduced by the 2014 Community Risk and Resiliency Act. At the local level, communities throughout the State have also begun increasingly supporting these principles through updates to their comprehensive plans, zoning ordinances, and various other policies.

New York State provides technical assistance and capacity building support to help municipalities progress transportation planning that emphasizes creating livable and sustainable communities. One example of this support is **New York "Rural Connect,"** an initiative funded through the U.S. Department of Transportation's **Thriving Communities** Regional Pilot Program,[14] led by DOT and supported by the New York State Department of State (DOS). Through **Rural Connect**, the State will provide technical assistance and training to five rural New York State municipalities in areas such as identifying/applying

[12] Annual Energy Outlook 2023, U.S. Energy Information Administration, https://www.eia.gov/outlooks/aeo/narrative/index.php
[13] 511NY, https://511ny.org/
[14] U.S. Department of Transportation, *Thriving Communities Program,* January 22, 2025, https://www.transportation.gov/grants/thriving-communities.

for grant opportunities, project management, and comprehensive planning. The successful implementation of Smart Growth principles statewide depends on cooperation between municipalities, State agencies, regional organizations (such as MPOs), and other community stakeholders.

3.2. Public Transportation

Public transportation is vitally important and is one of the most energy-efficient travel options available. In FY 2026, the State plans to provide roughly $9 billion in operating aid to mass transit systems.[15] This funding supports the operation of 130 major transit authorities throughout the State. Interstate transit operators, such as Amtrak and Greyhound bus service, help to facilitate statewide travel for those reliant on public transportation.

Figure 2, below, provides information on public transportation usage statewide from 2013 to 2024. Notably, transit ridership plummeted across the state in 2020 and 2021, due largely to the COVID-19 pandemic, but began to recover from 2022–2024.

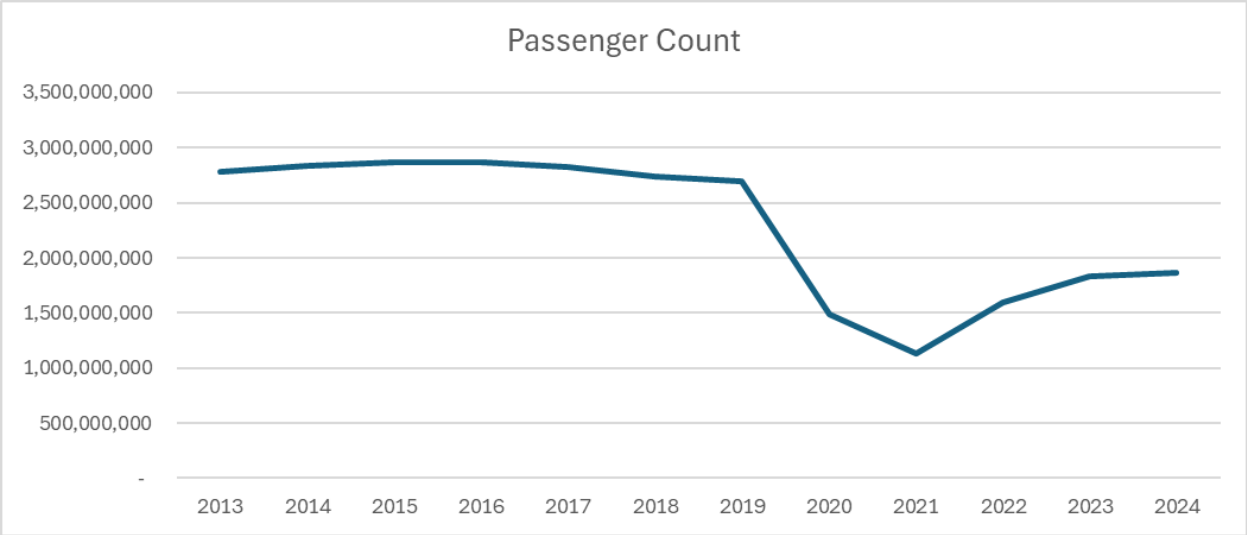

Figure 2: Statewide Public Transportation Ridership 2013–2024

Source: DOT Public Transportation Bureau[16]

3.2.1. Public Transportation in Metropolitan New York City Area

Transit service in the greater Metropolitan New York City area is largely coordinated by the Metropolitan Transportation Authority (MTA), which manages North America's largest transportation network, serving 15.3 million people across a 5,000-square-mile travel region encompassing New York City, Long Island, southeastern New York State, and parts of Connecticut.[17] The MTA network comprises the nation's largest bus fleet and more subway and commuter rail cars than all other U.S. transit systems combined, and includes New York City Transit, the Long Island Rail Road (LIRR), and the Metro-North Railroad

[15] New York State, *FY 2026 NYS Enacted Budget*, July 10, 2025, https://www.budget.ny.gov/pubs/archive/fy26/en/fy26fp-en.pdf
[16] DOT Public Transportation Bureau Figure Statewide Public Transportation Ridership 2013-2024
[17] Metropolitan Transportation Authority (MTA), *About the MTA,* accessed July 8, 2025, https://www.mta.info/about.

(Metro-North). Additional transit providers operating in Downstate New York include the Westchester County Bee Line System and Suffolk County Transit.

As illustrated by Figure 3, New York City Transit subway and bus ridership has begun to recover since the pandemic. In 2020, annual subway ridership dropped to 640 million and annual bus ridership dropped to 382 million.[18] In 2024, New York City Transit achieved daily subway ridership between 2.5 and 3.8 million (with 1.2 billion in annual ridership) and daily bus ridership between 0.8 and 1.3 million (with 409 million in annual ridership).[19, 20]

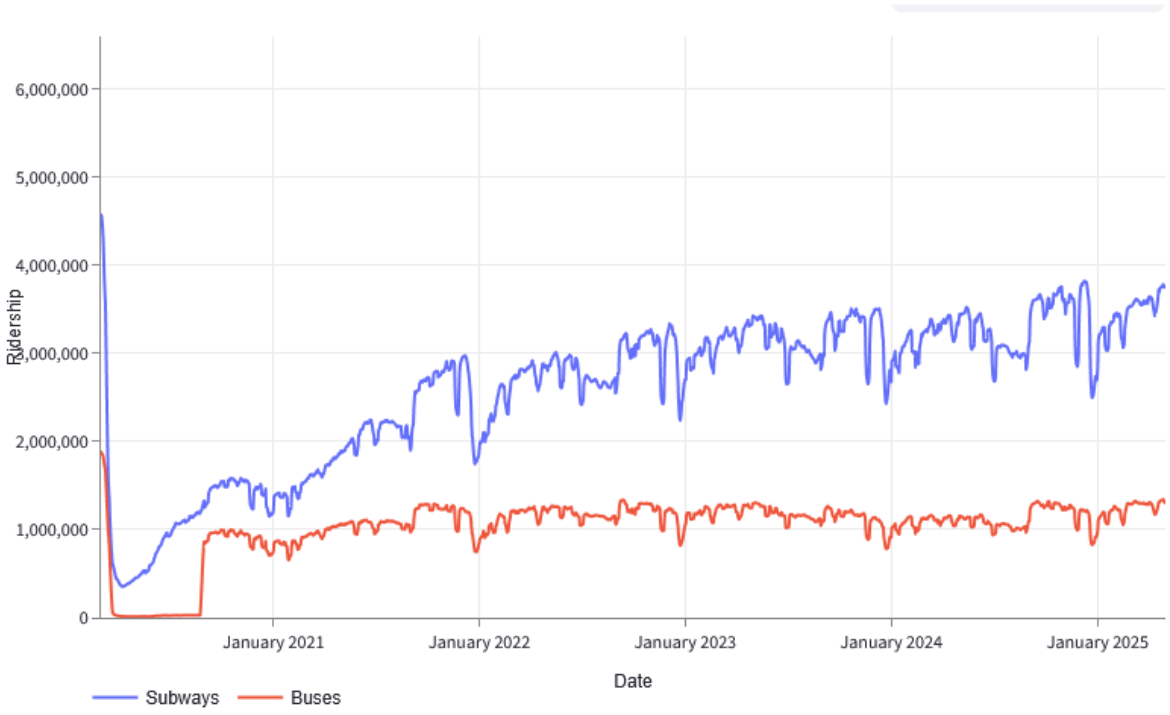

Figure 3: MTA Daily Bus and Subway Ridership, March 2020 through June 2025

Source: MTA

New York City subway trains and buses share real time arrival and departure data with travelers and utilize integrated payment methods for ease of use via a "tap and go" system that allows payment via contactless credit or debit card, smartphone, wearable device, or OMNY card.[21] Public transportation in New York City requires ongoing resources for maintenance and to respond to increasing transit demand for new routes and facilities, with these needs heightened by the system's expansive size and usage.

[18] MTA, *Subway and bus ridership for 2020*, accessed July 11, 2025, https://www.mta.info/agency/new-york-city-transit/subway-bus-ridership-2020

[19] MTA, *Metrics: Daily Ridership and Traffic*, accessed July 11, 2025, https://metrics.mta.info/?ridership/daybydayridershipnumbers.

[20] MTA, *Subway and bus ridership for 2024*, accessed July 11, 2025, https://www.mta.info/agency/new-york-city-transit/subway-bus-ridership-2024

[21] MTA, *Tap and go to pay your fare, accessed July 8, 2025,* https://www.mta.info/fares-tolls/subway-bus/tap-and-go.

Notably, transit ridership in New York City area has continued to increase with the introduction of Congestion Pricing, which went into effect January 2025 and charges fees for vehicles entering the designated "congestion pricing zone" of Manhattan's Central Business District during peak travel times, with the proceeds used to fund future MTA projects. Transit ridership has increased considerably since the program went into effect, with a 7.3% increase in subway usage and increases of 19% and 13% on the LIRR and Metro-North, respectively, as travelers seek to avoid paying the vehicle fee. As shown in Table 1, as of April 2025 there have been over 9 million less vehicle entries into the Central Business District compared to historical averages, reducing congestion and improving commuting times for both automobiles and transit bus riders.[22]

Table 1: Reduction in Vehicle Entries into New York City Central Business District

Month	Average Daily Entries	Daily Baseline (Historical Average)	Change from Baseline	Change from Baseline (%)	Total Fewer Entries per Month
January 2025	533,526	580,500	-46,974	-8%	-1,268,298
February 2025	541,309	613,900	-72,591	-12%	-2,032,548
March 2025	560,255	642,500	-82,245	-13%	-2,549,595
April 2025	568,143	644,400	-76,257	-12%	-2,287,710
May 2025	580,226	647,200	-66,974	-10%	-2,076,194

Source: MTA[23]

3.2.2. Public Transportation Outside the Metropolitan New York City Area

Public Transportation in other areas across the State outside the Metropolitan New York City area features a variety of land use patterns that include small towns, rural areas, and midsize cities surrounded by suburbs. Upstate transit authorities serve these mid-sized cities through a mix of fixed and flex route services, some incorporating bus rapid transit along more heavily traversed routes. The Niagara Frontier Transit Authority (NFTA) also operates a light rail service, the Buffalo Metro Rail. However, providing transit service to sprawled suburban municipalities within the larger metropolitan areas has been and remains a challenge.

Rural public transportation systems typically serve communities with populations less than 50,000 through a variety of public transportation modes, including demand response, traditional fixed route,

[22] MTA, *Metrics: Reduction in Vehicle Entries to the CBD*, accessed July 8, 2025, https://metrics.mta.info/?cbdtp/vehiclereductions.
[23] MTA, Metrics: Reduction in Vehicle Entries to the CBD, accessed July 8, 2025, https://metrics.mta.info/?cbdtp/vehiclereductions.

deviated fixed route services and vanpool. Regional systems do not exist in most rural areas and services are provided by an individual municipality or county primarily within their own borders. This creates an organizational and financial burden for these entities, many of which have limited staff and budgets. This also limits the availability of cross-county travel to employment, services and major destinations that are not within a resident's home county.

3.2.3. Bus Rapid Transit

Bus Rapid Transit (BRT) is a high-quality bus-based transit system that delivers fast and efficient service by having stops at highly frequented passenger locations along specific corridors. Bus Rapid Transit lines may include dedicated bus lanes, traffic signal priority, updated fare collection systems, and enhanced stations along designated routes. BRT is growing throughout the downstate and upstate regions. BRT has been implemented in all five boroughs of New York City[24] as well as three corridors in the Capital Region.[25] Design is underway for the Bailey Avenue corridor in Buffalo[26] and planning is in progress in Syracuse,[27] Suffolk County,[28] and Rochester.[29]

3.2.4. Institutional Partnerships and Universal Access

To increase ridership, many transit agencies have developed institutional partnerships that provide fare-free access to transit services for students, employees, and other affiliates of regional institutions such as colleges/universities, government agencies, hospitals, and major employers. These "universal access" programs typically utilize modern fare technology, allowing individuals to board by scanning a student or employee ID card or using a mobile application linked to their account. Such programs often increase ridership without requiring significant service expansion.

Agencies with robust universal access programs have experienced the strongest post-COVID ridership recoveries. For example, the Capital District Transportation Authority (CDTA) partners with 45 institutions, including all major colleges and hospital systems in the region.[30] CDTA's ridership rose from a pandemic low of 9.8 million in SFY21 to 18.4 million in SFY25, surpassing its pre-pandemic level of 15.3 million. In St. Lawrence County, ridership grew from 59,818 in 2020 to 159,407 in 2024, fueled by similar partnerships with colleges and universities in their service area.

3.3. Vehicular Transportation Management

The smooth functioning of the transportation system is supported by both the management of transportation demand and capacity. Currently, traveling by car is the only viable option for many New Yorkers. Additionally, first responders such as police, firefighters, and medical personnel heavily rely on the road network to fulfill their duties. The road network also facilitates large-scale response and

[24] New York City Department of Transportation, *About Select Bus Service*, accessed July 8, 2025, https://www.nyc.gov/html/brt/html/about/about.shtml.
[25] Capital District Transit Authority (CDTA), *BRT*, accessed July 8, 2025, https://www.cdta.org/brt.
[26] Niagara Frontier Transportation Authority, *Bailey Ave Bus Rapid Transit (BRT)*, accessed July 8, 2025, https://baileyavebrt.com.
[27] Central New York Regional Transportation Authority (Centro), *Special Projects*, accessed July 8, 2025, https://www.centro.org/programs.
[28] Connect Long Island, *Bus Rapid Transit (BRT)*, accessed July 8, 2025, https://www.connectli.org/busrapidtransit.html.
[29] City of Rochester, Minnesota, Link, accessed July 8, 2025, https://linkrapidtransit-rpu.hub.arcgis.com/.
[30] CDTA, *Better Mobility Throughout the Capital Region*, January 31, 2024, https://www.cdta.org/news/cdta-2023-year-review.

evacuation during large-scale emergencies, such as the extreme weather events that are becoming more frequent throughout the State. Any congestion on this road network negatively reduces the capabilities of first responders, threatens the safety and convenience of the traveling public, and adds to transportation costs for everyone by increasing fuel consumption and ensuing GHG and co-pollutant emissions.

As significant capacity expansion to address congestion (such as adding new lanes or roadways) is often not fiscally or operationally viable or desirable, local and recurring constrictions in traffic flow (i.e., bottlenecks) are most often addressed using demand management strategies. Transportation System Management and Operations (TSMO) is a set of strategies that can reduce congestion on the existing road network without expanding capacity. Technological advances allowing for real-time delivery of traffic information help to manage demand and improve the efficiency of roadways across the State.

Through its TSMO strategies, DOT actively monitors the operations of the highway network to reduce congestion, and the fuel consumed by vehicles operating on congested facilities. Some of the various TSMO strategies that DOT has deployed include Traffic Incident Management (TIM), Emergency Management Systems, and Traffic Signal Optimization, all three of which can help reduce traffic congestion and emissions. TIM activities are led by DOT's network of ten Transportation Management Centers (TMCs). The focus of these efforts is on:

- Safe and rapid traffic incident detection and clearance
- Management of planned and unplanned events such as construction, emergencies, high traffic special events (e.g., concerts, sporting events, the New York State Fair, etc.).

DOT accomplishes these strategies by:

- Deploying and using technology to monitor traffic conditions—including cameras, detectors, communications, and advanced traffic management systems.
- Coordinating multi-agency planning and response, including with State Police, local traffic and law enforcement, transit agencies, and management of the Highway Emergency Local Patrol (HELP) roadside assistance program.
- Communicating to the public about detours and route and modal alternatives through variable message boards, the 511NY.org system, and other public and private travel and navigation applications and outlets (e.g., Google, WAZE, Apple Maps, etc.).

Currently, DOT helps maintain traffic signals that are dispersed across the State and managed with varying degrees of connectivity and operations protocols. On local roadways, municipalities make sure traffic signals are properly installed and maintained within their jurisdiction. DOT provides coordination to improve traffic signal management spanning from design, operations, management, and maintenance to the ultimate replacement of deficient traffic signals. This includes upgrades to detection, communication and controller technology on state roadways, and in some cases even establishing communications to signals in the first place. This action also includes coordination of traffic signals with

local jurisdictions and introducing signal priority for emergency, transit, and commercial vehicles. Traffic Signal Optimization synchronizes groups of traffic signals to allow increased flows of traffic along designated corridors in urban, suburban, and rural areas without stopping.

3.4. Active Transportation and Micromobility

"Active transportation" is human-powered means of transportation, such as walking and bicycling, along with other human-scaled devices, referred to as micromobilty which includes electric bicycles ("e-bikes") and electric scooters ("e-scooters"). Active Transportation is low-cost, creates little to no GHG emissions, and in some cases promotes healthy lifestyles. Making these options a viable alternative to vehicular travel is key to New York's efforts to reduce GHG emissions while also promoting affordability and public health. New York residents without access to private automobiles, are not able to use one, or prefer not to drive, can particularly benefit from active transportation-oriented connections to jobs, educational opportunities, and public services.

Similar to national statistics, in New York State, roughly 53 percent of average daily trips, regardless of transportation mode, are a distance of less than three miles.[31] Given typical travel patterns, a large percentage of these trips were made by automobile. Local travel of less than three miles could potentially be completed by walking or bicycling.

Certain areas of the State do have a connected network for walking, rolling, and bicycling that includes sidewalks, bike lanes, dedicated shared use paths for pedestrians and cyclists, and recreational trails. However, in many places statewide, the current roadway configuration reflects an automobile-centric design. Multiple wide travel lanes, narrow shoulder widths, limited or missing sidewalks or bicycle infrastructure, and high-speed travel all present a challenge for the active transportation traveling public. These existing conditions frequently deter bicyclists and pedestrians from traveling along roadway corridors or serve as a barrier from accessing adjacent active transportation networks on both State roads and local streets.

State-owned and maintained roadways may serve as the primary commercial corridors and main streets of communities statewide, or as connector roads between small and rural communities. In many cases, these roads, whether in urban, suburban, or rural settings, may be challenging to navigate for non-motorized travelers. Facilities and infrastructure that accommodate walking, rolling, and bicycling work best when they interconnect with each other, forming a network. Short, disconnected sidewalks, trails, or bike lane segments can be frustrating for those who rely on them to access jobs, school, the grocery store, or other destinations. These isolated facilities can limit the options for those looking for different ways to travel within their community.

Active transportation has significant potential for expanding the reach of New York State's many public transportation systems. Encouraging transit customers to walk, bike, or use micromobility modes for the "first and last mile" (a term used to describe the trip between a person's home or work and a transit

[31] U.S. Department of Transportation Bureau of Transportation Statistics, *Tyler Data & Insights: Daily Mobility Statistics*, accessed July 8, 2025, https://data.bts.gov/Research-and-Statistics/Daily-Mobility-Statistics/w96p-f2qv/about_data.

stop or station) can help to reduce congestion and improve local air quality by replacing car trips. It can also reduce the need to build large parking lots and garages at major transit stations, allowing more opportunities for transit-oriented development[32] such as housing, business, civic, and recreational uses. Finally, enabling biking and walking to transit can potentially increase ridership by providing lower-cost options which can be especially beneficial for New Yorkers without access to an automobile. While DOT plays an important role in helping residents walk, roll, and bicycle along state roadways to reach bus stops and transit stations, there are also current and future opportunities for DOT to facilitate installation of additional transit shelters, bike parking, and bike share stations on State roadways.

3.4.1. Current Policies and Plans for Active Transportation

New York State has already implemented several laws and policies to address active transportation challenges, chief among them the 2011 New York State Complete Streets Act, which requires State, county, and local agencies to consider the convenience and mobility of all users when developing transportation projects that receive State and federal funding. The Complete Streets Act is complemented by the 2010 New York State Smart Growth Infrastructure Policy Act (SGIPA. The values embodied in the SGIPA and Complete Streets Act are interwoven in DOT's Statewide Transportation Master Plan (Draft) and the Active Transportation Strategic Plan (ATSP) (expected completion in 2025). The Transportation Master Plan spells out a vision of transportation choices for all and community centered planning, understanding that resilient, sustainable, and thoughtfully built transportation infrastructure can positively contribute to peoples' everyday lives. The ATSP will reflect New York State's recognition that facilities for walking, biking, and other forms of active transportation are important to the daily lives of New Yorkers, playing a vital role in providing connections both within and between communities. It will serve as a strategic guide for DOT's active transportation efforts.

3.4.2. Existing Bike Share and Micromobility Programs

Citi Bike is the nation's largest bike share program with 25,000 bikes and more than 1,500 stations spanning Manhattan, Brooklyn, Queens, and the Bronx—as well as Jersey City and Hoboken.[33] Usage metrics indicate that in as densely populated a municipality as New York City, Citi Bike is a popular choice to meet daily transportation needs.

In addition to Citi Bike, several bike shares can be found across the State. Examples of these include CDPHP Cycle!,[34] serving Albany, Schenectady, and Troy and HOPR in Rochester.[35] While these other bike shares don't compare in size and ridership to Citi Bike, they serve an important need and are becoming increasingly popular. New York's bike share programs, along with others throughout the country, generally offer both traditional pedal bikes and pedal-assist E-bikes. Bike shares are expected to continue to grow across the State and are expected to increasingly incorporate E-bikes and E-Scooters.

[32] Transit-oriented development integrates multiple mobility modes, including walking, biking, micromobility, and various forms of public transit, to provide residents with convenient and efficient transportation options beyond personal vehicles.
[33] *Get to know Citi Bike*, accessed July 8, 2025, https://citibikenyc.com/how-it-works.
[34] *CDPHP Cycle!*, accessed July 8, 2025, https://www.cdphpcycle.org/.
[35] HOPR, accessed July 8, 2025, https://gohopr.com/rochester/.

The DOT Statewide Mobility Services (SMS) Program has been expanding such efforts through partnerships with organizations like the Long Island Bike Co-Operative, which refurbishes and donates pre-owned bikes.[36] In early 2024, the SMS Program collaborated with the Co-Operative to bring bikes to community-based organizations in disadvantaged areas, increasing access to alternative transportation options. A bike library, as organized by the SMS Program, allows patrons of a public library or community organization to borrow a bike for free. These programs are especially impactful in lower-income communities and communities with limited public transportation and other transportation options. As of April 2025, 24 bikes have been distributed among four bike-borrow programs on Long Island, with expansion planned for across the State.

With the emergence of electric micromobility, namely E-scooters, on April 17, 2020, the State amended Chapter 71 of Vehicle and Traffic Law for the Operation of Electric Personal Assistive Mobility Devices and Operation of Electric Scooters (Title 7, Articles 34-C & 34-D), providing roadway rules and regulations for how these newer forms of transportation could operate.[37] This includes the age 16 requirement to operate, maximum speeds (20 mph for E-bikes and 15 mph for E-scooters), disengagement of motors when idle, ability of municipalities to further regulate speed limits (30 mph or less) headwear requirements, and the inability to utilize sidewalks.

3.5. Clean Vehicle Technologies

3.5.1. Electric Vehicle Sales Growth and Technology Advances

Over the past decade, the use of clean vehicle technologies, in particular electric vehicles (which includes both battery-electric vehicles [BEVs] and plug-in hybrid vehicles [PHEVs]), has grown rapidly. The number of EVs registered in New York State has grown by more than 2,000 percent since 2015, from about 13,000 vehicles to more than 275,000 in February 2025 (see Figure 4).[38] The number of models available has also grown, from about 20 in 2015 to more than 150 in 2025.[39] In 2025, EVs made up 10 percent of all new vehicle sales in New York State, although they still only account for about 2.1 percent of all registered vehicles.

[36] Long Island Bicyle Coop, accessed July 8, 2025, https://libicyclecoop.org/.
[37] Consolidated Laws of New York, CHAPTER 71, Vehicle & Traffic, TITLE 7, ARTICLE 34: Operation of Bicycles and Play Devices, accessed July 8, 2025, https://www.nysenate.gov/legislation/laws/VAT/1242.
[38] EValuateNY Dashboard, Atlas Public Policy, https://atlaspolicy.com/evaluateny/, accessed June 2025
[39] Ten States Hit Ambitious Electric Vehicle Target, NESCAUM, https://www.nescaum.org/documents/NESCAUM_Report_ZEV_MOU_FINAL_03102025.pdf, March 2025

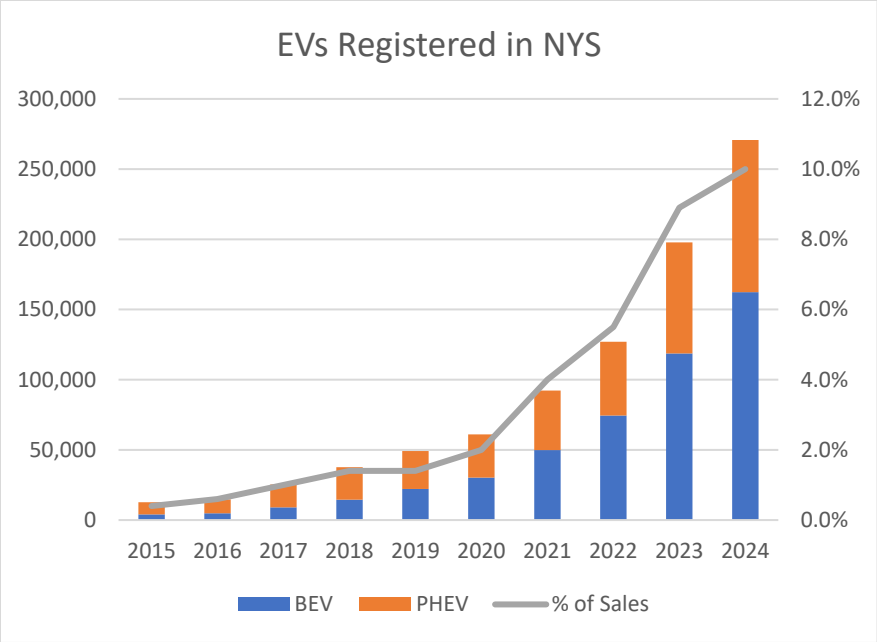

Figure 4: Registered in New York State (left axis) and Market Share as a Percent of New Vehicle Sales (right axis)

Source: Atlas Public Policy EValuateNY

To accompany the growth in EVs, charging stations have also proliferated. As of June 2025, there are more than 17,000 public charging ports – which includes more than 2,300 direct current fast charging ports (DCFCs), and more than 15,000 Level 2 chargers – at roughly 4,900 locations across the state.[40] Additionally, there are more than 4,000 "semi-public" ports at workplaces and multifamily buildings across the State, which serve multiple employees and tenants but not the broader public. The pace of charging station buildout has been nearly as fast as the pace of EV adoption, rising nearly 1,200 percent since 2015 and 260 percent since 2019. Public DCFC stations have expanded rapidly in recent years, from about 500 in 2019 (which were almost exclusively for Tesla drivers) to more than 2,100, including a mix of plug types, in early 2025.[41]

Medium- and heavy-duty vehicles have not switched to alternative fuels as rapidly as LDVs to date but are electrifying quickly. More than 9,000 Class 2b through 8 electric trucks and buses are now registered in NYS, a majority of which were introduced to the state in 2024. More than 95 percent of these are Class 2b and Class 3 pickup trucks and vans. In 2024, EVs made up more than 13 percent of all Class 2b and 3 new vehicles registered in NYS. In addition to electric vehicles, medium-duty vehicles vehicles in

[40] Alternative Fuels Data Center, Alternative Fueling Station Counts by State, U.S. Department of Energy, https://afdc.energy.gov/stations/states, accessed June 2025

[41] Alternative Fuels Data Center, Alternative Fueling Station Counts by State, U.S. Department of Energy, https://afdc.energy.gov/stations/states, accessed June 2025

New York State run on other alternative fuels.[42] Nearly 3,000 vehicles in New York State currently run on CNG and nearly 1,000 run on propane, most of which are buses and large trucks.[43]

The underlying technology behind electric vehicles has improved dramatically over the last decade. As shown in Figure 5, the average range of a new light-duty BEV registered in New York in 2024 was nearly 300 miles, nearly double the average BEV range in 2015, while the average manufacturer's suggested retail price (MSRP) of the vehicles fell by more than 35 percent (Figure 6). Light-duty BEVs are approaching price parity with similar internal combustion engine-powered vehicles.[44] EV efficiency and cold-weather performance has also improved, thanks in part to innovations like heat pumps. More than a dozen EV models now achieve an equivalent of more than 115 miles per gallon.[45] At the same time, charging speeds have dramatically increased. Whereas many BEVs charged at a maximum of 50 kW in 2015, today many can charge at 300 kW or more, adding 150 miles of range in about 10 minutes. Many of the DCFC stations that are being installed today are capable of providing at least 150 kW, and many can provide 350 kW.

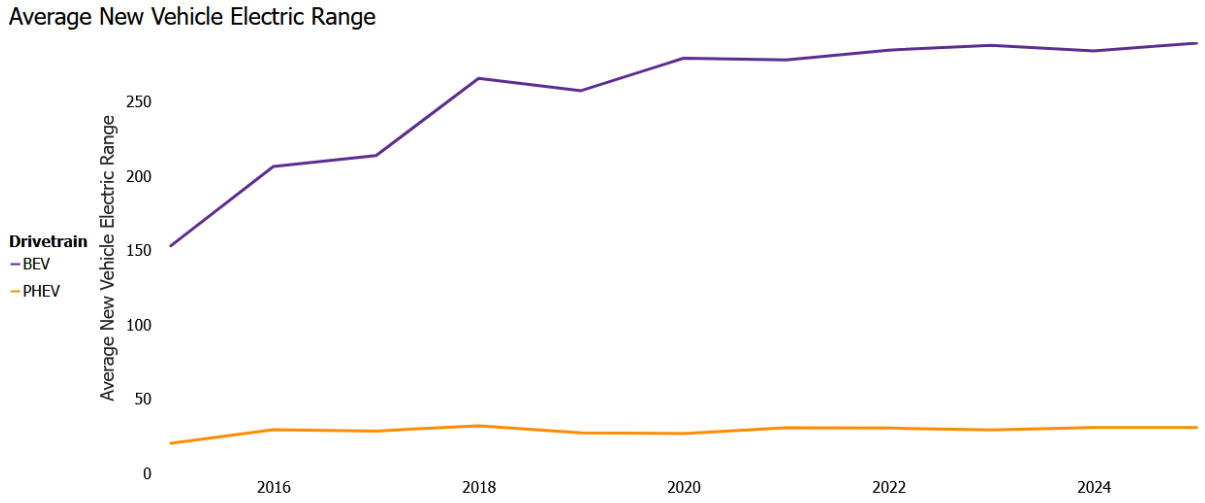

Figure 5: Average New Vehicle Electric Range for BEVs and PHEVs, 2015 to 2025

Source: Atlas Public Policy EValuateNY

[42] EValuateNY Dashboard, Atlas Public Policy, https://atlaspolicy.com/evaluateny/, accessed June 2025

[43] DMV registration database, as accessed on Open NY, June 2025, https://data.ny.gov/Transportation/Vehicle-Snowmobile-and-Boat-Registrations/w4pv-hbkt/about_data

[44] *EVs May Get Cheaper Than Gas Cars As Early As Next Year. Here's Why*, InsideEVs, August 6, 2024, https://insideevs.com/news/729153/ev-price-parity-ice-2025-2026/

[45] FuelEconomy.gov, U.S. Environmental Protection Agency, https://fueleconomy.gov/feg/PowerSearch.do?action=noform&path=3&year1=2024&year2=2025&vtype=Electric&srchtyp=newAfv&pageno=1&rowLimit=50, accessed June 2025

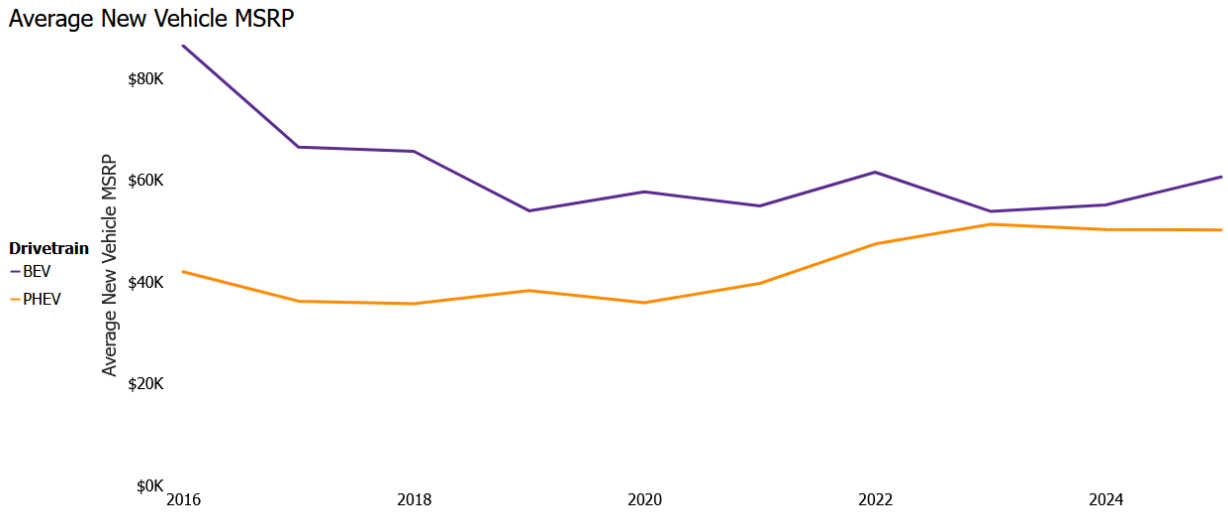

Figure 6: Average New Vehicle Manufacturer's Suggested Retail Price (MSRP) for BEVs and PHEVs, 2015 to 2025

Source: Atlas Public Policy EValuateNY[46]

Market growth has been driven by a combination of increased consumer interest, vehicle incentives from the State and federal government, investments in charging infrastructure, and regulatory requirements that push the auto manufacturers to sell more EVs. New York State is investing nearly $3 billion in electrifying its transportation sector. In addition, the new $1 billion Sustainable Future Program in the FY2026 State Budget includes a portion of funding specifically allocated to invest in the transportation industry, including charging infrastructure for passenger vehicles and medium to heavy-duty vehicles. There are a range of initiatives to grow access to EVs and improve clean transit for all New Yorkers, including the **EV Make Ready Program**,[47] **EVolve NY**,[48] the **Drive Clean Rebate** for EVs,[49] the **New York Truck Voucher Incentive Program (NYTVIP)**,[50] the **New York School Bus Incentive Program**,[51] **Charge Ready NY**,[52] and the **Direct Current Fast Charger Program**.[53]

Alongside the abovementioned incentive programs, New York State has also adopted regulations that encourage automakers to increase their sales of ZEVs in New York State. In December 2022, the New York State Department of Environmental Conservation (DEC) adopted the Advanced Clean Cars 2 rule, (see, 6 N.Y.C.R.R. Part 200 and 218) which requires automakers to sell an increasing percentage of light

[46] Atlas Public Policy, *EvaluateNY*, accessed July 8, 2025, https://atlaspolicy.com/evaluateny/.
[47] Joint Utilities of New York, *EV Make-Ready Program*, accessed July 8, 2025, https://jointutilitiesofny.org/ev/make-ready.
[48] New York Power Authority, *EVolve NY*, accessed July 8, 2025, https://evolveny.nypa.gov/.
[49] NYSERDA, *Drive Clean Rebate for Electric Cars*, accessed July 8, 2025, https://www.nyserda.ny.gov/Drive-Clean-Rebate.
[50] NYSERDA, *Truck Voucher Incentive Program*, accessed July 8, 2025, https://www.nyserda.ny.gov/All-Programs/Truck-Voucher-Program.
[51] NYSERDA, *NY School Bus Incentive Program Overview*, accessed July 8, 2025, https://www.nyserda.ny.gov/All-Programs/Electric-School-Buses/NY-School-Bus-Incentive-Program-Overview.
[52] NYSERDA, *Charge Ready NY 2.0*, accessed July 8, 2025, https://www.nyserda.ny.gov/All-Programs/Charge-Ready-NY.
[53] NYSERDA, "Governor Hochul Announces $23 Million in Funding and Awards for Transportation Electrification Initiatives," December 14, 2022, https://www.nyserda.ny.gov/About/Newsroom/2022-Announcements/2022-12-14-Governor-Hochul-Announces-$23-Million-in-Funding.

duty ZEVs in the State starting in 2026. The rules, which allow for a number of different approaches and include built-in flexibility mechanisms, aim for 35% of light-duty sales to be ZEVs in 2026, increasing up to 100% by 2035.

In December 2021, DEC adopted the Advanced Clean Trucks rule (see, 6 N.Y.C.R.R. Part 200 and 218), which requires manufacturers of Medium- and Heavy-Duty Vehicles (MHDVs) to sell an increasing percentage of ZEVs in the State starting in 2025. This rule also allows for different approaches and includes built-in flexibility mechanisms. It requires varying levels of ZEV sales based on vehicle weight class and body type, starting between 7% and 11% in 2025 and increasing to between 40% and 70% by 2035.

New York's ability to implement and enforce the Advanced Clean Cars 2 and Advanced Clean Trucks rules is currently subject to litigation challenging the federal government's attempt on June 12, 2025 to revoke the federal preemption waivers for these rules using the Congressional Review Act.[54, 55] New York State has established an interagency working group focused on the successful implementation of the clean vehicle transition and enhancing existing efforts to build out electric vehicle charging infrastructure.[56] New York State is also a member of the U.S. Climate Alliance Affordable Clean Cars Coalition.[57]

Additionally, in 2022 New York State enacted a requirement in statute that starting in 2027, all new school bus purchases must be ZEVs, and by 2035, all school buses in the State must be ZEVs. $500M has been allocated to support the transition to zero-emission school buses through the Environmental Bond Act, and NYSERDA has established the NY School Bus Incentive Program (NYSBIP) to assist school districts in meeting the zero-emission bus timelines.[58] While there are no similar requirements for non-road vehicles, New York State has set a target of 100 percent ZEV sales for non-road vehicles by 2035.[59]

3.5.2. EVs and the Electric Grid

Electrifying the transportation sector involves a major shift in the way vehicles are fueled. Rather than relying on gas stations, EVs can be charged at virtually any building with electrical access. This shift from petroleum-based fuels to electricity results in a major reduction of GHG emissions and an increase in energy efficiency (according to the U.S. Environmental Protection Agency, EVs are more energy

[54] New York State Attorney General's Office, "Attorney General James Sues Trump Administration for Unlawfully Stripping New York of Clean Vehicle Protections," June 12, 2025, https://ag.ny.gov/press-release/2025/attorney-general-james-sues-trump-administration-unlawfully-stripping-new-york.

[55] New York relies on three Clean Air Act waivers from the U.S. Environmental Protection Agency (EPA) to enforce its clean vehicle programs. These EPA waivers were previously granted to California and then New York adopted these same standards under federal law, which allows states to follow California's more protective emission rules.

[56] New York State Agencies Form Working Group to Accelerate Clean Vehicle Adoption and Charging Infrastructure Deployment. May 28, 2025. https://dec.ny.gov/news/press-releases/2025/5/new-york-state-agencies-form-working-group-to-accelerate-clean-vehicle-adoption-and-charging-infrastructure-deployment

[57] USCA, U.S. Climate Alliance Governors Launch Affordable Clean Cars Coalition to Expand Americans' Access to Newer and Cleaner Vehicles. https://usclimatealliance.org/press-releases/alliance-governors-launch-affordable-clean-cars-coalition-may-2025/

[58] NYSERDA, *NY School Bus Incentive Program Overview*, July 10, 2025, https://www.nyserda.ny.gov/All-Programs/Electric-School-Buses/NY-School-Bus-Incentive-Program-Overview

[59] See Section 3638 of the New York State Education Law.

efficient—87 to 91 percent—than gasoline or diesel vehicles—16 to 25 percent—even after accounting for electricity generation and line losses).[60] As more of the transportation sector is electrified, it will also result in an increase in overall electrical use in the State and possibly an increase in peak electricity use. However, actions like managed charging can reduce peak load increases and reduce costs for both drivers and electric ratepayers.

While access to the electric grid is pretty much ubiquitous in the built environment, there are many places that might require more electric power availability than currently available in order to charge EVs. Most vehicles are charged at home, and more than 90 percent of current EV users have access to home charging, according to a survey conducted by the National Renewable Energy Laboratory (NREL) on behalf of NYSERDA. Home charging tends to be relatively low-powered but can still be up to 19 kW, which is a large load for a single-family house. Clusters of EVs in a single neighborhood could require local transformer upgrades as power demand exceeds the existing transformers' rated capacity. Approaches like managed charging allow drivers and/or electric utilities to schedule charging times to charge at off-peak times. At this time, New York State utilities offer residential managed charging programs that incentivize EV drivers to charge at off-peak times, with the potential to generate substantial savings for drivers. Participating in managed charging programs can lower the likelihood of overburdened electrical distribution equipment, reducing the need to spend ratepayer dollars to upgrade equipment, and save drivers money. These benefits are made possible by two main approaches to managed charging: passive and active strategies that help align vehicle charging with grid needs and cost savings.

Residential managed charging can effectively reduce electricity demand peaks because with slower charging over a longer period of time, it is generally easier to shift charging to times when electricity use is lower, and electricity is less expensive. Managed charging can be passive, where EV owners react to price signals, or active, where a utility or third party actively controls an EV's rate of charging remotely. Often, passive managed charging can achieve a substantial reduction in peak electricity loads and customer savings but can sometimes create new spikes in electricity demand (for example, if lower-cost charging begins at 11 p.m., many EV drivers may program their cars to start charging at that time, creating a spike). Active managed charging can generate the greatest savings but can be complex to operationalize and relies on more sophisticated technology and communications between vehicles, chargers, and utilities. Active managed charging can result in a smoother electric load curve and the greatest reduction in electric system costs, which can then be passed on to ratepayers through bill savings. Studies done for NYSERDA have found that managed charging has the potential to reduce the cost of EV charging and the demands on the electric grid by more than 25%, which could result in a reduction of peak demand by gigawatts when EVs are widely adopted.[61] This reduction in peak demand can potentially lead to lower costs for all ratepayers.

[60] Electric Vehicle Myths, U.S. Environmental Protection Agency, https://www.epa.gov/greenvehicles/electric-vehicle-myths, accessed June 2025

[61] Electric Vehicle Managed Charging White Paper, The Cadmus Group, https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/Publications/Research/Transportation/22-09-Electric-Vehicle-Managed-Charging-White-Paper.pdf

The larger challenge for EVs and the electrical grid are higher powered charging stations. This includes high-powered DCFC stations (which provide 150 kW or more) where EVs can charge quickly, as well as fleet depots that may include dozens or even hundreds of slower Level 2 chargers (which provide between 6 kW and 19 kW). Some fleet depots housing larger vehicles may even have large numbers of fast-charging equipment, which could be necessary because of the large batteries used by these vehicles. Fleets often use advanced managed charging systems to level out their electricity demand throughout the day, thereby minimizing demand charges and electricity costs. DCFC stations do not have the same time-of-day flexibility as other EV charging stations because people generally come to charge at these locations because they need to charge quickly and do not want to wait until off-peak hours, but these stations can manage their charging through technologies like on-site battery energy storage systems (BESS), which can charge at off-peak times and reduce electricity demand during peak times.

Some EVs can also export power, either to a building (called vehicle-to-building, V2B power) or to the electric grid itself (called vehicle-to-grid, V2G, power). V2B offers an opportunity for EVs to provide local, mobile backup power in emergencies, essentially acting as clean mobile generators. V2G power is a way to monetize the EV's battery while it is not in use for driving. Studies have found that vehicles could earn hundreds of dollars per year through V2G participation, which can help increase operational savings from EVs.[62] V2G systems may require different interconnection technology than typical EV charging stations. New York utilities are actively pursuing V2G projects, which are expected to become more common in the coming years. The Public Service Commission (PSC) is addressing V2G through the Grid of the Future Proceeding, Case 24-E-0165. A recent report commissioned by NYSERDA and DPS found that EV charging, including both V2G and managed charging, offers the largest source of potential grid flexibility between now and 2040.[63]

3.5.3. Other Alternative Fuels

While liquid and gaseous alternatives to petroleum-based transportation fuels, such as CNG, propane, and biofuels, have been available for decades, none have made major inroads in the New York market. The primary use of biofuels in New York State transportation is ethanol blended with gasoline in a 10 percent blend (E10). Higher blends used for flex-fuel vehicles (E85) were more popular earlier in the 21st century but have generally faded in popularity in the last decade. There are currently about 75 gas stations that sell E85 in New York State, a small increase from the 63 stations that sold E85 in 2020.[64] Aside from the minimal blend of biodiesel in standard diesel (<5%), biodiesel is generally available for purchase from fuel distributors in the state and tends to be used at private fueling facilities for fleet use, but there are few public fueling stations that offer biodiesel for purchase by the general public. Renewable diesel, a drop-in fuel derived from fats and plant-based oils that is chemically identical to petroleum-derived diesel fuel, is becoming more widely available in New York State. It does not require a

[62] Economic Viability of Vehicle-to-Grid (V2G) Reassessed: A Degradation Cost Integrated Life-Cycle Analysis, Zhang, et al., June 2025, https://www.mdpi.com/2071-1050/17/12/5626

[63] New York's Grid Flexibility Potential, the Brattle Group, https://www.brattle.com/insights-events/publications/brattle-experts-conduct-a-study-to-determine-new-yorks-grid-flexibility-potential-in-2030-and-2040/, accessed June 2025

[64] Alternative Fuels Data Center, Alternative Fueling Station Counts by State, U.S. Department of Energy, https://afdc.energy.gov/stations/states, accessed June 2025

separate fueling infrastructure and can be blended freely with petroleum diesel. Large fleets like New York City have made commitments to purchase renewable diesel to power their fleets. Sprague Energy opened the first retail station specifically selling renewable diesel in 2024 and operates terminals for renewable diesel in the Bronx and Albany as of the end of 2024.[65] The price of renewable diesel has become more competitive with diesel, especially in places like California that have policies that support its production, like a Low Carbon Fuel Standard.[66]

CNG and propane have had some success in niche markets within the medium- and heavy-duty vehicle sectors, but, as noted above, remain a very small portion of the overall market. There are about 20 public CNG stations in New York State, with another 20 private stations, and there are approximately 20 stations that provide propane for fueling vehicles. CNG vehicles are available in a number of vocations and weight classes, but most on the road tend to be Class 4-8 straight trucks and tractors. Renewable natural gas (RNG), natural gas captured from landfills, digesters, wastewater treatment facilities, and other similar processes and cleaned to be usable for transportation use has seen increased use and interest. While burning RNG has similar tailpipe emissions to CNG derived from fossil fuel sources, the lifecycle GHG emissions can be much lower.[67] RNG has been a more widely used transportation fuel in places that have implemented low-carbon fuel standards and similar policies but still has a limited reach.

Hydrogen fuel cell vehicles are available in certain market segments, but the vehicles, fuel, and infrastructure remain expensive. Hydrogen fuel cell vehicles (FCEVs) offer the potential for faster refueling, longer ranges, and better performance carrying heavy loads compared to BEVs, and they have zero tailpipe emissions.[68] In New York State, on-road FCEVs were first tested more than two decades ago but were not commercially available for many years. Recently two transit operators, New York City Transit (NYCT) and Rochester's Regional Transit Service (RTS), moved forward with the purchase of FCEV transit buses in 2024. Most other market segments in New York State do not currently have FCEV options available. Fuel cells are already used in some non-road vehicles, especially forklifts. Hydrogen-powered marine vessels are in use in some parts of the world.

One challenge related to hydrogen-powered transportation is the distribution of hydrogen to fueling facilities. Hydrogen can be produced onsite using electrolysis (the process of using electricity to split water molecules into hydrogen and oxygen molecules, which, if powered with carbon-free electricity, can create GHG-free hydrogen) or can be delivered by truck or pipeline. Delivery by truck can be expensive, energy-intensive, and prone to losses, especially if hydrogen is stored under high pressure. Other solutions include storing hydrogen as ammonia and cracking ammonia molecules apart (creating

[65] Small volumes of renewable diesel are now consumed on the U.S. East Coast, U.S. Energy Information Administration, https://www.eia.gov/todayinenergy/detail.php?id=63884, accessed June 2025

[66] California Air Resources Board, *Low Carbon Fuel Standard*, accessed July 8, 2025, https://ww2.arb.ca.gov/our-work/programs/low-carbon-fuel-standard.

[67] Natural Gas Vehicle Emissions, Alternative Fuels Data Center, U.S. Department of Energy, https://afdc.energy.gov/vehicles/natural-gas-emissions, accessed June 2025

[68] *A Tale of Two Vehicles: Exploring BEVs and Hydrogen FCEVs*, Power Magazine, May 29, 2024, https://www.powermag.com/a-tale-of-two-vehicles-exploring-bevs-and-hydrogen-fcevs/

hydrogen and nitrogen molecules), but these solutions can be energy intensive as well and are in the early stages of commercialization.

The State is advancing maritime and ports decarbonization initiatives as well. The maritime and ports sectors in New York State are critical components of the State and national economies where they facilitate commerce, create good jobs, and promote economic growth. Because of the integral nature of the maritime sector and ports in New York, these facilities are at the forefront of climate adaptation and are poised to be near-term actors. To support the energy needs of this sector, DOS is leading a collaborative statewide Maritime and Ports Asset Inventory and Needs Assessment to identify port energy infrastructure and availability, including electrification, decarbonization, and alternative fuels opportunities and needs.[69] The State, more broadly, is evaluating potential decarbonization pathways for maritime facilities, alternative fuel technologies, current fuel delivery and storage mechanisms at ports, and near-term feasibility of certain vessel types making the switch to alternative fuels (e.g., ferries).

For a full review of alternative fuels, see the Low-Carbon Alternative Fuels chapter of this Plan.

4. Outlook (2025 – 2040)

The next fifteen years will be categorized by continued use of New York State's available powers to advance clean transportation options and efficiency in transportation.

ZEV sales in all market categories are expected to grow at an increasing pace, spurred on by regulations, investments, and market demand. The focus for policymakers over the next five years (2025 to 2030) is on improving the economics of ZEVs to achieve relative parity in total cost of ownership (and in some LDV market segments, upfront price parity) with internal combustion vehicles. By 2040, all LDV sales and most MHDV sales are projected to be zero-emission, and ZEVs are expected to have made their way prominently into the used vehicle market as well. Cleaner fuels, like hydrogen, renewable diesel, and sustainable aviation fuel, should be widely available for hard-to-electrify market segments and for vehicles remaining in use that have not yet switched to zero-emission fuels.

New York will continue to work to increase both the supply of and demand for transit, electric micromobility, and active modes of transportation, including a focus on efficient land use. The State's investments are expected to reflect this priority. New York transit operators are expected to regain ridership lost during COVID and aim for further increases in ridership beyond previous levels. This could be achieved through partnerships with employers, economic development organizations, and local municipalities. New York expects to see an increase in services like BRT, shared mobility programs, and bike and pedestrian infrastructure in areas that have traditionally had strong transit service — and many that have not.

[69] New York State Department of State, *Maritime and Ports Asset Inventory and Needs Assessment (24-OPD-7)*, accessed July 8, 2025, https://dos.ny.gov/24-OPD-7.

5. Themes and Recommended Actions: Accessible and Affordable Transportation Choices

5.1. Improve Interaction Between Land Use and Transportation

Compact neighborhoods and location-efficient development make walking, bicycling, or taking public transportation more viable options. The integration of land use and transportation planning is a vital step in enabling this type of development and will lead to less energy-intensive transportation options for communities across the state.

For example, transit-oriented development (TOD) is a land use approach that focuses on development around well-utilized transit routes. Transit-oriented development integrates multiple mobility modes, including walking, biking, micromobility, and various forms of public transit. Its primary goal is to reduce VMT for residents relying on transit who otherwise may need to drive or utilize other methods to reach a primary transit system. Location-efficient development and TOD may seem the most logical in dense, space-constrained communities, but it is also a strategy for suburban or rural towns and villages to develop walkable areas and reduce their residents' reliance on single-occupancy vehicles. Given that location-efficient development is a land use strategy as well as a transportation one, success requires working closely with planning officials as well as transportation leaders. On the transportation side, this is best done by understanding the development opportunities surrounding existing and future transportation hubs, including the impact that additional development may have on ridership. The Smart Growth chapter of this Plan discusses smart growth planning in greater detail.

Recommendations

- New York State should prioritize and coordinate investments in location-efficient areas to enable compact development, where feasible. This includes enhancing interagency coordination to encourage more active transportation and public transportation use as well as locating housing and mixed-use development in location-efficient areas. See the Smart Growth chapter of this Plan for detail.

- New York State should develop resources to support local governments' Smart Growth development. Led by DOS in consultation with other state agencies and authorities, this may include developing a guidebook to help communities navigate State programs and policies, design manual(s) for local governments and developers to advise on incorporating Smart Growth principles into neighborhoods in different contexts (rural, suburban, urban), model Smart Growth local laws, or best practices. See the Smart Growth chapter of this Plan.

5.2. Expand Public Transportation Across New York State

Enhancing public transportation through increased availability, accessibility, reliability, and affordability will expand transportation options and reduce emissions and air pollution. Ways to achieve these goals include transit enhancements, improving connectivity and convenience, and fleet modernization. A practical goal is for transit around the State to rebound to their 2019 pre-COVID ridership levels.

Community-based service enhancements, based on local input, would help tailor upgrades based on the needs and desires of the locales served. This could include increasing transit routes, frequency, and/or

stops and shelters. It should also include partnerships between mobility providers, neighboring communities, and major employers. Policy and program transit development should recognize that shifts in transportation patterns take time: transit enhancements, such as increases in service area and more frequent service, need to be consistent in order to drive ridership in concert with land use evolution, and therefore need to be maintained for the long term based on appropriate planning rather than increasing or decreasing in response to short-term existing ridership.

To encourage ridership, transit needs to be convenient, competitive, and reliable in terms of travel times. This can be achieved by employing real-time technology such as electronic customer information, trip planning and fare payment apps, and bus signal prioritization.

Transit fleets around the state have begun converting to electricity and hydrogen, including in Buffalo, New York City, and the Capital District. Outcomes and lessons learned from the 2025 Zero Emission Transit Transition pilot projects will help inform DOT's planning for the eventual transition of all the transit fleet throughout the State.[70] This near-term action is critical in meeting the State's energy efficiency and climate goals.

5.2.1. Systemwide Route Restructurings and Service Redesign

While transit agencies routinely adjust routes and schedules, comprehensive network redesigns are necessary every 5–10 years to align services with evolving travel patterns. These restructurings reallocate resources to communities with the greatest demand, improving system productivity and reducing energy use by focusing service where it will be most utilized. Though some lower-demand areas may experience service reductions, the net effect is a more efficient and effective system. However, policy should not result in reactive scheduling based on existing ridership and should instead provide consistent routing and sufficient frequency of service to drive ridership by making transit more competitive and convenient—recognizing that developing ridership in conjunction with land use changes is a slow process that relies on developers and riders knowing that their service lines will persist for years to come.

Another useful component of reliable and competitive public transportation is dedicated bus lanes, especially in congested areas, along with BRT infrastructure (e.g., platforms and bus stop bulb-outs): these not only make transit more competitive—they also signal a permanence akin to rail lines, where developers and riders can rely on lines for the long term.

The post-COVID shift toward telework has further underscored the need for system redesigns. Recent or upcoming system redesigns in New York State include Suffolk County Transit (2023), Central New York Regional Transportation Authority (commonly referred to as "Centro") in Rome (2024), and MTA in Queens (Summer 2025). Other transit agencies, such as Westchester County, are in the planning stages for future implementation. These redesigns are most successful when paired with other system improvements such as BRT implementation, microtransit deployment, or new universal access partnerships.

[70] DOT, *Public Transportation Funding Sources*, accessed July 8, 2025, https://www.dot.ny.gov/divisions/policy-and-strategy/public-transportation/funding-sources.

5.2.2. Bus Rapid Transit

In corridors with high transit demand but without the population density or land use characteristics to justify light rail investments, BRT offers a cost-effective alternative. BRT enhances traditional fixed-route bus service by improving speed, reliability, frequency, and passenger amenities through features such as dedicated lanes, signal priority, advanced fare collection, and uniquely branded buses and stations. These improvements increase both ridership and operational efficiency, resulting in greater service productivity. While BRT has been implemented throughout various parts of New York State, there is still opportunity to continue identifying key areas or corridors of high population density where light rail investment may not be justified.

5.2.3. Institutional Partnerships and Universal Access

Institutional partnerships and universal access to public transportation continue to advance throughout the state, as many agencies have already embraced this concept. Between upstate providers such as Centro, CDTA, and the Rochester-Genesee Regional Transportation Authority (RGRTA) as well as the major providers downstate, New York State transit agencies have made a tremendous amount of progress, though opportunities remain. These programs increase ridership without requiring significant service expansion. By filling excess capacity with new riders, transit systems improve efficiency and reduce energy use per passenger trip.

5.2.4. Microtransit

Microtransit is an emerging solution for providing transit in areas where fixed-route service is not viable due to low population density, disconnected land use, or limited pedestrian infrastructure. Microtransit offers flexible, demand-responsive service using smaller vehicles and app-based booking, typically operating without fixed routes or schedules.

Although microtransit is less productive on a per-vehicle basis since each vehicle carries less passengers than a transit vehicle, it can be more energy-efficient than underused fixed routes by offering better coverage and using right-sized vehicles. Microtransit is particularly effective when paired with route restructurings, enabling agencies to concentrate fixed-route service in high-demand corridors while preserving coverage through microtransit.

Current microtransit deployments in New York State include CDTA,[71] Centro,[72] RGRTA,[73] NICE,[74] and Suffolk County Transit.[75] Planning efforts are underway in Buffalo (NFTA), Westchester County, and several rural transit systems.

Support for microtransit development is available through:

[71] CDTA, FLEX, accessed July 8, 2025, https://www.cdta.org/flex.
[72] Centro, *MOVE*, accessed July 8, 2025, https://www.centro.org/rome-move/move.
[73] Regional Transit Service, *RTS On Demand*, accessed July 8, 2025, https://www.myrts.com/on-demand.
[74] Nassau Inter-County Express, *NICE Mini*, accessed July 8, 2025, https://www.nicebus.com/Passenger-Information/NiceLink.
[75] Suffolk County Transit, *Fast, easy, affordable On-Demand rides around Southampton and East Hampton*, accessed July 8, 2025, https://sctbus.org/On-Demand.

- NYSERDA's Clean Mobility Program,[76] which offers technical assistance and implementation funding to projects that improve zero-emission connections to public transportation and showcase innovative shared transportation options through planning and demonstration projects.
- DOT's Innovative Mobility Initiative,[77] which funds technology, vehicles, and operating costs for pilot programs statewide.

5.2.5. Zero-Emission and Low-Emission Transit

To further the role of public transportation in reducing energy use, transit fleets themselves can shift from diesel to low- and zero-emission propulsion systems. These transitions not only reduce fuel consumption but also improve air quality and support broader climate goals.

A variety of State and federal programs offer technical assistance and funding for planning, facility construction, and vehicle procurement for low- and zero-emission transit, including:

- NYSERDA – **Clean Mobility Program**[78] and **Truck Voucher Incentive Program**[79]
- DOT– **Zero Emission Transit Transition (ZETT)** [80] and **National Electric Vehicle Infrastructure (NEVI) Program**[81]
- DEC – **Municipal Zero-emission Vehicle (ZEV) Program**[82]
- OGS – **New York State Clean Fleet Plan**[83]
- Federal Transit Administration – **Low or No Emission Grant Program**[84] and **Bus & Bus Facilities**[85]
- Department of Energy

[76] NYSERDA, *Clean Mobility Program*, accessed July 8, 2025, https://www.nyserda.ny.gov/All-Programs/Clean-Mobility-Program.
[77] DOT, *Public Transportation Funding Sources: Innovative Mobility Initiative*, accessed July 8, 2025, https://www.dot.ny.gov/divisions/policy-and-strategy/public-transportation/funding-sources/InnovativeTransitMobility.
[78] NYSERDA, *Clean Mobility Program*, accessed July 8, 2025, https://www.nyserda.ny.gov/All-Programs/Clean-Mobility-Program.
[79] NYSERDA, Truck Voucher Incentive Program, accessed July 8, 2025, https://www.nyserda.ny.gov/All-Programs/Truck-Voucher-Program.
[80] DOT, *Public Transportation Funding Sources*, accessed July 8, 2025, https://www.dot.ny.gov/divisions/policy-and-strategy/public-transportation/funding-sources.
[81] NYSERDA, *National Electric Vehicle Infrastructure Program*, accessed July 10, 2025, https://www.nyserda.ny.gov/All-Programs/Charging-Station-Programs/National-Electric-Vehicle-Infrastructure-Program.
[82] DEC, *Grants for Climate Action*, accessed July 8, 2025, https://dec.ny.gov/environmental-protection/climate-change/resources-for-local-governments/grants-for-climate-action.
[83] OGS, *New York State Clean Fleet Plan: Summary of Recommendations*, accessed July 8, 2025, https://ogs.ny.gov/system/files/documents/2024/10/nys-clean-fleet-recs-final.pdf.
[84] Federal Transit Administration, *Low or No Emission Grant Program - 5339(c)*, accessed July 8, 2025, https://www.transit.dot.gov/lowno.
[85] Federal Transit Administration, *Grants for Buses and Bus Facilities Program*, accessed July 8, 2025, https://www.transit.dot.gov/bus-program.

- Maritime Administration (MARAD) – **Port Infrastructure Development Program**[86]

New York transit systems currently operate a mix of clean propulsion technologies:

- **Hybrid-electric** – NYC/MTA, Westchester County/Bee-Line, Capital Region/CDTA, Broome County/B.C. Transit, Tompkins County/TCAT
- **Compressed Natural Gas** – primarily in Buffalo/NFTA, Syracuse/Centro, and Nassau County/NICE
- **Propane** – Allegany County
- **Battery-electric** – MTA, Capital Region/CDTA
- **Hydrogen-electric** – Rochester / RGRTA

Recommendations

Transportation agencies across New York State should work together with other agencies to:

- Expand public transportation through transit service enhancements, improving affordability, connectivity and convenience.
- Modernize transit fleets through the broader transition to zero-emission transit buses.
- Introduce BRT where there is high transit demand but without the population density or land-use characteristics to justify light rail investments.
- Support shared mobility services that provide access to affordable, flexible transportation options that connect more people to transit and provide additional options in communities with limited transit.
- Offer microtransit services, which can be more efficient than underused fixed routes by offering wider coverage and using right-sized vehicles.

5.3. Expand Active Transportation and Micromobility

DOT is in the process of developing the ATSP, which will set the state to help facilitate improved opportunities for walking, rolling, and bicycling throughout New York State. The ATSP will aim to improve active transportation networks along state roads for which DOT has jurisdiction. The intent is to use a data driven approach to prioritize linkages based on active transportation trip potential and to provide guidance to expand access to active transportation, including micromobility. DOT recognizes that the state roadways only form a small portion of a communities' transportation network. As such, the ATSP will also provide the tools, templates and guidance for regional and municipal planners to enhance and expand active transportation networks both within and between communities. This includes forming state and local partnerships to fill in network gaps with pedestrian and bicycle infrastructure such as

[86] U.S. Department of Transportation Maritime Division, *Port Infrastructure Development Program*, accessed July 8, 2025, https://www.maritime.dot.gov/PIDPgrants.

paths, on-street bike lanes, traffic calming measures, improved crosswalks, better lighting, and enhanced public transportation stops.

5.3.1. Programs to Assist Municipalities

The state has also created several funding and incentive programs to assist local governments and municipalities in the implementation of active transportation efforts. These include the Climate Smart Communities program and federal programs administered by DOT, such as the Transportation Alternatives Program (TAP) and the Congestion Mitigation Air Quality Improvement (CMAQ) Program.[87]

NYSERDA administers two transportation programs specifically aimed at increasing mobility options, including active transportation. These two programs, the Clean Mobility Program[88] and the Clean Transportation Prize initiative,[89] are described below.

NYSERDA's **Clean Mobility Program** helps communities plan and implement transportation alternatives to reduce reliance on personal vehicles, including programs focused on active transportation. The program, which launched in 2024 and focuses on DACs, helps communities plan and implement zero-emission transportation options such as bike share, bike ownership programs, microtransit, and EV car share.

Similarly, NYSERDA's **Clean Transportation Prize** initiative, which launched in 2022, was designed to ensure that the benefits clean transportation were not felt solely by those with the means to buy personal electric vehicles. The Prize program focuses on electrifying transportation, reducing air pollution, and increasing clean mobility options in disadvantaged communities across New York State. Prize recipients are working on bike share and microtransit projects, as well as launching the MTA's first two hydrogen transit buses, among other projects.

Recommendations

- New York State should enhance active transportation planning to enable more walking and bicycling opportunities.
- New York State should develop municipal guidance resources, such as a template for site plan regulations that localities could adopt that require developers to include active transportation and transit amenities within commercial and residential developments where feasible.

5.4. Expand Transportation System Operational Strategies

As described in the previous section, the state will continue to focus on efforts to improve vehicular transportation efficiency and emission reduction by investing in strategies to improve transportation system operations but also address system resiliency. Throughout New York, many communities are

[87] New York State Department of Environmental Conservation, *Climate Smart Communities Grant Program*, accessed July 8, 2025, https://dec.ny.gov/environmental-protection/climate-change/resources-for-local-governments/grants-for-climate-action; DOT, *2023 Transportation Alternatives Program (TAP), Congestion Mitigation and Air Quality Improvement (CMAQ) Program, and Carbon Reduction Program (CRP)*, accessed July 8, 2025, https://www.dot.ny.gov/TAP-CMAQ.

[88] NYSERDA, *Clean Mobility Program*, accessed July 8, 2025, https://www.nyserda.ny.gov/All-Programs/Clean-Mobility-Program.

[89] NYSERDA, *Clean Transportation in Action*, accessed July 8, 2025, https://www.nyserda.ny.gov/All-Programs/New-York-Clean-Transportation-Prizes-Initiative/Clean-Transportation-in-Action.

often faced with unpredictable and increasingly severe weather-related events. The unique challenges vary across the state; for example, New York City and Long Island see more emergencies related to storm surge and flooding, while communities in Western New York often face lake-effect snowstorms. These events all have potential to impede access to critical services and goods, making emergency management and preparation vital for maintaining community lifelines such as the power grid, fuel networks, and the transportation system. Common practices that can be broadly applied, across the unique contexts and differences in weather-related events, that communities may face include:

- Identify key local agency partners such as planning partners, roadway and maintenance teams, and transportation technology teams.
- Identify employers that provide vital goods and services (e.g., transportation, hospitals, pharmacies, energy & utility providers, human service organizations).
- Create community outreach and engagement plans.
- Support real-time information sharing to community members.
- Ensure first responders can reach and assist people in need.
- Create a vulnerability assessment map.
- Expand investment in regional data sharing.

6. Themes and Recommended Actions: Zero Emissions Vehicles

6.1. Electrification of Light Duty Vehicles

The share of new vehicle sales in New York that are ZEVs will continue to grow over the next decade due to a combination of market forces, consumer preferences, and requirements for automakers to increase their sales of ZEVs. However, the pace and scale of this increase is not a foregone conclusion. New York's policies and activities are two factors which may influence how consumers react to ZEVs and how quickly ZEV market share grows.

6.1.1. EV Charging

Modeling informing the State Energy Plan and other modeling exercises project that the light-duty ZEV market will continue to be almost exclusively electric vehicles, as opposed to hydrogen fuel cell vehicles. A key factor for expanding EV adoption is the expansion of charging infrastructure. While government support is critical to quickly building EV charging stations in the near-term, the goal is to transition to a stage in the market where site owners and charging station developers can realize attractive returns on their investments and charging is a service that is provided by the private market.

EV charging is very context-specific, and different types of charging make more sense in different operating environments. Level 2 charging stations are most appropriate in residential settings and at public or semi-public places where people will be parked for longer durations, such as:

- Long-dwell-time public locations with a high likelihood of longer distance traveler use, such as tourist attractions (e.g., parks, theaters, stadiums, museums).
- Public charging stations likely to be used by local residents without access to home charging.
- Workplace locations, especially those serving employees with a lower likelihood of home charging access.
- Multi-unit dwellings serving residential parking needs.

Access to home charging is one of the biggest indicators of whether a person considers purchasing an EV.[90] Installing Level 2 charging at places like multifamily buildings and workplaces can help provide options for people without home charging access. This is particularly important in New York, which has a higher percentage of housing considered to be multifamily buildings (52.7%) than any other state, by a wide margin.[91]

DCFC stations make the most sense at public locations along travel corridors and at locations within communities that can serve high-mileage drivers and residents without easy access to reliable Level 2 charging. Public and semi-public charging in DACs can be especially important. A focus on DCFC and Level 2 stations at multifamily buildings in DACs will help expand opportunities for DAC residents to purchase or lease EVs.

Fleets also require charging stations, often at their depots. Fleets may also rely on public or semi-public or shared charging hubs to charge their fleets, especially if there are space or power constraints at their depots or if they typically do not return to depots every day or travel longer routes than the range of their batteries.

Key barriers to sustainable economics of EV charging that have not yet been resolved include consistent local permitting practices across the State (which can add costs and slow the process for building new charging stations) and ongoing uptime and maintenance issues.

Managing the electrical load from both public and private charging stations helps minimize the overall cost of charging and the costs associated with charging station installations. At the PSC's direction, New York's investor-owned utilities have introduced programs to incentivize residential customers to reduce their electricity use at peak hours (see Case 18-E-0138). Similar programs also encourage commercial EV charging station owners to reduce electricity use at peak hours (see Case 22-E-0236). Participation in these programs has been mixed, and the State's electric ratepayers would benefit from greater uptake of these programs and related vehicle-grid interactive technologies that reduce electric grid impacts and turn EVs into grid assets.

Charging equipment should be appropriate for the context of its use and New York State entities funding charging equipment should aim for consistency in technical requirements across funding programs, to

[90] *The State of Electric Vehicle Charging for Multifamily Housing*, Energy Innovation, October 2024, https://energyinnovation.org/wp-content/uploads/The-State-of-Electric-Vehicle-Charging-for-Multifamily-Housing.pdf

[91] *U.S. Cities Building the Most Multi-Family Housing*, Construction Coverage, https://constructioncoverage.com/research/cities-building-the-most-multi-family-housing, accessed June 2025

ensure easy cross-program participation and enable a consistent customer experience at charging stations across the state. Public charging stations that may require payment for electricity provided should be able to meet accuracy and measurement standards so the validity of the public sale of energy can be verified and accountable. The National Institute of Standards (NIST) Electrical Vehicle Supply Equipment Program (EVSE) establishes key standards for equipment testing.[92]

Recommendations

- New York State agencies should prioritize funding for charging station locations with the highest impact on EV adoption and that will be the most likely to be financially self-sufficient in the future. Consistent with this approach, agencies should continue offering mechanisms for funding support, such as targeted funding programs for specific types of charging installations, utility make-ready programs, and EV-supportive electricity tariffs, while monitoring station economics to determine appropriate funding levels and program efficacy.
- The State should continue to focus on building out DCFC infrastructure along major travel corridors. Continuing support for public and semi-public Level 2 charging that supports New Yorkers who don't live in single-family homes will also greatly increase the number of people who ultimately buy EVs.
- State agencies should coordinate programs to develop consistent technical standards across programs and, wherever possible, similar application processes to increase ease of access for users. Funding programs should prioritize transparency and require charging station operators to provide uptime and availability information to the funding agencies and the public.
- New York should increase workforce development to train more EV installers and technicians to keep pace with the rapid expansion of new and existing EV charging infrastructure.
- NYSERDA should expand efforts to encourage local governments to adopt best-practice policies around permitting of EV charging stations.
- NYSERDA should work with the EV charging industry to provide better information about the benefits of installing charging stations at commercial sites, in terms of increased revenue, tenant and employee attraction/retention, and other measurable data points.
- The PSC and utilities should continue to refine load management and managed charging programs to increase participation and efficacy and should seek to remove barriers to V2G charging to expand opportunities for flexible EV load.

6.1.2. EV Incentives

As of 2025, EVs are approaching price parity with internal combustion engine (ICE) vehicles; in some market segments EVs are already cost-competitive with ICE vehicles, especially when considering total cost of ownership (TCO).[93] However, there are still many consumers who are reluctant to buy EVs, and

[92] https://www.nist.gov/programs-projects/electric-vehicle-supply-equipment-evse-program-standards-services-and-training
[93] *EVs May Get Cheaper Than Gas Cars As Early As Next Year. Here's Why*, InsideEVs, August 6, 2024, https://insideevs.com/news/729153/ev-price-parity-ice-2025-2026/

purchase incentives can offer an additional reason to move forward with an EV purchase. Given potential shifts in federal policy, New York's Drive Clean Rebate may take on more significance as New York tries to aggressively ramp up EV sales over the next decade. Expanding consumer choice and the availability of EVs for New York's car buyers will also help increase sales, and New York should take steps to make EVs as easily available as possible.

Many low- and moderate-income (LMI) car buyers do not typically buy new vehicles.[94] Ensuring that lower income New Yorkers can participate in a clean transportation economy means both ensuring access to clean public transportation and other mobility options and enabling opportunities for them to purchase clean personal vehicles if needed. Higher incentives for LMI EV buyers and incentives for the purchase of used EVs by LMI buyers can help bridge the gap to expand EV adoption among this demographic.

Other types of vehicles could also benefit from incentives and contribute to meeting New York's climate and affordability goals. Electric-assist bicycles have grown dramatically in popularity since they were legalized in New York State in 2020.[95] They offer a more affordable alternative electric transportation option for many New Yorkers but remain significantly more expensive than traditional bikes. Introducing incentives for e-bikes, especially if targeted at LMI buyers, could introduce clean transportation to a wider swath of the population.

Recommendations

- New York State should continue to fund the Drive Clean Rebate and look for opportunities to increase its impact through higher, targeted incentives.
- New York State should consider adding incentives for LMI EV buyers of new and used EVs.
- New York State should continue to support state fleets in incorporating light duty ZEVs into their fleets in accordance with Executive Order 22.[96]
- New York State should identify opportunities to animate the market for e-bikes, especially for LMI buyers and delivery workers, through public-private partnerships and targeted funding.

6.2. Electrification of Medium/Heavy Duty Vehicles and Non-road Vehicles

MHDVs and non-road vehicles are major energy users within the transportation sector and substantial contributors to the sector's GHG and local criteria pollutant emissions. Both industry segments have opportunities to electrify and move to ZEVs but are still in the early stages. MHDVs are a priority for New York State to electrify, with particular attention on electrifying school buses.

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[94] *Cox Automotive's Car Buyer Journey Study Shows Satisfaction With Car Buying Improved in 2023 After Two Years of Declines*, Cox Automotive, January 17, 2024 https://www.coxautoinc.com/market-insights/2023-car-buyer-journey-study/

[95] *U.S. E-bike Market Size, Share & Trends Analysis Report By Propulsion Type, By Drive Type, By Application, By Battery, By End-use (Personal, Commercial), And Segment Forecasts, 2023 – 2030*, Grand View Research https://www.grandviewresearch.com/industry-analysis/us-e-bike-market-report, accessed June 2025

[96] New York State Governor Kathy Hochul, *Executive Order 22, Leading by Example: Directing State Agencies to Adopt a Sustainability and Decarbonization Program*, accessed July 8, 2025, https://www.governor.ny.gov/executive-order/no-22-leading-example-directing-state-agencies-adopt-sustainability-and.

ZEV deployment in the MHDV sector has lagged behind the LDV sector, but progress is starting to accelerate. Notably, the market for electric school and transit buses are nearing maturity as multiple manufacturers have ZEV models available, including the leading manufacturers in the market segments, and many of these vehicles have been deployed. Other MHDV market segments are also ramping up offerings from both established OEMs and new vehicle startups, in introducing new vehicles. Several companies have introduced or announced ZEV versions of class 3 vans, class 6 box and work trucks, class 7 tractors, and light-duty delivery vans.

6.2.1. MHDV Charging

MHD ZEVs face similar but different charging challenges than LDVs. Different vehicle classes, vocations, and use cases will require very different charging arrangements. MHDVs that return to depots each night and do not exceed their charging range on a daily basis will likely be able to charge at relatively slow speeds overnight or between trips. MHDVs that do not regularly return to the same place or that usually exceed their electric range on a daily basis will rely more on en-route charging. Public charging serving MHDVs will likely follow different business models than charging for LDVs; public charging for MHDVs is more likely to follow a shared model where fleets may reserve a percentage of charging time, rather than the “first-come, first-served” model that public LDV charging typically uses. Charging speeds are also expected to be much higher for public/shared MHDV charging (at least 350 kW, with 1 MW and up likely). These high-powered charging installations, and even depot charging installations (which could consist of hundreds of medium-powered chargers between 25 and 150 kW), will likely require substantial utility upgrades and expensive equipment. There is a strong societal benefit to these installations, as diesel MHDVs are major contributors to poor air quality and the associated negative health impacts.

Identifying the appropriate charging power and approach is critical to making MHD EVs work in fleets while reducing the cost of installations. NYSERDA and the electric utilities have been working with fleets, especially school bus fleets, to help develop fleet electrification plans that analyze routes, depots, and available vehicles, and develop a phased approach for integrating EVs into the fleets. This type of approach would be helpful for a wide range of fleets in New York to ensure that they are making appropriate investments and pursuing a viable, well-considered strategy to electrification.

In 2023, the PSC announced proceeding 23-E-0070, Proceeding on Motion of the Commission to Address Barriers to Medium- and Heavy-Duty Electric Vehicle Charging Infrastructure. This proceeding builds on the Medium- and Heavy-Duty pilot program (part of Case 18-E-0138) and aims to address EV charging needs for medium- and heavy-duty vehicles and remove market barriers. As of 2025, this proceeding is still ongoing. Stakeholder comments and preliminary research shows that the capacity needed to charge these vehicles will be significant and likely not follow the same duty cycles as LDVs.

The proceeding is accompanied by the Proactive Planning Proceeding that is designed to proactively examine load patterns from both transportation and buildings and grid needs at the distribution level. The findings will allow the utilities to deploy distribution-level upgrades ahead of need, thereby reducing

costs, avoiding over- or under-building and modernizing our electric system.[97] These proactive utility investments will support the buildout of EV infrastructure in locations where the State and utilities anticipate necessary grid upgrades.

Recommendations

- The PSC should continue its ongoing MHD Make Ready proceeding and development of its proactive investment strategy for utility upgrades supporting EV infrastructure.
- NYSERDA and DPS should further investigate shared public site business models for MHD charging and work to remove any barriers to enabling the construction and possibly make-ready financial support for these types of sites.
- New York State (led by NYSERDA, DOT, and the New York State Thruway Authority) should identify and fund opportunities for installing MHD EV charging stations at public truck parking locations.
- New York State should make available additional funding (as feasible) to support EV charging installations supporting public fleets like school buses, transit buses, and state and municipal fleet trucks.
- New York should expand the availability of funding (as feasible) to support fleet electrification plans for more types of fleets.
- New York should develop roadmaps for the electrification of target market segments and work with industries to identify near-term and longer-term actions that will help electrify those market segments.

6.2.2. MHD EV Incentives

The upfront cost of MHD EVs remains significantly higher than that of diesel equivalents. The TCO of these vehicles is closer, but many fleets cannot currently justify the investment in EVs based on the high upfront costs. NYSERDA's New York Truck Voucher Incentive Program and School Bus Incentive Program have helped bring down the upfront cost, but both are limited in scope and eligibility. New York should aim to achieve successes in sub-markets where the switch to EVs is most viable, such as local delivery vehicles and school buses, and expand focus to additional fleets as the technology and economics become more favorable in those areas.

Financing and leasing for MHD EVs has also been a barrier to market entry. Especially in the early days of the MHD EV market, little is known about the residual value of the vehicles, which is a requirement for financial institutions to lend money or lease the vehicles. Reducing the risk associated with getting the residual value wrong can help increase lending around MHD EVs, and gathering and disseminating market data around residual values will help accelerate market participation by lenders.

[97] Case 24-E-0364, In the Matter of Proactive Planning for Upgraded Electric Grid Infrastructure; https://documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?MatterSeq=73733

Recommendations

- New York State should expand funding for MHD EV incentives and increase opportunities for participation in existing programs through enhanced eligibility. Funding should focus on priority market segments where zero-emission solutions are commercially available and phase in additional market segments as they become commercially available.
- New York State should continue to support state fleets in incorporating MHD ZEVs into their fleets in accordance with Executive Order 22.
- NYSERDA should pilot approaches for reducing MHD EV residual value risk in the financial sector through partnerships with the private sector.
- NYSERDA, DEC, NYPA, DPS, and other agencies involved with funding MHD EVs, and EV charging should collect and analyze data associated with these vehicles to provide better information about vehicle performance and economics to the market.

6.3. Electric School Buses

New York has taken a nation-leading approach to electrifying its school bus fleet, with requirements that all new school buses purchased after July 1, 2027, be zero-emission, and all school buses in operation as of July 1, 2035, must be zero-emission. While many of the recommendations described above related to MHD electrification are also relevant to school bus electrification, some additional recommendations relevant specifically to school buses are warranted.

Recommendations

- New York State should work with school districts to complete individualized fleet electrification plans for every school district by the end of 2028. These plans will guide schools in their phase-in of electric school buses (ESBs).
- New York State should set further guidance for schools by providing interim targets between the start of ESB purchases and the completion of fleet electrification. This could also include additional flexibility based on how the fleets incorporate other opportunities to lower emissions, such as using low-carbon biofuels.
- New York State should continue to develop resources to assist fleets in their electrification process, including updates to NYSERDA's Electric School Bus Roadmap and Guidebooks, improved range estimates and total cost of ownership estimates, and explanations of how to work with utilities to reduce electrification costs.
- New York State should ensure that schools are able to purchase electric school buses at prices that reflect the current status of battery prices and manufacturing costs, and that the state contract for electric school buses adequately reflects these prices.

6.4. Non-road Vehicles

Non-road engines and equipment sometimes overlap with on-road MHDVs but have many specific use cases that are unique and pose specific problems to transition to electric or hydrogen power. These applications are particularly challenging to electrify given the high cost of equipment, relatively low turnover, and, frequently, grid-constrained locations.

In the non-road sector, several zero-emission applications have reached early market entry phases, including yard hostlers, yard equipment, transportation refrigeration units, port and airport ground support equipment, automated guided vehicles, harbor craft vessels, and railcar movers.[98] Although the non-road sector is less mature than LDV segments and some MHDV segments, major non-road OEMs and new vehicle startups have started to introduce zero-emissions and hybrid options. Some agricultural equipment manufacturers with electric production or prototype models include Solectrac, Monarch, and John Deere. Some construction OEMs with electric models and prototypes include Caterpillar, Volvo, Komatsu, and Hyundai.

Non-road applications have specific safety and operational considerations, including those that operate in industries such as aviation, ports, and construction.[99] At this time, New York State is beginning to support demonstrations through NYSERDA's clean mobility and Vehicle-Grid Integration (VGI) funding opportunities. To continue this shift to zero-emission options, New York State should continue seeding the market for demonstrations and pilot programs, knowing that many of these areas will require more bespoke solutions to move away from fossil fuel sources. The State expects many of these sectors to move towards hydrogen as a fuel source, which will change the industry's energy landscape.[100]

Another challenge for this market is the rural nature of many of their uses, particularly for farming equipment and long-distance heavy-duty trucking. Rural areas are uniquely grid constrained, which creates opportunities to innovate including battery storage, vehicle-to-grid integration, and portable energy generation such as solar panels. This area requires further investment to be able to fully estimate its energy burden for electrification and other zero-emission operations.

Recommendations

- New York State should consider expanding its Make Ready efforts to incorporate non-road vehicle needs, including hydrogen fueling.
- New York State should undertake further demonstrations and market and fleet studies for non-road market segments, which will help expand understanding of the decarbonization opportunities in these hard-to-electrify sectors. This includes farm vehicles that face challenges including high equipment cost, relatively low turnover, and often grid-constrained locations.

[98] California Air Resources Board. "Proposed Fiscal Year 2022-23 Funding Plan for Clean Transportation Incentives, Appendix D." https://ww2.arb.ca.gov/sites/default/files/2022-10/fy2022_23_funding_plan_appendix_d.pdf
[99] New York State Climate Action Council Scoping Plan, 2022
[100] New York State Climate Action Council Scoping Plan, 2022

6.5. Other Alternative Fuels

There is a need for further demonstrations of in-service hydrogen fuel cell vehicles and fueling infrastructure. These technologies have been used in small numbers, but for them to be more widely adopted it will be important to gather more in-service data and share lessons learned and best practices. Depending on how the market evolves, broader investments in hydrogen fueling infrastructure may be warranted. New York State should continue working with local authorities, such as municipal fire marshals, to demonstrate the safety of hydrogen fuel cell vehicles and identify safe options for operating these vehicles in tunnels and on bridges.

New York State should also continue to encourage demonstration-scale and larger rollouts of advanced biofuels, including sustainable aviation fuel (SAF) and renewable diesel. Published test results of the performance of these fuels can help encourage more end users to integrate these fuels into their operations. Market-based policies that encourage the use of these fuels could lead to the voluntary introduction of substantial quantities of these fuels into the market in NYS. State leading-by-example policies and procurements could also pave the way to broader use.

6.6. Alternative Fuel Research

Over the coming years, New York can help bring new technologies to market that support the needs of the evolving markets for EVs and other clean-fueled vehicles, non-road equipment, and vessels. Many of the technologies necessary to improve the performance and minimize the costs associated with these vehicles have not yet been commercialized. NYSERDA has historically funded these types of R&D projects and will continue to do so. Some of the key topics for NYSERDA future product development and demonstration may include:

- Further investigation into effective managed charging and technologies that support vehicle-grid interaction is important to maximize the ratepayer benefits of transportation electrification and minimize the cost of installing charging equipment to power the State's EVs.
- Continued support for the development of technology improvements that improve battery fire safety and mitigate risks associated with e-bike batteries and other lithium-ion batteries used in transportation.
- Additional research to bring down the cost of hydrogen fueling infrastructure and the generation or transportation of hydrogen for use as a transportation fuel is needed to improve the economics of hydrogen fuel cells.
- Additional research in port and vessel decarbonization and feasibility of zero emission vessels or alternative fuels.
- Additional research and pilot projects for zero emission locomotives.
- Additional research and pilot projects for zero emission non-road applications, especially for large emitters operating in populated areas such as construction equipment, marine port equipment, and intermodal facilities.

7. Themes Recommended Actions: Sustainable Transportation Construction Considerations

7.1. Reducing the Use of GHG-intensive Materials in Constructing Transportation Systems

Embodied emissions are GHGs emitted during a material's life cycle, created by activities like mining, raw material harvesting, processing, manufacturing, transporting, installing and using products and materials, and end-of-life emissions associated with the disposal of those materials. Increasing demand for low-emission construction materials will spur manufacturers to reduce the impacts of their processes and products, making cleaner alternatives more available. New York State recognizes the opportunity to accelerate the growth of this demand via public procurement directives, given that nearly 50% of all cement and 20% of all steel that is purchased in the United States is paid for with tax dollars.[101]

Embodied emissions are estimated using life cycle analyses (LCA) and expressed as GHG emissions intensity (kilograms CO_2-equivalent [kg CO_2e]) per physical units of a product used (e.g., ton, cubic foot). Environmental Product Declarations (EPDs) are the most common way of quantifying and reporting the environmental impacts of a product, frequently compared to the "nutrition label" of a construction product. To date, EPDs have been a voluntary reporting tool, so most products with EPDs tend to have lower environmental impact, since higher polluting facilities have no incentive to produce an EPD. As New York and other jurisdictions start to rely on EPDs as a regulatory reporting tool, it is important to standardize assumptions so all products are evaluated evenly. Product stage EPDs quantify the embodied emissions associated with raw material extraction through production of a given product (stages A1 to A3), also known as "cradle-to-gate" (see Figure 7 below).

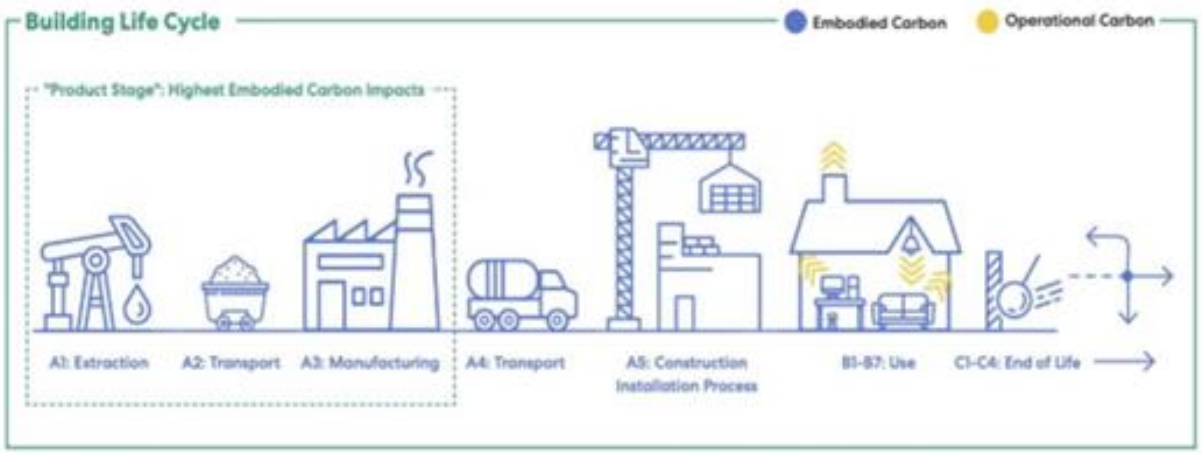

Figure 7: What is Included in Embodied Carbon Calculations

When new buildings and infrastructure projects are constructed and renovated, clear and cost-effective opportunities exist for reducing embodied emissions associated with construction materials. Selecting and procuring lower-embodied emissions materials is possible if transparency exists around the embodied emissions associated materials or product, to allow for comparison of similar products or of entire construction options. In addition, reuse of existing infrastructure and materials where practical,

[101] New York State Climate Action Council Scoping Plan, 2022

rather than demolishing and constructing again, can generate large emissions savings. The reuse of existing structures and materials can save significant amounts of new GHG from being emitted.

While all construction materials have embodied emissions, the highest impact materials are those that have a high greenhouse gas footprint, are used in significant quantities, and where substantially lower-intensity product alternatives exist.

7.1.1. Initiatives Underway

As part of New York State's commitment to lead by example under Executive Order 22, State projects are accounting for embodied emissions in procurements associated with capital projects and reporting on data to increase transparency and provide data to inform future decisions. As of January 1, 2025, State projects that meet minimum size thresholds have begun collecting product stage EPDs from awarded contractors for 'covered materials' including asphalt mixtures, concrete mixtures, steel, and glass.[102]

Acceptable EPDs under Executive Order 22 are third-party verified (also known as "type III") and are product-, facility-, or supply chain-specific (rather than industry average EPDs), which allow for more transparent quantification of a product's environmental impact. Through the collection of EPDs, the State will: drive the demand for and creation of EPDs in the market; create a market for low embodied carbon construction materials; and start to benchmark New York State's performance on the environmental impact of its construction materials—with a view to setting limits in the future.

Increasing demand for low-emission building materials through public procurements will support local manufacturing facilities producing these products, create a long-term market signal for the demand of these products, and increase the availability of low-emission alternatives for private sector projects as well. Specific methods of reducing the emissions-intensity of a given building material vary by subsector (such as cement, glass, and steel).

Buy Clean Concrete Guidelines

In December 2021, Governor Hochul signed into law Chapter 724 of the Laws of 2021, relating to provisions in state procurement contracts involving the use of low embodied carbon concrete. The law adds a new section 136-d ("SFL § 136-d") to the State Finance Law which requires the Office of General Services ("OGS") to establish guidelines requiring the procurement of low embodied carbon concrete on appropriate projects. Effective in 2022, the law applies to State procurement contracts involving the use of low embodied carbon concrete, on State agency projects deemed appropriate by OGS, as defined in the guidelines. From 2025 onward, State agency contracts shall include the minimum standards for low embodied carbon concrete in all relevant authorized contracts.[103]

State Finance Law § 136-d applies to any State agency contract equal to or greater than $1 million and includes use of at least 50 cubic yards of concrete for building projects. For transportation projects, this

[102] New York State Office of General Services (OGS), *Executive Order 22: Carbon Guidance*, accessed July 8, 2025, https://ogs.ny.gov/executive-order-22-embodied-carbon-guidance.
[103] OGS, *NYS Buy Clean Concrete Guidelines*, accessed July 8, 2025, https://ogs.ny.gov/nys-buy-clean-concrete-guidelines-0.

applies to contracts equal to or greater than $3 million that include a concrete pay item with an estimated quantity of at least 200 cubic yards.

The Law is intended to increase the use and innovation of low-carbon concrete in state procurement projects. The corresponding Buy Clean Concrete Guidelines, which cover concrete mixes only, were developed in 2023 with input from a diverse group of stakeholders in concrete and government procurement. The guidance applies to State Agencies and is focused on EPD requirements and global warming potential (GWP) thresholds for concrete. As of January 1, 2025, contracts for relevant State agency projects will require concrete mixes procured to certify a GWP lower than the established limit in the relevant compressive strength category (Table 2), in the form of an EPD, and additional certifications as required by each agency.

Table 2: Maximum Global Warming Potential Limits for Low Embodied Carbon Concrete (relevant for Phase 1 and Phase 2)

Specified compressive strength (f'c in PSI)	Maximum Global Warming Potential Limits for Low Embodied Carbon Concrete (kilograms of carbon dioxide equivalent per cubic yard - CO_2e kg/y^3)
0 - 2500	275
2501 - 3000	302
3001 - 4000	360
4001 - 5000	434
5001 - 6000	458
6001 - 8000	541

Notes:

- These limits reflect 150% of the Eastern Region average GWP figures from the National Ready Mix Concrete Associations' "A Cradle-to-Gate Life Cycle Assessment of Ready-Mixed Concrete Manufactured by NRMCA Members – Version 3.2 "(Jul 2022), page 62-66
- In 2027, pending availability of sufficient data for analysis, New York State will revise (lower) the concrete GWP limits in the table shown above.

Lower Embodied Carbon Material Use in the Transportation Sector

As of May 1, 2024, the New York State Department of Transportation implemented Performance Engineered Mixture (PEM) Concrete requirements.[104] These specification changes are part of the Department's effort to improve the performance of concrete and meet the targets of the Climate Leadership and Community Protection Act, Buy Clean Concrete guidelines, and Executive Order 22. The use of PEM for concrete and the associated optimized concrete mixture design approach can reduce environmental impacts by decreasing the amount of cement required while achieving improved performance characteristics.

Pilot Project Observations

DOT's observations from 10 pilot projects comparing PEM Concrete vs Class HP Concrete revealed that the use of 8,800 cubic yards of PEM Concrete resulted in:

[104] New York State Department of Transportation. "Revisions to the Standard Specifications for Portland Cement Concrete (PCC) Production and Placement," Issued December 27, 2023, https://www.dot.ny.gov/portal/pls/portal/MEXIS_APP.EI_EB_DOC_DETAILS.show?p_arg_names=doc_id&p_arg_values=14917.

- Increased strength from a Design Strength of 3,000 PSI to 4,000 PSI.
- Less observed cracking due to shrinkage during the drying and hardening process.
- 662,000 less pounds of cement used.
- 595,800 less pounds of CO_2 emitted, based on a typically used conversion of 0.9 lbs of CO2 per pound of cement produced.

PEM Concrete also is expected to have a longer life, require less maintenance, and reduce CO_2. DOT's efforts continue through ongoing research to evaluate construction materials and products that meet performance criteria and have "substantially lower[1]" levels of embodied GHG emissions associated with all relevant stages of production, use, and disposal as compared to the estimated industry averages of similar materials or products.

Recommendations for Additional Action

- Collect better lifecycle embodied emissions data for covered materials to identify the best opportunities for achieving material performance and emission reductions.
- Update material specifications in a manner that supports construction performance and drives scale and progress toward lowering embodied carbon emissions in high volume construction materials to achieve New York's 2050 climate goals.
- Evaluate opportunities to further State procurement processes for large projects to evaluate whole-building or whole-project emissions that account for the trade-offs between material intensity, lifespan, maintenance, and energy use.
- Coordinate with other States and jurisdictions on standardized reporting requirements and methods used in EPDs.
- Support market development of technologies and the development of New York industries producing affordable, low-emission materials.
- Investigate market-based opportunities to encourage the development of EPDs and the procurement of low-emitting products in private-sector construction.