



Building Clean Energy in NY:

The Case for Electric Vehicle Deployment Policies

May 2021

Building Clean Energy in New York is a series of Issue Briefs published by the Alliance for Clean Energy New York. Each Issue Brief aims to provide an in-depth look at a topic critical to the achievement of New York's legislative mandate to reduce greenhouse gas emissions 40% by 2030 and 85% by 2050.

Table of Contents

I. Executive Summary.....	1
II. Background and Scope of the Issue	3
III. Electric Vehicles: The Future of New York’s Transportation Sector	6
IV. New York EV Incentive Landscape	9
V. Barriers to Electric Vehicle Deployment in New York.....	11
Barrier 1: High Upfront Costs.....	12
Barrier 2: Lack of Consumer Awareness.....	13
Barrier 3: Accessibility Issues.....	13
Barrier 4: Limited Charging Infrastructure	14
Barrier 5: Rate Design and Charging Station Operating Costs.....	14
VI. Recommendations for EV Deployment.....	15
VII. Conclusion.....	22
VIII. Appendices.....	23
Appendix 1: Some Electric Vehicle Basics	23
Appendix 2: Market Drivers for Electric Vehicles	24
Appendix 3: Summary of Current New York State Programs	27

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I. Executive Summary

This Issue Brief puts forth policies that New York should enact, both legislative and administrative, to overcome specific barriers to the growth and deployment of electric vehicles in our state.

To achieve the ambitious goals set in the Climate Leadership and Community Protection Act (CLCPA), New York State needs to take decisive and bold action. This is especially true in the transportation sector, where there has been decidedly less focus on decarbonization as compared to the electric sector, where strong policy progress has been made in recent years.

The transportation sector is the largest source of greenhouse gas emissions, accounting for nearly one-third of statewide emissions. It is also a significant source of harmful air pollutants. Therefore, transportation electrification is a critical pathway to achieve the goals under the state's climate law and to secure a clean, equitable transportation future for New York.

Electric vehicles (EVs) produce zero-tailpipe emissions. They are cheaper to maintain. It is also possible that as more car chargers are installed, electricity delivery rates could drop for all consumers. Technological advances are rapidly reducing the cost of electric cars, and more and more electric vehicles types are becoming available to consumers. Still, despite these market drivers, and programs such as ChargeNY and EVolve NY, other states like Massachusetts and Oregon are outpacing New York in the transition to transportation electrification. Key barriers to continued EV market development include:

- High relative upfront costs for electric vehicles;
- Lack of consumer awareness of electric vehicle options;
- Limited charging infrastructure, or consumer anxiety about charging infrastructure; and
- Electricity rate design that serves as a barrier to installation of fast chargers.

Over time some of these barriers are eroding. However, a rapid increase in sales must occur over the next 20 years in order for the state to reach the CLCPA mandates. Therefore, New York must act quickly to implement specific policies and strategies to address market barriers. This Issue Brief outlines recommended actions that will stimulate the EV industry and meet the state's climate goals:

- 1) **Commit to the Transportation and Climate Initiative (TCI)** with other states to provide a comprehensive cap on transportation pollution and create a revenue stream to invest in equitable transportation solutions.
- 2) **Implement Legislative Proposals to Overcome Barriers:**
 - a) **Create a Clean Fuels Standard for New York** that requires fuel providers to meet a carbon intensity standard either directly or by supporting transportation electrification or alternative fuels.
 - b) **Target school buses for electrification** by providing additional State Aid to public schools for the purchase or leasing for schools, with additional support in high need districts; allow for 10-year

lease contracts, waive sales tax for electric school buses purchased by private contractors to be leased to public schools; and allow transportation State Aid to be used for charging infrastructure and electricity, as it is allowed for diesel fuel.

- c) **Develop rate design solutions** for EV fast charging with a special focus on specific sectors, including fleets, workplaces, and multi-unit dwellings. This issue is the subject of legislation (A.3876/S.3929) passed by both houses of the New York State Legislature in the 2021 session.
- d) **Allow direct sales of electric vehicles at new retail stores** to scale up the number of EV retailers in the State and make EVs more accessible to New Yorkers. This measure would remove the current State cap that limits the number of EV manufacturers without a franchised dealership network who can open their own direct-to-consumer retail locations in the state.
- e) **Adopt California's zero-emission mandates** for all in-state sales of new passenger cars and trucks to be zero emissions by 2035 and for 100% of medium- and heavy-duty vehicles to be zero-emission vehicles by 2045. Legislation which would direct that New York rules be consistent with California's zero-emissions sales requirements passed both houses of the New York State Legislature in April 2021 (A.4302/S.2758).

3) **Modify and Expand Existing State Programs to Overcome Barriers:**

- a) **Implement and Expand the EV Make-Ready Program** to rapidly deploy publicly available charging stations statewide and increase demand for EVs, with particular attention to all types of fleets and installation in areas that are most convenient for customers. The Public Service Commission should move beyond the foundation of make-ready by offering rebates for charging hardware and software, and proceed quickly towards managed charging, among other initiatives.
- b) **Increase Funding for EV Incentive Programs** for all classes of vehicles, including privately-owned passenger vehicles, and light-, medium-, and heavy-duty fleet vehicles. More sustained funding for incentives are necessary to increase EV sales in the near-term and achieve the goals of the CLCPA.
- c) **Pursue 100% Public EV Fleets** to reduce emissions as well as demonstrate the technology to the public. Municipalities should have access to low-cost State contracts so that local governments can also transition their fleets.
- d) **Establish EV-Ready Building Codes and Permitting** to expedite the installation of EV charging infrastructure, especially at multi-unit dwellings and commercial buildings at scale, making it convenient for New Yorkers to fully maximize use of their EVs.
- e) **Incentivize Electric Vehicles at Ports** to significantly improve local air quality near ports and reduce negative health impacts for adjacent environmental justice communities who are unduly burdened by diesel emissions from these port facilities and operations.
- f) **Boost Public Education and Outreach Efforts** on transportation electrification to increase familiarity with EVs and utilization of existing incentive programs, and thereby accelerate EV adoption in the State, especially in the near-term while awareness is low.

II. Background and Scope of the Issue

In 2019, New York enacted a landmark law, the Climate Leadership and Community Protection Act (CLCPA)¹, establishing some of the most ambitious goals to tackle climate change in the nation. The CLCPA mandates New York State to reduce economy-wide greenhouse gas (GHG) emissions by 40% below 1990 levels by 2030 and 85% by 2050. The law also requires renewable energy to account for 70% of electricity by 2030 and 100% zero emissions electricity by 2040. While New York has made concrete steps towards reducing emissions from the electricity generation sector aligned with meeting these renewable energy targets, similar measures have not been taken to address the transportation sector. Transportation is the largest source of greenhouse gas emissions, contributing 29% of total emissions in New York State (Figure 1).²

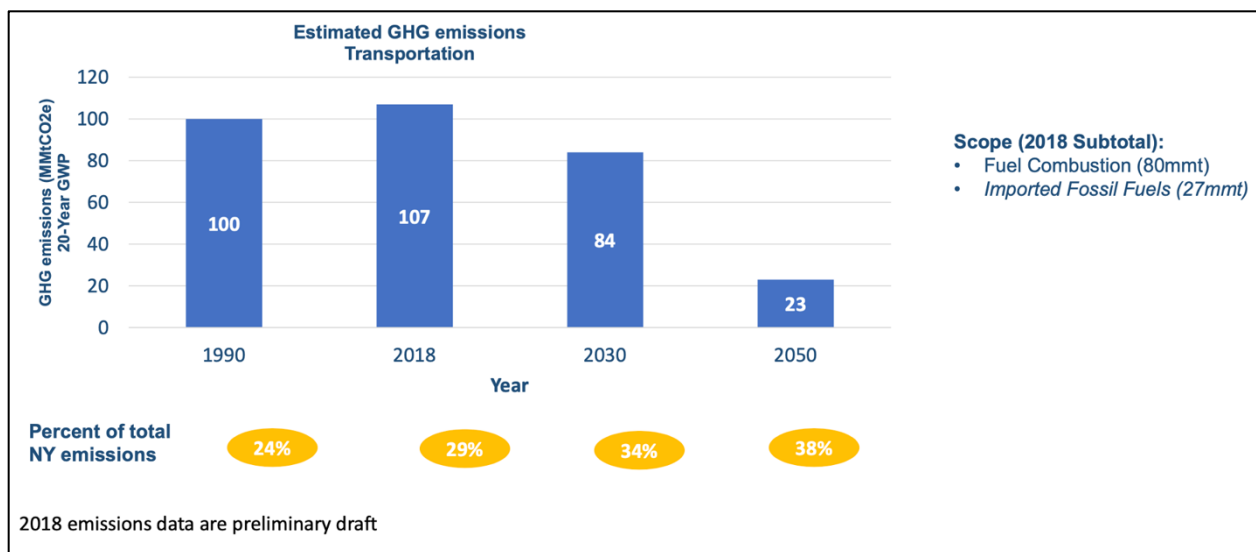


Figure 1 Greenhouse Gas Emissions from the Transportation Sector in New York. Source: Transportation Advisory Panel

Emissions from the sector have increased 25% since 1990,² and are still growing. The greatest share of transportation emissions is produced mainly from gasoline fuel combustion and light-duty automobiles and trucks, as illustrated in Figure 2.³ Transportation also accounts for \$26.7 billion in fuel costs every year for New Yorkers.⁴

¹ Chapter 753 of 2019, NY Senate Bill S6559, *Climate Leadership and Community Leadership Act* (June 18, 2019), <https://www.nysenate.gov/legislation/bills/2019/s6599>

² Transportation Advisory Panel Recommended Strategies, slide 4 (May 10, 2021), <https://climate.ny.gov/-/media/CLCPA/Files/2021-05-03-Transportation-Recommendations.pdf>

³ Energy and Environmental Economics Inc., *Characterization of the Transportation Sector* (September 17, 2020; slide 17), <https://climate.ny.gov/-/media/CLCPA/Files/2020-09-18-Transportation-Panel-Presentation.pdf>

⁴ Joint Utilities of New York, *EV Readiness Framework* (March 2018), https://jointutilitiesofny.org/sites/default/files/JU_NY_EV_Readiness_Framework_March_18.pdf

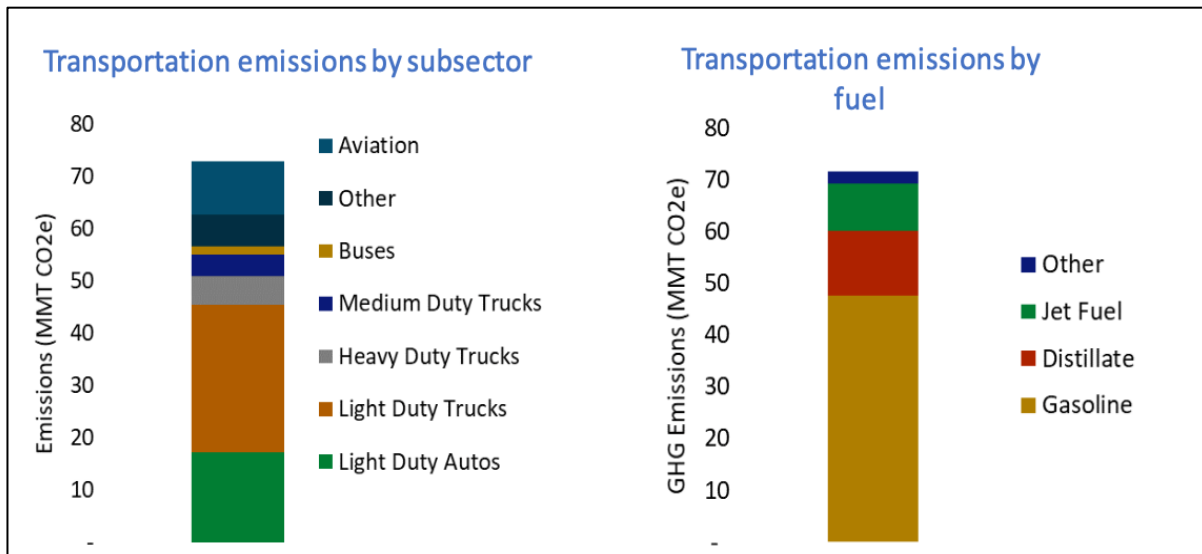


Figure 2 2016 Transportation emissions by subsector and fuel in New York. Source: Energy and Environmental Economic Inc.

Moreover, tailpipe emissions from transportation significantly contribute to harmful air pollution in the state, primarily from cars, trucks, and buses.⁵ These vehicles emit air pollutants, including particulate matter, ozone, carbon monoxide, volatile organic compounds, nitrogen and sulfur oxides, which adversely impact public health.^{6,7} Transportation pollution, particularly from heavy-duty diesel trucks and buses, is most concentrated in high traffic, populous boroughs of Bronx, Manhattan, and Queens in New York City (NYC), and is estimated to contribute to approximately 320 premature deaths and 870 hospitalizations and emergency visits as a result of respiratory illness and cardiovascular disease annually.⁸ Beyond the NYC metropolitan area, emissions are localized in the car-dependent cities of Albany, Buffalo, Rochester, and Syracuse (Figure 3).⁹ In 2015, New York State spent over \$7.9 billion in health costs, including premature deaths, heart attacks, asthma, emergency room visits, and lost workdays from pollution attributable to passenger cars.¹⁰ Non-road transportation, including aviation, marine vessels, and rail, is also a major source of GHG emissions and air pollution.

⁵ Union of Concerned Scientists, *Inequitable Exposure to Air Pollution from Vehicles in New York State* (June 21, 2019), <https://www.ucsusa.org/sites/default/files/attach/2019/06/Inequitable-Exposure-to-Vehicle-Pollution-NY.pdf>

⁶ New York State Department of Environmental Conservation, *Motor Vehicle Pollution Facts and Tips* (n.d.), <https://www.dec.ny.gov/chemical/8577.html>

⁷ Choma, E. et al, Assessing the health impacts of electric vehicles through air pollution in the United States, *Environment International*, Volume 144 (2020), doi: <https://doi.org/10.1016/j.envint.2020.106015>

⁸ Kheirbek, Iyad et al. “The contribution of motor vehicle emissions to ambient fine particulate matter public health impacts in New York City: a health burden assessment.” *Environmental Health*, Vol. 15,1 89. 26 Aug. 2016, doi: [10.1186/s12940-016-0172-6](https://doi.org/10.1186/s12940-016-0172-6)

⁹ Union of Concerned Scientists, *Inequitable Exposure to Air Pollution from Vehicles in New York State* (June 21, 2019), <https://www.ucsusa.org/resources/inequitable-exposure-air-pollution-vehicles#ucs-report-downloads>

¹⁰ Holmes-Gen, B and W.Barett, *Clean Air Future: Health and Climate Benefits of Zero Emission Vehicles*, American Lung Association in California (October 2016), <https://www.lung.org/getmedia/b4231b57-878c-4263-8c2b-8c4cb80d86ca/2016zeroemissions.pdf>

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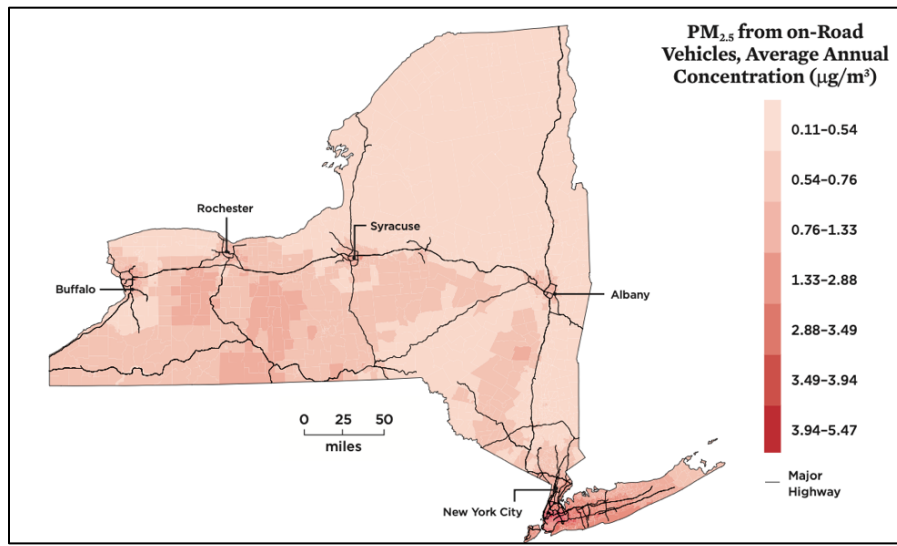


Figure 3 Variation in Exposure to PM_{2.5} from On-Road Vehicles in New York. Source: Union of Concerned Scientists

Most impacted by transportation-related air pollution are communities within nonattainment areas that exceed National Ambient Air Quality Standards (NAAQS) under the Clean Air Act in the state.^{11,12} These areas strongly correlate with environmental justice communities in New York.¹³ An analysis by the Union for Concerned Scientists found that Asian, Latino, and African American New Yorkers are disproportionately burdened with the highest exposures to fine particulate matter smaller than 2.5 micrometers in diameter (PM_{2.5}) from transportation emissions.¹⁴

These emissions are more acute for communities that live near freight facilities and ports, which are heavily dependent on diesel vehicles and equipment. Ports are disproportionately located in low-income and minority communities resulting in cumulative exposure to elevated levels of diesel emissions from port and goods movement operations and other industries co-located with ports.^{15,16} Inequitable transportation planning has led to racial and socio-economic health impact disparities and economic disinvestment in these communities.¹⁷ Moreover, it has caused overburdened communities to benefit less from transportation improvements and have limited access to jobs and other important destinations and services such as healthcare facilities.¹⁸ As outlined by Hricko (2008),¹⁹ these issues regarding the impacts of ports and good movements on these communities have long been a central concern for environmental justice advocates.

¹¹ US EPA, NAAQS Table (n.d.), <https://www.epa.gov/criteria-air-pollutants/naaqs-table>

¹² US EPA Green Book, *New York Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants* (November 30, 2020), https://www3.epa.gov/airquality/greenbook/anayo_ny.html

¹³ New York State Department of Environmental Conservation, *Maps & Geospatial Information System (GIS) Tools for Environmental Justice* (n.d.), <https://www.dec.ny.gov/public/911.html>

¹⁴ Union of Concerned Scientists, *Inequitable Exposure to Air Pollution from Vehicles in New York State* (June 21, 2019), <https://www.ucsusa.org/resources/inequitable-exposure-air-pollution-vehicles#ucs-report-downloads>

¹⁵ US EPA, *Ports Primer: 7.2 Air Emissions* (March 2020), <https://www.epa.gov/community-port-collaboration/ports-primer-72-air-emissions>

¹⁶ US EPA, *Ports Primer: 4.1 Port Impacts to Local Communities* (March 2020), <https://www.epa.gov/community-port-collaboration/ports-primer-41-port-impacts-local-communities>

¹⁷ Velasco, G., *How Transportation Planners Can Advance Racial Equity and Environmental Justice* (August 18, 2020), <https://www.urban.org/urban-wire/how-transportation-planners-can-advance-racial-equity-and-environmental-justice>

¹⁸ Grengs, J., *Advancing social equity analysis in transportation with the concept of accessibility* (October 2015), <https://www.psc.isr.umich.edu/pubs/rr15-8487352.pdf?i=980513239622528934662835997&f=rr15-848.pdf>

¹⁹ Hricko, A., *Global trade comes home: Community Impacts of Goods Movement, Environmental Health Perspectives*, Volume 116: 2 (February 2008), <https://ehp.niehs.nih.gov/doi/pdf/10.1289/ehp.116-a78>

Transitioning the transportation sector from internal combustion engine (ICE) vehicles to emissions-free, electric technologies is critical to reducing greenhouse gas (GHG) emissions and improving air quality for all communities in New York State. The American Lung Association estimates that transportation electrification can yield significant public health and economic benefits saving the state over \$4 billion in health impact costs and avoiding 351 premature deaths, 5,000 asthma attacks, and 18,735 workdays lost in 2050.²⁰

What can states do to reduce this pollution? Deploying electric vehicles (EVs) and reducing vehicle miles traveled (VMT) are the primary options. VMT reductions can be realized by improving public transportation ridership and increasing pedestrian and biking infrastructure, smart-growth, and transit-oriented development. For vehicles that are hard to electrify now, such as trains, marine vessels, and aviation equipment, low carbon fuels can serve as a bridge. Combining these measures can decrease GHG emissions in New York’s transportation sector by 86 – 97% and 63 – 67% in 2030 and 2040, respectively, based on modeling done by Energy and Environmental Economics Inc.²¹ However, they will require major funding.

In particular, financial support for the Metropolitan Transit Authority (MTA) must occur concurrently with investment in EVs, given the low car ownership²²/high ridership in New York City,²³ and the fiscal deficit caused by COVID-19.²⁴ Public transportation funding is a critical issue in New York, but will not be the focus of this Issue Brief.

Federal action is also vital to decarbonizing the sector as transportation is the largest share of GHG emissions in the nation, accounting for 28% of total emissions, as of 2018.²⁵ However, states cannot rely on the federal government to reduce sector emissions and New York has always been a national climate leader. New York should lead the way on transportation electrification. Therefore, this Issue Brief focuses primarily on state actions to promote investment in transportation electrification, electric vehicles, and charging infrastructure. These are the investments that will accelerate EV adoption and transition New York to a clean transportation future.

III. Electric Vehicles: The Future of New York’s Transportation Sector

In this Issue Brief, we use “EV” to refer to plug-in electric vehicles (PEVs), battery electric vehicles (BEVs), plug-in hybrids (PHEVs), range extended electric vehicles, and fuel cell powered vehicles. Please see [Appendix 1](#) for a primer on EV types, classes, and models, as well as various types of chargers. Like the U.S. as a whole, the New York EV market is on a growth trajectory, as seen in Figure 4. As of May 4,

²⁰ American Lung Association, *The Road to Clean Air: Benefits of a Nationwide Transition to Electric Vehicles* (September 2020), <https://www.lung.org/getmedia/99cc945c-47f2-4ba9-ba59-14c311ca332a/electric-vehicle-report.pdf>

²¹ Energy and Environmental Economics Inc., *Pathways to Deep Decarbonization in New York State* (2020), <https://climate.ny.gov/-/media/CLCPA/Files/2020-06-24-NYS-Decarbonization-Pathways-Report.pdf>

²² New York City ranked highest for cities with the least cars per house, <https://www.city-data.com/top2/h21.html>

²³ New York City ranked number 1 in top 10 metropolitan areas with highest percentage of commuters (30.9%), <https://www.apta.com/wp-content/uploads/APTA-2020-Fact-Book.pdf>

²⁴ “The MTA is still projecting a \$3.2 billion deficit in 2022 and will soon begin a fight for another round of aid under the new Biden administration.” <https://www.politico.com/states/new-jersey/story/2020/12/21/regional-transit-operators-poised-to-get-federal-aid-but-fiscal-worries-remain-1349665>

²⁵ US EPA, *Sources of Greenhouse Gas Emissions*, <https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions>

2021, there are over 69,000 registered PEVs on the road in New York.²⁶ The state has experienced a 140% increase of approximately 35,000 new EV registrants since January 2018.²⁷

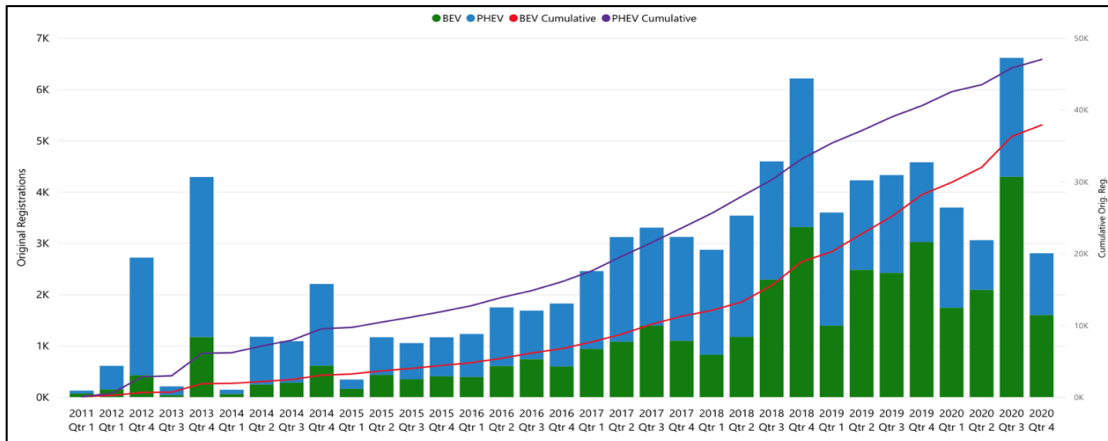


Figure 4 Original EV Registrations in New York State 2011 – 2020 (as of January 12, 2020). Source: NYSEDA/EvaluateNY

Additionally, there are 5,229 Level 2 chargers and 634 direct current fast chargers (DCFCs) publicly available in the state as of May 3, 2021²⁸ - a significant number but not nearly enough to achieve our goals. New York is 11th in light-duty EV stock (1.4%) but has similar EV charger deployment per EV as comparable states (Figure 5).²⁹ The highest density of EVs in the state is found in Long Island and the New York City metropolitan area,³⁰ while most charging infrastructure is located in the Capital and Mid-Hudson regions.³¹

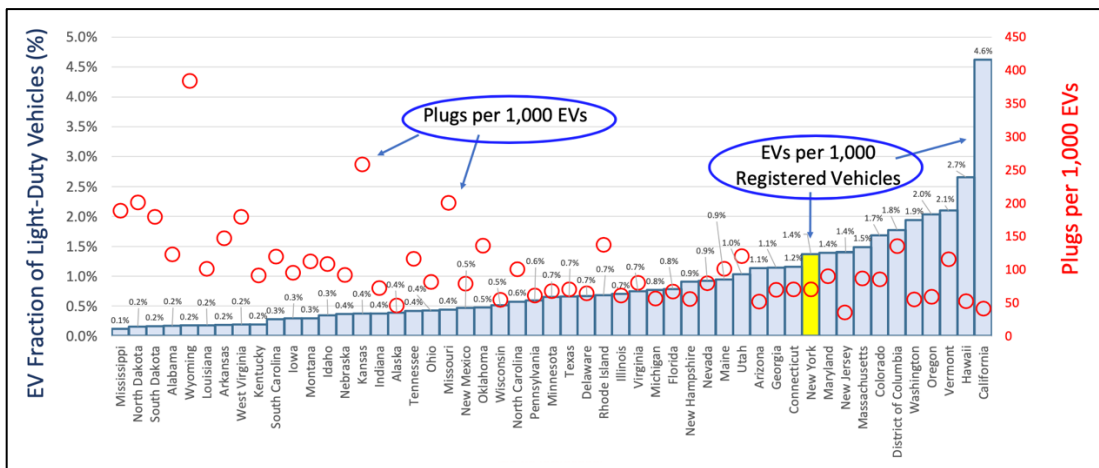


Figure 5 Fraction of Electric Vehicle Stock, by State. Source: The Cadmus Group

²⁶ EvaluateNY, <https://atlaspolicy.com/rand/evaluateny/>

²⁷ 2021 New York State of the State, pg

139) https://www.governor.ny.gov/sites/governor.ny.gov/files/atoms/files/SOTS2021Book_Final.pdf?source=email

²⁸ EvaluateNY, <https://atlaspolicy.com/rand/evaluateny/>

²⁹ The Cadmus Group, The Transportation Panel: Electric Vehicle Market Barriers and Opportunities (November 3, 2020), slide 10, <https://climate.ny.gov/-/media/CLCPA/Files/2020-11-03-Transportation-Presentation.pdf>

³⁰ Ibid

³¹ EvaluateNY, <https://atlaspolicy.com/rand/evaluateny/>

The growth in the use of EVs shown in Figure 4, while positive, is not at the rate needed to achieve NY’s emissions mandates. Rapid growth of the New York EV market must continue over the next 20 years to achieve the emissions reductions goals of the CLCPA. Based on the New York decarbonization pathways analysis done by Energy and Economics Inc (Figure 6)³²: to meet emissions goals, electric vehicles must comprise 60-70% of sales by 2030 (1.8-2.2 million electric vehicles on the road) and 100% of sales by 2040 (~7 million electric vehicles on the road).³³ For medium and heavy duty vehicles, 30-50% and ~90% sales will be necessary in those same years.³⁴

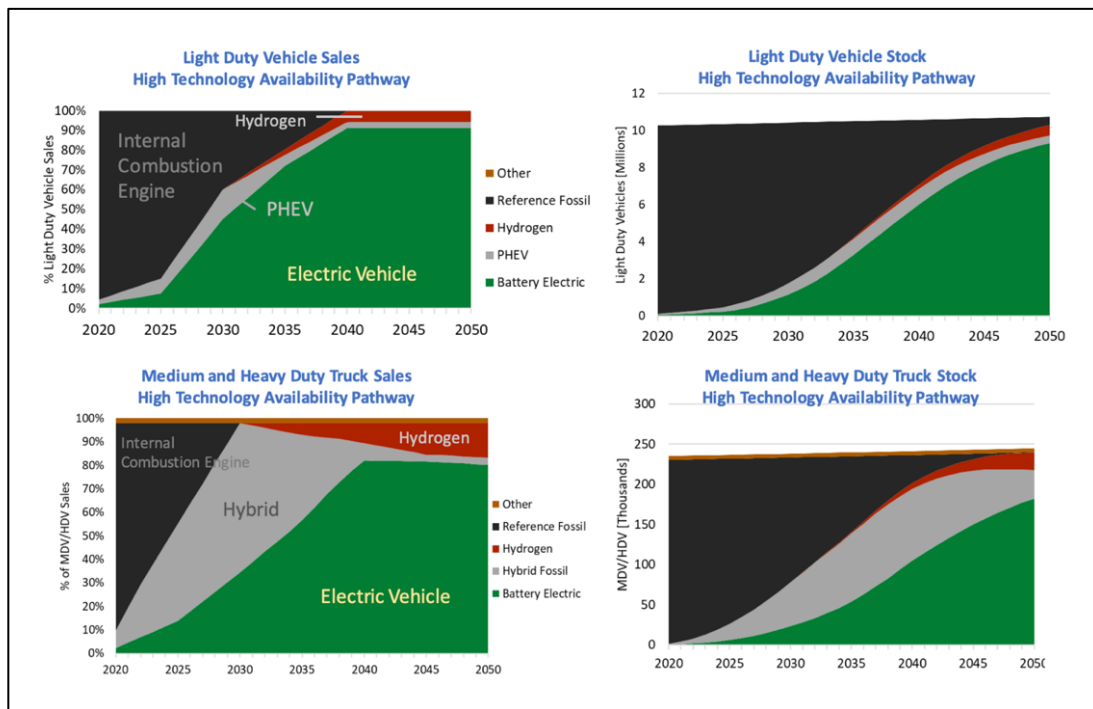


Figure 6 Timing of Electrification. Source: Energy and Environmental Economics Inc.

As electricity in New York gradually becomes cleaner, the benefits of EVs will grow.³⁵ Within six to eighteen months, the avoided pollution from using an EV is more than is produced in its manufacture.³⁶ Furthermore, EV adoption can lower electric rates for all electricity consumers.³⁷ Avoiding gas purchases will reduce energy spending and fuel imports.³⁸

What is driving the growth of the EV market in New York and across the U.S.? Market drivers include improvements in battery technology and costs; dropping costs of new electric vehicles; a lower total cost

³² Energy and Environmental Economics Inc., *New York State Decarbonization Pathways Analysis: Transportation Advisory Panel Discussion* (September 17, 2020), <https://climate.ny.gov/-/media/CLCPA/Files/2020-09-18-Transportation-Panel-Presentation.pdf>

³³ Energy and Environmental Economics Inc., *Pathways to Deep Decarbonization in New York State* (2020), <https://climate.ny.gov/-/media/CLCPA/Files/2020-06-24-NYS-Decarbonization-Pathways-Report.pdf>

³⁴ Ibid

³⁵ IEA, *Electric Vehicles* (2020), <https://www.iea.org/reports/electric-vehicles>

³⁶ Penney, V., *Electric Cars Are Better for the Planet- and Often Your Budget, Too*, *The New York Times*, (January 15, 2021), <https://www.nytimes.com/interactive/2021/01/15/climate/electric-car-cost.html>

³⁷ “Achieving New York’s EV adoption goals could reduce projected electric rates by 6.6% by 2050, resulting in annual savings of approximately \$144 per household in New York.” https://mjbradley.com/sites/default/files/NY_PEV_CB_Analysis_FINAL.pdf

³⁸ International Economic Development Council, *Creating the Clean Energy Economy: Analysis of the Electric Vehicle Industry* (2013), https://www.iedconline.org/clientuploads/Downloads/edrp/IEDC_Electric_Vehicle_Industry.pdf

of ownership than internal combustion engine (ICE) vehicles due to lower fuel and maintenance costs; longer driving ranges and more varieties of EVs available; improved consumer experience; and commitments and progress made by vehicle manufacturers. Please see [Appendix 2](#) for a summary of these market drivers.

But even with this list of market drivers, smart policy is required to accelerate EV purchasing to the rate required for New York to meet its CLCPA goals.

IV. New York EV Incentive Landscape

New York State has already put in place a number of foundational policy and program initiatives,³⁹ which are listed below. A more detailed summary of these initiatives is included in [Appendix 3](#). In addition to the programs listed below, there are also pending or recently passed legislative measures.⁴⁰

- The *Drive Clean Rebate*⁴¹ dedicated \$55 million to providing rebates of up to \$2000 for the purchase or lease of a new PEV. Fleet managers and more than 40 EV models are eligible. \$15 million is also available to support consumer awareness of EVs, installing more charging stations across the state, and demonstrating new EV-enabling technologies. As of January 2021, more than 38,000 in rebates had been issued, totalling over \$55 million.⁴² On May 7, 2021 Governor Cuomo announced that an additional \$30 million is now available through this initiative.⁴³
- *The New York Truck Voucher Incentive Program (NYT-VIP)* provides discounts to fleets that buy or lease clean medium- and heavy-duty vehicles and requires fleet operators to scrap a similar, older diesel vehicle.⁴⁴ More than 600 trucks, including 65 all-electric trucks and buses, have been purchased under this program since 2014. In December 2020, New York State committed \$16.4 million more to this program to support the five largest public transit operators's transition to 100% zero emission vehicles (ZEVs) by 2035.⁴⁵ Another \$2.5 million is available for school bus operators to purchase electric buses.
- *Charge Ready NY* offers rebates of \$4000 to public and private organizations that install Level 2 charging stations at public parking facilities, workplaces, and multifamily apartment units, per charging port installed.⁴⁶ Charge Ready NY provides an extra \$500 per port for eligible Level 2 charging

³⁹ New York is ranked second in the AEEE State Transportation Electrification Scorecard for the state's policy and program efforts to electrify transportation, <https://www.aceee.org/research-report/t2101>

⁴⁰ **Recent and Pending Legislation.** During the 2019 – 2020 Legislative Session, several bills aimed at incentivizing and expanding EV ownership in New York State including: Chapter 676 of 2019, [S.5820/A.4937](#) (Metzger/Fahy) which directs NYSERDA to develop an inventory of the state's EVs and charging infrastructure; Chapter 206 of 2020, [S.6836/A.8608](#) (Metzger/Paulin) prohibiting motor vehicles from parking in EV charging spaces, and Chapter 597 of 2019, [S.5157-A/A6338-A](#) (Breslin/Fahy) which removes restrictions on the installation of electric charging stations for owners of condominiums. In 2021, [S3929/A.3876](#) (Kennedy/Cusick) establishing an EV commercial tariff and [S.2758/A.4302](#) (Harckham /Eglebright), which would adopt California's rules to have 100% of in-state sales of new passenger cars and trucks be zero-emissions by 2035, and medium- and heavy-duty vehicles by 2045 were passed in both the Senate and Assembly.

⁴¹ Drive Clean Rebate, <https://www.nyserda.ny.gov/All-Programs/Programs/Drive-Clean-Rebate>

⁴² Drive Clean Rebate Program Statistics, <https://www.nyserda.ny.gov/All-Programs/Programs/Drive-Clean-Rebate/Rebate-Data/Rebate-Stats>

⁴³ Governor Cuomo Announces Additional \$30 Million Available for Drive Clean Rebate Program, <https://www.governor.ny.gov/news/governor-cuomo-announces-additional-30-million-available-drive-clean-rebate-program>

⁴⁴ NYT-VIP, <https://www.nyserda.ny.gov/All-Programs/Programs/Truck-Voucher-Program>

⁴⁵ Governor Cuomo Announces Initiatives to Electrify Transit Buses, <https://www.governor.ny.gov/news/governor-cuomo-announces-initiatives-electrify-transit-buses-boosting-access-clean>

⁴⁶ Charge Ready NY, <https://www.nyserda.ny.gov/All%20Programs/Programs/ChargeNY>

equipment installed after December 10, 2020 within disadvantaged communities. NYSERDA has issued \$7.5 million in rebates out of a total budget of \$17 million committed.

- The *New York State Tax Credit* provides an income tax credit for each installation of EV charging stations of up to \$5000.⁴⁷ This credit is targeted at mainly commercial and workplace charging stations and is only available through the end of 2022.
- The *Clean Pass Program* allows drivers of EVs and hybrids to use the Long Island Expressway High Occupancy Vehicle (HOV) lanes, regardless of the number of occupants in the vehicle,⁴⁸ as well as discounted Port Authority of NY/NJ off-peak tolls⁴⁹ and a 10% discount on E-ZPass.⁵⁰
- The *Low Emission Vehicle Program*⁵¹ requires all new vehicles sold in New York State to meet California's ZEV and greenhouse gas emissions standards.⁵² Car manufacturers must deliver ZEVs including PEVs for sale in the state in order to meet the ZEV standards.
- *NYPA's EVolve NY program* is investing \$250 million in fast charging station installations through 2050. In the first phase, NYPA committed \$40 million in interstate DCFCs, airport charging hubs, creating EV Model Communities (to test programs to increase EV adoption), and install 200 EV fast chargers in 50 locations by the end of 2021 and 800 by 2050.⁵³ For phase two, NYPA will work with the MTA to increase EV transit fleets and public fast charging locations. To date, NYPA has installed 29 fast charging stations currently operational at 7 locations as part of the EVolve NY program^{54,55}
- *Clean Transportation NY – VW Settlement Funds*. The New York State's Beneficiary Mitigation Plan⁵⁶ sets out actions to accelerate the transition to zero-emission transportation using the \$127.7 million made available from the Volkswagen (VW's) violation of nitrogen oxide emissions standards. The funding is being used to replace diesel powered medium- and heavy-duty vehicles with new all-electric or alternative fueled vehicles and for electric vehicle supply equipment (EVSE) installation projects for light-duty BEVs in New York State.
- *EV Make-Ready Program*. On July 2020, New York's Public Service Commission approved a \$701 million statewide "make-ready" infrastructure incentive program funded by utilities. Of that \$701 million, \$480 million will be used to accelerate the deployment of Level 2 charging stations at workplaces and public locations, and DCFCs.⁵⁷ \$85 million is allocated to three prize programs⁵⁸

⁴⁷ New York State Tax Credit, https://www.tax.ny.gov/pit/credits/alt_fuels_elec_vehicles.htm

⁴⁸ Clean Pass Program, <https://www.dot.ny.gov/programs/clean-pass>

⁴⁹ PANYNJ's Green Pass Program, <https://www.panynj.gov/bridges-tunnels/en/tolls.html>

⁵⁰ NYS Thruway Authority's Green Pass Discount Plan, <http://www.thruway.ny.gov/ezpass/greentag.html>

⁵¹ NYSDEC, *Light-Duty ZEV Program*, <https://www.dec.ny.gov/chemical/8575.html>

⁵² California Air Resources Board, *Zero-Emission Vehicle Program*, <https://ww2.arb.ca.gov/our-work/programs/zero-emission-vehicle-program/about>

⁵³ EVolve NY, <https://www.nypa.gov/services/clean-energy-advisory-services/evolve-ny>, <https://www.nypa.gov/-/media/nypa/documents/document-library/evolveny/nypa-a-vision-for-an-electric-future.pdf>

⁵⁴ NYPA Press Release, <https://www.nypa.gov/news/press-releases/2021/20210225-monroe>

⁵⁵ EVolve NY Planned Sites, <https://www.google.com/maps/d/viewer?mid=1QCZN9XmXHzSgo-N2jo3h-oXKDhiPuvdx&ll=43.09980800000005%2C-77.443163&z=8>

⁵⁶ NYS Beneficiary Mitigation Plan (August 1, 2019), https://www.dec.ny.gov/docs/air_pdf/vwcleantransportplan19.pdf

⁵⁷ Governor Cuomo Announces Nation-Leading Initiatives to Expand EV use, <https://www.governor.ny.gov/news/governor-cuomo-announces-nation-leading-initiatives-expand-electric-vehicle-use-combat-climate>

⁵⁸ NYSERDA, *Clean Transportation Prizes*, <https://www.nyserda.ny.gov/All-Programs/Programs/New-York-Clean-Transportation-Prizes>

targeted to address equity and electrification in disadvantaged communities, which were launched in April 2021 by NYSERDA.⁵⁹

- *MTA EV commitments.* The MTA, which is the largest transit authority in the nation, has committed to electrifying 100% of its bus fleet by 2040 and procuring only electric buses after 2029. This year, the MTA aims to purchase 45 electric buses in an effort to move closer towards these goals.⁶⁰
- *EV Targets for Upstate and Suburban Transit Fleets.* In 2020, Governor Cuomo required the five largest upstate and suburban transit authorities to electrify 25% of their fleets by 2025 and 100% by 2035. The State is providing \$20 million in financial support for Buffalo, Rochester, Albany, Westchester, and Suffolk transit systems to purchase at least 55 electric buses.⁶¹ This is the second tranche of a \$100 million 5-year program to assist transit agencies transition to electric bus fleets.⁶²

V. Barriers to Electric Vehicle Deployment in New York

While New York State has begun to incentivize the growth of the EV market through its programs, as described in section IV above, EVs account for just 0.73% of the light-duty vehicle market in the state.⁶³ Current numbers have only brought New York 8% toward the state's goal under the multi-state ZEV Memorandum of Understanding (MOU),⁶⁴ of having 850,000 registered EVs on the road by 2025. With only 5,229 Level 2 and 634 DCFCs public charging stations available, the state is also behind with respect to public charging infrastructure. New York needs between 20,000 – 50,000 additional Level 2 chargers, 35,000 - 80,000 added workplace Level 2 chargers, and 1,000 – 4,000 additional DCFCs to support the ZEV MOU goal.⁶⁵ Moreover, though New York has made noteworthy strides to accelerate renewable energy technologies, policies to advance EV deployment have been slower especially in comparison to its west coast counterparts such as California. In California, there are 14.2 PEVs per 1000 persons (as of December 31, 2019) versus 3.5 PEVs per 1000 persons (as of May 1, 2021) in New York State.⁶⁶ A further 2 million and 7 million light-duty and ~75,000 and 200,000 medium- and heavy-duty EVs on the road are required in 2030 and in 2040, respectively, to help meet the emissions reduction targets of the CLCPA.⁶⁷

Therefore, rapid and widespread adoption of EVs are needed in the next two decades to achieve New York's EV deployment and climate goals. The programs and initiatives New York has put in place will certainly help, but the state needs to comprehensively address the following market barriers to encourage continued and accelerated EV market development:

⁵⁹ Governor Cuomo Announces Launch of \$85 Million New York Clean Transportation Prizes Initiative, <https://www.nyserda.ny.gov/About/Newsroom/2021-Announcements/2021-04-20-Governor-Cuomo-Announces-Launch-of-85-Million-New-York-Clean-Transportation-Prizes-Initiative>

⁶⁰ The New York State 2021 State of the State, https://www.governor.ny.gov/sites/governor.ny.gov/files/atoms/files/SOTS2021Book_Final.pdf

⁶¹ Ibid

⁶² FY 2022 Executive Budget Briefing Book, <https://www.budget.ny.gov/pubs/archive/fy22/ex/book/briefingbook.pdf>

⁶³ EValuateNY, <https://atlaspolicy.com/rand/evaluateny/>

⁶⁴ State Zero-Emission Vehicle Programs MOU, <https://www.nescaum.org/documents/zev-mou-8-governors-signed-20131024.pdf/>

⁶⁵ PSC, *Order Establishing Electric Vehicle Infrastructure Make-Ready Program and Other Programs*, <http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={6238DD07-3974-4C4E-9201-3E339E311916}>

⁶⁶ Atlas Public Policy, *State EV Registration Data Dashboard*, <https://www.atlasevhub.com/materials/state-ev-registration-data/#data>

⁶⁷ Energy and Environmental Economics, *New York State Decarbonization Pathways Analysis*, <https://climate.ny.gov/-/media/CLCPA/Files/2020-06-24-NYS-Decarbonization-Pathways-CAC-Presentation.pdf>

Barrier 1: High Upfront Costs

Although price parity is fast approaching for light-duty (Figure 7)⁶⁸ and medium- and heavy-duty EVs (Figure 8),⁶⁹ consumer surveys indicate that the price of EVs compared to ICE vehicles is still a critical barrier to EV adoption.⁷⁰ Reductions in battery prices and increased manufacturing of new models will continue to lower upfront costs of EVs. However, EVs remain out of reach for low-income individuals as affluent customers dominate the market.⁷¹ The state must provide support to address affordability and improve access to EVs and charging infrastructure for disadvantaged communities, as a matter of good policy and compliance with the spirit of the CLCPA. High upfront and capital expenditures is also a barrier for public and commercial fleets, especially in the medium- and heavy-duty vehicle categories,^{72,73} such as public schools.

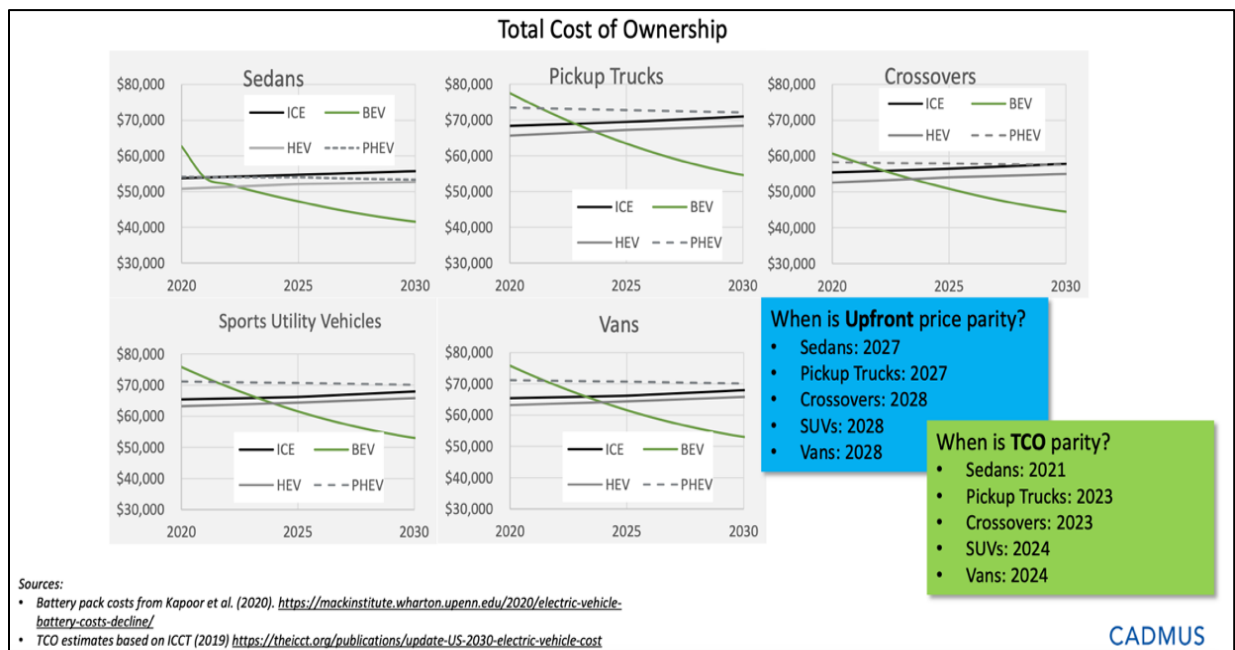


Figure 7 Upfront and Total Cost of Ownership Parity of Light-Duty EVs with ICE Vehicles. Source: The Cadmus Group

⁶⁸ The Cadmus Group *Transportation Panel Meeting*, slide 12 (January 2021), <https://climate.ny.gov/-/media/CLCPA/Files/2021-01-21-Transportation-Advisory-Presentation.pdf>

⁶⁹ CALSTART and FIER Automotive & Mobility, *Moving Zero-Emission Freight Toward Commercialization* (October 2020), <https://globaldrivetozero.org/site/wp-content/uploads/2020/12/Moving-Zero-Emission-Freight-Toward-Commercialization.pdf>

⁷⁰ Deloitte Insights (July 28, 2020), <https://www2.deloitte.com/us/en/insights/focus/future-of-mobility/electric-vehicle-trends-2030.html>

⁷¹ "...70% of EV owners have an annual income of over \$100,000," <https://www.cnbc.com/2019/10/20/electric-car-prices-finally-in-reach-of-millennial-gen-z-buyers.html>

⁷² Electrification Coalition (November 2020), <https://www.electrificationcoalition.org/wp-content/uploads/2018/07/EC-Fleet-Roadmap-screen.pdf>

⁷³ NYSERDA, *EV Procurement Review for Public Fleets* (January 2018), <https://www.nyscrda.ny.gov/-/media/Files/Publications/Research/Transportation/18-07-EV-Procurement-Review-Public-Fleets.pdf>

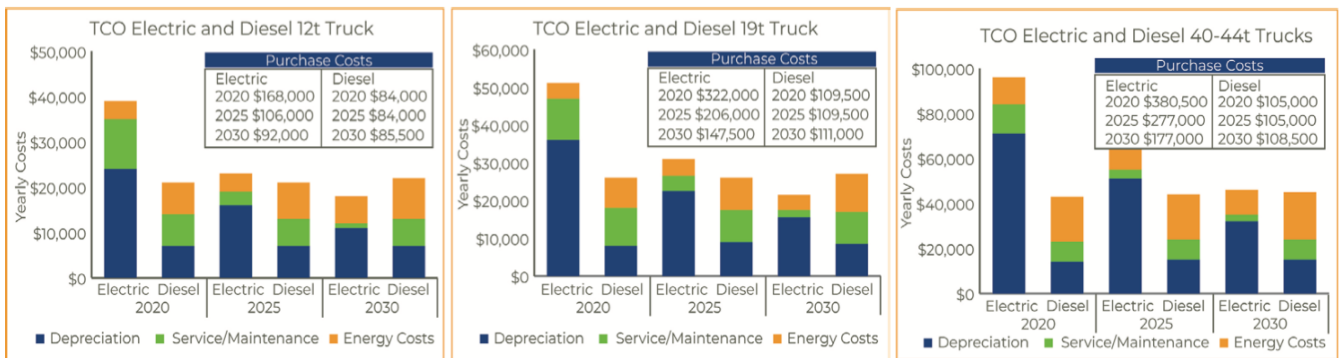


Figure 8 Total Cost of Ownership for Cargo Vans (12t), Medium- (19t) and Heavy-Duty (40-44t) Trucks. Source: CALSTART and FIER

Barrier 2: Lack of Consumer Awareness

Numerous surveys also indicate that another critical barrier to EV adoption is the lack of consumer knowledge.⁷⁴ Specifically, consumers are unaware of the types and models of EVs and the benefits they provide as well as the incentives and programs available to them.

Barrier 3: Accessibility Issues

In New York, current legislation restricts car manufacturers from selling vehicles directly; they are required to use franchised autodealers. Although this model has worked in the past, new companies that exclusively make EVs have a new business model: direct retail sales. But car companies are prohibited in New York from selling their EVs at direct sales outlets. There is a statewide cap certifying only five retail locations, all of which are located downstate. This prevents EV companies from opening retail stores across New York. As a result, New York is being outperformed by states that allow direct sales (Figure 9).⁷⁵ California has 10 times as many EVs on the road than New York.⁷⁶ Despite having aggressive climate and EV goals, New York State is also lagging behind states like Florida⁷⁷ that do not have such goals. The restriction on direct sales makes it difficult to purchase EVs at convenient and accessible locations and limits consumer choice for New Yorkers. A study by Sierra Club found that 74% of traditional autodealers nationwide do not have a single EV for sale on their lots.⁷⁸ While autodealers that do sell EV models from traditional car companies, such as the Nissan Leaf or Chevy Bolt, the study shows that their sales are a small fraction of their total sales volume. Moreover, consumers were still not being given important information about charging, battery range, and financial incentives impacting their purchase. Salespeople do not push EVs as assertively as they sell traditional vehicles.

⁷⁴ICCT, *Literature review of electric vehicle consumer awareness and outreach activities* (March 17, 2017),

https://theicct.org/sites/default/files/publications/Consumer-EV-Awareness_ICCT_Working-Paper_23032017_vF.pdf

⁷⁵ NRDC, *Supporting EV Direct Sales or "Let Drivers Buy Clean Cars"* (March 1, 2020), <https://www.nrdc.org/experts/kathy-harris/why-we-support-ev-direct-sales-or-let-drivers-buy-cars>

⁷⁶ As of December 31, 2019, Florida has 555,346 EVs on the road, <https://www.atlasevhub.com/materials/state-ev-registration-data/>

⁷⁷ As of December 31, 2020, Florida has 71,441 EVs on the road, <https://www.atlasevhub.com/materials/state-ev-registration-data/>

⁷⁸ Sierra Club, *Rev Up Electric Vehicles: A Nationwide Study of the Electric Vehicle Shopping Experience* (November 2019), <https://www.sierraclub.org/sites/www.sierraclub.org/files/press-room/RevUpReportFinal.pdf>

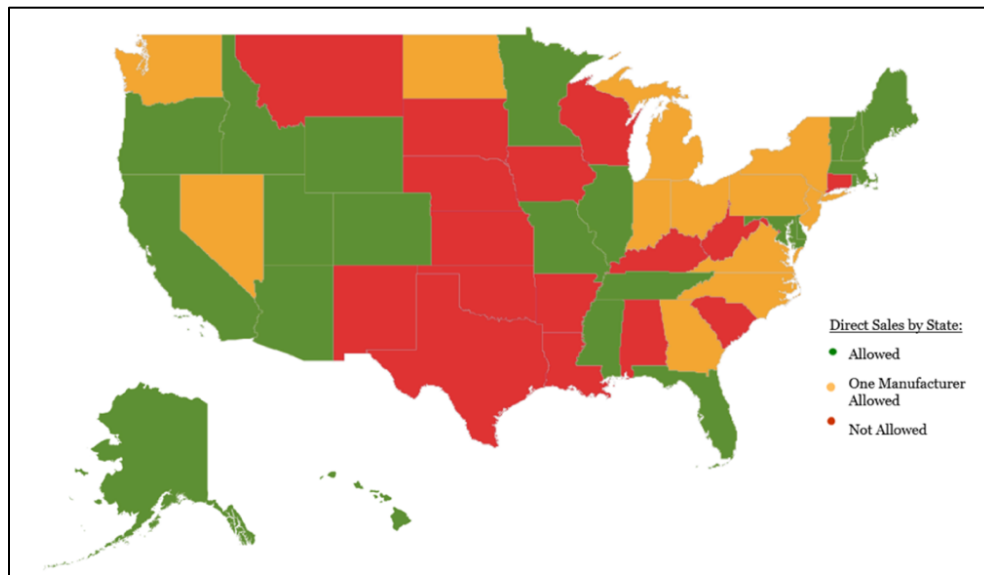


Figure 9 States that allow EV Direct Sales as of February 15, 2021. Data source: Atlas EV Hub via NRDC

Barrier 4: Limited Charging Infrastructure

Another critical barrier: insufficient charging infrastructure in convenient locations.⁷⁹ Visible and publicly available infrastructure will assuage range anxiety.⁸⁰ A particular challenge with deploying charging infrastructure is that existing utility processes for new service connection requests in New York are not designed for EVs but rather large construction projects. Therefore, it can take weeks to months from the time of application submission to fulfill requests, delaying charger deployment projects. The Joint Utilities of New York noted that current demand has not warranted a separate or parallel service connection process to ensure rapid installation of EV charging infrastructure.⁸¹ Local government land use planning, zoning, and parking ordinances can also make it inconvenient and costly to install chargers.

Barrier 5: Rate Design and Charging Station Operating Costs

As EV penetration increases, we need strategies to manage electricity demand, referred to as “load.”⁸² Most utilities in New York have whole-house and/or dedicated EV time-of-use (TOU) rate structures to incentivize EV owners to charge during off-peak times to manage loads.⁸³ Individual EV owners are not yet taking advantage of EV-TOU rates. EV-only time of use rates may offer a straightforward option to shape residential charging patterns, but must be designed in such a way as to not put in place additional barriers to participation. For example, requirements for installation of a second meter can add significant costs. Some utilities have leveraged embedded metering in smart chargers as one way to limit costs and encourage participation.

⁷⁹ AlixPartners, *International EV Consumer Survey* (October 9, 2019), <https://www.alixpartners.com/media/13453/ap-electric-vehicle-consumer-study-2019.pdf>

⁸⁰ PSC, *Order Establishing Electric Vehicle Infrastructure Make-Ready Program and Other Programs*, <http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={6238DD07-3974-4C4E-9201-3E339E311916}>

⁸¹ Joint Utilities of New York, *EV Readiness Framework* (March 2018), https://jointutilitiesofny.org/sites/default/files/JU_NY_EV_Readiness_Framework_March_18.pdf

⁸² NYSERDA, *Electricity Pricing Strategies from Plug-in EVs Charging in New York State* (June 2015), <https://www.mjbradley.com/sites/default/files/NYSERDA-EV-Pricing.pdf>

⁸³ Joint Utilities of New York, *EV Readiness Framework* (March 2018), https://jointutilitiesofny.org/sites/default/files/JU_NY_EV_Readiness_Framework_March_18.pdf

Demand charges can also serve as a disincentive for investment and deployment of Level 3 fast charging infrastructure, especially in the early development of EV market. Electricity demand at DCFCs is generally high and with current low utilization rates, demand charges can undermine the financial viability of these stations, especially if station operators are not able to manage charging load through scheduling or technology.^{84,85} Managing demand charges can also be a particular challenge for medium- and heavy-duty fleets.⁸⁶

VI. Recommendations for EV Deployment

To overcome the barriers discussed above, and to accelerate the transition to a low-carbon transportation sector, New York State needs to take affirmative and decisive action. These actions as shown in Figure 10, are not a comprehensive list of strategies to achieve full decarbonization goals, but will help to address market barriers so that the market can develop while New York develops a more comprehensive plan. Our recommendations to overcome barriers are in three categories: (1) implement the Transportation and Climate Initiative (TCI), (2) enact a suite of legislative proposals, and (3) modify existing state programs to overcome specific barriers.

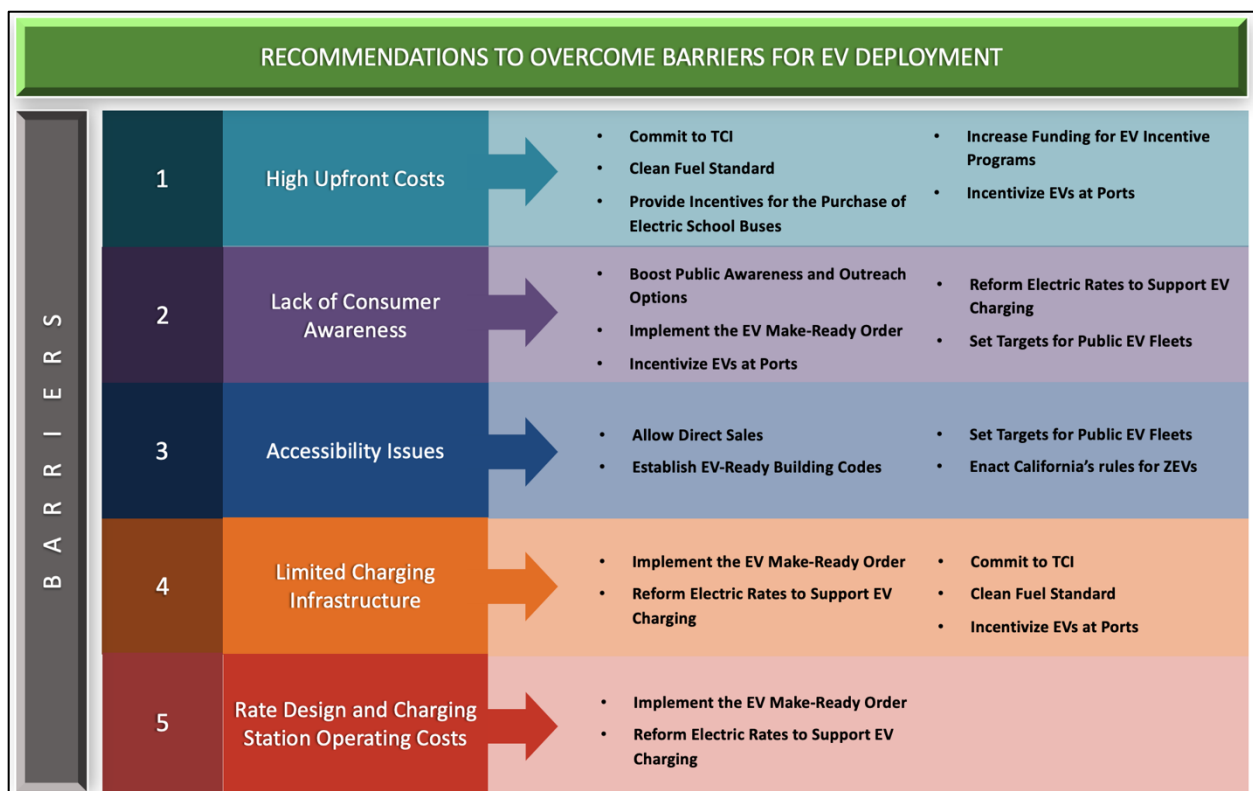


Figure 10 Recommendations to Overcome Barriers to EV Deployment. Source: ACE NY

⁸⁴Ibid

⁸⁵ ZEV Action Plan for 2018-2021, <https://www.nescaum.org/topics/zero-emission-vehicles/multi-state-zev-action-plan-2018-2021-accelerating-the-adoption-of-zero-emission-vehicles>

⁸⁶ AEE, *EVs 101: A Regulatory Plan for America's Electric Transformation Future* (September 2018), https://info.aee.net/hubfs/EV%20Issue%20Brief_PDF_9.20.18.pdf

1. COMMIT TO THE TRANSPORTATION AND CLIMATE INITIATIVE (TCI).

Joining and implementing TCI is critical to overcoming the barrier of the funding necessary to pursue clean transportation initiatives and to target progress to communities in New York that are not currently meeting national air quality standards. In December 2020, Connecticut, Massachusetts, Rhode Island, and Washington, D.C. committed to move forward with the multi-state TCI initiative.⁸⁷ Participating states are continuing to develop the detailed TCI program framework in 2021⁸⁸ and full implementation is expected in 2023. While New York State pledged to continue its engagement,⁸⁹ the state should fully join this cap-and-invest program before it launches, in order to reduce carbon dioxide emissions and other pollution and to generate revenues for a clean and equitable transportation sector. Modelled revenue generation⁹⁰ in New York State would be up to \$1.4 billion for the period 2022 – 2032. Public revenues from the TCI, combined with private revenue from the Clean Fuel Standard, can secure long-term, stable funding for mass transit, electric vehicles of all types and purposes, charging infrastructure, and biking and pedestrian infrastructure. The TCI program will be designed to incorporate:

- a. **A Strong Carbon Reduction Cap.** States involved in the program must limit carbon emissions from transportation by at least 30% by 2032. A strict emissions cap is a foundational component of this program that guarantees that emissions from transportation will decrease over time.
- b. **Modest Impacts on Gas Prices & Significant Revenue Dedicated to Clean Transportation.** Even under a more ambitious 25% carbon reduction cap, preliminary results from modelling done by an independent team of reputable universities estimate that total annual proceeds for the region could total \$6.8 billion, while public health benefits from the TCI could amount to \$11.6 billion by 2032, preventing 46,000 childhood asthma cases and 1,1160 deaths.⁹¹ This would correspond to an increase to gas prices of 5 to 17 cents per gallon⁹² (less than a typical year's fluctuation for gas prices) and up to \$1.4 billion for the period 2022 – 2032⁹³ that New York could invest in new clean transportation initiatives. Designing the program to both achieve modest impacts to transportation fuel prices and create a significant dedicated revenue stream to fund targeted clean transportation initiatives is the key to popular and political support for New York's clean transportation transition.
- c. **Equitable Investments and Complementary Programs.** As required by the CLCPA, a minimum of 35% of TCI investments must be directed towards programs that benefit disadvantaged communities in New York. This is already required in law, but the TCI Program must reiterate commitment to this requirement. The programs supported in disadvantaged communities could be enhanced and improved mass transit programs, or transportation electrification and charging of buses, freight trucks, other commercial trucks, or cars. The state should adopt safeguards to guarantee that these investments are not diverted or reduced. Moreover, adopting a suite of complementary policies (such as the other recommendations

⁸⁷ Transportation and Climate Initiative Memorandum of Understanding,

<https://www.transportationandclimate.org/sites/default/files/TCI%20MOU%2012.2020.pdf>

⁸⁸ TCI Draft Model Rule, <https://www.transportationandclimate.org/sites/default/files/TCI-P-Draft-Model-Rule-March-2021.pdf>

⁸⁹ Announcement from New York and other states on TCI, <https://bit.ly/3h85oOD>

⁹⁰ Based on an analysis of the TCI program using projections from [TCI 2019 Cap-and-Invest Modeling](#) Results and calculations on the average annual allowance proceeds per state undertaken by [NY for TCI](#)

⁹¹ Transportation, Equity, Climate and Health (TRECH) Project Preliminary Results (February 2021),

<https://cdn1.sph.harvard.edu/wp-content/uploads/sites/2343/2021/02/TRECH-ResearchUpdateFeb2021.pdf>

⁹² TCI, Evaluating the Potential Environmental and Economic Benefits and Costs of a Cap and Invest Program for Transportation Emissions in the TCI Region (December 2019), https://www.transportationandclimate.org/sites/default/files/TCI%20Modeling-Results-Summary_12.17.2019.pdf

⁹³ Based on an analysis of the TCI program using projections from [TCI 2019 Cap-and-Invest Modeling](#) Results and calculations on the average annual allowance proceeds per state undertaken by [NY for TCI](#)

- included herein) is also necessary and of equal importance to achieve a full transition to a clean transportation sector.
- d. **Transparency.** TCI includes equity provisions to enhance transparency through annual reports on proceeds and investments, as well as reviews of the impacts of the program, including with regards to equity. Inclusive public participation and comprehensive yearly reports and reviews must provide accountability to stakeholders and serve as a mechanism to assess the performance and effectiveness of the program in reducing emissions and addressing equity.
 - e. **Equitable Processes.** Each state must establish and support an Equity Advisory Body comprised of diverse stakeholders, with representation from underserved and overburdened communities. New York has committed to continue conducting community outreach and engagement⁹⁴ to garner meaningful input from disproportionately impacted communities on TCI. However, if the state joins the program, these advisory bodies should have the ability to provide recommendations and develop metrics for how and where complementary programs are directed to achieve demonstrable benefits for frontline communities and play a key role in annual reviews and reports on expenditures of TCI revenues and equity impacts.
 - f. **Commitment to Labor and Workforce Development.** As jurisdictions work towards finalizing a model rule for TCI,⁹⁵ inclusive, family-sustaining jobs with good benefits must be prioritized. TCI should also support workforce development and job training in the EV industry, targeting workers affected by the transition to clean vehicles and renewable energy, and communities in need of employment opportunities. Furthermore, the TCI program should include supplier diversity goals prioritizing businesses owned by minorities, women, and veterans.

2. ENACT LEGISLATION TO OVERCOME EV BARRIERS

There are several pieces of legislation primed for enactment in 2021 that would each overcome barriers to EV deployment. They are:

- g. **Clean Fuel Standard (CFS). A.862-A (Woerner)⁹⁶/S.2692-A (Parker)⁹⁷** establishes a carbon intensity standard for all transportation fuels. A CFS encourages the gradual transition away from gasoline to electrification without costing the State's General Fund. Under this policy, entities must meet the standard by producing or purchasing low-carbon fuels. Switching to low-carbon fuels reduces pollution, especially in the short-term, and yields air quality and public health benefits, especially for communities that experience high traffic. A similar policy has been used successfully in California⁹⁸ and Oregon⁹⁹ for a number of years. Because this approach provides private funding for EVs and charging infrastructure at no cost to New York State's General Fund and fosters emissions reductions in the short-term, it is a perfect

⁹⁴ Announcement from New York and other states on TCI, <https://bit.ly/3h85oOD>

⁹⁵ TCI Draft Model Rule, <https://www.transportationandclimate.org/sites/default/files/TCI-P-Draft-Model-Rule-March-2021.pdf>

⁹⁶ Assembly Bill A862-A, <https://www.nysenate.gov/legislation/bills/2021/a862>

⁹⁷ Senate Bill S2692-A, <https://www.nysenate.gov/legislation/bills/2021/S2962>

⁹⁸ "Since its start in 2011 the program has generated credits representing a total reduction of 47.1 million metric tons of climate-changing gases." <https://ww2.arb.ca.gov/news/cleaner-fuels-have-now-replaced-more-3-billion-gallons-diesel-fuel-under-low-carbon-fuel>

⁹⁹ "The Oregon Clean Fuels program has prevented 3.6 million tons of climate pollution, the equivalent of 778,000 tailpipe emissions over the near four years the program has been in effect, at a cost of pennies per gallon." <https://oeconline.org/cfs-march-2020/>

- complement to the California Zero Emissions Vehicle (ZEV) requirement¹⁰⁰ which will mandate reductions in the long-term.
- h. Allow Direct Sales of Electric Vehicles.** In New York, a manufacturer of only electric vehicles **cannot** open retail locations to sell directly to customers. There is a bill [**A.4614(Fahy)**¹⁰¹/**S.1763 (Kaminsky)**¹⁰²] that would fix this problem by eliminating the cap on the number of retail locations that manufacturers that do not have franchised dealerships can open. This change would have no cost to New York State’s General Fund and would scale up the number of EV retailers in the state with limited disruption to franchise auto dealerships. Moreover, opening up the state to direct sales would also increase local sales tax revenues, create new jobs,¹⁰³ increase consumer choice, and make EVs more easily accessible to New Yorkers.
 - i. Reform Electric Rates to Support Electric Vehicle Charging.** The Public Service Commission (PSC) should work with utilities to reform the tariffs that would be applied to fast chargers. While this could be done without legislative change, there is a measure [**A.3876 (Cusick)**¹⁰⁴/**S.3929 (Kennedy)**¹⁰⁵] that would amend the public service law to require utilities to establish a commercial tariff for EV fast charging. The policy, which will also have no cost to the State’s General Fund, could offer customers flexible, alternative rates making it easier and attractive for New Yorkers, especially fleet operators, to afford and maximize use of their EVs. New rates could also encourage investment in the deployment of EV fast chargers and increase demand for EVs. Note that the referenced legislation passed both houses of the New York State Legislature in April 2021.
 - j. Provide Incentives for the Purchase of Electric School Buses.** If you are a school district that wants to buy or lease an electric bus, it is not easy to do. The electric bus is initially more expensive, the charging infrastructure isn’t covered by State education aid, and the allowed contract length (for leasing) doesn’t allow electric buses to compete well. **A.6754 (Fahy)**¹⁰⁶ / **S.5268 (Kennedy)**¹⁰⁷ would fix these problems by providing an increase in transportation State aid to schools that choose electric, and the amount would be based on the level of financial aid that a school district received in the previous fiscal year, with higher incentives going to school districts which receive higher state aid. The aid would cover charging equipment and the use of electricity for school transportation. Furthermore, the legislation would offer a sales tax exemption to private transportation companies that lease electric buses to public school districts and extend the allowed lease term from 5 to 10 years, all meant to encourage faster adoption of electric buses by schools. New York is home to just over 10% of all school buses in the United States,¹⁰⁸ so these changes can smooth the path for schools to go electric and set an example for the entire U.S.
 - k. Enact California’s requirements for Zero-Emission Vehicles.** Just this past year, California decided to ban the sale of traditional light-duty ICE vehicles by 2035, and to do the same for

¹⁰⁰ Zero-Emission Vehicle Market Development Strategy, <https://business.ca.gov/industries/zero-emission-vehicles/zev-strategy/>

¹⁰¹ Assembly Bill A4614, <https://www.nysenate.gov/legislation/bills/2021/a4614>

¹⁰² Senate Bill S1763, <https://www.nysenate.gov/legislation/bills/2021/S1763>

¹⁰³ In 2019, the electric transportation (ET) industry supported 4,200 jobs in New York. ET-related employment in the state is expected to grow by 32% between 2019 and 2024, adding 1,300 more jobs. <https://info.aee.net/electrifying-new-york-economic-potential-of-growing-electric-transportation>

¹⁰⁴ Assembly Bill A3876, <https://www.nysenate.gov/legislation/bills/2021/a3876>

¹⁰⁵ Senate Bill S3929, <https://www.nysenate.gov/legislation/bills/2021/s3929>

¹⁰⁶ Assembly Bill A6754, <https://www.nysenate.gov/legislation/bills/2021/a6754>

¹⁰⁷ Senate Bill S5268, <https://www.nysenate.gov/legislation/bills/2021/s5268>

¹⁰⁸ New York School Bus Contractors Association, <https://www.nysbca.com/fastfacts.html>

medium- and heavy-duty trucks by 2045.¹⁰⁹ This is the type of bold action that will attract EV companies and their investment to our state. New York should do the same, and **A.4302 (Englebright)**¹¹⁰ /**S.2758 (Harckham)**¹¹¹ would do just that. For many years, New York State policies have been consistent with California's zero emission vehicle (ZEV) standards and our law should be updated to reflect this recent development. Note that this legislation passed both houses of the New York State Legislature in April 2021.

3. AMEND EXISTING STATE PROGRAMS TO OVERCOME EV BARRIERS

New York has numerous and laudable existing initiatives to promote transportation electrification. Below are some recommendations to amend these programs to overcome barriers. Further, what is currently lacking is sustained and scaled-up funding for these programs. With a dedicated revenue stream from TCI, the following electrification initiatives could be further resourced.

- l. Implement the EV Make-Ready Order.** Outside of California, New York's EV-Make Ready program is the largest commitment to EV charging infrastructure in the U.S.¹¹² and its success is critical to overcoming EV barriers. As it implements this program, the PSC should strive to simplify utility requirements and ensure flexible and appropriate incentive levels. Attention should be paid to expanding charging infrastructure in specific sectors/locations that are most convenient for customers and encourage the greatest utilization including medium- and heavy-duty fleets, light-duty fleets, highway corridors, workplaces, urban shared, and multi-unit dwellings. To the extent possible, PSC should enable utilities to go beyond the foundation of make-ready, for example by offering rebates for charging hardware and software, and encourage creative program design to meet the needs of particular communities and geographies, rather than limiting efforts to make-ready. Utilities should also be encouraged to move quickly to establish managed charging programs. Finally, the level of success of the program should be compared to the required deployment of charging infrastructure identified by the Climate Action Council¹¹³ to meet CLCPA goals, and the program should be adjusted accordingly.

- m. Increase Funding for EV Incentive Programs.** New York should use funds generated from TCI (or other sources) to provide long-term and stable funding for existing and new incentive programs. Currently, some of the existing incentive programs are not funded on a sustained basis. Full disbursement of the VW settlement funds supports key programs, but that funding source is not sustained. These incentive programs should focus on all classes of vehicles, including privately-owned passenger vehicles, and light, medium, and heavy-duty fleet vehicles. The deliberations of the Transportation Advisory Panel¹¹⁴ of the Climate Action Council demonstrated that while deployment of EVs will continue and accelerate without incentives, this will not be anywhere near the levels required to meet the schedules of the CLCPA (Figure 11 and 12).¹¹⁵ Therefore, sustained funding for incentives are necessary in the

¹⁰⁹ Executive Order N-79-20, <https://www.gov.ca.gov/wp-content/uploads/2020/09/9.23.20-EO-N-79-20-Climate.pdf>

¹¹⁰ Assembly Bill A4302, <https://www.nysenate.gov/legislation/bills/2021/a4302>

¹¹¹ Senate Bill S2758, <https://www.nysenate.gov/legislation/bills/2021/s2758>

¹¹² AEE, *New York's \$701 Million Program for EV Charging, By the Numbers* (August 19, 2020), <https://blog.aee.net/new-yorks-701-million-program-for-ev-charging-by-the-numbers>

¹¹³ The Climate Action Council is a committee charged with developing a Scoping Plan to achieve the CLCPA, <https://climate.ny.gov/Climate-Action-Council>

¹¹⁴ Advisory Panels of the Climate Action Council, <https://climate.ny.gov/Advisory-Panel>

¹¹⁵ The Cadmus Group, Summary of Cadmus Technical Analysis for Transportation Electrification (February 26, 2021), <https://climate.ny.gov/-/media/CLCPA/Files/2021-01-26-CAC-Meeting-presentation.pdf>

near term to bridge that gap. Further, a feebate structure should be analyzed as another source of revenue for these incentives. In a feebate approach, a fee on the purchase of gasoline vehicles would be used to offer a rebate to buyers of EVs. Several European countries have utilized this model to reduce emissions reduction and facilitate the transition to EVs.¹¹⁶

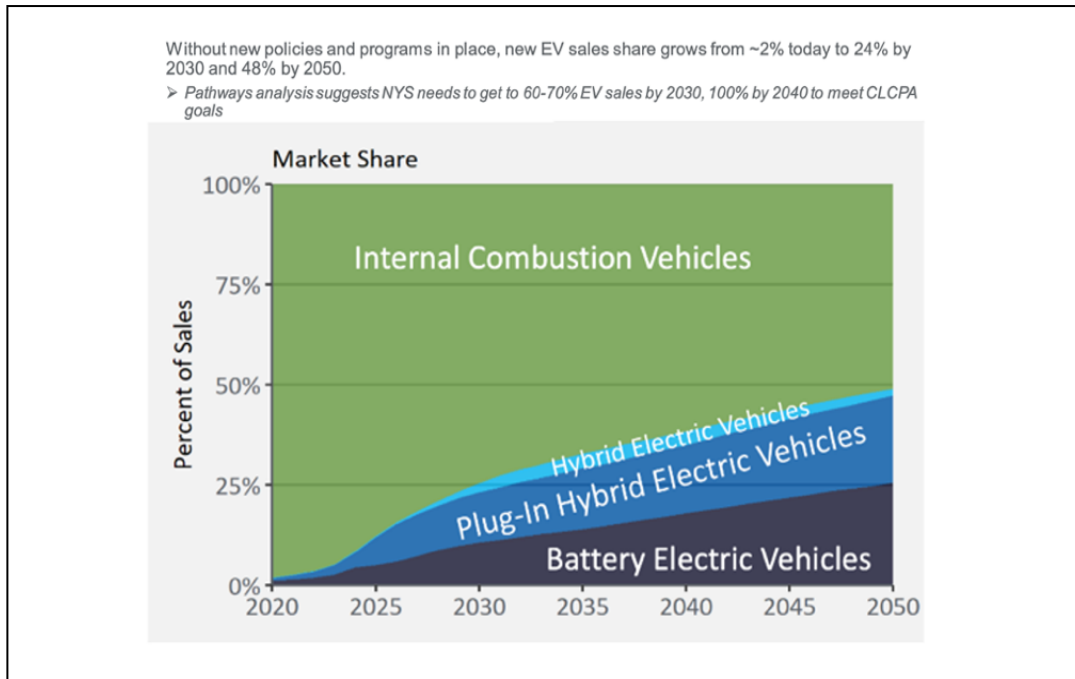


Figure 11 Projection of Light-Duty EV Sales (without new policies and programs). Source: The Cadmus Group

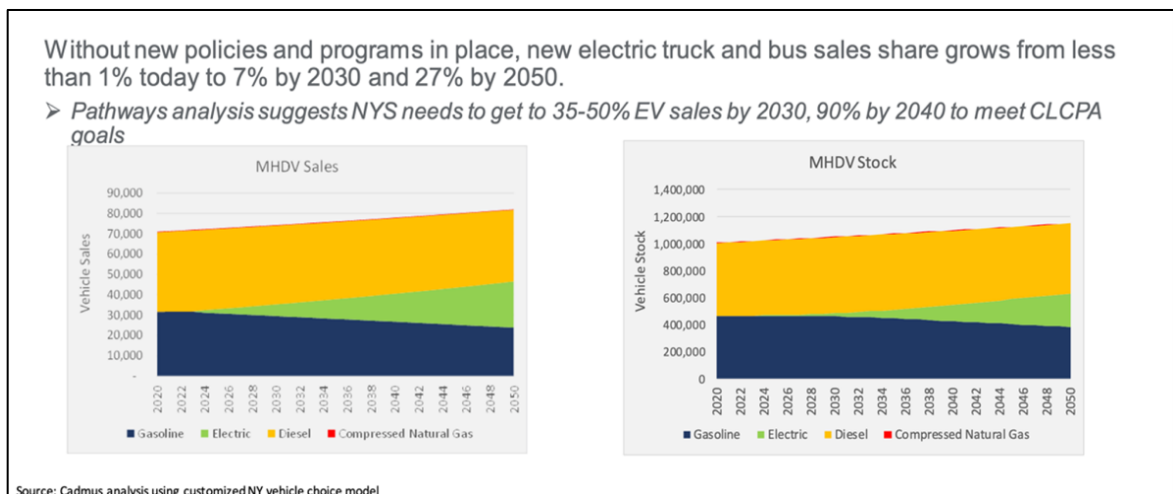


Figure 12 Projections of Medium- and Heavy-Duty Vehicles Sales and Stock. Source: The Cadmus Group

¹¹⁶ M.J. Bradley & Associate, *Toolkit for Advanced Transportation Policies* (October 2018), https://www.mjbradley.com/sites/default/files/mjba_transportation_toolkit.pdf

- n. Rate Design Solutions.** As described above in the legislative section, the PSC should direct utilities to propose new, well-designed rate structures for EV fast charging in the near-term especially for specific sectors, including fleets, workplaces, and residential areas. Easy-to-use, time varying rates with TOU periods can incentivize charging at off-peak low-cost hours, provide cost savings for customers and utilities, and reduces charging loads, which will be increasingly important as EV penetration rises.¹¹⁷ The load management benefit of TOU rates are amplified when coupled with smart, networked ESVE. This can facilitate the exportation of electricity back to the grid.¹¹⁸ Therefore, the PSC should also direct utilities to invest in vehicle-to-grid programs and smart-grid improvements in addition to load-balancing, battery storage, and renewables to facilitate the transition to a clean, electrified transportation sector.¹¹⁹
- o. Set Targets for Public EV Fleets.** New York State should set a target for 100% EV public fleets including buses, drayage trucks, and waste hauling vehicles. This is important especially at the early stages of EV deployment, as it allows state agencies to lead by example and demonstrates the technology to the public. Moreover, it sends signals for charging infrastructure and grid service businesses as well as mobilizes EV supply chains to deliver bulk orders that initiate economies of scale, reducing the cost of EVs for all New Yorkers.¹²⁰ Public fleets benefit from lower vehicle prices because of large volume orders.¹²¹ Local municipalities should have access to state contracts to access this benefit.
- p. Establish EV-Ready Building Codes and Permitting.** Municipal codes and permitting processes across New York State should be updated and simplified to expedite EV charging infrastructure installation especially at multi-unit dwellings and commercial buildings at scale. Local governments need to develop comprehensive planning, zoning, and parking ordinances to promote widespread deployment of charging and increase accessibility for residents. NYSERDA has developed guidance for municipalities and planners¹²² and permit process streamlining best practices to support residential EV charging infrastructure.¹²³
- q. Incentivize Electric Vehicles at Ports.** The Port Authority should encourage transportation companies utilizing New York ports to electrify their drayage fleets by providing incentives and establishing fast charging stations on site. There should also be increased utilization of on-port electric waste haulage and material handling equipment and vehicles including tractors, stackers, forklifts, and cranes. This will significantly improve local air quality and reduce negative health impacts for adjacent environmental justice communities who are unduly burdened by diesel emissions from these port facilities and operations.
- r. Boost Public Education and Outreach Options.** The State should implement a public education campaign on transportation electrification. By raising consumer awareness around EV options and the benefits these vehicles offer, New York could increase the utilization of its

¹¹⁷ NYSERDA, *Electricity Pricing Strategies from Plug-in EVs Charging in New York State* (June 2015), <https://www.mjbradley.com/sites/default/files/NYSERDA-EV-Pricing.pdf>

¹¹⁸ AEE, *EVs 101: A Regulatory Plan for America's Electric Transformation Future* (September 2018), https://info.aee.net/hubfs/EV%20Issue%20Brief_PDF_9.20.18.pdf

¹¹⁹ Sierra Club, *Transforming Transportation in New York* (September 2019), <https://www.sierraclub.org/sites/www.sierraclub.org/files/blog/Transforming%20Transportation%20in%20New%20York.pdf>

¹²⁰ IEA, *Electric Vehicles* (June 2020), <https://www.iea.org/reports/electric-vehicles#recommended-actions>

¹²¹ NYSERDA, *EV Procurement Review for Public Fleets* (January 2018), <https://www.nyserda.ny.gov/-/media/Files/Publications/Research/Transportation/18-07-EV-Procurement-Review-Public-Fleets.pdf>

¹²² NYSERDA, *Creating EV-Ready Towns and Cities: A Guide to Planning and Policy Tools* (November 2012), <https://www.nyserda.ny.gov/-/media/Files/Programs/ChargeNY/Planning-and-Policy-Tool-Guide.pdf>

¹²³ NYSERDA, *Residential EVSE Permit Process Best Practices* (April 2013), <https://www.nyserda.ny.gov/-/media/Files/Programs/ChargeNY/Permit-Process-Streamlining.pdf>

many existing programs meant to accelerate EV adoption in the state as well as ensure that all New Yorkers feel the benefits of transportation electrification. The campaign should include public showcases, ride-and-drives, informational events for EV drivers to share experiences and allay misconceptions with interested customers, and training for dealerships to inform consumers on the strengths of EVs.^{124,125} The build out of public infrastructure, with highly visible and consistent signage and labelling will also signal to consumers of the ease and convenience of charging, increasing the likelihood of greater EV adoption.¹²⁶

VII. Conclusion

New York State is transitioning to a clean electric transportation future. This Issue Brief and its appendices outlines the current state of the New York EV market and its policy landscape; identifies key barriers limiting widespread adoption; and proposes strategic and tailored policy recommendations to overcome these barriers. With quick action, New York can implement this suite of strategies, even as more detailed plans for the transportation sector are developed over time. While this Brief focuses on electric vehicles, we acknowledge it is equally important to green the electricity sector and invest in public transit in order to fully create a low-carbon transportation system.

As a first item, New York should implement the multi-state Transportation and Climate Initiative to provide a dedicated revenue stream for the clean transportation transition.

Second, New York should enact a Clean Fuel Standard; allow EV manufacturers to open retail locations in New York; re-design electric rates to incentivize charging infrastructure; adopt specific measures directed at the use of electric school buses; and align New York law with the most recent California ZEV mandate.

Third, outside of the Legislature, New York should increase funding and incentive programs for EVs and charging infrastructure by building on the programs it has in place; develop time-of-use rate structures for EV charging for specific sectors and vehicle categories, convert the State fleet to all EVs, promote EVs through building codes and planning; deploy EVs at ports; and implement a public education program on the net benefits of EVs. All of the initiatives in this third category could be implemented with funds from TCI or another carbon pricing mechanism.

¹²⁴ Sierra Club, *Transforming Transportation in New York* (September 2019), <https://www.sierraclub.org/sites/www.sierraclub.org/files/blog/Transforming%20Transportation%20in%20New%20York.pdf>

¹²⁵ ICCT, *Literature review of electric vehicle consumer awareness and outreach activities* (March 21, 2017), https://theicct.org/sites/default/files/publications/Consumer-EV-Awareness_ICCT_Working-Paper_23032017_vF.pdf

¹²⁶ *Ibid*

VIII. Appendices

Appendix 1: Some Electric Vehicle Basics
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Types of EVs

Electric Vehicles (EVs) are powered by batteries (usually lithium-ion) that can be plugged-in and recharged with electricity from the grid.¹²⁷ Plug-in electric vehicles (PEVs) which are fully-electric containing a rechargeable battery and only an electric motor are known as battery electric vehicles (BEVs), while vehicles containing both a battery/electric motor and a gasoline-powered engine are referred to as plug-in hybrid vehicles (PHEVs). Another type of PEV is range extended EVs (REEVs) which use an internal combustion engine to recharge a battery that is depleted allowing for traveling longer distances. Finally, there are electric vehicles powered by a fuel cell rather than a battery. In this Brief, EVs will refer to all plug-in electric vehicles, which are BEVs, PHEVs, and REEVs, as well as fuel cell vehicles, which are much less common. A few examples of current models of PEVs are shown in Table 1.

Table 1 Examples of Models of Electric Vehicles¹²⁸

BEVs	PHEVs	REEVs
Nissan LEAF	Chevy Volt	BMW i3 REx
Chevy Bolt	Ford C-Max Energi	Audi E-Tron
Tesla Model S	Honda Clarity Plug-in Hybrid	

Charging Infrastructure

PEVs require charging infrastructure, which includes chargers (often referred to as electric vehicle supply equipment (EVSE); interconnection to the electricity grid (“make-ready”); and communications and information technology, which manage the EVSE and billing to customers.¹²⁹ There are three types of chargers:

- Level 1 chargers use conventional 120-volt household outlets providing approximately 5 miles of range for every hour of charging.
- Level 2 EVSE offers faster charging utilizing a 240-volt circuit and provides longer mileage, and offers 10 – 30 electric miles/hr. Level 2 chargers are conducive to home, workplace, and public applications.
- Level 3 or direct current fast chargers (DCFCs) use high powered 480-volt plugs¹³⁰ with the ability to charge a vehicle’s battery speedily, providing 25 -75 miles of range within 10 minutes of charging. DCFCs are best suited for public sites such as cities, retail centers, along highway corridors or at public and private parking garages. Fast chargers are necessary for day-long or multi-day trips that exceed the range of a single charge.

¹²⁷ AEE, *EVs 101: A Regulatory Plan for America’s Electric Transformation Future* (September 2018), https://info.aee.net/hubfs/EV%20Issue%20Brief_PDF_9.20.18.pdf

¹²⁸ EVgo, *Types of Electric Vehicles*, <https://www.evgo.com/why-evs/types-of-electric-vehicles/>

¹²⁹ AEE, *EVs 101: A Regulatory Plan for America’s Electric Transformation Future* (September 2018), https://info.aee.net/hubfs/EV%20Issue%20Brief_PDF_9.20.18.pdf

¹³⁰ Mission Electric, <https://www.missionelectric.org/electric-vehicle-charging.html#/find/nearest?fuel=ELEC>

Appendix 2: Market Drivers for Electric Vehicles

The United States is the third-largest market for PEVs globally, with sales amounting to 326,000 units in 2019.¹³¹ Despite the economic impacts of the COVID-19 pandemic, the U.S. market for EVs of all vehicle classes is poised for growth.^{132,133} By 2030, the share of new car sales that are EVs is predicted to be 27%.¹³⁴

Technology

Battery technology for EVs is rapidly improving. Average battery energy density increases at a 4-5% rate every year, and new, diverse chemistries are coming onto the market.¹³⁵ According to BloombergNEF, this movement from lithium-ion batteries utilizing liquid electrolytes to solid-state batteries addresses the need for safe and more powerful energy storage¹³⁶ and will realize significant cost reductions.¹³⁷ EV charging rates are also increasing due to technological advances of both EVs and EVSE. For instance, technology companies and vehicle manufacturers are rapidly developing wireless charging in new EV models, some of which are already available on the market.¹³⁸

Vehicle Price

The upfront costs of EVs are higher than internal combustion engine (ICE) vehicles in large part due to the battery.¹³⁹ Battery prices decreased by 89% to \$137 per kilowatt-hour (kWh) in 2020 from \$1,100/kWh in 2010.¹⁴⁰ These price reductions are due to declining lithium-ion battery costs due to technological advances, large-scale EV production, and mass battery manufacturing driven by demand from the largest EV market, China. As battery costs continue to fall, so too will the purchase price of PEVs. BloombergNEF estimates when average battery costs reach \$100/kWh around 2023, PEVs will be produced and sold at the same price and margin as comparable ICE vehicles.¹⁴¹ Overall, forecasts reveal EVs of all types and classes will achieve upfront price parity with ICE vehicles by mid- to late-2020s to mid-2030s,^{142,143} even without subsidies.

¹³¹ IEA, *Electric Vehicles* (June 2020), <https://www.iea.org/reports/electric-vehicles#recommended-actions>

¹³² Guidehouse Insights, <https://guidehouseinsights.com/reports/market-data-ev-geographic-forecast-north-america>

¹³³ “Despite a coronavirus-led recession, the 2020s still look set to be the decade of the electric vehicle,” <https://www.woodmac.com/news/opinion/electric-vehicles-market-to-get-back-on-track-post-covid-19/>

¹³⁴ Deloitte Insights, *Electric Vehicles: Setting the course for 2030* (July 28, 2020), <https://www2.deloitte.com/us/en/insights/focus/future-of-mobility/electric-vehicle-trends-2030.html>

¹³⁵ BloombergNEF, *Electric Vehicle Outlook 2020*, <https://about.bnef.com/electric-vehicle-outlook/>

¹³⁶ BloombergNEF, *Why Battery Cost Could Put the Brakes on Electric Car Sales* (November 2017), <https://about.bnef.com/blog/why-battery-cost-could-put-the-brakes-on-electric-car-sales/>

¹³⁷ “BloombergNEF expects that these cells [solid-state batteries] could be manufactured at 40% of the cost of current lithium-ion batteries, when produced at scale,” <https://about.bnef.com/blog/battery-pack-prices-cited-below-100-kwh-for-the-first-time-in-2020-while-market-average-sits-at-137-kwh/>

¹³⁸ Plugless, <https://www.pluglesspower.com/learn/wireless-charging-evs-guide-tesla/>

¹³⁹ Wood Mackenzie (February 2020), <https://www.woodmac.com/news/opinion/electric-vehicle-growth-set-to-accelerate-through-the-2020s/>

¹⁴⁰ BloombergNEF (December 2020), <https://about.bnef.com/blog/battery-pack-prices-cited-below-100-kwh-for-the-first-time-in-2020-while-market-average-sits-at-137-kwh/>

¹⁴¹ Ibid

¹⁴² The Cadmus Group estimates that light-duty EVs will achieve upfront cost parity by 2027-28, <https://climate.ny.gov/-/media/CLCPA/Files/2021-01-21-Transportation-Advisory-Presentation.pdf>

¹⁴³ “...light-duty EVs will reach upfront price parity with their ICE counterparts in the mid- to late-2020s, while electric Heavy-Duty Trucks will approach upfront price parity with diesel trucks in the mid- to late-2030s,” <http://www.2035report.com/transportation/wp-content/uploads/2020/05/2035Report2.0-1.pdf?hsCtaTracking=544e8e73-752a-40ee-b3a5-90e28d5f2e18%7C81c0077a-d01d-45b9-a338-fcaef78a20e7>

Total Cost of Ownership

Total cost of ownership (TCO) refers to the sum of all costs of owning a vehicle over its lifetime including purchase/financing, maintenance, fuel, and insurance – a true measure of long-term competitiveness.¹⁴⁴ Estimates show that TCO price parity will be achieved for light-duty EVs within the next 5 years and before 2030 for medium- and heavy-duty EVs (which already have a TCO advantage over its diesel counterparts).^{145,146} Though TCO varies across regions due to factors such as fuel prices, electricity rates and access to charging, PEVs are less than similar ICE vehicles.¹⁴⁷ EVs are inherently more energy efficient (in terms of miles traveled per energy consumed) and have fewer moving parts than gas-powered vehicles, which reduces maintenance costs. Even the rate of depreciation, which tends to be higher for EVs,¹⁴⁸ have become comparable to ICE vehicles, especially for REEVs.¹⁴⁹ Moreover, EVs have lower costs of charging as electricity prices are cheaper and less volatile to supply disruptions and market changes than gasoline prices.¹⁵⁰ In New York, EV drivers accrue \$770 in fuel cost savings per year.¹⁵¹ Altogether, these factors lower TCO, offsetting the higher upfront price of EVs over time.¹⁵² TCO savings are especially compelling for commercial fleets. EVs offer strong cost savings. Since these highly utilized vehicles drive long distances resulting in high fuel and maintenance costs, fleet operators prioritize TCO than other purchasing factors.¹⁵³ Moreover, mass procurement by fleet operators creates economies of scale, which lowers the cost of EVs for all consumers.

Model Availability and Vehicle Range

Formerly, EVs had a shorter driving range (per charge) than conventional ICE vehicles (per tank of gas).¹⁵⁴ Now the variety of moderately priced (\$35,000) light-duty PEVs with a driving range of over 200 miles available on the market is increasing.¹⁵⁵ There are also several types and models of medium- and heavy-duty EVs such as buses, delivery vans, and trucks with a 100-mile range¹⁵⁶, and within the next 2-3 years, model availability of these vehicles in the 200+ range is expected to grow.^{157,158} This trend is important for

¹⁴⁴ AEE, *EVs 101: A Regulatory Plan for America's Electric Transformation Future* (September 2018),

https://info.aee.net/hubfs/EV%20Issue%20Brief_PDF_9.20.18.pdf

¹⁴⁵ CALSTART and FIER Automotive & Mobility, *Moving Zero-Emission Freight Toward Commercialization* (October 2020), <https://globaldrivetozero.org/site/wp-content/uploads/2020/12/Moving-Zero-Emission-Freight-Toward-Commercialization.pdf>

¹⁴⁶ Goldman School of Policy, 2035 Report (April 2021), <http://www.2035report.com/transportation/wp-content/uploads/2020/05/2035Report2.0-1.pdf?hsCtaTracking=544e8e73-752a-40ee-b3a5-90e28d5f2e18%7C81c0077a-d01d-45b9-a338-fcaef78a20e7>

¹⁴⁷ Deloitte Insights (July 28, 2020), <https://www2.deloitte.com/us/en/insights/focus/future-of-mobility/electric-vehicle-trends-2030.html>

¹⁴⁸ “Electric vehicles tend to have higher rates of depreciation because of secondhand owners cannot utilize tax incentives, the need for battery replacement, and technological advance suppresses demand for older

EVs,” https://assets.ey.com/content/dam/ey-sites/ey-com/en_gl/topics/power-and-utilities/ey-how-commercial-fleet-electrification-is-driving-opportunities.pdf

¹⁴⁹ Consumer Reports (October 2020), <https://advocacy.consumerreports.org/wp-content/uploads/2020/10/EV-Ownership-Cost-Final-Report-1.pdf>

¹⁵⁰ Union of Concerned Scientists, <https://www.ucsusa.org/sites/default/files/attach/2017/11/cv-report-ev-savings.pdf>

¹⁵¹ Yamauchi, M., <https://www.pluglesspower.com/learn/driving-electricity-cheaper-gas-50-states/>

¹⁵² Penney, V., Electric Cars Are Better for the Planet- and Often Your Budget, Too, *The New York Times*, <https://www.nytimes.com/interactive/2021/01/15/climate/electric-car-cost.html>

¹⁵³ Mickinsey (March 2019), <https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/making-electric-vehicles-profitable#>

¹⁵⁴ <https://www.missionelectric.org/electric-vehicles.html>

¹⁵⁵ InsideEVs (February 21, 2020), <https://insideevs.com/reviews/344001/compare-evs/>

¹⁵⁶ Alternative Fuels Data Center, *Medium- and Heavy- Duty Electric Vehicles Search*

¹⁵⁷ CALSTART and FIER Automotive & Mobility, *Moving Zero-Emission Freight Toward Commercialization* (October 2020), pg 14, <https://globaldrivetozero.org/site/wp-content/uploads/2020/12/Moving-Zero-Emission-Freight-Toward-Commercialization.pdf>

¹⁵⁸ SAE International, <https://www.sae.org/news/2020/07/zero-emission-commercial-vehicles>

continued market development. Increasing vehicle range addresses “range anxiety” concerns,¹⁵⁹ the well-documented concern of not having enough charge to reach your desired destination or the next charging station. The proliferation of model options and production also expands consumer choice and drives down EV prices.

Consumer Experience

In comparison to ICE vehicles, PEVs have instant torque, fast and smooth acceleration, and provide a quieter ride.¹⁶⁰ For this reason surveys indicate that consumers enjoy the EV driving experience.¹⁶¹ Coupled with declining purchase prices, TCO savings, and environmental benefits,¹⁶² these performance attributes are driving consumer interest and adoption of EVs.

Company Commitments

Commitments by car-manufacturers and large commercial fleet operators are also driving EV adoption and market growth.¹⁶³ Auto-makers are investing in electrification as they anticipate stricter fuel economy and performance standards under the Biden Administration,¹⁶⁴ while some manufacturers who have set ambitious targets for all-electric sales by 2035¹⁶⁵ or to achieve carbon neutrality by 2050 are greening their supply chains and electrifying their fleet portfolios.¹⁶⁶ Recent announcements by car manufacturers to supply the vehicle market with EVs will see the expansion of EV models of classifications and sizes by mid-decade.¹⁶⁷ Companies are also significantly investing in state-of-art and commerce-centric charging infrastructure¹⁶⁸ and research and development to accelerate transportation electrification.¹⁷⁰ In addition, a coalition of U.S. clean transportation industry leaders has launched the Zero Emission Transportation Association (ZETA), an organization advocating for national policies enabling 100% EV sales throughout the light-, medium-, and heavy-duty sectors by 2030.¹⁷¹

¹⁵⁹Deloitte Insights (July 28, 2020), <https://www2.deloitte.com/us/en/insights/focus/future-of-mobility/electric-vehicle-trends-2030.html>

¹⁶⁰ Plugless, *Infographic: People love their EVs this much* (n.d.), <https://www.pluglesspower.com/full-infographic-people-love-evs-much/>

¹⁶¹ Consumer Reports (November 2020), <https://www.consumerreports.org/hybrids-evs/electric-cars-101-the-answers-to-all-your-ev-questions/>

¹⁶² EVs have a lower carbon footprint than conventional ICE vehicles (e.g. In New York annual emissions from BEVs 1846 pounds of CO2 equivalent versus 11,435 pounds of CO2 equivalent from gasoline fueled vehicles, https://afdc.energy.gov/vehicles/electric_emissions.html

¹⁶³ BloombergNEF, *Electric Vehicle Outlook 2020*, <https://about.bnef.com/electric-vehicle-outlook/>

¹⁶⁴ Krishner, T., *Automakers prep for stronger efficiency standards under Biden* (December 3, 2020),

<https://www.pbs.org/newshour/economy/automakers-prep-for-stronger-efficiency-standards-under-biden>

¹⁶⁵ Yurkevich, V., *GM plans to sell only emission-free vehicles by 2035* (January 28, 2021), <https://www.msn.com/en-us/money/companies/gm-plans-to-sell-only-emission-free-vehicles-by-2035/ar-BB1dbsmY>

¹⁶⁶ World Economic Forum, *A circular car industry could slash carbon emissions – here’s how* (January 14, 2021),

<https://www.weforum.org/agenda/2021/01/circular-car-industry-could-slash-carbon-emissions-accenture/>

¹⁶⁷ IEA, *Electric Vehicles* (June 2020), <https://www.iea.org/reports/electric-vehicles#recommended-actions>

¹⁶⁸ “Volta, the industry leader in commerce-centric electric vehicle (EV) charging networks, today announced an oversubscribed Series D financing of \$125 million,” <https://voltacharging.com/press/volta-announces-series-d/>

¹⁶⁹ Rhombus Energy Solutions Announces UL and CSA Certifications of Its Remote Charging Dispenser for Fleet Electric Vehicles,

http://www.prweb.com/releases/rhombus_energy_solutions_announces_ul_and_csa_certifications_of_its_remote_charging_dispenser_for_fleet_electric_vehicles/prweb17672082.htm

¹⁷⁰ “German auto giant Daimler has announced a new plan to invest €70 billion (\$85 billion) in “research and development and in property, plant and equipment” between 2021 and 2025,” <https://chargedevs.com/newswire/daimler-announces-massive-new-investments-in-evs-plus-a-fund-to-protect-workers/>

¹⁷¹ ZETA (November 17, 2020), <https://www.zeta2030.org/news/clean-transportation-leaders-launch-zero-emission-transportation-association/>

Appendix 3: Summary of Current New York State Programs

ChargeNY

ChargeNY seeks to stimulate EV deployment in New York by raising awareness and providing financial support for EVs and the installation of charging stations.¹⁷² This initiative is a collaboration of the New York State Energy Research and Development Authority (NYSERDA), New York Power Authority (NYPA), and New York State Department of Environmental Conservation (NYSDEC). The program encompasses a range of incentives such as the:

Drive Clean Rebate - Drive Clean Rebate is \$70 million EV rebate and outreach initiative. \$55 million is dedicated to providing rebates of up to \$2000 for the purchase or lease of a new PEV.¹⁷³ Fleet managers can also access the Drive Clean Rebate. More than 40 EV models are eligible and the amount received for particularly BEVs depends on the car's range. The remaining \$15 million supports consumer awareness of EVs, installing more charging stations across the state, and demonstrating new EV- enabling technologies. As of January 2021 more than 38,000 rebates, totalling the \$55 million allocated for the program.¹⁷⁴ New York State Governor Cuomo announced on May 7, 2021 that an additional \$30 million is now available under the initiative.¹⁷⁵

New York Truck Voucher Incentive Program (NYT-VIP) - The NYT-VIP is aimed at making clean and alternative trucks and buses more accessible to fleets across the state by reducing upfront costs. The program provides incentives in the form of discount vouchers to fleets that purchase or lease clean medium- and heavy-duty vehicles including PEVs from a network of approved dealers and requires fleet operators to scrap a similar, older diesel vehicle from their fleet.¹⁷⁶ More than 600 medium- and heavy-duty trucks, including 65 all-electric trucks and buses, have been purchased under this program since 2014. In December 2020, Governor Cuomo announced initiatives to increase electric buses in New York committing \$16.4 million under the NYT-VIP program, to support the five largest public transit operators in the state to transition their fleets to 100% ZEVs by 2035.¹⁷⁷ Additionally, over \$1 million of investments will be allocated for a new NYSEDA and NYPA program to assist the five large upstate and suburban transit operators to develop plans to convert to all-electric transit buses. Another \$2.5 million is also available through the NYT-VIP program for school bus operators across the state purchase electric buses. Up to 100% of the incremental costs of these buses operating near disadvantaged communities could be covered.

Charge Ready NY - This program offers rebates of \$4000 per charging port installed to public and private organizations that install Level 2 charging stations at public parking facilities, workplaces, and multifamily apartment units.¹⁷⁸ In addition to helping these organizations save on the cost of charging installations, Charge Ready NY provides an extra \$500 per port for eligible Level 2 charging equipment installed after December 10, 2020 within disadvantaged communities. NYSEDA has issued \$7.5 million in rebates out of a total budget of \$17 million committed for the program, leaving over \$9 million available.

¹⁷² ChargeNY, <https://www.nyserda.ny.gov/All-Programs/Programs/ChargeNY>

¹⁷³ Drive Clean Rebate, <https://www.nyserda.ny.gov/All-Programs/Programs/Drive-Clean-Rebate>

¹⁷⁴ Drive Clean Rebate Program Statistics, <https://www.nyserda.ny.gov/All-Programs/Programs/Drive-Clean-Rebate/Rebate-Data/Rebate-Stats>

¹⁷⁵ Governor Cuomo Announces Additional \$30 Million Available for Drive Clean Rebate Program, <https://www.governor.ny.gov/news/governor-cuomo-announces-additional-30-million-available-drive-clean-rebate-program>

¹⁷⁶ NYT-VIP, <https://www.nyserda.ny.gov/All-Programs/Programs/Truck-Voucher-Program>

¹⁷⁷ Governor Cuomo Announces Initiatives to Electrify Transit Buses (December 2020),

<https://www.governor.ny.gov/news/governor-cuomo-announces-initiatives-electrify-transit-buses-boosting-access-clean>

¹⁷⁸ Charge Ready NY, <https://www.nyserda.ny.gov/All%20Programs/Programs/ChargeNY>

New York State Tax Credit

The state also provides an income tax credit for each installation of EV charging stations of up to \$5000¹⁷⁹. This credit is targeted at mainly commercial and workplace charging stations and is only available through the end of 2022.

Clean Pass Program

New York State's Clean Pass Program allows drivers of eligible low-emission, energy-efficient vehicles (EVs and hybrids) to use the Long Island Expressway High Occupancy Vehicle (HOV) lanes, regardless of the number of occupants in the vehicle.¹⁸⁰ In addition, discounted Port Authority of New York and New Jersey (PANYNJ) off-peak tolls,¹⁸¹ and a 10% discount on E-ZPass rate through the New York State Thruway.¹⁸²

Low Emission Vehicle Program

The Low Emission Vehicle Program¹⁸³ requires all new vehicles sold in New York State to meet California's zero-emission vehicles (ZEV) and greenhouse gas emissions standards.¹⁸⁴ The aim of the program is to reduce smog-forming pollutants and greenhouse gas emissions caused by light-duty transportation emissions and protect public and environmental health.¹⁸⁵ Car manufacturers must deliver ZEVs including PEVs for sale in the state in order to meet the ZEV standards.

EVolve NY

Led by NYPA, EVolve NY¹⁸⁶ seeks to improve and expand the network of fast, convenient, and affordable public charging stations in key locations across the state, including highways, airports and New York's six largest cities. NYPA is investing \$250 million in fast charging station installations through 2050. In the initiative's first phase, NYPA committed \$40 million in interstate DCFCs, airport charging hubs, and creating EV Model Communities, which will test programs to increase EV adoption. The program aims to install 200 EV fast chargers in 50 locations by the end of 2021 and at least 800 by 2050.¹⁸⁷ For the second phase of the program, NYPA will work with the MTA to increase EV transit fleets as well as develop additional public fast charging locations. To date, NYPA has installed a 10 fast charging stations at the JFK airport as well as smaller ones in 6 locations¹⁸⁸ across the state including Fairpoint, Lagrangeville, Oneonta, Watertown, Schroon Lake, and Malone as part of the EVolve NY program, with many more becoming operational in 2021.¹⁸⁹

¹⁷⁹ NYS Tax Law §210-B and §606

¹⁸⁰ Clean Pass Program, <https://www.dot.ny.gov/programs/clean-pass>

¹⁸¹ PANYNJ's Green Pass Program, <https://www.panynj.gov/bridges-tunnels/en/tolls.html>

¹⁸² NYS Thruway Authority's Green Pass Discount Plan, <http://www.thruway.ny.gov/eypass/greentag.html>

¹⁸³ NYSDEC, *Light-Duty ZEV Program*, <https://www.dec.ny.gov/chemical/8575.html>

¹⁸⁴ California Air Resources Board, *Zero-Emission Vehicle Program*, <https://ww2.arb.ca.gov/our-work/programs/zero-emission-vehicle-program/about>

¹⁸⁵ Light-Duty Low and Zero Emission Vehicles, <https://www.dec.ny.gov/chemical/8575.html>

¹⁸⁶ EVolve NY, <https://www.nypa.gov/innovation/initiatives/evolve-ny>

¹⁸⁷ NYPA, *EVolve NY: A Vision for an Electric Future* (September 2020), <https://www.nypa.gov/-/media/nypa/documents/document-library/evolveny/nypa-a-vision-for-an-electric-future.pdf>

¹⁸⁸ EVolve NY Planned Sites, <https://www.google.com/maps/d/viewer?mid=1QCZN9XmXhZsQo-N2jo3h-oXKDhiPuvdx&ll=43.09980800000005%2C-77.443163&z=8>

¹⁸⁹ EVolve NY Make-Ready Site List (May, 2021),

<http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={8925134E-745B-4C6A-B81B-777B8288AF44}>

Clean Transportation NY – VW Settlement Funds

The New York State’s Beneficiary Mitigation Plan sets out actions to accelerate the transition to zero-emission transportation using the \$127.7 million made available from the Volkswagen (VW’s) violation of nitrogen oxide emissions standards.¹⁹⁰ The funding is being used to replace diesel powered medium- and heavy-duty vehicles with new all-electric or alternative fueled vehicles and for EVSE installation projects for light-duty BEVs in New York State. As of December 2020, \$3.6 million and \$5.3 million have been utilized in the NYT-VIP and New York City Department of Transportation Clean Truck Program (NYCDOT CTP)¹⁹¹ respectively for local freight and port drayage trucks.¹⁹² \$44.7 million has been secured for all-electric transit buses and all-electric, propane and CNG school buses under the NYT-VIP, while \$4.8 million and \$3.7 million were used to procure local freight trucks for NYT-TIP and NYCDOT CTP, respectively. \$5.5 million was utilized under Charge Ready NY for EVSE and requests for letters of interests has been issued for rural electric cooperatives and municipal electric utilities to develop EVSE at locations across the state.¹⁹³ NYSERDA is also soliciting proposals to deploy DCFC ESVE in Regional Economic Development Councils with up to \$11 million is available for this DCFC program.¹⁹⁴ The intention behind this NYSERDA DCFC program is to lower costs of procuring and deploying EVSE, and thereby accelerate EV adoption.¹⁹⁵

Multi-State (Light-Duty) Zero-Emissions Vehicles Memorandum of Understanding (MOU)

In 2013, within a coalition of Northeast and West Coast states, New York signed a MOU¹⁹⁶ committing to coordinated action to ensure the implementation of light-duty ZEV programs that will support market growth. The MOU set a target of having 3.3 million ZEVs on the road within participating states by 2025 and to establish charging infrastructure to support this number of vehicles. A multi-state ZEV Action Plan¹⁹⁷ was developed in 2014 which mapped out these initiatives including consumer purchase incentives, grant and outreach programs to achieve the goals of the MOU. Building on this plan, a new ZEV Action Plan for 2018-2021¹⁹⁸ was released in 2018 incorporating recommendations of 80 market actions to accelerate consumer adoption of light-duty ZEVs and to achieve the goal of approximately 12 million ZEVs on the road by 2030, cumulatively. The updated Plan focuses on 5 priority areas including raising consumer awareness of EV technology, scaling up the charging/fueling infrastructure network, consumer incentives, fleet electrification, and supporting dealerships to increase ZEV sales. New York set a target of 850,000 EVs on the road by 2025, and 2 million by 2030 based on this ZEV MOU.

Multi-State Medium- and Heavy- Duty ZEV MOU

In July 2020, Governor Cuomo announced that New York, along with 14 other states and the District of Columbia signed into a joint MOU,¹⁹⁹ to develop a multi-state action plan to support and accelerate the

¹⁹⁰ NYS Beneficiary Mitigation Plan (August 1, 2019), https://www.dec.ny.gov/docs/air_pdf/vwcleantransportplan19.pdf

¹⁹¹ NYC Clean Trucks Program, <https://www.nycctp.com>

¹⁹² NYSDEC, *VW Funding for Diesel Replacement and EVSE Projects*, <https://www.dec.ny.gov/chemical/118556.html>

¹⁹³ https://www.dec.ny.gov/docs/air_pdf/vwdfcsevse.pdf

¹⁹⁴ NYSERDA DCFC Program,

https://portal.nyserdera.ny.gov/CORE_Solicitation_Detail_Page?SolicitationId=a0rt00000138SPVAA2

¹⁹⁵ Charging Station Programs, <https://www.nyserdera.ny.gov/all-programs/programs/chargeny/charge-electric/charging-station-programs>

¹⁹⁶ State Zero-Emission Vehicle Programs - MOU, <https://www.nescaum.org/documents/zev-mou-8-governors-signed-20131024.pdf/>

¹⁹⁷ Multi-State ZEV Action Plan: 2014, <https://www.nescaum.org/topics/zero-emission-vehicles/multi-state-zev-action-plan-2014>

¹⁹⁸ ZEV Action Plan for 2018-2021, <https://www.nescaum.org/topics/zero-emission-vehicles/multi-state-zev-action-plan-2018-2021-accelerating-the-adoption-of-zero-emission-vehicles>

¹⁹⁹ Multi-State Medium- and Heavy-Duty ZEV MOU, <https://www.nescaum.org/documents/multistate-truck-zev-governors-mou-20200714.pdf/>

market for electric medium- and heavy-duty vehicles including large pickup trucks and vans, delivery trucks, box trucks, school and transit buses, and long-haul delivery trucks. Signatory states committed to working collaboratively to ensure that 100% of all new medium- and heavy-duty sales be zero-emission vehicles by 2050 with an interim target of 30% ZEV sales be ZEVs in these categories by 2030. Special focus will be placed on the deployment of zero-emission buses and trucks in disadvantaged communities. Participating states also aim to make progress toward electrification of its government and quasi-governmental fleets and explore opportunities for coordinated vehicle and infrastructure procurement.

EV Make – Ready Program

On July 2020, the New York State Public Service Commission approved a \$701 million statewide “Make-Ready” charging infrastructure incentive program,²⁰⁰ which will be funded by investor-owned utilities²⁰¹ in New York State. Of that \$701 million, \$480 million will be used to accelerate the deployment of over 50,000 Level 2 charging stations (at workplaces and public locations) and 1,500 DCFCs by 2025. This will support the state’s light-duty ZEV MOU goal to have 850,000 registered ZEVs on the road by 2025. Additionally, \$85 million is allocated to three prize programs targeted to address equity and electrification in disadvantaged communities, including an Environmental Justice Community Clean Vehicles Transformation Prize, the Clean Personal Mobility Prize, and the Clean Medium- and Heavy-Duty Innovation Prize. These prizes were launched in April 2021.²⁰² The initiative also funds a Fleet Assessment Service, a Medium- and Heavy-Duty Make Ready Pilot program, and a Transit Authority Make-Ready Program. It is anticipated that the EV Make Ready initiative will stimulate the EV market and provide more than \$2.6 billion in net economic and consumer benefits.²⁰³

Utility DCFC Per Plug Incentive Program

Approved by the PSC in February 2019, the DCFC Per Plug initiative is intended to stimulate investment and the build out of publicly accessible DCFC infrastructure needed to meet the state’s ZEV goals.²⁰⁴ It provides an annual declining per plug incentive for eligible private DCFC operators. While the incentive structures vary among utilities, plugs capable of charging at 75 kW and greater receive the full incentive while plugs which can charge between 50 to 75 kW receive an incentive equal to 60% of that for plugs capable of charging at a rate of 75 kW or greater.²⁰⁵ For the Joint Utilities of New York, 43 plugs have been enrolled and only \$12,000 have been dispersed by ConEd as of May 4, 2021. Collectively, about \$31.5 million of incentive funds are remaining for 2021.²⁰⁶

MTA EV Commitments

The MTA, which is the largest transit authority in the nation, has committed to electrifying 100% of its bus fleet by 2040 and procuring only electric buses after 2029. This year, the MTA aims to purchase 45 electric

²⁰⁰ Governor Cuomo Announces Nation-Leading Initiatives to Expand EV use, <https://www.governor.ny.gov/news/governor-cuomo-announces-nation-leading-initiatives-expand-electric-vehicle-use-combat-climate>

²⁰¹ EV Make-Ready Program, <https://jointutilitiesofny.org/ev/make-ready>

²⁰² Governor Cuomo Announces Launch of \$85 Million New York Clean Transportation Prizes Initiative, <https://www.nyscrda.ny.gov/About/Newsroom/2021-Announcements/2021-04-20-Governor-Cuomo-Announces-Launch-of-85-Million-New-York-Clean-Transportation-Prizes-Initiative>

²⁰³ Governor Cuomo Announces Nation-Leading Initiatives to Expand EV use, <https://www.governor.ny.gov/news/governor-cuomo-announces-nation-leading-initiatives-expand-electric-vehicle-use-combat-climate>

²⁰⁴ PSC Expands Electric Vehicle Charging Incentive Program (March 19, 2020), [https://www3.dps.ny.gov/pseweb/WebFileRoom.nsf/ArticlesByCategory/12BA1DF50DF070E8852585300052D138/\\$File/pr20028.pdf?OpenElement](https://www3.dps.ny.gov/pseweb/WebFileRoom.nsf/ArticlesByCategory/12BA1DF50DF070E8852585300052D138/$File/pr20028.pdf?OpenElement)

²⁰⁵ DCFC Per Plug Incentive Program, https://jointutilitiesofny.org/ev/dcfc_incentive_program

²⁰⁶ Ibid

buses in an effort to move closer towards these goals. Additionally, the MTA is partnering with the U.S. Department of Energy's National Renewable Energy Laboratory (NREL) and utilities to develop the capacity to utilize traction power substations for electric bus charging as well as other charging options such as managed charging that ensures charging occurs outside peak hours.²⁰⁷

EV Targets for Upstate and Suburban Transit Fleets

In 2020, Governor Cuomo required the five largest upstate and suburban transit authorities to electrify 25% of their fleets by 2025 and 100% by 2035. The state is providing \$20 million in financial support for the Buffalo, Rochester, Albany, Westchester, and Suffolk transit systems to purchase at least 55 electric buses. This is the second tranche of a \$100 million 5-year program to assist transit agencies transition to electric bus fleets.²⁰⁸

Municipal ZEV Rebate and Infrastructure Grant Program

The New York State Department of Environmental Conservation (NYSDEC) provides rebates up to \$300,000 for local municipalities for the purchase or lease (for at least 36 months) of ZEV fleets²⁰⁹ and grants up to \$2,500,000 for the procurement and installation of publicly accessible Level 2 and DCFC EVSE or hydrogen fuel cell fueling stations. This is aimed at supporting the adoption of clean vehicles in New York and reducing greenhouse gas emissions. During fiscal 2019-2020, NYSDEC issued 21 rebates amounting to \$187,500 for 46 EVs and \$298,961 for eight Level 2 charging ports and two DCFC stations (several are still awaiting approval).²¹⁰ The 2021 application period is now open^{211,212} with \$2.8 million²¹³ now available through this program to help municipalities transition their fleets and deploy EV charging infrastructure.

²⁰⁷ The New York State 2021 State of the State,

https://www.governor.ny.gov/sites/governor.ny.gov/files/atoms/files/SOTS2021Book_Final.pdf

²⁰⁸ FY 2022 Executive Budget Briefing Book, <https://www.budget.ny.gov/pubs/archive/fy22/ex/book/briefingbook.pdf>

²⁰⁹ Municipal Zero-Emission Vehicle (ZEV) Rebate and Infrastructure Grants,

<https://www.dec.ny.gov/energy/109181.html#ZEV%20>

²¹⁰ Municipal ZEV Program, Legislative Report (2019 – 2020),

https://www.dec.ny.gov/docs/administration_pdf/1920zevlegrpt.pdf

²¹¹ 2021 ZEV Rebates for Municipalities, https://www.dec.ny.gov/docs/administration_pdf/21zevcvfs.pdf

²¹² 2021 ZEV Infrastructure Grants for Municipalities, https://www.dec.ny.gov/docs/administration_pdf/21zevinfs.pdf

²¹³ Governor Cuomo Announces \$2.8 Million Available For Municipal Charging Stations and Zero-Emission Vehicles, <https://www.governor.ny.gov/news/governor-cuomo-announces-28-million-available-municipal-charging-stations-and-zero-emission>

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