

EPN Comments on Greenhouse Gas Emissions Standards for Heavy-Duty Engines and Vehicles-Phase 3

Docket No.: EPA-HQ-OAR-2022-0985

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Founded in 2017, the [Environmental Protection Network](https://www.epn.org/) (EPN) harnesses the expertise of more than 550 former Environmental Protection Agency (EPA) career staff and confirmation-level appointees from Democratic and Republican administrations to provide the unique perspective of former regulators and scientists with decades of historical knowledge and subject matter expertise.

EPA has proposed new and stronger greenhouse gas standards for heavy-duty vehicles (HDV) for model years (MYs) 2027 through 2032, building from the “Phase 2” greenhouse gas standards established in 2016.¹ These “Phase 3” greenhouse gas standards would significantly reduce carbon emissions from HDV² and, through the increased use of zero-emission vehicle (ZEV) technology projected in the proposal, would also reduce emissions of smog and soot-forming pollutants and help to address the challenges of global climate change and air pollution in communities near major roadways.

EPN strongly supports EPA’s proposal but believes that it could go substantially further. The revision of the greenhouse gas standards for HDV is a unique opportunity to closely align emission reductions in the sector with President Biden’s stated goal of reducing emissions 50-52% below 2005 levels by 2030. A recent study by the International Council on Clean Transportation (ICCT) presented several possible scenarios for the standards, estimates each scenario’s potential to align with U.S. climate goals, and quantifies the associated air quality and health benefits through 2050.³

The analysis finds that fully aligning the sector with climate goals would require a 55% ZEV sales share in 2030, including a 40% ZEV sales share for long-haul tractors. More stringent greenhouse gas emission reduction targets can be met by a combination of ZEV uptake and internal combustion engine efficiency improvements. The analysis finds that cost-effective internal combustion engine vehicle improvements of up to 25% for tractors and 31% for vocational trucks can be achieved beyond 2027.

The Need for and Benefits of the Proposal

As noted in the proposal, transportation is the single largest U.S. source of greenhouse gas emissions, making up 27% of the total. Within the transportation sector, all HDV (Class 2b-8) are the second largest contributor, at 25% of all transportation sources. Further, a recent Rhodium Group report revealed that

¹ 88 FR 25926 (April 27, 2023).

² The Phase 3 greenhouse gas proposal covers Class 4-8 heavy-duty vehicles. We refer to these vehicles in our comments as heavy-duty vehicles or HDV. We recognize that EPA’s multi-pollutant proposal for Model Years 2027 and later covers light-duty and what EPA calls “medium-duty” vehicles in that proposal. 88 FR 29184 (May 5, 2023). The “medium-duty” vehicles in that proposal are Class 2b and 3 vehicles, which technically are heavy-duty vehicles under EPA’s regulatory classification and previously were included in the Phase 1 and Phase 2 greenhouse gas standards for heavy-duty vehicles. For clarity in these comments, we refer to Class 4-8 heavy-duty vehicles as HDVs. Medium-duty refers to Class 2b and 3 vehicles. We note when we refer to the entire group of Class 2b-8 vehicles.

³ “Potential Benefits Of The U.S. Phase 3 Greenhouse Gas Emissions Regulation For Heavy-Duty Vehicles,” Pierre-Louis Ragon et al. (April 14, 2023)

greenhouse gas emissions for the transportation sector and national economy grew 1.3% in 2022.⁴ This upward trend is pushing the country off course from President Biden’s stated goal.

In addition, air pollution continues to be a public health problem in many communities across the U.S., with exposure to ozone, particulate matter, and other pollutants leading to premature death, asthma, and other negative health and environmental effects. By increasing the use of zero-emission HDV, the proposed Phase 3 program would reduce emissions of smog and soot-forming pollutants by:

- 650 tons of particulate matter,
- 72,000 tons of nitrogen oxides, and
- 21,000 tons of volatile organic compounds, compared to 2055 levels without the proposal.

The proposed standards would reduce air pollution near roads. Near-roadway communities are often low income or communities of color, and children who attend school near major roads are disproportionately represented by children of color and children from low-income households. These populations would benefit most directly from the projected emission reductions. Reducing these emissions would also provide cleaner air for communities across the country, prevent health issues like asthma, and ultimately save money, lives, and trips to the hospital.

The proposed heavy-duty truck proposal will reduce carbon pollution by 1.8 billion metric tons, roughly equivalent to the annual emissions of 480 coal-burning power plants, achieving \$180-\$320 billion in benefits.

Strong State Support

The ambitious EPA standards are well supported by state-based policy pillars already in place. For example, for commercial trucks and buses, a group of states representing 36% of the U.S. heavy-duty vehicle market signed a coordinated agreement to achieve 30% electric sales of commercial trucks and buses by 2030 and 100% by 2050 with an emphasis on the need to accelerate deployment in disadvantaged communities.⁵

California now requires 68% of new car sales and 45% of new truck sales to be zero emissions by 2030. California’s new clean car and truck emissions rules have been adopted by Massachusetts, New Jersey, New York, Oregon and Washington, amplifying their impact for tens of millions of additional drivers and their vehicles. Just recently, Colorado joined the group. This means the California standards requiring much more stringent greenhouse gas standards will cover around 40% of the light-duty and 36% of the heavy-duty vehicle (Class 2b-8?) markets.

⁴ “Preliminary US Greenhouse Gas Emissions Estimates for 2022”, Alfredo Rivera et al. (January 10, 2023).

⁵ “Multi-State Medium- and Heavy-Duty Zero Emission Vehicle - Memorandum of Understanding,” <https://ww2.arb.ca.gov/sites/default/files/2020-07/Multistate-Truck-ZEV-Governors-MOU-20200714.pdf>

Battery Electric Trucks and Buses Will Save Money

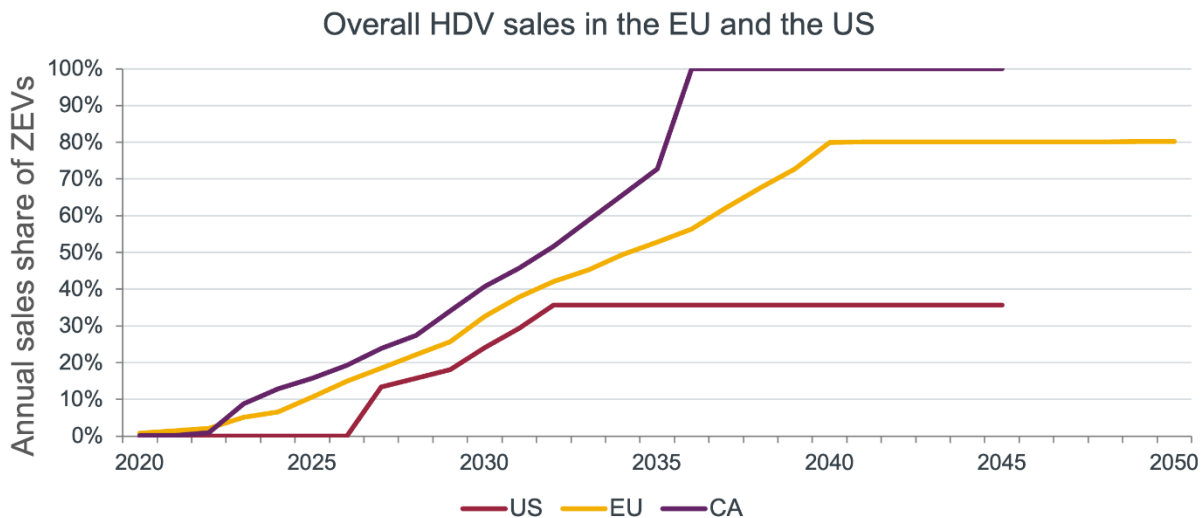
The Environmental Defense Fund recently commissioned an analysis⁶ by Roush Industries to evaluate the cost of electrifying vehicles in several medium and HDV market segments, specifically those concentrated in urban areas, in the 2027-2030 timeframe. These included transit buses, school buses, shuttle buses, delivery vans, delivery trucks, and refuse haulers. The analysis concluded that electric vehicles are cost competitive with diesel vehicles in all vehicle segments examined, and in most cases at the time of purchase in 2027.

Another recent analysis by ICCT finds that by 2030, the Total Cost of Ownership (TCO) of battery electric long-haul trucks will likely be lower than that of their diesel counterparts.⁷ Despite their higher upfront price, battery electric trucks have substantially lower operational expenses than the other trucks studied due to their higher energy efficiency and lower maintenance costs. For very high daily mileages, battery electric trucks can still achieve a better total cost of ownership than their diesel counterparts despite the larger battery size required.

Among heavy-duty commercial vehicles, electric trucks and buses will be cheaper TCOs than their diesel counterparts between 2024 and 2030 depending on the vehicle segment.

Major Truck Manufacturers Compete Globally, Must Meet Tightest Standards

The largest truck manufacturers, including Navistar, Volvo, and Daimler, compete globally and therefore are working to meet the world's toughest standards. Today, those include the European Union (EU) and California, both of which are more stringent than the EPA proposal. The EU will require 100% zero emissions HDV by 2040 and California by 2036.



⁶ “Technical Review of Medium and Heavy Duty Electrification Costs for MY 2027-2030, Final Report”, Vishnu Nair et al. Roush Industries, Inc., (February 2, 2022).

⁷ “Total Cost Of Ownership Of Alternative Powertrain Technologies For Class 8 Long-Haul Trucks In The United States”, Hussein Basma et al. (April 27, 2023).

Sufficient Infrastructure Should Not Be A Problem

A recent paper by ICCT assessed the near-term charging and refueling infrastructure needs for Class 4-8 HDV at the national and sub-national levels. Charger needs in 2025 and 2030 are projected based on ZEV market growth, and priority locations for the deployment of charging and refueling infrastructure are identified in key areas.⁸

Building the charging and refueling infrastructure required to support an accelerated transition to zero-emission HDVs requires timely investments and policy support. A full network of charging infrastructure covering the entire United States is not needed in the near term. To best manage resources, infrastructure deployment in the near term should be prioritized in areas that are expected to see the highest energy needs from HDV traffic flows in 2025 and 2030. The ICCT analysis finds that, in the near term, a few U.S. states are expected to experience the highest energy needs from medium- and heavy-duty vehicle charging. Those include states that have adopted California's Advanced Clean Trucks (ACT) rule, as well as states with the largest industrial activity. Industrial areas in the largest metropolitan areas—including Boston, Chicago, Dallas, Houston, Los Angeles, New York, and Phoenix—are expected to require most of the charging needs, driven first by the energy needs of short- and regional-haul trucks and buses. California and Texas are standout priorities, accounting for a combined 19% of the projected nationwide charging needs in 2030. Seven of the top ten counties by absolute charging needs in 2030 will be in these two states.

As the zero-emission HDV market develops, charging needs are expected to expand along freight corridors that connect those industrial nodes. Deploying charging infrastructure along National Highway Freight Network (NHFN) corridors can accommodate up to 85% of the charging needs from long-haul trucks by 2030. Those charging needs can be satisfied by setting traffic-based targets for the deployment of charging stations every 50 miles, in line with the Federal Highway Administration's Alternative Fuel Corridors, as well as introducing additional criteria for HDV compatibility, including pull-through lanes and wide ingress and egress requirements.

Projections of the total energy consumption of the electric HDV fleet in 2030 represent less than 1% of the national electricity retail market in 2021, suggesting that HDV electrification will not be limited by electric power generation capacity. There are immediately actionable options to optimize the use of existing grid capacity, including smart charging, load rebalancing, and making use of non-firm capacity. In parallel, modifications to existing policy frameworks are needed to enable utilities to incorporate projections of future charging load when planning for near- and long-term grid capacity building.

The Private Sector Is Stepping Up On Infrastructure

Daimler Truck North America (DTNA), NextEra Energy Resources and BlackRock Alternatives, through a fund managed by its Climate Infrastructure business (BlackRock), announced Greenlane, a more than \$650-million joint venture to design, develop, install, and operate a nationwide, high-performance, zero-emission public charging and hydrogen fueling network for medium- and heavy-duty battery-electric

⁸ "Near-Term Infrastructure Deployment To Support Zero-Emission Medium- And Heavy-Duty Vehicles In The United States", Pierre-Louis Ragon et al. (May 11, 2023).

and hydrogen fuel cell vehicles.⁹ Greenlane’s initial focus will be on battery-electric medium- and HDV, followed by hydrogen fueling stations for fuel cell trucks, with plans to expand access to light-duty vehicles in the future to serve the greater goal of electrifying mobility.

Greenlane addresses the need for a publicly available, nationwide electric charging infrastructure for commercial vehicles, especially for long-haul freight operations, and is a major step toward developing a sustainable ZEV ecosystem across North America. The network of charging sites will be built on critical freight routes along the east and west coasts and in Texas. Where synergistic, Greenlane will leverage existing infrastructure and amenities while also adding complementary greenfield sites to fulfill anticipated customer demand.

Ambitious EPA Standards Helped By Converging Pillars

The bipartisan Infrastructure Investment and Jobs Act (IIJA) adds \$100 billion for EV and clean energy policy. The Inflation Reduction Act of 2022 (IRA) includes about \$370 billion in climate investments to decarbonize the power and transportation sectors. The law offers up to \$7,500 to buy new EVs and up to \$4,000 for used EVs, along with tax credits of up to \$40,000 for commercial ZEVs and \$100,000 for truck charging stations. An additional \$1 billion provides funding for zero-emission school buses, heavy-duty trucks and public transit buses. Finally, billions of dollars will be invested in manufacturing loans and investment in EVs and domestic fuel cell production.

A new study by ICCT and Energy Innovation (EI) modeled how the IRA will drive new EV sales, finding that IRA incentives mean sales of new heavier commercial EVs, like tractor trailers, school buses, and delivery vans, could likewise rise dramatically to represent 38% to 48% of new vehicle sales.¹⁰

For HDV, it considers states that have adopted California’s ACT rule and ZEV targets.

For both the light- and heavy-duty sectors, the analysis shows rapid electric vehicle uptake when considering both expected manufacturing cost reductions and the IRA incentives, as well as state policies. By 2030, for heavy-duty, ZEV sales shares are estimated to range from 39% to 48% by 2030 and from 44% to 52% by 2032.

The impact of the IRA and IIJA provide strong support for EPA setting more stringent Phase 3 heavy-duty vehicle greenhouse gas standards than would have been possible otherwise, at lower cost and higher benefit to consumers and manufacturers. To meet climate goals, federal standards would need to drive electrification rates above 40% by 2030 for HDV.

⁹ “Daimler Truck North America and partners move ahead with public charging infrastructure”, JV: Greenlane, Green Car Congress (April 28, 2023).

¹⁰ “Analyzing The Impact Of The Inflation Reduction Act On Electric Vehicle Uptake In The United States”, Peter Slowik et al. (January 31, 2023).

Heavy Duty Electric Trucks Are Already Entering the Market

Global model availability for medium and heavy-duty EVs rose from 609 models to 808 models available for purchase between 2021 until the end of 2022. Additionally, CALSTART estimates that the U.S. and Canada will experience steady growth from 166 models to 213 models available for purchase between 2021 and 2023.¹¹

Pride Group, the second largest refuse fleet in the U.S., ordered 200 Freightliner eCascadia Class 8 electric trucks and 50 Freightliner eM2 Class 6-7 electric trucks starting in mid-2023, with the intention of switching its local delivery fleet to 100% EVs within the next one to two years.

Volvo Trucks has received a record order for up to 1,000 electric trucks including 130 heavy-duty electric trucks to be delivered by the end of the decade.¹² The order, the largest commercial order to date for Volvo electric trucks, was placed by Swiss-based Holcim, a global manufacturer of building solutions. The first 130 electric trucks to be delivered by the end of 2024 will be the heavy-duty electric Volvo FH and Volvo FM trucks, which boast an electric range of up to 300 kilometers depending on what is being carried. Both trucks can move up to 44 tonnes of gross combination weight (GCW). It is expected that by replacing 1,000 of Holcim's existing Volvo FH diesel trucks with Volvo FH electric trucks using green electricity along a typical route, up to 50,000 tonnes of CO₂ could be saved each year. Jan Jenisch, the chairman and CEO of Holcim, said the company aims to reach a share of 30% of zero-emission heavy-duty trucks by 2030.

Volvo trucks set a global target of 50% of total sales by 2030 with higher targets of 70% in North America and Europe. Navistar has set a goal of 50 percent heavy-duty ZEV sales by 2030 and 100% EV or fossil free by 2040. Daimler, the leading manufacturer of heavy-duty class 8 trucks in the U.S., has committed to offering only carbon-neutral trucks and buses in the U.S. by 2039 and has allocated \$85 billion toward this goal. Tesla plans to produce 50,000 units annually of its semi Class 8 electric truck starting in 2024 after a one-year ramp up, with 36 delivered to Pepsi in December 2022.

Conclusion

The current state of the technology and market developments, the tremendous public investment under the IRA and IIJA, the industry's staggering investment plans, the exponential growth of EV sales, and California's and other states' clean emissions roadmap provide strong support that bold action by the EPA in the Phase 3 standards is warranted and appropriate.

An ambitious national standard that helps the country transition to ZEVs and trucks would save more than 100,000 lives, especially in communities of color and low-income communities that are disproportionately impacted by air pollution and climate change. It will strengthen our economy by providing certainty to automakers and a level playing field for the massive transformation of the auto industry and its supply chains.

Therefore, we recommend that EPA set the Phase 3 greenhouse gas standards for HDV at the same level as California's ACT program.

¹¹ "Electric Vehicle Market Update," April 2023.

¹² "Volvo secures record order for 1,000 electric trucks", Joshua S. Hill, The Driven (May 23, 2023).