MULTI-STATE MEDIUM- AND HEAVY-DUTY ZERO-EMISSION VEHICLE ACTION PLAN:

A Policy Framework to Eliminate Harmful Truck and Bus Emissions

MULTI-STATE ZEV TASK FORCE

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Senior Policy Advisor

April 11, 2022
Presentation Outline

• Northeast States for Coordinated Air Use Management
• Key policy drivers of transportation electrification
• MHD vehicles and their impacts
• Positive MHD ZEV market developments
• Multi-State MHD ZEV initiative and MHD ZEV Action Plan
• MHD ZEV Action Plan development process
• MHD ZEV Action Plan policy recommendations
• Request for public input
• New York State’s MHD vehicle electrification legislation, regulation, goals, and programs
• Questions and discussion

KEY TERMS

Medium and heavy duty (MHD) refers to vehicles with a gross vehicle weight rating (GVWR) greater than or equal to 8,500 pounds (3,860 kilograms) regardless of how they are powered.

Zero emission vehicles (ZEVs) include:

• Battery electric vehicles (BEVs) powered solely by an electric motor and battery
• Plug in hybrid electric vehicles (PHEVs) powered by a combination of an electric motor and a fossil fueled internal combustion engine
• Fuel cell electric vehicles (FCEVs) powered by an electric motor fueled by hydrogen
Northeast States for Coordinated Air Use Management (NESCAUM)

• Non-profit **regional association** of state air quality agencies in the Northeast U.S. (est. 1967)

• Provides scientific, technical, and policy support on wide range of air quality and climate issues

• Significant focus on **transportation electrification**

• Long history of collaborating with other states, federal agencies, and the automobile industry to promote low- and zero-emission vehicles

• Develops and leads multi-state initiatives, e.g.,
  - 2013 **Multi-State ZEV MOU**
  - Multi-State ZEV Task Force
  - The “Section 177 States”
  - 2020 **Multi-State MHD ZEV MOU**
ZEV Task Force – Light-Duty Vehicles

MULTI-STATE ZEV ACTION PLAN
May 2014
ZEV Program Implementation Task Force

ELECTRIC VEHICLE CHARGING SIGNING: RECOMMENDED PRACTICES
June 2015
ZEV Program Implementation Task Force

Northeast Corridor Regional Strategy for Electric Vehicle Charging Infrastructure 2018 – 2021
May 16, 2018

DRIVE CHANGE
DRIVE ELECTRIC
Key Policy Drivers of Transportation Electrification

Mitigate climate change
• Transportation is the largest source of greenhouse gas (GHG) emissions in the U.S.

Improve air quality
• Major source of smog-forming pollutants, particulate matter, and hazardous air pollutants that harm public health

Promote equity and justice
• Develop policies that address historical and current public health, economic, and social inequities

Generate economic growth
• Policies that advance ZEV market development incentivize vehicle deployment, attract investments, and create jobs

Enhance energy security and resilience
• Transitioning to ZEVs reduces reliance on foreign oil and insulates consumers from global market fluctuations

**Medium- and Heavy-Duty Vehicles**

<table>
<thead>
<tr>
<th>Weight Class</th>
<th>Class 2b</th>
<th>Class 3</th>
<th>Class 4</th>
<th>Class 5</th>
<th>Class 6</th>
<th>Class 7</th>
<th>Class 8</th>
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<tbody>
<tr>
<td>Example Vehicles</td>
<td><img src="https://via.placeholder.com/150" alt="Image" /></td>
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<tr>
<td>GVWR</td>
<td>8,500 – 10,000 lb</td>
<td>10,001 – 14,000 lb</td>
<td>14,001 – 16,000 lb</td>
<td>16,001 – 19,500 lb</td>
<td>19,501 – 26,000 lb</td>
<td>26,001 – 33,000 lb</td>
<td>&gt; 33,000 lb</td>
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<td></td>
<td>3,856 – 4,536 kg</td>
<td>4,536 – 6,350 kg</td>
<td>6,351 – 7,257 kg</td>
<td>7,258 – 8,845 kg</td>
<td>8,846 – 11,793 kg</td>
<td>11,794 – 14,969 kg</td>
<td>&gt; 14,969 kg</td>
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**Medium- and heavy-duty (MHD)** refers to vehicles with a gross vehicle weight rating (GVWR) greater than or equal to 8,500 pounds (3,860 kilograms)
While MHD vehicles account for less than 5% of total on-road vehicles . . . Their annual vehicle miles traveled (VMT) is far greater than other classes

MHD vehicles account for 28% of GHGs from on-road transportation

MHD Vehicles – NOx and PM$_{2.5}$ Emissions

42% of smog-forming NOx emissions (a precursor to ground-level ozone)

51% of PM$_{2.5}$ emissions (particulate matter < 2.5 micrometers in diameter)

Disproportionate Impacts on Frontline and Overburdened Communities

- Research shows a direct correlation between exposure to near-road air pollution and increased health risk.
- Air pollution worsens asthma and other cardio-respiratory illnesses and increases risk of premature death.
- Many low-income communities and communities of color are located near trucking corridors, ports, warehouses, and other emissions sources.
- And are directly and disproportionately exposed to harmful pollutants and more vulnerable to the effects of climate change.

Positive Market Developments

State adoption of Advanced Clean Trucks regulation
- Sales requirements adopted in CA, MA, NJ, NY, OR, and WA
- Many states considering adoption
- Reduces emissions and provides market certainty needed to drive investment in zero-emission technologies and infrastructure

Infusion of federal funding
- Infrastructure Investment and Jobs Act provides $15 billion in funding for MHD vehicle electrification:
  - $250 million for projects that reduce truck emissions at port facilities
  - $5 billion for clean school bus purchases
  - $10 billion for clean transit buses, refueling infrastructure, and bus facility upgrades
Positive Market Developments

Continuously improving economics

- Rapid advances in battery technologies are driving sharp cost reductions; forecasted through 2030
- Lifetime operation and maintenance cost savings
- Favorable total cost of ownership for applications in many classes by 2025 and all classes by 2030

Growing model availability and vehicle deployments

- > 125 MHD ZEV models (Class 2b-8) currently available; > 240 models expected by 2023
- > 3,500 zero-emission buses and 1,700 electric school buses in operation or on order in the U.S.
- > 100,000 electric MHD vehicles pre-ordered by commercial fleets; deployments have begun

Source: Volvo

Source: Volvo
Positive Market Developments

- UPS invests in Arrival and orders 10,000 Generation 2 Electric Vehicles
- Amazon Will Buy 100,000 Rivian Electric Delivery Trucks
- Lion Electric Receives Conditional Purchase Order from Student Transportation of Canada for 1,000 Electric School Buses
- Maersk to add 300 electric trucks to North America network
- Walmart orders 5,000 electric delivery vans from GM's BrightDrop
- Pride Group Enterprises Orders 6,320 Workhorse C-Series Delivery EVs
- Charging Ahead: FedEx Receives First All-Electric, Zero-Tailpipe Emissions Delivery Vehicles from BrightDrop
- Fluid Truck Orders 600 Lightning Electric Vehicles
- King County Metro to purchase up to 120 battery-electric buses from New Flyer of America, Inc.
Multi-State Medium- and Heavy-Duty Zero-Emission Vehicle Initiative

• Governors’ Multi-State MHD ZEV Memorandum of Understanding (MOU) announced in July 2020

• Commits 17 states, D.C., and Quebec to work to promote rapid and equitable electrification of trucks and buses

• Sets goal for at least 30% of new truck, van, and bus sales to be zero-emission by 2030, and 100% of sales by 2050

• Prioritizes deployment of electric trucks and buses in and near frontline and overburdened communities

• Directs ZEV Task Force to develop a Multi-State MHD ZEV Action Plan to identify barriers and recommend policies to support widespread MHD vehicle electrification
MHD ZEV Initiative Participating Jurisdictions

- 43% of the U.S. population
- Nearly half of the U.S. economy
- Over 35% of Class 2b-8 vehicles
- Over 40% of goods (by value) moved by truck in the U.S.

*Not including Quebec.


Bureau of Economic Analysis, GDP and Personal Income, [https://apps.bea.gov/itable/itable.cfm?ReqID=70&step=1#reqid=70&step=1&isuri=1](https://apps.bea.gov/itable/itable.cfm?ReqID=70&step=1#reqid=70&step=1&isuri=1) (2021 Real GDP)


National Transportation Research Center, Freight Analysis Framework 5 (2020), [https://faf.ornl.gov/faf5/SummaryTable.aspx](https://faf.ornl.gov/faf5/SummaryTable.aspx)
Multi-State Medium- and Heavy-Duty Zero-Emission Vehicle Action Plan

- Identifies the environmental, economic, and social policy drivers of MHD vehicle electrification
- Offers principles to support a just and equitable transition to electric trucks and buses and emphasizes the need for a “whole-of-government” approach to equity
- Describes the state of the MHD ZEV market today
- Discusses the barriers and opportunities associated with widespread MHD vehicle electrification
- Includes 60+ recommendations for state policymakers to promote rapid and equitable MHD ZEV deployment
- Features innovative MHD ZEV policies and programs
- Includes local and federal government recommendations
Action Plan Development Process – Prioritizing Equity

- Goals: center equity, reflect frontline and overburdened community voices and expertise, and deliver direct benefits to communities and workers

- Prioritized engagement with national equity and environmental justice organizations to learn about issues facing communities and workers and their priorities

- Developed principles for the design and implementation of just and equitable state MHD ZEV programs and robust community engagement practices

- Collaborated on the development of equitable electrification strategies and received feedback on preliminary draft recommendations
### Action Plan Development Process – Informational Webinar Series

<table>
<thead>
<tr>
<th>Date</th>
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<tbody>
<tr>
<td>October 1, 2020</td>
<td>Regulatory Tools to Accelerate MHDV Adoption</td>
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<tr>
<td>October 29, 2020</td>
<td>Understanding the Truck Market</td>
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<tr>
<td>November 24, 2020</td>
<td>Early Experiences in Truck Electrification: A Panel Discussion with Commercial and Public Sector Fleets</td>
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<tr>
<td>December 17, 2020</td>
<td>Transit and School Bus Electrification: Getting to Scale</td>
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<td>January 7, 2021</td>
<td>Role of Utilities in Accelerating Electrification of MHD Vehicles – Part 1 (overview)</td>
</tr>
<tr>
<td>January 21, 2021</td>
<td>Role of Utilities in Accelerating Electrification of MHD Vehicles – Part 2 (utility panel)</td>
</tr>
<tr>
<td>April 1, 2021</td>
<td>Innovative Financing to Accelerate Truck and Bus Electrification</td>
</tr>
<tr>
<td>December 9, 2021</td>
<td>Prioritizing Transportation Policy for Health and Equity</td>
</tr>
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NY Outreach

- M/HD ZEV MOU - DEC Informational Meeting, October 21, 2020
- NYS Community Group Webinar, December 7, 2021
- M/HD ZEV Action Plan - April 11, 2022
MHD ZEV Action Plan Recommendations

➢ **Equity Principles**
  • Develop inclusive, accessible, and transparent community engagement processes
  • Ensure that MHD ZEV programs deliver direct benefits and just and equitable outcomes for frontline and overburdened communities

➢ **Vehicle Sales and Purchase Requirements** (e.g., Advanced Clean Trucks (ACT) + HD NOx, Advanced Clean Fleets, Innovative Clean Transit)
  • Require manufacturers to sell and fleets to purchase MHD ZEVs
  • Establish state fleet, school bus fleet, and public transit fleet electrification targets

➢ **Vehicle and Infrastructure Purchase Incentives**
  • Establish incentive programs, e.g., point-of-sale (most effective), tax credits/waivers, toll exemptions, parking fees, registration fees
  • Reserve funding to benefit frontline/overburdened communities and small/minority-owned fleets and independent owner/operators

Source: Lion Electric
MHD ZEV Action Plan Recommendations

➢ Electric Utility and Utility Regulator Actions
  • Adopt targets for infrastructure deployment that align with state air quality, climate, and transportation electrification goals
  • Adopt rate structures, infrastructure incentives, and fleet support programs tailored to meet fleet planning and operational needs
  • Prioritize utility investments in frontline/overburdened communities

➢ Mobilizing Private Capital to Finance Fleet Conversions
  • Work with transit agencies, school districts, utilities, green banks, and others to explore and adopt policies and financing approaches to generate private investment in fleets and infrastructure

➢ Outreach and Education
  • Work with utilities, manufacturers, charging/fueling providers, fleets, independent owner/operators, and other partners to develop outreach and education programs tailored for all fleet types

Source: Volvo
MHD ZEV Action Plan Recommendations

- **Economic Equity for Workers**
  - Adopt a “whole-of-government” approach and mobilize interagency coordination to address important labor issues
  - Partner with workers, schools, industry, and others to develop training and apprenticeship programs for vehicles and infrastructure

- **Community Air Monitoring**
  - Partner with communities and sensitive populations to design and deploy community air monitoring programs to identify “hot spots”
  - Develop appropriate indicators and geographic mapping systems to define and identify frontline/overburdened communities

- **Planning for and Deploying Public Charging and Fueling Infrastructure**
  - Coordinate with other agencies and partners to plan for highway and community public infrastructure, charging and parking needs
  - Support development of a standardized, interoperable, reliable, and accessible fast-charging network for MHD ZEVs
MHD ZEV Action Plan Recommendations

➢ **Ongoing Multi-State Research and Policy Evaluation**
  • Collect data to evaluate effectiveness of MHD ZEV policies
  • Support research to inform the development of sustainable battery manufacturing and supply chains and approaches to battery reuse
  • Evaluate potential state actions to support port electrification

➢ **Local Government Recommendations** (Appendix A)
  • Engage in planning for charging/fueling infrastructure deployment
  • Incentivize MHD ZEV adoption with monetary (e.g., tax credits) and non-monetary (e.g., zero-emission zones) approaches
  • Amend local codes/rules to minimize administrative burdens for infrastructure planning, permitting, and construction

➢ **Federal Government Recommendations** (Appendix A)
  • Adopt increasingly stringent emissions standards for MHD vehicles
  • Statutory and policy changes to allow ZEV charging/fueling along interstate rights-of-way and streamline federal funding processes

Source: Lion Electric
Request for Public Input

NESCAUM and the participating jurisdictions have released a [draft MHD ZEV Action Plan](#) for public input. Comments can be submitted through NESCAUM’s [Public Input Portal](#) by April 25, 2022. Previously submitted comments are available [here](#).
NYS ZEV M/HD legislation, regulation, and goals

- Climate Leadership and Community Protection Act
  - 40% GHG reductions by 2030, 85% by 2050
  - 100% zero-carbon electricity by 2040
- 2020 SOTS – 5 transit bus authorities 25% ZEVs by 2025; 100% by 2035
- Chapter 423 of Laws of 2021 (A.4302/S.2758) requires:
  - 100% passenger ZEV sales by 2035
  - 100% truck/bus ZEV sales by 2045
  - 100% off-road ZEV by 2035
NYS ZEV M/HD legislation, regulation, and goals

- Advanced Clean Trucks (ACT) regulation – December 2021
  - Increasing M/HD truck ZEV sales 2025-2035 and beyond
    - 2035%: Class 2b/3 (55%); Class 4-8 (75%); Class 7-8 tractors (40%)
- 2022 SOTS – Only new ZEV school bus purchases by 2027; 100% transition to ZEV by 2035
New York State M/HD ZEV Programs

- **Clean Transportation NY**
  - $70M in VW funds committed to date for zero emission M/HD projects (trucks, school buses, transit buses, cargo handling equipment, transit charging infrastructure)

- **New York Truck Voucher Incentive Program**
  - VW and CMAQ

- **New York City Clean Trucks Program**
  - M/HD Trucks in NYC EJ IBZs
New York State M/HD ZEV Programs (continued)

• PSC Make Ready Order July 2020
  • $15M MHD Fleet Make Ready Pilot
  • $10M Upstate Transit Authorities
  • Mid Point review Fall 2022
• NYSERDA Clean Transportation Prize Competition
  • $85M for transportation electrification demonstrations in underserved communities, including $24M specifically for Electric Truck & Bus Challenge
  • Phase 1 - Seventeen projects awarded grants to further develop project plans for Phase 2 competition.