2022 Long Term Forecast – Electric Vehicle Forecast Update

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Electric System Planning Working Group/Load Forecasting Task Force Meeting

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Primary Topics

- Updated electric vehicle (EV) stock forecast assumptions

- EV Stock Forecast

- Energy and Peak Impact Forecast
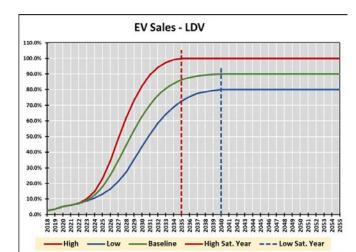
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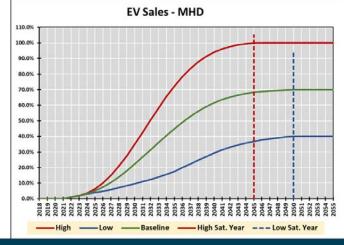# EV Stock Forecast Base Assumptions

- **The key assumption is the recent legislation signed by the New York Governor**
  - Goal of all new light duty vehicles (LDV) sales by 2035 to be zero emission vehicles (ZEV)
  - Goal of all new medium- and heavy-duty (MHD) vehicles sales by 2045 to be ZEV
- **The stock forecast was made in three categories – LDV, MHD vehicles and Buses**
- **MHD vehicles ZEV target was used for the Bus stock forecast**

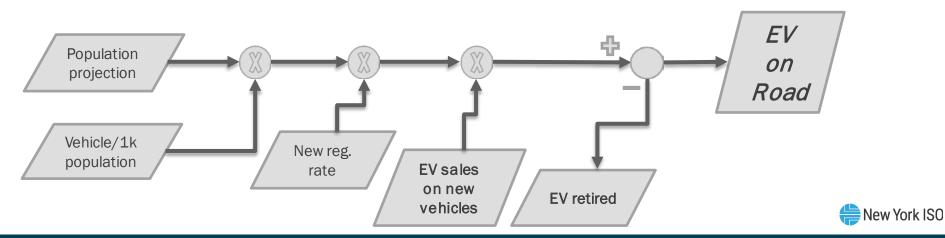DRAFT – FOR DISCUSSION PURPOSES ONLY

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Scenarios

- Two scenarios created for EV sales target

- The high scenarios assume 100% EV penetration by the target year, with assumption of no alternate fuel ZEVs

- The low and baseline scenarios were informed by different scenario assumptions from the New York State Climate Action Council (CAC) Draft Scoping Plan

  - The baseline scenario is the average of the high and the low scenario
  - The LDV baseline final penetration is similar to the Strategic Use of Low-Carbon Fuels scenario assumptions
  - The MHD baseline final penetration is similar to the Accelerated Transition Away from Combustion scenario assumptions
  - The MHD low final penetration is similar to the Strategic Use of Low-Carbon Fuels scenario assumptions

- Differential rates applied for different parts of the state, but they all reach maximum in the same year. The graphs show the bin 1 regions with the fastest growth

CAC Scenarios
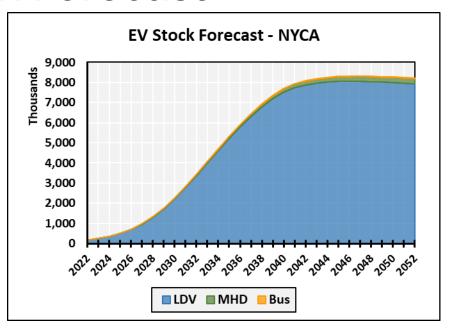

EV Sales - LDV

EV Sales - MHD

EV Stock Forecast Process

- A general forecast procedure was applied across three categories for the stock forecast
- From population projection and vehicle per capita, total vehicles on road was projected
- EV sales scenarios were applied to the new registrations
- Data used from variety of sources including Moody's, EValuateNY, and New York DMV
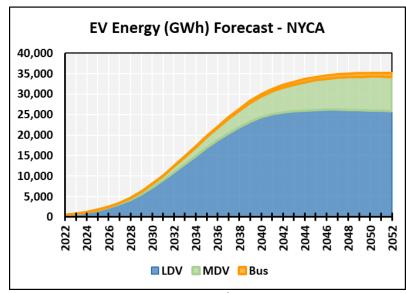
EV Stock Forecast

EV Stock Forecast - NYCA

- LDV has the largest share of the EV stock
- LDV share is 99% until early 30s, gradually declining to 96% by 2052

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EV Energy Forecast

- **Annual stock forecast was converted into energy requirement by applying unit energy consumption per vehicle by class**
- **Charging energy requirement depends on a number of factors:**
  - Annual vehicle miles traveled (VMT)
  - Improved efficiency of batteries of new vehicles
  - Percentage of Plug-In-Hybrid Vehicle (PHEV)
  - For LDV, 8,760 hourly charging profiles were built for the years 2022 - 2052, with an average requirement of 3.2 MWh/year/vehicle
  - For MHD and Buses, the average energy requirements are about 10 times larger relative to LDV

EV Energy (GWh) Forecast - NYCA

Legend: LDV, MDV, Bus

- **LDV has the largest share of the EV energy**
- **LDV share declines over time**
  - Influx of MHD and Buses in the outer years
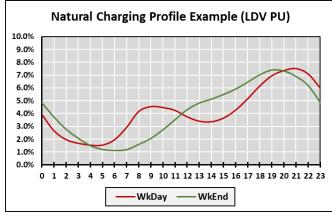 - Greater energy requirement for MHD and Buses
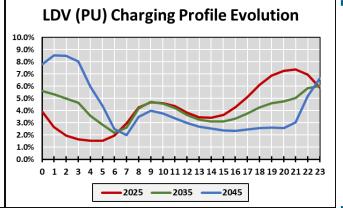
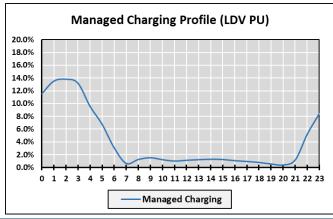New York ISO

EV MW Impact Forecast

- Annual energy requirement forecast was converted into summer and winter coincident peak MW impact by applying charging profiles

- MW impact depends on number of factors:
  - Weekday vs. weekend profile
  - Higher energy requirement during winter due to heating needs
  - Relative shares of different charging technologies (L1, L2, direct current fast charger)
  - Percentage of population having access to residential and workplace chargers
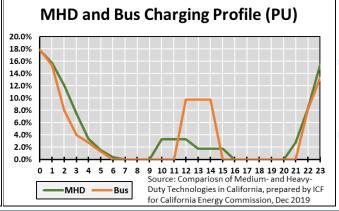 - Shares of natural and managed charging

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EV MW Impact Forecast (cont'd)

Natural Charging Profile Example (LDV PU)

LDV (PU) Charging Profile Evolution

Managed Charging Profile (LDV PU)

MHD and Bus Charging Profile (PU)

Source: Compariosn of Medium- and Heavy-Duty Technologies in California, prepared by ICF for California Energy Commission, Dec 2019
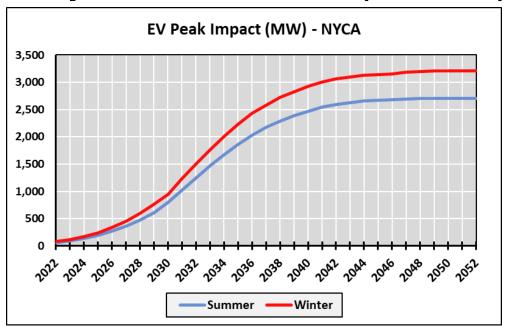
- For LDV, 8,760 hourly natural charging profiles were built for the years 2022 – 2052, using projection of different shares of PHEV, shares of charging technologies, workplace/residential/public charging, annual temperature variability

- Natural charging profiles reflect those developed for the 2021 Goldbook EV forecast

- Starting from 2026, managed charging profile was introduced for LDV, reaching 60% by 2045

- Charging impact for MHD and Buses is very low during the evening peak hours

EV MW Impact Forecast (cont'd)

EV Peak Impact (MW) - NYCA

- LDV is the dominant vehicle class of peak impact
- Winter peak impact is higher than summer primarily due to heating needs and greater coincidence with the peak load hour

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Questions?

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Our Mission & Vision

Mission
Ensure power system reliability and competitive markets for New York in a clean energy future

Vision
Working together with stakeholders to build the cleanest, most reliable electric system in the nation

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