



Office of
General Services

NEW YORK STATE FLEET

Clean Fleet Plan

2024

SUMMARY OF
RECOMMENDATIONS

New York State's conversion is estimated to provide the following benefits

Remove **182,000**
metric tons of
carbon dioxide

Save **\$58.5 million**
in annual vehicle
maintenance costs

\$1,000 in benefits
per legacy vehicle
replaced with a BEV

BACKGROUND

As part of Governor Hochul's effort to electrify all on-road vehicles in New York, the State has committed to transitioning its 17,500*-vehicle non-emergency light-duty fleet to zero-emission vehicles (ZEVs) by 2035, as directed by Executive Order 22 (EO 22). The Executive Order directs the State to "lead by example" in order to further accelerate the economy-wide adoption of ZEVs. EO 22 builds on the commitment under the Climate Leadership and Community Protection Act (CLCPA) to reduce greenhouse gas emissions by 85 percent by 2050 and separately to cease internal combustion engine (ICE) sales starting in 2035.

In New York, the transportation sector is the second largest source of greenhouse gas emissions economy-wide, making the electrification of its vehicles a critical undertaking. As a first step toward meeting these commitments, New York State entities subject to Executive Order 22 developed plans to transition all light-duty non-emergency vehicles to ZEVs and submitted those plans to the GreenNY Council, the body charged with implementing the Executive Order. The Council is jointly chaired by the Commissioners of the Office of General Services (OGS) and the Department of Environmental Conservation (DEC), the director of the Division of Budget (DOB), and the Presidents of the New York State Energy Research and Development Authority (NYSERDA) and the New York Power Authority (NYPA). The transition of the State light-duty fleet is also reinforced by the multistate ZEV memorandum of understanding to which New York State is a signatory. The transition to ZEVs will not only satisfy mandates but will also reduce greenhouse gas and criteria pollutant emissions, improve health outcomes, and provide fiscal benefits. During this transition, New York State will rely on a mix of battery electric vehicles (BEVs) with fully electric powertrains and plug-in hybrid electric vehicles (PHEVs) that utilize both an electric motor and an ICE.

The speed at which agencies will be able to convert their light-duty fleets will vary considerably depending on multiple factors, including fleet size, composition, agency mission, and vehicle use patterns. While the path to 100 percent electrification will be different for each agency, all agencies can incorporate ZEVs into their fleets today and can build on these early wins to overcome operational, market, and financial barriers.

*Based on time of plan submission in December 2023.

Key Milestones

2023

Plans submitted
for light-duty,
non-emergency
fleet conversion

Plans due
for medium/
heavy-duty
conversion

2025

2027

100%
of school bus
purchases to be ZEV

100% of light-duty,
non-emergency fleet to be ZEV
100% of school buses to be ZEV
End of sales for internal
combustion engines in new vehicles

2035

100%
of medium/
heavy-duty fleet
to be ZEV

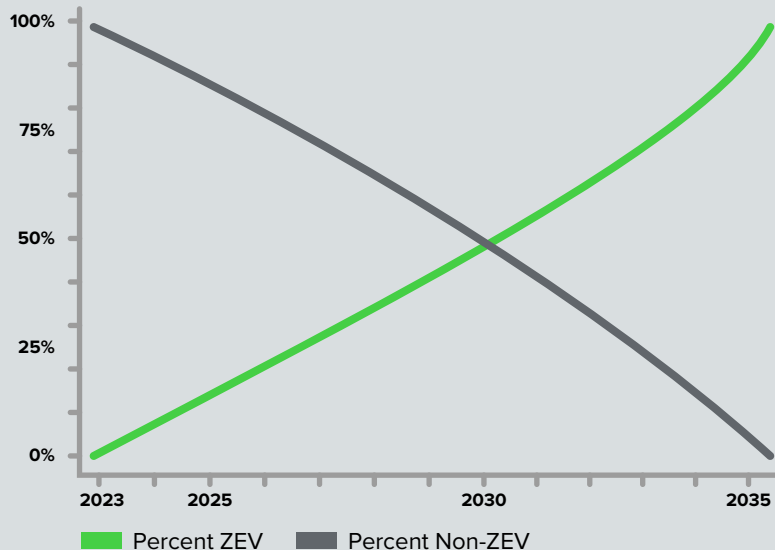
2040

Estimated NYS ZEV Conversions

Light-duty non-emergency fleet

ZEV conversion estimates for all Affected Entities under E.O. #22 by end of calendar year 2035

Source: NYS Light-duty ZEV Conversion Plans



As Affected Entities under EO 22 set out to designate their own fleet-specific targets, the Clean Fleet Plan was completed through **NYSDOT** and **OGS**. This study provides guidance for a coordinated transition by identifying best practices in hardware selection, vehicle-to-port ratios, and other guidelines for an effective electric conversion, as well as estimated costs and savings.

INSIGHTS

Detailed conversations held with State agency fleet teams* yielded important insights into New York State’s roadmap to an all-electric future:

Experiences with ZEVs to date have largely been positive and many agencies are well-positioned for electrification.

While reinforced through EO 22, agency purchases have in many ways reflected the consumer market to date, and State entities have already been integrating ZEVs with success. Agencies that have begun the transition to ZEVs have found them to be an operational asset. For example, PHEVs have a range that exceeds their gasoline counterparts and generate emission reductions that are integral to the mission of many teams, such as DEC. DEC is well-positioned to electrify, as agency staff estimate that over 85 percent of the fleet travels less than 100 miles per day, an ideal use case for BEVs that return to site daily. The Office of Mental Health also provides good use cases for electrification, as vehicles used for client transportation consistently return to depots or garages. The introduction of a wider range of ZEVs, such as all-wheel drive sedans and compact pickups, will better meet the needs of agencies such as Parks and Agriculture and Markets. Parks is already operating over 60 ZEVs, an encouraging sign for an agency with a land-use mission that often requires larger vehicles and all-wheel drive.



Staff training and installation of electric vehicle supply equipment (EVSE) at State facilities are integral to expanding ZEV adoption. While commercial charging continues to grow through federal programs like the National Electric Vehicle Infrastructure program (NEVI), charging access at State facilities will be a key factor in ensuring ZEVs can leave garages and parking lots with a full charge, which can then be supplemented through commercial charging at public fast chargers. OGS has already worked with WEX to pilot commercial charging through fobs, which is a recommended best practice that will ease future adoption for all agencies by reducing the need for immediate in-house charging. Depending on the sufficiency of commercial charging over the next decade, this may also reduce EVSE installation costs, as the State will be less reliant on in-house EVSE. OGS developed written materials to introduce ZEVs to fleet managers and operators, a best practice employed by leading fleets.

*Contractors interviewed staff from OGS, DEC, the Department of Agriculture and Markets, the Department of Transportation, the Office of Mental Health, and the Department of Parks, Recreation, and Historic Preservation.



As State and public charging expands, agencies will need to assess market offerings with vehicle use data to fine-tune procurement decisions. New York State has the opportunity to take advantage of vehicle telematics (on-board vehicle tracking devices) to build a rich data set that will enable highly calibrated planning on a vehicle-specific basis across its entire fleet. While the hardest cases will depend on manufacturers providing the vehicles necessary to fulfill an agency’s mandate, New York State is positioned to ensure that as its fleet is electrifying, fleet management processes will also be improving. Agriculture and Markets faces many challenging use cases due to remote sites, limited infrastructure and EVSE, and the need for all-wheel drive and larger vehicles. The move by the Department of Transportation (DOT) to lease more vehicles may ease the path to electrification, as vehicles will be held for fewer years before they are replaced, allowing the agency to reap the benefit of newer products with greater range and capability.

This will likely allow DOT, already a leader in fleet electrification, to increase ZEV adoption earlier than other agencies who commonly wait for a vehicle to reach the end of a 10- or 12-year service life. The State’s move to adopt telematics in all light-duty vehicles will provide greater data and analytical capacity to streamline the transition. Telematics data will help identify the most appropriate replacement for each legacy vehicle, as well as provide insights on the most critical locations for EVSE installation.

The electrification of New York State’s light-duty vehicle fleet will provide substantial environmental and health benefits for state residents. Fleet electrification will reduce roughly 182,000 metric tons of carbon dioxide by 2035, helping meet the climate goals set forth in the CLCPA. Permanently replacing light-duty vehicles powered by petroleum fuels with clean, zero-emission units will also reduce pollutants like particulate matter, resulting in significant public health benefits, particularly in disadvantaged communities. The statewide benefits associated with avoiding these health and environmental impacts are estimated at over \$10 million over the next 10 years.

REPORT FINDINGS

Infrastructure: New York State’s parking facilities include lots and garages, in rural and urban settings, and may be shared across a variety of users or dedicated entirely to fleet. These characteristics will have a major impact on the preferred approach to EVSE installation and require consultation with facility teams to ensure an optimal design.

Determining the ideal location for EVSE involves several factors. Perhaps the most important consideration is the electrical capacity of a potential site. Upgrades to electrical infrastructure may be needed to support ZEV charging and can often significantly affect overall project costs. Agencies should coordinate with their electrical utility early in the ZEV planning process. Another variable that determines a site’s suitability is the number of ZEVs that will be housed there. Because ZEVs can take hours to fully charge, placing chargers in locations where the vehicles will already be parked is an important step in an efficient charging process.



A slab prepared for future EVSE

Once a site has been selected, agencies should consider charger layout and access control. It is a best practice to place chargers in areas that allow for easy access and that avoid gridlocks between

charging and non-charging vehicles. Similarly, it is crucial that charging cords can reach the ports of various ZEVs. Fleets often opt for extended and retractable charging cords to ensure that all vehicles can connect to EVSE. While planning for construction, agencies should consider their future charging needs and prepare their site to handle additional chargers and vehicles. This is often referred to as “future-proofing” and can save agencies money and time by reducing the need for future construction and installations. After construction has been completed, agencies will need to decide who can access their chargers. Limiting access to agency vehicles may involve placing the EVSE in gated lots or utilizing electronic access cards.

New York State can reduce costs and infrastructure needs by sharing EVSE among multiple vehicles. Sharing EVSE will be essential given cost constraints and the need to serve various user groups. The following is the recommended starting point for agency EVSE adoption and implementation, focused on Level 2 charging:

- **Manual EVSE Sharing.** The simplest approach requires unplugging and moving the charging cord/connector from a charged ZEV to a ZEV that needs to be charged. This option may be preferred in some circumstances, such as midday cord swaps for EVSE located near staff offices or work sites. However, most State fleet charging is likely to occur overnight, which would make this option challenging at many sites due to lack of available staff.
- **Dual-port EVSE with power-sharing capability.** Dual-port power-sharing charging stations allow two ZEVs to connect to a single charging station simultaneously. This option provides a simple, flexible approach to charging as ZEV inventories increase and understanding of charging practices improves. Shared charging stations should be sited to allow access from multiple parking spaces and to account for the distance from the charging station to different vehicle charging port locations.
- **Charging station software management solutions.** EVSE with power management capability can be controlled remotely by a charging management system. These systems vary power output (on/off, power throttling, etc.) at the station level and distribute power to multiple EVSE with a 1:1 port-to-ZEV ratio. This obviates the need for on-site staff to manually plug in vehicles when other vehicles have completed charging.



Networked Level 2 EVSE: Considering the relative cost differences between Level 2 and Level 3 charging, the amount of electrical infrastructure required to support Level 3 charging, and the lead time necessary to install Level 3 chargers, New York State should rely mainly on Level 2 EVSE. This is especially true for the transition of light-duty vehicles, which have smaller battery packs than medium- and heavy-duty vehicles. The early years of the transition will also rely more heavily on PHEVs than BEVs. Due to the smaller battery packs of PHEVs relative to BEVs, this is an additional factor in favor of Level 2 charging. Because improving fleet data is critically important to this transition, the State should rely mainly on networked charging as the baseline for EVSE. Networked EVSE share data on charging events and maintenance through wireless communication. These EVSE are a source of information on charger utilization, vehicle charging speeds, amount of electricity dispensed over time, duration of charging, and more, which will help agencies understand where more EVSE may be necessary or where EVSE may be underutilized.



Public charging of fleet vehicles: While most ZEV charging will likely occur at state agency depots (with some fraction of the charging occurring during take-home events), fleet ZEVs will also need the flexibility to charge at publicly accessible stations on occasion. However, the number of public direct current fast charging (DCFC) stations in New York State is currently limited. Agency staff should therefore carefully plan long and/or rural routes to ensure public DCFC station access, if needed.

NEVI seeks to advance electric vehicle adoption by lowering costs for EVSE installation, increasing access to EVSE, and creating reliable refueling for ZEVs. Due to federal interoperability standards that must be met at NEVI sites, these sites should be easier to access than other DCFC stations, which lack such standards. With Tesla's transition from proprietary charging to the North American Charging Standard, State vehicles should also be able to access the company's large network of charging stations, which in New York State includes more than 850 ports at 91 sites. NEVI standards for reliability and interoperability are expected to become industry standards, which should lead to an increase in the reliability of other EVSE networks. This change, combined with access to existing NEVI infrastructure and the Tesla network, will give New York State a boost in the infrastructure it needs to advance fleet electrification, especially after 2030 as more sites are completed.

RECOMMENDATIONS

To take full advantage of telematics systems, New York State should:

- **Identify key performance indicators for measuring fleet performance and electrification progress.** The State should develop indicators that are shared on a regular basis to keep executive staff apprised of progress with electrification.
- **Complete the rollout of telematics to the State's entire light-duty fleet to bolster the transition.** Once data collection begins, the State can begin to fully understand vehicle use for both fleet management and vehicle electrification purposes, including identification of vehicles with very low utilization that could potentially be pooled for temporary needs. Telematics can also be used to objectively demonstrate that many concerns about ZEV ranges and specific use cases are unfounded.
- **Standardize State agency fleet data.** The State should carefully standardize data across agencies to ensure that utilization and other key metrics can be compared accurately across agencies. This can be achieved through the use of shared platforms and data capture of consistent categories.

To mitigate the costs of ZEV installation and provide broader access to EVSE, New York State should:

- **Use public or commercial charging as much as possible.** To reduce the expense of EVSE installation, the State should equip operators to access commercially available recharging seamlessly and with no added cost, both locally and using the national NEVI network (assuming charging costs at DCFC stations remain close to 50 cents per kWh).
- **Create support tools for use of public and private EVSE.** To facilitate the use of public and private EVSE, the State should develop access cards and/or app-based tools to procure electricity from multiple vendors and integrate the charging data into the State's fleet management information system (WEX is one vendor offering this functionality). These tools would consist of a standard package of phone applications or radio frequency identification (RFID) tags issued to each vehicle to facilitate charging.
- **Share EVSE across agencies where possible to reduce the need and cost for EVSE and to charge the fleet more efficiently.** New York State should strive to remove existing or potential barriers to cross-agency charging, including restricted access to State-operated gated lots hosting EVSE.
- **Prioritize fleet access to EVSE in the near term.** The primary function of State-owned EVSE is charging agency vehicles. The State should consider limiting public access to state-owned EVSE during the early stages of fleet electrification to prioritize fleet access and minimize equipment delivery and installation bottlenecks. Creating dedicated fleet-only access hours is one strategy to prioritize fleet operations.

- **Make Level 2 the primary charging method for the vast majority of vehicles.** Installing higher-power Level 2 charging (19.2 kW) will provide future-proofing as the fleet grows and/or vehicle usage increases above current levels. With PHEVs likely to outnumber BEVs in the first years of light-duty electrification, there may be opportunities to use cheaper Level 1 charging for PHEVs, which have smaller-capacity batteries than BEVs.
- **Develop a reimbursement strategy to facilitate take-home use of ZEVs.** Installing EVSE in private homes to allow ZEVs to be used as take-home vehicles is complex and can be avoided by creating a reimbursement scheme for drivers. A standard monthly reimbursement based on estimated electricity costs is the simplest mechanism.

To realize the greatest benefits from this transition, New York State should:

- **Ensure that vehicles being replaced presently are replaced with ZEVs.** To maximize health benefits, operational savings, and emissions reductions, it is critical that each light-duty vehicle the State relinquishes is replaced with a ZEV. Replacement of an ICE sedan with a similar ICE vehicle represents a seven-year delay, at minimum, in reducing emissions. Rapid replacement of older vehicles has the additional benefit of bringing additional safety features, such as autonomous emergency braking, into the fleet.

As part of a longer-term strategy to provide cost-effective and efficient charging operation to its fleet, New York State should:

- **Study on-site renewable power integration.** Organizations are increasingly considering on-site renewable energy generation, mainly with solar energy, to reduce their greenhouse gas footprint. ZEV charging will add power demand to sites, making on-site renewables an attractive option for cutting emissions, potentially lowering energy costs, and increasing resiliency. Planners should consider electrical requirements for future renewables integration with anticipated ZEV charging infrastructure upgrades.
- **Consider the future need for faster charging.** Level 2 charging is adequate for the vast majority of light-duty fleet uses and should remain the primary strategy for New York State. However, by 2030, the need for faster charging will become more urgent as the percentage of ZEVs increases, and this need will have to be addressed to assist medium-and heavy-duty electrification by 2040.