The Vehicle Suppliers Association

Comments of MEMA, The Vehicle Suppliers Association to the Environmental Protection Agency on the Greenhouse Gas Emissions Standards for Heavy-Duty Vehicles—Phase 3

June 16, 2023

Docket: EPA-HQ-OAR-2022-0985

Introduction

MEMA, The Vehicle Suppliers Association, is the leading trade association in North America for vehicle suppliers, parts manufacturers, and remanufacturers. It has been the voice of the vehicle supplier industry since 1904.

Automotive and commercial vehicle suppliers are the largest employer of manufacturing jobs in the United States, employing over 900,000 people throughout the country. Direct, indirect, and induced vehicle supplier employment accounts for over 4.8 million U.S. jobs and contributes 2.5 percent to U.S. GDP.

Suppliers lead the way in new vehicle innovations. Member companies conceive, design, and manufacture the OE systems and technologies that make up two-thirds of the value of every new vehicle and supply the automotive aftermarket with the parts that keep millions of vehicles on the road, fueling international commerce and meeting society's transportation needs. MEMA members are committed to safety and sustainability.

Executive Summary

MEMA and its members support the objectives of the agency to improve national air quality through improvements to heavy duty trucks. The supplier industry directly manufactures vehicle components and systems that enable the transformation of the transportation sector to more environmentally friendly vehicles. The industry also supports advancements in internal combustion engine technologies, needed to serve the vocational and long-haul sectors where zero-tailpipe emission vehicles are not yet feasible due to weight, load, and infrastructure limitations.

MEMA member companies have made significant investments in zero-emission vehicles, by way of employment, research and development, and manufacturing. Further, additional and consistent financial investment is needed from federal and state governments as well as industry to bolster success. The supplier workforce will require upskilling for technical skills and talent enhancement. A robust vehicle charging infrastructure must be built. New supply chains will need to be established and extended warranties will require open access to repair and maintenance information. These changes are necessary and must be considered and addressed to achieve the EPA's Heavy-Duty Phase 3 goals.

The success of our industry is interwoven with the success of this proposal, and we offer the following comments as challenges we must meet to foster success.

The success of this proposal depends on the ability of the government working with industry and other stakeholders to address these concerns. Therefore, the rule must address:

- The need for regulatory certainty. The final rule must contain an effective mix of feasible, demonstrated technology along with emerging technology, leaving options to improve emissions reductions in today's advanced propulsion designs. This will foster innovation in a coordinated direction, aligned with U.S. policy, but not mandate application of a narrowly defined technology path to make a positive impact on the country's urgent environmental goals.
- The impact of other technologies – including internal combustion engines fueled by hydrogen and other renewable carbon-neutral fuels – can impact and make measurable environmental improvements at scale. These technologies can provide immediate improvement to the environment, especially where battery-electric alternatives are not feasible due to load and weight limitations. This is important not only for environmental improvements but for environmental justice in providing cleaner commercial vehicles immediately to communities living and working close to busy streets, highways, and other transportation networks. Inclusion of all technologies that can decarbonize the transportation sector will foster the necessary growth in manufacturing capacity, vocational performance, infrastructure improvements, and commercial acceptance.
- The inadequacies of our nation's infrastructure. Without significant federal and state incentives to expand the HD charging and refueling infrastructure, a reliable network with sufficient access to energy and fuels will not be available through the numerous transit corridors along U.S. roads. Likewise, urban, industrial centers will need focused buildout while rural areas will need thoughtful rollouts to achieve sustainable GHG reductions. For example, EPA can direct high power DC bi-directional charging electric vehicle supply equipment (EVSE) funds to Justice40 communities leveraging EPA Clean School Bus funds and build learnings and best practices to expand Hydrogen and DC charging infrastructure to support this and other rulemakings.

- **The limitations of the supply chain.** The proposed rule assumes that all materials for advanced trucks, which are not available today in the quantities needed to support the massive growth in vehicle construction, will become available within sufficient time. This places a significant and unnecessary risk on manufacturers and suppliers. Furthermore, once a company has converted production to new technology lines, that company cannot easily pivot its facilities and workforce back to the previous technology if EPA projections are not realized by the mid- to late-2020s.
- **The necessity to clearly define the applicability of the extended warranty and the need to provide repair access to service these new vehicle**s.

Overall: MEMA members are working to accelerate the performance and availability of clean-operating vehicle technologies and are directly contributing to their realization. Presently, many electric alternatives either do not exist or fall far short of parity of performance compared to today's trucks. Effective, low- and zero-carbon technologies for future and current in-use vehicles do exist and can readily be put to use to reduce nationwide emissions and help EPA meet its climate goals.

Appendices:

1) MEMA Recommendations for Improvements to EPA HD TRUCS Model
2) Comparison of California vs. U.S. Federal EV Programs
3) Map of Estimated U.S. EV Charging Electricity Needs

Detailed MEMA Comments and Concerns on our Shared Challenges

The Final Rule Must Reflect Regulatory Certainty Paired with Technology Neutrality

EPA must provide sufficient regulatory certainty to manufacturers and consumers to ensure the most favorable outcome of this ambitious market transformation. The final rule must contain an effective mix of feasible, demonstrable technology along with emerging technology, and leverage all available options to improve emissions reductions in today's advanced propulsion designs. At the same time, the final rule must encourage innovation in clean transportation, including more advanced low- and zero-emissions technology. MEMA opposes a 100% ZEV mandate. A ZEV mandate stifles innovation and would disallow technologies that could address the urgent need to decarbonize applications for HD and MD vocational vehicles.

It is imperative that EPA aligns with the Joint Office of Energy and Transportation through the implementation period of this rule to identify shared concerns and solutions for the many moving parts of the rule. Failure in one key sector, lithium sourcing as one example, could result in significant cost or schedule impacts, stunting availability or adoption of these new vehicles. Positive regulatory certainty bolsters consumer confidence in new technologies and decreased use of gasoline- and diesel-fueled vehicles. EPA should adopt an "all hands on deck" approach with regards to emissions-lowering technologies and encourage greater acceptance of and investment in renewable fuels, which can positively impact the net emissions of the entire U.S. Internal Combustion Engine (ICE) vehicle fleet.

The aggressive pace and scope of the proposed rule obliges EPA to work to ensure success throughout the course of this rule's implementation. EPA must follow through on all assumptions, and act accordingly to help make them a reality and reassure manufacturers and consumers along the way.

Recommendation: EPA align regulations and priorities in concert with the Joint Office of Energy and Transportation throughout the implementation period of this rule to identify shared concerns and solutions for the many moving parts of the rule. EPA must follow through on all assumptions regarding critical materials, infrastructure needs and timing of milestones identified in the rule's analyses, and take action to make them a reality as this rule is implemented.

Technology neutrality pairs with Regulatory Certainty

The proposed rule disproportionally favors battery electric propulsion, which in turn discourages high-efficiency diesel and other internal combustion technology, including carbon-neutral renewable fuels. Emerging innovations and recent technologies offer significant reduction in emissions from ICE vehicles.

Technology forcing regulations that foster innovation aligned with policy, rather than regulations that mandate a narrowly defined technology path, will lead to a more positive national outcome. The chassis in the scope of this rule are not only expected to carry heavy loads long distances, but also perform work during and after transit.

MEMA recognizes that the proposal attempts a performance-based standard, and the agency makes forecasts that estimate a variety of technology combinations in future fleets. At the same time, the supplier industry projects more time is needed for innovation of non-electric technology than EPA has estimated. By accepting the potential for technologies other than battery electric and hydrogen fuel cell, EPA can make a more immediate, widespread, positive impact on nationwide emissions reductions. Therefore, EPA must incent the development and deployment of advanced technology options to include advanced internal combustion (ICE) technologies and renewable fuels. These incentives will assist in accelerating the necessary infrastructure improvements needed to support advanced technology vehicles.

Renewable fuels, such as hydrogen, ethanol, renewable natural gas (RNG) and carbon-neutral renewable diesel are viable, proven pathways to lower emissions in the trucking sector almost *immediately*. We are concerned the EPA has dismissed alternate fuel options, and as a result is missing opportunities for greater emissions reductions. We refer the EPA to the U.S. DOE alternate fuels data center for detailed examples of how alternate fuels can reduce vehicle emissions.[1] Several studies and programs run by Argonne National Laboratory also point to reduced emissions through alternate fuels.[2] EPA should include more analysis of these alternatives and do more to encourage investment and deployment of these technologies. We note CARB recognizes renewable diesel fuel[3] and allows it to be used for compliance with certain regulations. EPA should consider similar provisions.

Trucks that use alternative, lower-carbon fuels can help advance EPA climate goals while also contributing to *national security* by lowering our dependence on foreign oil. Additionally, encouragement and investment in carbon-neutral fuels will also positively impact existing vehicles already on the road.

Furthermore, EPA should support both hydrogen fuel cell technology and H2ICE because they complement the overall deployment of hydrogen infrastructure. FCEV and H2ICE address different vehicle use cases; however, both utilize the same hydrogen infrastructure.

The proposal should be more technology-neutral and provide added regulatory certainty by fairly assessing carbon content of vehicle's technologies, their production and where vehicle charging electricity comes from. At this time, there is no review of carbon content of components or vehicles in the Draft Regulatory Impact Analysis (DRIA). We understand the complexity of this endeavor, but EPA unfairly tilts the balance toward battery electric vehicles by a selectively narrow focus on tailpipe emissions. We agree with EPA statements that its

[1] https://afdc.energy.gov/fuels/
[2] https://www.anl.gov/taps/fuels
[3] See § 2449.1(f) of the CARB In-Use Off-Road Diesel-Fueled Fleets Regulation https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2022/off-roaddiesel/ord15dayatta-1.pdf

authority stems from Congressional directives to reduce tailpipe emissions. Electric vehicles have no tailpipe, and thus no tailpipe emissions. If EPA is determined to regulate zero-emissions vehicles, EPA should address lifecycle carbon content of vehicles in scope of this rule to better balance technology vs. tailpipe.

Recommendation: EPA to move beyond tailpipe emissions and examine lifecycle carbon assessment to compare and evaluate vehicles in scope of this rule.

Recommendation: EPA to act decisively to further encourage and incent the development and deployment of advanced clean ICE technologies, including renewable fuels and H2ICE.

Timing of Regulations: EPA Cannot Begin HD GHG Ph3 Regulations with MY2027

The Clean Air Act, which is the primary source of authority for EPA to conduct this rulemaking, provides for a four-year lead time for new standards. This is codified in 42 USC § 7521(a)(3)(C) which states:[4]

> (C) Lead time and stability.—
>
> Any standard – promulgated or revised under this paragraph and applicable to classes or categories of heavy-duty vehicles or engines – shall apply for a period of no less than 3 model years *beginning no earlier than the model year commencing 4 years after such revised standard is promulgated.* [Emphasis added][5]

Changing MY 2027 standards will result in millions of dollars of additional unnecessary burden on manufacturers, due to the associated replanning of production timelines, production contracts, and revision of capital expenditure plans already in place for MY2027 under the current regulations.

Similarly, EPA intends to finish this rulemaking near the end of 2023. By that time, MY2024 designs will be the "new" designs. Adding four years' lead time per 42 USC§ 7521(a)(3)(C) results, again, in 2028 implementation.

Because of these two significant issues, Phase 3's proposed three-year lead time should be extended to four years and new regulations should begin with MY 2028 trucks (if the regulation is finished as intended, post-2028 if not). Respect for 4-year implementation timing will help avoid unnecessary negative impacts on the industry and owners associated with revisions to existing plans and allow for a more stable transition and improved regulatory certainty for the medium- and heavy-duty vehicle (MHDV) industry.

[4] https://www.govinfo.gov/content/pkg/USCODE-2021-title42/pdf/USCODE-2021-title42-chap85-subchapII-partA-sec7521.pdf

[5] 42 USC § 7521(b)(3)(A) defines the term "model year" https://www.govinfo.gov/content/pkg/USCODE-2010-title42/html/USCODE-2010-title42-chap85-subchapII-partA-sec7521.htm

The probability of achieving sustainable GHG reductions improves if EPA allows a 4-year lead time for ZEV technology forcing regulations, even for vehicle applications that currently have ZEV models available. A 4-year lead time more effectively fosters industry innovation and continuous improvement for OEMs and supporting suppliers to release improved Gen 2+ ZEV technology based on field experience and learning from Gen 1 ZEV releases launched for CARB's ZEV mandates.

Recommendation: EPA continues to honor minimum 4-year lead time for GHG Phase 3 technology forcing regulations, even for the heavy-duty vehicle applications we suggest as more ready to adopt ZEV technology. These vehicle applications that we project can adopt ZEV earlier than others should not have technology-forcing regulations for ZEV applied earlier than MY28, assuming the rule is finalized by the end of 2023.

Note: If EPA chooses to stay with MY2028, the agency should add supplier, manufacturer and owner facility, financial and schedule change burdens into the cost-benefit analyses.

Supply Chain Challenges Will Continue Throughout Implementation

In the supporting documents of the proposed rule, EPA catalogs all public statements of investment in and projections for future availability of critical minerals. This projected sum is then cited as evidence there will be sufficient materials for construction of the future fleet. We disagree with this optimism. To assume that all materials for advanced trucks, which are not available today, in the quantities needed to support the exponential growth in advanced technology vehicle adoption will become available creates significant, unnecessary risk. This risk will be borne by manufacturers and their suppliers. Furthermore, once a company has converted production to new technology lines that company cannot pivot its production capabilities or workforce skills back to the previous technology if EPA projections are not realized by the mid- to late-2020s.

We share the national goal of converting many MHDV platforms to electric and clean-fueled trucks, however where technology falls short due to physical limitations, there must be effective pathways to still serve the U.S. economy and the nation's demands. EPA cannot grant waivers post-2027 to allow greater production of ICE vehicles if electric vehicle technology fails to be adopted sufficiently fast enough. A rule which respects the pace and limitations of technological development is the appropriate pathway.

Recommendation: Battery recycling and disposal costs should be added to EPA's analysis as part of a sustainable BEV deployment to better address scarcity of critical minerals, provide a more resilient domestic supply chain, and over time reduce the added carbon impact of battery manufacturing and associated multi-national logistics.

Recommendation: EPA revises and contains estimates of future (sufficient) materials availability through increased use of scaling factors, confidence levels and sensitivity analyses to prevent overoptimistic projections.

Infrastructure Success is Critical

While MEMA urges EPA to consider other propulsion systems, we believe it is imperative to address infrastructure challenges that will limit the success of a zero-emission vehicle fleet.

MEMA urges EPA to consider these factors that apply to the necessary infrastructure for advanced technology deployment:

1. There is currently insufficient infrastructure for EV charging and refueling of MHDV vehicles. While government incentives exist for consumer vehicle systems, there are few comparable programs for heavy and medium-duty trucks. Similar to passenger cars, heavy duty and fleet vehicle EV adoption success will be dependent on positive operator experiences with the EV Charging infrastructure. The government needs to incentive and partner with fleet owners to establish this infrastructure. Without significant federal incentives to expand the MHDV charging and refueling infrastructure, a reliable network with sufficient access to energy and fuels will not be available through the numerous transit corridors along U.S. roads. Likewise, urban, industrial centers will need focused buildout while rural areas will need thoughtful rollouts to achieve sustainable GHG reductions.
2. EPA appears to be over optimistic with regard to both electricity generation growth and wide dispersal needed to assure charging across the roads of the U.S. Similarly, many heavy trucks must operate off road away from infrastructure. Today they are capable of doing this, as fuel can be topped-off before leaving the road or brought to the job site. EVs do not have this luxury and would require a large generator to replicate this scenario, which would be counterproductive. Oversizing a fuel tank is a cost-effective way to guarantee sufficient energy for asset flexibility across the full range of applications and locations. Oversizing batteries or pressurized hydrogen tanks is more costly.
3. We note the timelines forecasted by the U.S. DOE for deployment of nationwide hydrogen production, distribution and delivery are several years, almost a decade, behind the EPA estimates for production of vehicles fueled by hydrogen (H2ICE or FCEV). The recently released DOE paper titled "U.S. National Clean Hydrogen Strategy

and Roadmap"[6] shows, in its generation and distribution studies, significant gaps in regional production and availability of hydrogen through 2050. While it may be possible for national production of clean hydrogen to reach the 50 million metric ton (MMT) capability noted in the paper, we call attention to figures 7, 8(a), 8(b) and 23, which show an infrastructure yet to emerge, and one that as forecasted is not likely able to support HD trucking effectively. Furthermore, the timelines for growth of hydrogen generation and distribution, pages 70-75, do NOT ALIGN with EPA forecast of vehicle production. We note this gap so that it may be addressed, and hydrogen-powered trucks manufactured using MEMA member technology will have the fuel they will need to deliver the service they are built for. Left unattended, the national hydrogen infrastructure could lag vehicle production by almost a decade. In practical terms, such mismatch will result in loss of consumer confidence and low- to no-sales of hydrogen fueled trucks, leading to few financially and technologically feasible options for fleets obliged to upgrade or replace existing diesel trucks.

4. The federal government is well-suited to deploy infrastructure along interstates and should allocate targets in funding for hydrogen and DC fast charging to support opportunity charging needs for MHDV.

Recommendation: EPA to work with other agencies in the Joint Office of Energy and Transportation to deploy even more infrastructure than currently planned along interstates and allocate increased targets in funding for hydrogen and DC fast charging to support opportunity charging needs for MHDV.

Opportunity to Build a Resilient and Sustainable EV Infrastructure

The American Transportation Research Institute (ATRI) has released a study[7] on the challenges facing the U.S. infrastructure for EV, which we urge the EPA to incorporate alongside the other ATRI studies noted in the DRIA. It projects significant grid expansion is needed in each state if all vehicle applications are electrified; see Appendix 3.

MEMA applauds the EPA's leadership on its Clean School Bus program. Federal programs such as the FTA grant programs for Transit bus and IRA Grants to Reduce Air Pollution at Ports are also critical to building better, more future-proofed EVSE that can later support a higher quantity of ZEV vehicle deployment during GHG Phase 3 MY2028+.

EVSE that has higher DC charging capacity (i.e., DC fast charging, or DCFC) than the minimum requirements modeled in the HD TRUCS tool will enable opportunity charging and help future-proof charging infrastructure, which is especially important to further encourage EV rollouts. School bus and other applications suited to bi-directional charging can also offer a layer of grid resiliency that will address stakeholder concerns about increasing dependency

[6] https://www.hydrogen.energy.gov/pdfs/us-national-clean-hydrogen-strategy-roadmap.pdf

[7] https://truckingresearch.org/2022/12/new-atri-research-evaluates-charging-infrastructure-challenges-for-the-u-s-electric-vehicle-fleet/

on electrical grids and also improve local and national security. Likewise, significantly more investment is needed to address fleet operator confidence and reliability for EVs. For medium- and heavy-duty EV, DCFC is critical.

Although the recommended EVSE outlay is a significant investment upfront, public funds used for high capacity EVSE will offer the highest return on investment by futureproofing this public investment. Publicly funded DC fast charging will also provide useful lessons to the Joint Office of Energy and Transport on the challenges and opportunities for MHDV applications, including building sufficient ZEV infrastructure in both urban and rural environments, which can prioritize Justice40 communities.

Additionally, we propose EPA purchase ACT Research[8] reports for these early adopter segments because upon checking EPA's projection based on MOVES MY 2019 data, we note a significant >30% difference in EPA's projected volume for school bus compared to forecasts for MY 2027 based on market sizing from ACT Research, and an even larger difference >75% in market sizing for other bus (Coach, transit, and shuttle). A specific segmentation report of CL5-7 bus markets can be purchased at this link to inform EPA HD TRUCS projections for these ZEV early adopter segments for better alignment with industry and modeling of emissions benefits for the final GHG Phase 3 rule. ACT Research is a trusted industry information source.

Recommendations:

1) EPA futureproof EVSE purchased with public funds, to enable DCFC and vehicle-to-grid interactions like bi-directional charging.
2) EPA pursues other sources of useful information for the regulatory impact analyses, to include ACT Research reports.

To provide helpful feedback to the EPA's question about stakeholders that must be involved and metrics that should be tracked to ensure the success of GHG Phase 3 targets, MEMA recommends EPA work with industry, end-customers, and other sources to understand MHDV unique charging requirements and require the Joint Office of Energy and Transportation to develop a dashboard for transparent reporting for the public to track the maturity of infrastructure needed for net-neutral transportation technology. MEMA has prepared a few charts and high-level takeaways from MHDV infrastructure needs in the U.S., Cybersecurity risks for Fast Charging stations, emerging EU Alternative Fuel Infrastructure Regulations, and a comparison of California State vs. U.S. federal actions to coordinate infrastructure readiness.

A smooth transition will require that infrastructure coverage mature along with projected advanced technology vehicle adoption. Otherwise, payback assumptions on capital are in

[8] Example: https://www.actresearch.net/reports-data/state-of-the-industry-reports/north-america-classes-5-7-bus-market .

question. Without sufficient charging availability and capacity, EV cannot reach operational parity with Diesel ICE. Without sufficient renewable fuels infrastructure and supply, advanced ICE vehicles cannot be deployed at scale and existing fleets cannot reduce their carbon footprint in operation.

Recommendations:

1) Federal government coordinate infrastructure action with state and local stakeholders specifically to address commercial vehicle needs in metro areas and along interstate corridors.
2) Due to long-lead times for capital improvements, utilities are compelled to begin building out capability *ahead of demand* from transportation.
3) Workforce development and incentives be aligned with capital planning for MHDV end-users to accelerate advanced vehicle adoption.
4) Coordinate standardization efforts to deliver national standards for the installation, operation, and maintenance of EV charging stations.
5) Standards EV and EVSE Cybersecurity policies, especially for areas of the grid where high peak load events need to be addressed for grid reliability.

A recent International Council on Clean Transportation (ICCT) white paper[9] reveals that MD and HD vehicles have different infrastructure requirements than light duty and passenger car, which will need to be addressed for end-users to be willing to adopt net-neutral technology such as ZEV and H2ICE. These include:

a) Energy and higher peak load requirements are concentrated in certain areas and states.
(i) 10 counties in metro areas will have the highest peak load, up to 132MW.
(ii) California and Texas are expected to represent 19% of load requirements for MHDV charging by 2030.
(iii) The states with the highest energy demands are expected to come from a mix of CARB Advanced Clean Truck (ACT) adopting and non-ACT adopting states. Texas, Illinois, and Florida have high industrial activity, but are not ACT adopting states.
b) Local and state legislation and coordination of utilities are needed to support MHDV charging needs.
c) Utilities need to be compelled to begin building out for future demand.
d) Rural areas have other unique charging difficulties.
e) Incentives are difficult to stack and align with capital planning needs.
f) The report assumes that end-users will choose to follow minimum charging protocols to support typical daily energy needs at 19-50KW for most vehicles. Based on our anecdotal experience we disagree with this assumption and think more MHDV end-users will plan for higher DC charging needs to maintain productivity and futureproof on-site infrastructure.

[9] https://theicct.org/publication/infrastructure-deployment-mhdv-may23/

g) Hydrogen needs support to reach Total Cost of Ownership (TCO) parity with conventional technology. Hydrogen is not expected to have good TCO unless it gets to $5/gal and then it will need deployment at stations.
h) Cybersecurity risks of fast charging stations[10].

The European Union Alternative Infrastructure Regulation has made significant requirements on member states in making the necessary infrastructure investment.

As an example of how EPA might compel State and Regional infrastructure buildout, we note below how the European Union has approached this challenge:

1) European Union Alternative Fuel Infrastructure Regulation (AFIR) as part of EU's "Fit for 55" package the EU has agreed on a direction forward March 2023 that ensures fast charging availability at distance-based intervals along the trans-European transport network (TEN-T).
1) Member States will be required to ensure publicly available chargers with power output capable to support BEV deployment;
2) The AFIR established targets for urban nodes for trucks and busses.
3) Member States will be required to ensure installation of a fast-charging pool every 60km in each direction along the TEN-T (Trans-European Transport Network) with milestones for completion in 2025, 2027, and 2030.

Additionally, we refer the reader to Appendix 2, in which MEMA has prepared a chart that reviews current CA state and federal actions to support ZEV transition.

Lightweighting Will Continue to be Important and Should be Encouraged.

Lightweighting is an important part of the overall strategy for improving vehicle emissions performance. The use of lighter weight materials (high strength steel, aluminum, plastics, polymer composites, carbon fiber, magnesium, etc.) and designs – otherwise known as mass reduction or lightweighting – continues to be an important cost-effective strategy in meeting emissions reduction standards. Lightweighting is well-recognized to increase trucking efficiency and there are three primary ways that this occurs:

- By lowering rolling resistance, less energy is needed to start the vehicle moving and then overcome the friction of its contact with the road.
- By allowing carriers to add more cargo to each truck, which reduces the number of trucks on the road and/or trips that need to be made.
- By facilitating the adoption of other efficiency and emissions reductions technologies higher payloads through utilization of heavier components for battery, fuel cell, and

[10] https://www.osti.gov/servlets/purl/1607113

efficient engines as well as other emissions reductions, improvements are possible, and can negate the concerns about the added weight of those technologies.

- By allowing vehicles with equivalent range to use a smaller battery, leading to less consumption of critical raw materials like lithium, cobalt, nickel, and manganese. This helps reduce supply chain risk due to limited availability of critical minerals in the U.S. and reduced demand from mining for these materials, resulting in both environmental and human factors improvements.

Furthermore, lightweighting also includes the unsprung mass of suspension and brake components as well as, but not limited to, wheels. The North American Council for Freight Efficiency's Confidence Report on Lightweighting noted that the aluminum wheel is the, "...single most effective product for saving weight on both a tractor and trailer."[11]

We commend EPA for continuing to recognize the contributions of wheel-related weight reductions and non-wheel-related weight reductions to the agency's overall emissions reductions goals. This is reflected in Table 6 to § 1037.520 and Table 8 to § 1037.520 of the proposed rule which provide specific vehicle weight reduction credit inputs. The NPRM relies on prior assumptions around lightweighting that were part of the Regulatory Impact Analysis for Greenhouse Gas Emissions and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles - Phase 2 as the weight reduction credits for Phase 2 appear to have been extended to Phase 3.

EPA should recognize that suppliers have introduced new technologies and products since the Phase II rule was finalized in 2016 and seek comments from suppliers to update the agency's assumptions around weight reduction inputs to reflect the latest available technologies on the marketplace. For example, lightweight forged aluminum wheel producers have continuously improved their product offerings to the heavy-duty truck, bus, and trailer markets. More recent generations of products – introduced to the market since the Phase 2 was promulgated – offer weight savings of nearly 10% as compared to similar steer or dual-drive, and wide base wheels which were part of the analysis EPA previously conducted.

Recommendation: EPA should continue to grant credit for lightweighting and weight reduction and update GHG Ph2 assumptions on lightweighting in the GHG Ph3 GEM model.

Warranty Provisions Must Not Harm Aftermarket or Preclude Choice in Repair

MEMA urges the EPA to clarify that warranty repairs can be completed at dealer or authorized repair locations, at independent aftermarket repair locations, or at the fleet

[11] North American Council for Freight Efficiency, 'Confidence Report on Lightweighting,' January 10, 2021 https://nacfe.org/wp-content/uploads/2021/02/Lightweighting-Confidence-Report-Feb2021.pdf

owner's own shops. The repair and maintenance of in-service vehicles is critical to ensuring that they operate as designed and continue to meet safety and emissions standards. A properly operating vehicle is critical for consumers who rely on light-duty passenger vehicles for daily transportation. This importance is increased when considering the regular repair, maintenance, and service of heavy-duty commercial vehicles. For these commercial vehicles, vehicle downtime costs the vehicle owner's business money, leads to shipment delays, and negatively impacts supply chains. In many locations throughout the country, the nearest dealer or authorized repair facility is, at best inconvenient or, at worst, hundreds of miles away.

MEMA urges EPA to clarify and specify the specific vehicle parts intended to be covered by the proposed warranty, namely the vehicle high-voltage battery and propulsion motors. Heavy-duty vehicles include thousands of individual parts and components. Many of these parts are regularly replaced because they experience wear over time. As currently written in the NPRM, the boundaries of which parts are covered by the warranty, and which are not covered are unclear. This uncertainty could lead to vehicle owner misunderstandings, unintended legal exposure for OEMs and technology providers, and significantly increased new vehicle costs that counter the goal of targeted market adoption.

Taken further, MEMA urges EPA to not require warranty coverage on parts that have a shorter life and are a routinely replaced due to wear, or are adjacent to the warrantied parts through physical, electrical, or software connections but not the targeted component; such as sensors, filters, monitoring systems, cooling systems, HVAC, braking systems, control systems, inverters, converters, charging systems, structural systems, other drivetrain components, electrical motors not part of the forward propulsion system, and filters. We urge EPA to work with industry stakeholders, including suppliers, to develop a list of wear and non-applicable parts and components with these criteria in mind.

The EPA HD TRUCS Tool Must Be Expanded and Improved

We appreciate the substantial work EPA has invested in framing and inputting to the Heavy-Duty Technology Resource Use Case Scenario (HD TRUCS) tool to date, to create modeling resources for various truck technologies. The model needs to be improved before it can accurately inform and assist EPA in finalizing this rule. Industry and end-users can support EPA with data to improve inputs to the HD TRUCS model. Appendix 1 of this document contains several sections and use-case reviews, along with numerous recommendations on how to improve HD TRUCS.

Advanced Technology Multipliers

Considering advanced technology multipliers, the agency has proposed to retain the technology multiplier for FCEV "because it has been slower to develop in the HD market."

MEMA urges that the same consideration be made for H2ICE technology and that it be included along with FCEV in the credit multiplier calculation.

MEMA supports EPA's proposal to include H2ICE in the GEM model credited as a zero CO2 technology. MEMA believes H2ICE has potential as another technology that fits within a performance-based standard regulatory framework to decarbonize applications that are more challenging to electrify from a performance standpoint. H2ICE holds promise as a bridge technology to encourage building out hydrogen infrastructure that will be shared with FCEV applications.

We also note that the California Air Resources Board has few exceptions, most temporary, for ICE in its Advanced Clean Fleets[12] program and ask EPA to encourage CARB to respect technological limitations and provide more exceptions beyond case-basis.

Recommendation: EPA should retain the technology multiplier for FCEV and include H2ICE in the GEM model with zero CO2 emissions. EPA should also encourage CARB to find space for H2ICE within its ZEV mandate regulatory structure which is set up to allow exemptions from conventional ICE to fill technology readiness gaps.

Conclusion

MEMA appreciates the opportunity to present these comments for EPA's consideration. We look forward to an ongoing dialogue with the agency and are happy to act as a collaborative resource.

For any questions or more information, please contact Alex Boesenberg, vice president, regulatory affairs, MEMA at aboesenberg@mema.org.

# # #

[12] https://ww2.arb.ca.gov/our-work/programs/advanced-clean-fleets

Appendix 1

The Draft EPA HD TRUCS Model is a Good Framework and Will Benefit from Significant Additional Development

We commend EPA for building and soliciting comments on the HD TRUCS model, which represents an endeavor to build a bottom-up projection of ZEV adoption deemed feasible from MY27 through MY32. We offer several observations on the HD TRUCS model and where it can be improved:

- There is a great level of detailed source data from the National Renewable Energy Lab (NREL) about one vocational application (utility boom trucks) in the TRUCS model and limited detail for other vocational applications. This limited view must be corrected.
- EPA included one source that measures Power Takeoff (PTO) across vocations – the California data on safe-harbor percentages – to estimate PTO usage and energy demands into HD TRUCS. This must be expanded.
- EPA's GHG Phase II inclusion of neutral-idle technology within the GEM model creates a compliance pathway for more OEMs to utilize idle reduction features in vocational trucks as GHG Phase 2 stringencies tighten. This is a positive example of how EPA can integrate efficiency features into the GEM model to incentivize deployment for mature, ready-efficiency technology with low regulatory overhead.
- The model assumes that end-users will buy the lowest cost, lowest power chargers possible given the vehicle application's daily energy expenditures and overnight dwell time ~12 hours. This assumption does not match what we have heard from end-users that indicates commercial vehicle end users want to invest in EVSE at a higher power level than minimum requirements. Because of the need for faster charging time, 150KW-350KW charging rather than 19-50KW charging is more desirable in the commercial vehicle space due to desires to future proof infrastructure investments and have more flexibility in charging options for overnight and opportunity charging. It is believed this higher kW power charging provides a margin of safety that fleet operators will seek to avoid costly vehicle downtime.

  Recommendation: EPA run a sensitivity analysis using HD TRUCS to see how payback and adoption analyses would change if the applications currently assumed to use 19-50 KW in the model instead are projected using 150-350KW. EPA issue a public request for information about vehicle dwell time and intentions to install higher power DC fast charging on site.

Industry and end-users can support EPA with data to improve inputs to the HD TRUCS model. We recommend EPA plan a second comment period or technical amendment to publicize data collected from this NPRM and to solicit additional data similar to EPA data collections from NREL on boom trucks for vehicle applications within HD TRUCS. Given the time constraints EPA is under to finalize the rule, some MEMA members plan to provide available duty cycle data that has been collected from end-user vehicle applications to answer EPA's question regarding vehicle applications that are expected to be more challenging to electrify and take more time to convert to ZEV. For example, PTO data can be used to estimate energy usage for battery sizing as EPA has, and PTO can also be an indicator of vehicle specialization which has additional timing considerations for end-user ZEV adoption.

Section 1: Vehicle applications with additional challenges to implementing ZEV technology

Specialized vehicle bodies – EPA has gathered information on PTO operation time and energy consumption for battery sizing. The presence of a PTO also indicates specialization of the truck body with accessories and other high-powered equipment.

EPA recognizes ZEV deployment in commercial vehicle will have an added challenge compared to Light Duty due to the necessity for manufacturers to efficiently allocate capital expenditures (CAPEX) towards the highest market segment opportunities, and release BEV chassis according to resources available and prioritized business case. Therefore, EPA should expect that serial production of specialized vocational applications will take longer due to diffuse volume across many vehicle configurations.

In exploratory R&D projects, a MEMA member has found some unique challenges to releasing efficiency technology on conventional vocational vehicles. While manufacturers may release vehicles with new GHG-saving technology, certifiers have more challenges capturing the GHG benefits via powertrain certification due to the need to contain vehicle specification details in the model (for example, axles ratios) to reliably quantify GHG credits and limit complexity.

OEMs prioritize resources towards deploying new GHG-saving technology on higher volume vehicle configurations with end-users that value fuel savings first, and these features are released for specialized vocational trucks later.

Vehicles that have higher volumes, less specialization, and operate in less harsh environments, like step-vans, can be a better starting point for vocational segments, rather than targeting ZEV adoption across all vocational segments before MY32.

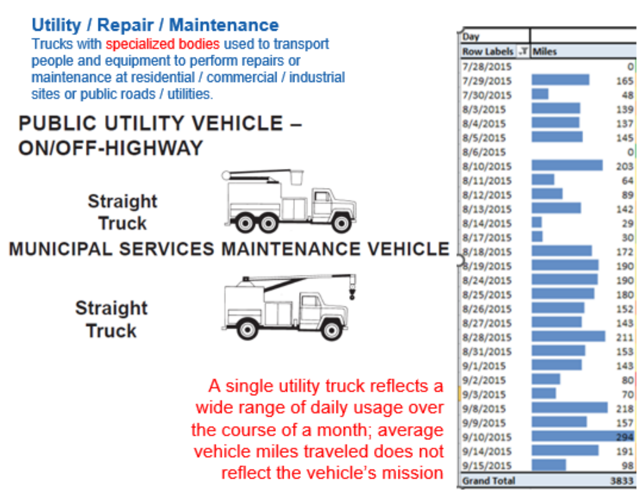
Additionally, specialized vehicle bodies are more unique to end-users' needs, so there is higher cradle-to-grave ownership cycle costs, which means that battery replacement costs are going to weigh higher into fleet-level business cases and decision-making. These end-users with longer ownership cycles tend to adopt technology more cautiously, with a more measured approach due to limited resale markets.

<u>Recommendation</u>: EPA project slower adoption for electrification of specialized vocational vehicles because the OEM business case to release new technology on limited volume vehicles will pace these applications behind higher volume vehicle applications, and end-users will likely show slower adoption of new technology.

GHG reduction and partial electrification can be incentivized by EPA by including electrification of accessories in the GEM model. Vehicles with high specialization and lower volumes for each body type will benefit if body builders are included in the regulatory structure for integration of electrified accessories that occurs after chassis delivery by OEMs, like ePTO, which is not currently part of the GEM model, and should be added as an optional innovative efficiency technology option.

<u>Section 2: Worksite location unpredictable, away from depot</u>

Any vehicle application that builds and maintains infrastructure, including construction applications and utility trucks that respond in emergencies to restore critical services, represent commercial vehicle missions where the vehicle has a significant probability of not being able to return to the depot to charge overnight. Such vehicles might stay at the job site for days or weeks at a time when its performance demands are highest and most critically needed. This need for geographic flexibility brings added challenges to fleets planning infrastructure. A MEMA member has compiled available duty cycle data to provide real-world examples of these kinds of vehicle's daily variation in miles traveled. This is shown in the figure below:



Body type	Chassis MY	Mileage	% Idle Time
Altec Bucket	2007	High • Average 92 miles/day • Range (2.3-221 miles per day)	Med • Average 1 hr per day • Range 0.1-3.7 hours per day)
Altec Bucket	2009	Med • Average 55 miles/day • Range (13-115 miles per day)	High • Average 2.7 hrs per day • Range (0.4-6.3 hours per day)
Service Body	2010	Med • Average of 57 miles/day • Range (5 - 110 miles per day)	High • Average 3.3 hrs per day • Range (0.1 – 5.3 hours per day)
Service Body	2010	High • Average 142 miles/day • Range (29-294 miles per day)	Low • Average <1 hour per day • Range (0.2-5.5 hours per day)
Altec Bucket	2011	Low • Average 37 miles/day • Range (3-150 miles per day)	Med • Average 1.4 hours per day • Range (0.1-5.2 hrs per day)
Altec Bucket	2012	High • Average of 120 miles/day • Range (5 - 250 miles per day)	Low • Average <1 hour per day • Range (0-3.2 hours per day)

Data collection for utility trucks between July and September 2015 shows significant variation across six vehicles.
Notably, **each individual vehicle also has high variation** in daily mileage and idle time reflecting the need for **asset flexibility**. Customers **spec larger fuel tanks than standard,** so the vehicle is equipped to perform on high demand days..
Usage variation for an individual trucks will challenge battery sizing.
High body specialization and the need to restore critical services will affect end-user willingness to convert to ZEV on EPA's timetable.

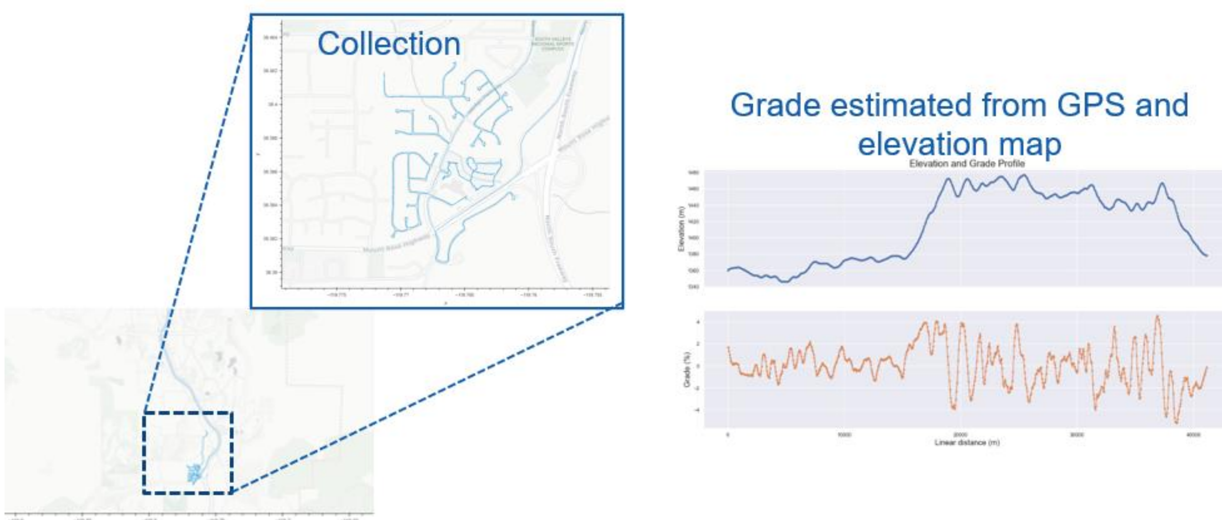
<u>Take-away</u>: Like motorcoach and sleeper applications, liquid fueling (hydrogen) or other renewable fuel capability, provided through publicly available infrastructure

would be the best solutions path to address the variable performance demands and extended use these applications.

Recommendation: EPA expands the HD TRUCS model feasibility and cost sections to include the preceding applications and fuel sources.

Some percentage of the above noted vehicle applications can electrify once suitable charging is available near the job site. We would expect BEV adoption to increase in areas where fast charging (>150-350KW) has been deployed in industrial, metro, and interstate locations. However, we would not recommend full-BEV technology be modeled, recommended or mandated for utility vehicles that restore critical services in emergency situations due to the risk of charging infrastructure downtime impeding the vehicles' missions.

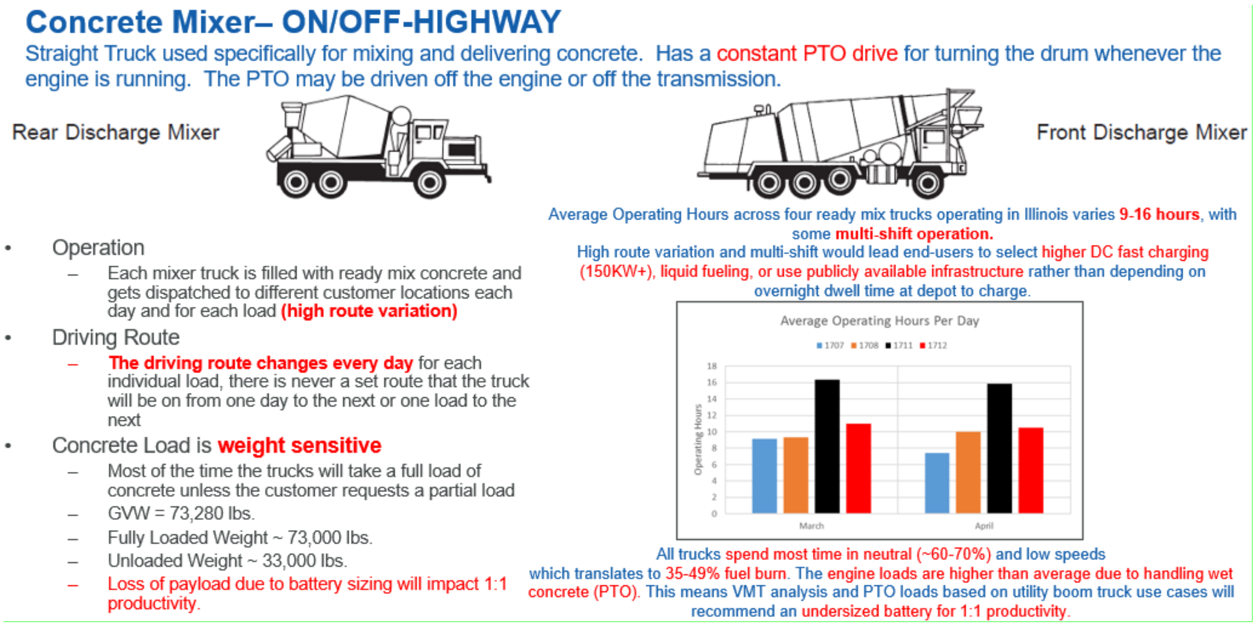
Given sufficient time to gather data, industry can support EPA development of HD TRUCS model with GPS-driven geographical inputs of a variety of vehicle applications to assess the variability of routes/location and assess public infrastructure charging needs. A MEMA member provides an example below of the kind of additional data that could be provided to EPA using telematics, GPS, and elevation maps on a refuse application.



Section 3: Continuous, stationary use and occasional high-performance demands

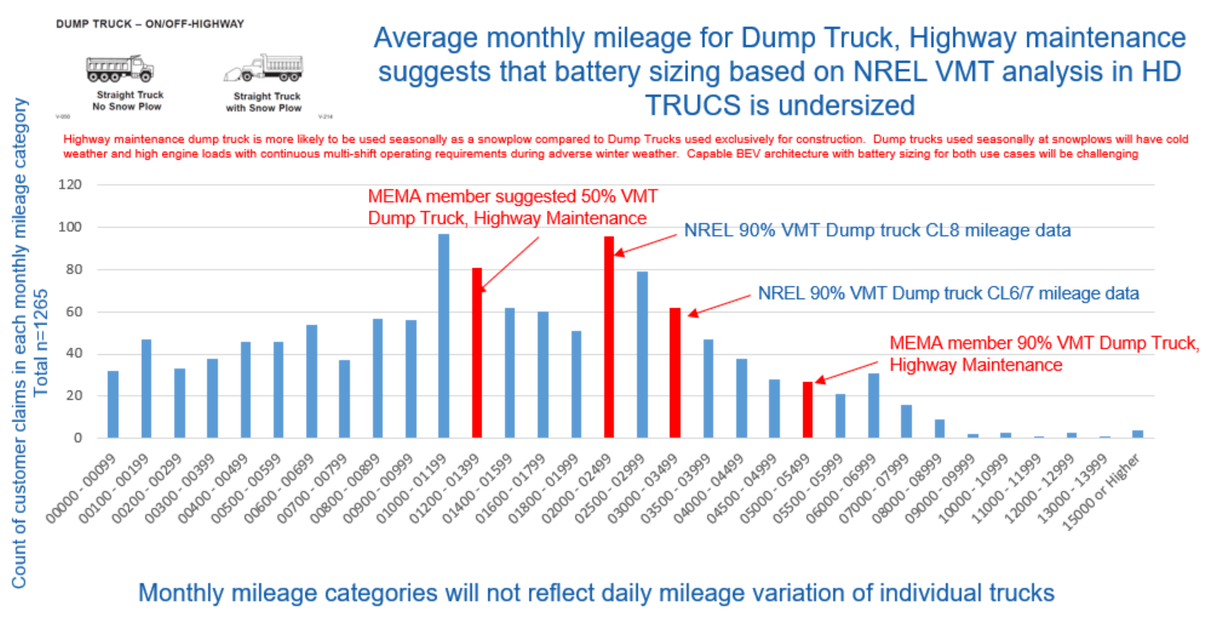
Vehicles such as Fire Trucks, Utility trucks and Snowplows periodically have higher performance demands than typical daily operation. Fire trucks need to pump water continuously all night to quench a fire. Utility trucks must restore critical services like power or sanitation to protect public health and the environment.

Similarly, ready-mix concrete applications need to continuously turn the drum to avoid concrete hardening leading to higher fuel burn in the range of 35-49% from PTO usage. *This is higher fuel burn from PTO usage than referenced NREL data from utility bucket trucks showing <15% fuel burn from intermittent PTO usage*. Likewise, concrete pumpers have extremely high-performance needs for PTO that would require higher performance PTO than utility bucket trucks.



Some vehicles that need to operate continuously are mostly stationary, so challenges of electrifying are not well captured in EPA's Vehicle Miles Traveled (VMT) analysis. Other vehicles in the EPA models have mileage needs that vary widely on a day-to-day basis, so average VMT analysis does not reflect the true need for asset flexibility and end-use patterns.

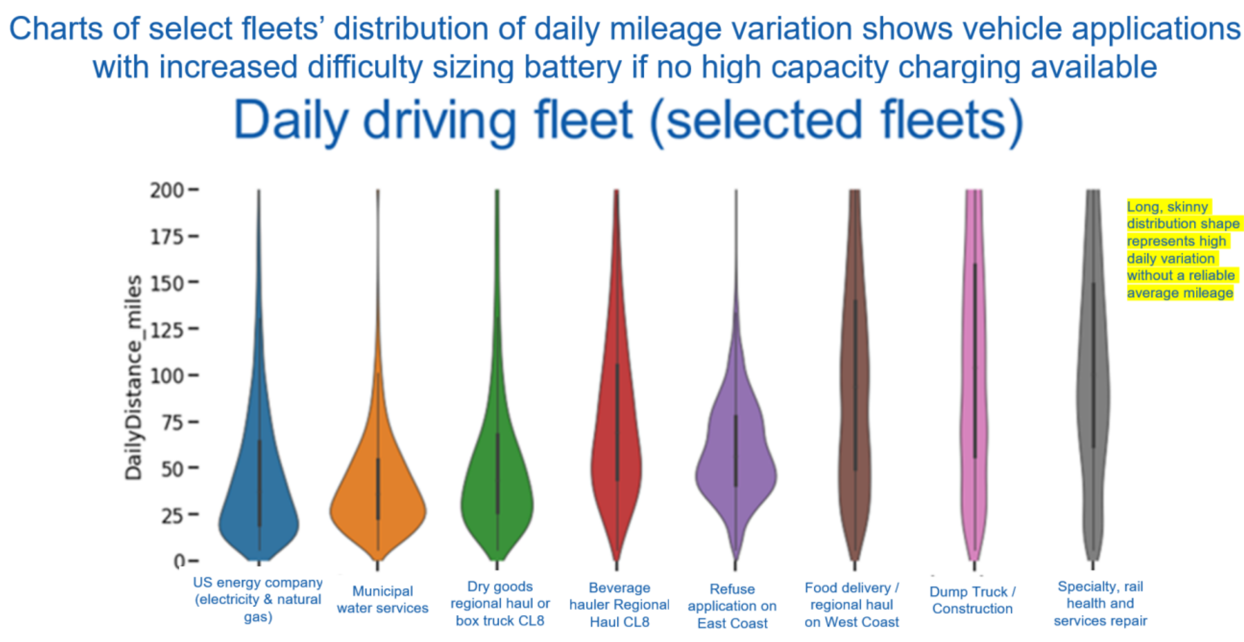
Another example is that snowplows must operate continuously in adverse winter weather to clear roads for public safety. Snowplows are often converted and used as dump trucks for highway maintenance other times in the year. It will be very challenging for OEMs and end-users to size batteries for this different seasonal usage, so H2ICE, Renewable Fuel or FCEV with liquid fueling would provide better asset flexibility for this kind of seasonal dual-use vehicle.



EPA recognizes a special use case in the NPRM where an optional custom chassis certification structure for Fire Trucks is proposed so that the regulation does not force BEV technology to this category prematurely, even though the HD TRUCS model predicts 13% BEV adoption in MY27 and 25% BEV adoption in MY2032 for Fire Trucks based on energy requirements.

Recommendation: EPA provide an optional custom chassis certification for other vehicles used in emergency response (ex. snow emergency, utilities restoration) to provide needed regulatory relief until there is more certainty in 1:1 replacement capability and productivity for each conventional application to decarbonized vehicle conversion based on technology and infrastructure readiness. This approach would mirror EPA's proposal for "Optional Customer Chassis: Emergency Vehicle" with 0% ZEV adoption modeled through MY32.

For vehicles not engaged in emergency response, but with wide variation of daily operating needs, we recommend that EPA give thought to a productivity factor for each vehicle's mission, apart from mileage analysis, to improve the HD TRUCS model's ability to forecast 1:1 replacement. Given sufficient time to gather data, industry can support EPA with daily fuel consumption, when in heavy use, for these targeted applications to determine correct battery sizing. A MEMA member has compiled available duty cycle data to provide real-world examples of these kinds of vehicle's daily variation in miles traveled, shown in figure x-y below.



<u>Section 4: Advanced applications with end-customers with higher readiness for ZEV transition than currently modeled in HD TRUCS</u>

<u>BEV early adopter market segments with predictable daily routes and usage</u>: Bus applications, including school bus and transit, are early adopter segments for BEV. Even though Heavy Duty BEV is still in early stages of deployment worldwide, school bus and transit bus have already had more time to validate that BEV technology can be 1:1 with ICE for performing daily missions for a larger percentage of fleets than the adoption currently projected in the HD TRUCS model for these segments (0-32% in MY27 and 35-45% in MY32).

<u>Segments that can reliably charge overnight in depot</u>: School bus, transit bus, and port drayage can take advantage of the flexibilities of overnight depot charging and opportunity charging throughout the day when not in use. Although more costly EVSE is required to maintain the fleet's business model, these three applications also have increased incentive support to overcome initial cost barriers of vehicle and EVSE at the state and federal level. *These fleets can also participate in V2G bi-directional charging capabilities.*

Port drayage fleets are more likely to require multi-shift operation during peak shipping periods, which will need higher power EVSE to maintain productivity. Multi-shift operation can challenge 1:1 productivity parity for BEV vs. conventional technology if minimum charging infrastructure is assumed, as is currently reflected in HD TRUCS at 50KW. However, purchasing high power EVSE (350KW+) as noted above can be part of the drayage fleet manager's and port operator's plans for electrifying port operations due to domiciled operations allowing for re-charging during 30-minute lunch breaks.

End-users with goals to minimize fuel costs and/or achieve progress towards ESG metrics

Pickup & delivery duty cycles served by Box trucks, Step-Vans, and Regional Haul tractors, especially those purchased by fleets motivated by ESG goals, indicate fleet owner/operators with more willingness to adopt new technology faster. Many of the early orders of BEV included in EPA's GHG Ph 3 preambles come from packaging and consumer package goods fleets who have aligned goals to reducing GHG from operations.

Recommendations:

a) EPA and other Federal agencies consider how incentivized support for infrastructure can be used to 1) future-proof DC charging needs, 2) allow faster ZEV deployment for early adopter segments, 3) provide opportunity to leverage potential benefits in bi-directional charging for school bus and other suitable municipal applications, resulting in 4) improved grid resiliency to maintain critical services in case of casualty.
b) EPA reexamine the readiness for ZEV adoption for the three advanced applications noted above and adjust the TRUCS model accordingly.

The Vehicle Suppliers Association

Appendix 2

Comparison of California vs. U.S. Federal EV Programs

State of California	US Federal
Infrastructure coordination: • AB 2127 – coordination CEC (California Energy Commission), CPUC (California Public Utilities Commission), and IOU (Investor-Owned Utilities) – HIGHLIGHT BELOW • CEC estimates 157K high powered chargers will be needed by 2030 to support 181K MDV & HDV; and expects Advanced Clean Fleets to represent 3% of the system annual load in 2035, but only 1.4% for peak hour demand from 5PM to 8PM • Special task force for rural charging needs • Infrastructure providers working with majority of OEMs requirements for connectors, electric vehicle equipment supply equipment, communications, safety, and related hardware • Alliance of Clean Renewable Hydrogen Energy Systems	**Infrastructure coordination:** • September 2022 MOU signed between Environmental Protection Agency (EPA), Department of Transportation (DOT), Department of Energy (DOE), Department of Housing and Urban Development (HUD) are coordinating actions towards a decarbonized sustainable transport future (LD, MD, HD) starting with The U.S. National Blueprint for Transportation Decarbonization; targets for all new vehicles to zero emissions between 2030 and 2040. • BIL establishes Joint office of Energy and Transportation in Dec 2021, which has announced formation of EV working group in June 2022 to advise LD/MD/HD • In Preamble HD GHG Ph3 NPRM, EPA requests comment regarding stakeholders that must be engaged to overcome infrastructure barriers to ZEV adoption for >14K GVW On Highway Vehicles (Commercial Vehicle incl. trucks & buses) and metrics to track to ensure success.
Infrastructure investments: • CPUC has authorized $686M for projects over the next 5 years for infrastructure upgrade projects across 3 public utilities • CEC invests $2.9B to accelerate CA 2025 EV charging and hydrogen refuel which includes $1.7B for MDV & HDV infrastructure, $90M for hydrogen refueling infrastructure, $15M for ZEV and NZEV product support, and $10M for workforce development • EnergIIze (https://www.energiize.org/) has authorized $276M through 2026 for CA MDV & HDV • Private investments including from OEMs ($650M from Daimler, Volvo, Hyundai, Nikola are also listed without $ specified) • CARB LCFS provides credits to offset cost of lower carbon intensity fueling (with is included in CARB TCO comparisons BEV vs. ICE) • Private investments from hydrogen station develops for LDV (Chevron and Iwatani, with funding support from CEC; have committed to continue w/o gov't funding) • Today there are 56 hydrogen refueling stations in CA, and building 200 over the next 5 years (13 of these will offer fueling for commercial vehicle)	**Infrastructure investments:** • Bipartisan Infrastructure Law (BIL) $350B for FY22-26 Federal Highway Program with $7.5B to establish a National EV Charging Infrastructure (across LDV, MDV, HDV); $65B to upgrade power infrastructure; and NEVI formula program $5B for national development of EV charging infrastructure • DOE awards $7.4M to several projects to develop MD & HD EV ZEV charging and hydrogen corridor infrastructure plans • Regional clean hydrogen hubs: 2022-2026 $8Billion, program to support the development of at least 4 clean H2 Hubs, at least 1 shall have end-use in the transportation sector • Clean hydrogen electrolysis program 2022-2026 $1B: R&D, demonstration commercialization and deployment program for purposes of commercialization to improve efficiency, increase durability and reduce cost of producing clean H2 using electrolyzes (goal to reduce cost of H2 produced using electrolyzes to less than $2/kg by 2026 • Clean Hydrogen production tax credit for production of clean hydrogen for first 10 years for facilities put in place CY23-CY32 • IRA tax credit up lesser of $100K or 30% of cost of qualified alternative refueling CY23-32 including EV chargers, hydrogen, Natural Gas, Biodiesel through Alternative Fueling Property Credit
Vehicle incentives: • CALSTART reports over 2,118 M/HDV ZEV pop. in CA, supported by $303M total funding ($143K/veh) • HVIP point of sale vouchers ($657M for MHDV in 2021 and $675M in 2022); voucher varies by vehicle application with Straight truck $45K-$120K/veh; School buses $70-$198K/veh. • CARB matches funding provided by EPA DERA programs to support rural school bus replacement • VW Trust ($90M deployed for ZE CL8 & port drayage trucks, now $130M authorized over next 10 years for transit, shuttle, and school bus, up to $400K per vehicle) • Truck Loan Association program to subsidize small businesses that would not otherwise qualify for capital loans for Cleaner Trucks including ZEV	**Vehicle incentives:** • BIL authorizes $5B over FY22-26 for Clean School Bus program administered by EPA Diesel Emission Reduction Authorization (DERA) – FY22 awarded nearly $1B grants to 389 school districts to fund 2,400 clean school buses and infrastructure (~$416K per bus) • BIL authorizes U.S. DOT Federal Transit Administration (FTA) increased funding for Low and No Emissions Vehicle Grant Program for Public Transit bus & facilities, $1.1B for FY22, $1.2B for FY23, funding will continue to be authorized through FY26. • IRA $1B in grants to purchase zero emission Class 6 and 7 trucks and install infrastructure • IRA $3.6B Credits for Qualified Commercial Clean Vehicles authorized 2023-2032 (avg. $360M py), Up to 30% cost of Clean Commercial Vehicle (ZEV/PHEV) capped at $40K per vehicle in tax credits to offset cost delta from same configuration conventional vehicles

• R2: Refuse Reimagined will double ZE Refuse truck in CA for 2023 (currently 23 vehicles, targeting 110 vehicles in 2023) • CARB Project 800 to support ZEV purchase at ports/drayage	• IRA $3B Grants to Reduce Air Pollution at Ports authorize through 2027 for competitive rebates and grants to purchase and/or install zero emissions port equipment and technology

Takeaways from Appendix 2:

a. States and entities beyond California play a role in supportive legislation for infrastructure development.

b. Utilities need to be compelled to build out ahead of demand. Utilities are a mix of public and private entities and coordination is challenging for end-users. California has adopted AB 2127 to coordinate CEC (California Energy Commission), CPUC (California Public Utilities Commission), and IOU (Investor-Owned Utilities).

c) AB 2127 is important because it reflects California's charging assumptions did not have clear charging infrastructure requirements for MHDV using standardized common connectors at final rulemaking in 2018, prior to EO N-79-20 and final MHDV ZEV mandates. This creates a capability gap for near term goals such as CARB Advanced Clean Fleets mandates calling for 100% ZEV sales in some vehicle application segments from drayage on Jan 1, 2024, to transit bus in 2029. EPA should review this program for best practices and lesson learned to improve guidance on MHDV requirement for use of IIJA and IRA funds.

https://www.energy.ca.gov/data-reports/reports/electric-vehicle-charging-infrastructure-assessment-ab-2127

"AB 2127 (2018) requires the California Energy Commission to biennially assess the electric vehicle charging infrastructure needed to meet the state's goals of putting at least 5 million zero-emission vehicles on California roads by 2030 and reducing greenhouse gas emissions to 40% below 1990 levels by 2030.

The inaugural Assembly Bill (AB) 2127 Electric Vehicle Charging Infrastructure Assessment examines charging needs to support California's plug-in electric vehicles (PEVs) in 2030. Under AB 2127, the California Energy Commission (CEC) is required to publish a biennial report on the charging needs of 5 million zero emission vehicles (ZEVs) by 2030. In September 2020, Governor Gavin Newsom issued Executive Order N-79-20, which directed the Commission to update this assessment to support expanded ZEV adoption targets.

In 2018, Executive Order B-48-18 had set a goal of having 250,000 chargers (including 10,000 direct current fast chargers) by 2025. As of January 2021, California has installed more than 70,000 public and shared chargers, including nearly 6,000 direct current fast chargers. This report finds that an additional 123,000 are planned, of which about 3,600 are fast chargers. This leaves a gap of about 57,000 installations, including 430 fast chargers, from the 250,000 charger goal for 2025.

For passenger vehicle charging in 2030, this report projects over 700,000 public and shared private chargers are needed to support 5 million ZEVs as envisioned in the AB 2127 legislation. For the 8 million ZEVs anticipated by 2030 under the more ambitious Executive Order N-79-20 goals, nearly 1.2 million chargers will be needed for light-duty vehicles. An additional 157,000 chargers are needed to support the 180,000 medium- and heavy-duty vehicles anticipated for 2030.

The report also finds that a portfolio of charging solutions is needed to address site-specific real estate and grid constraints. To maximize grid integration, energy resilience, and ease of use for site hosts and drivers, charging equipment hardware and software should use common connector and communication standards. Innovative business models are prioritizing higher utilization, diversified revenues, and adaptation to local environments. Finally, the report outlines the need for continued government support and funding, increased private funding, and a flexible and scalable framework to accommodate the growing charging market."

d) A robust hydrogen infrastructure suitable for commercial vehicle applications is farther behind and reducing GHG impact of transportation needs this to be established along freight corridors. Only 13 out of 200 of the hydrogen fueling locations planned for readiness in California over the next 5 years will offer fueling for commercial vehicles.

e) While IRA and BIL are supportive of ZEV transition, more support and coordination is needed to overcome initial adoption barriers as well as targets to address the different needs of MHDV vehicle with higher peak loads.

f) The Federal government can be well positioned to direct infrastructure capabilities along interstates – including Hydrogen infrastructure and DC fast charging hubs.

g) In comments filed on behalf of the trucking industry to the Federal Highway Administration (FHWA) on its National Electric Vehicle Infrastructure Formula Program Notice of Proposed Rulemaking (Federal Register, June 22, 2022), FHWA was asked to direct states to dedicate specific funding levels towards the build-out charging infrastructure for the trucking sector.
In its final rule, the FHWA addressed this request as follows:

> "FHWA understands that the MD/HD charging industry is very nascent and rapidly evolving; as such, *FHWA has not modified the language in this final rule to specifically accommodate MD/HD needs* so as not to preempt the pace of the technological innovation. The rule does not preclude MD/HD charging infrastructure and FHWA strongly encourages project sponsors to consider future MD/HD needs. The FHWA will continue to monitor the technological advancements in the MD/HD industry for consideration as to whether further regulation is needed to provide applicable minimum standards and requirements at a future date." Federal Register, Vol. 88, No. 39, Page 12731 (February 28, 2023).

f) The Joint Office of Energy & Transport agency could be the responsible agent for coordinating ZEV infrastructure readiness. Industry would benefit from transparent reporting and agreed milestones.

g) EPA programs are supportive of bus and port ZEV transition, but other vehicle applications have comparatively less federal support to transition to ZEV relative to higher incentives in the California Hybrid Voucher Incentive Project.

Recommendations:

1) EPA defines MHDV charging requirements for States on ACT pathway and non-ACT pathway.
2) EPA defines and provide FHWA guidance regarding truck and bus requirements for NEVI.

Table Sources:

https://ww2.arb.ca.gov/sites/default/files/barcu/board/books/2023/042723/prores23-13.pdf (CARB Advanced Clean Fleets Resolution 23-13);

https://californiahvip.org/ (CALSTART Hybrid and Zero Emission Truck and Bus Voucher Incentive Project);

https://unfccc.int/sites/default/files/NDC/2022-06/United%20States%20NDC%20April%2021%202021%20Final.pdf (USA National Determined Contribution Reducing GHG in the US: A 2030 Emissions Target)

https://driveelectric.gov/news/ (Joint Office of Energy and Transportation News Site) https://www.transit.dot.gov/lowno (FTA Low or No Emission Vehicle Program)

Appendix 3

Map of Estimated U.S. EV Charging Electricity Needs

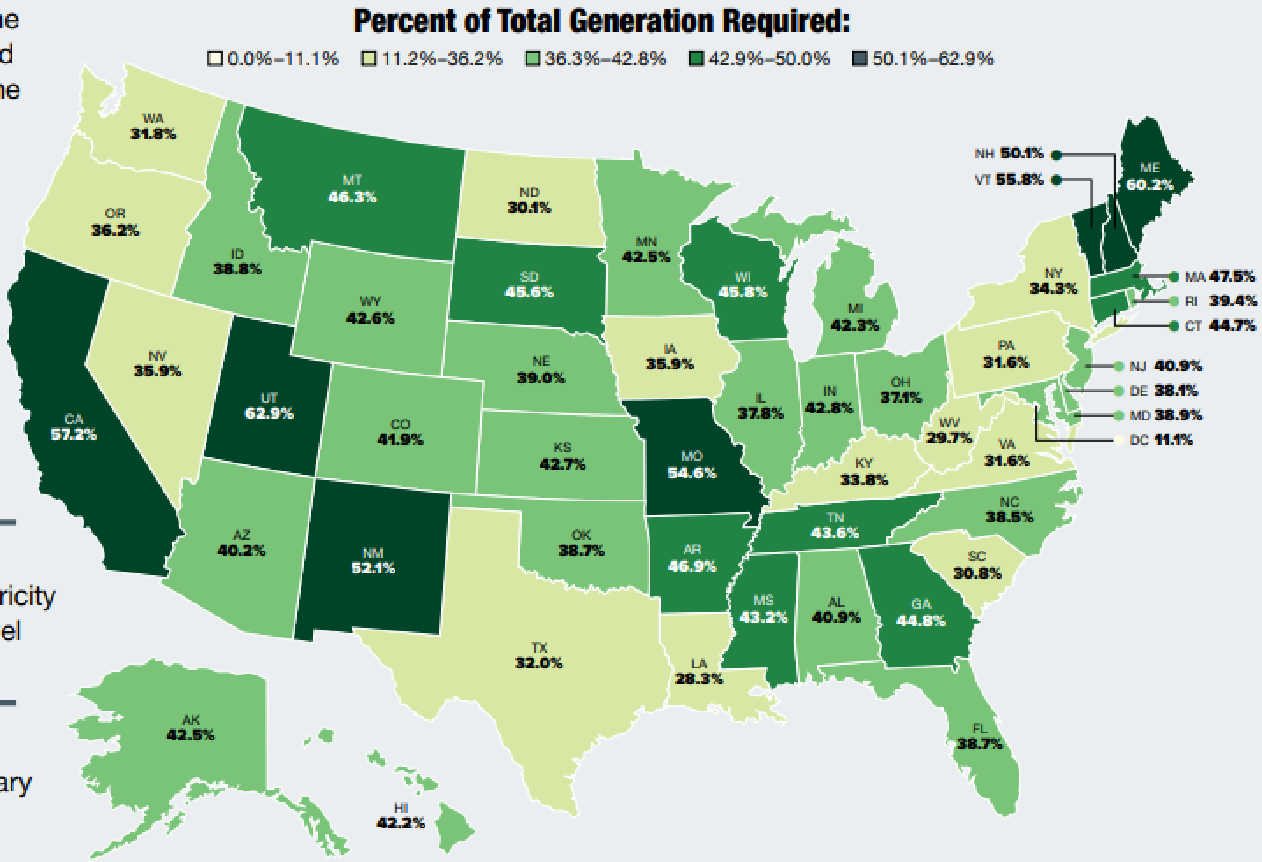
ELECTRICITY NEEDS ARE SIGNIFICANT

Full electrification of the U.S. vehicle fleet would require a large percentage of the country's existing electricity generation including:

- 26.3 percent for passenger cars and trucks
- 14 percent for all freight trucks, including 10.6 percent for long-haul trucks
- 40.3 percent for all vehicles

Some states would need more than 50 percent of current electricity generation to meet vehicle travel needs (see map at right).

Large-scale infrastructure investment would be a necessary precursor to electrification.



Source: https://truckingresearch.org/wp-content/uploads/2022/12/ATRI-Charging-Infrastructure-Challenges-for-the-U.S.-EV-Fleet-Summary-12-2022.pdf