

**Discussion Paper for Heavy-Duty Vehicles and Engines:  
Transitioning to a Zero-Emission future**



**Canadian Vehicle Manufacturers' Association**

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The Canadian Vehicle Manufacturers' Association (CVMA) is the industry association that has represented Canada's leading manufacturers of light and heavy-duty motor vehicles for more than 90 years. Its membership includes Ford Motor Company of Canada, Limited, General Motors of Canada Company, and Stellantis (FCA Canada Inc.). Collectively its members operate five vehicle assembly plants as well as engine and components plants, and have over 1,300 dealerships. In Canada, over 136,000 jobs are directly tied to vehicle assembly. Direct and indirect jobs associated with vehicle manufacturing are estimated at over 792,000 across Canada.

We recognize that the Government is beginning consultations on the federal approach to further reduce Canadian emissions from medium-duty and heavy-duty vehicles (HDVs). In addition, seeking input on the near-term opportunities to reduce emissions from the current fleet of HDVs and how to encourage early adoption of HD ZEVs.

To provide context, it is important to highlight that the auto industry continues to deliver significant reductions in greenhouse gas (GHG) and criteria emissions from both the light and heavy-duty on-road vehicle fleets through ongoing technological advancements to both internal combustion engines (ICE) and electrified powertrains. The automotive industry is highly integrated with the United States (U.S.) and the need for a continued harmonized vehicle emissions regulatory approach cannot be overlooked. The highly integrated nature of the auto industry has been recognized since the Auto Pact of 1965 and more recently under CUSMA. This alignment and need for collaboration between our economies to achieve a zero-emissions future was reaffirmed in the Roadmap for a Renewed U.S.-Canada Partnership and in the Joint Statement made by Environment and Climate Change Canada (ECCC) and the U.S. Environmental Protection Agency (EPA) regarding the environment and climate change.<sup>12</sup>

Historically, the Heavy-Duty Vehicle and Engine Greenhouse Gas Emission (HDVE) Regulations have been aligned with the U.S. EPA through Phase 1 (2014 to 2018 model years) and through Phase 2 (2019 to 2027 model years). This approach has served Canada well, and continued alignment will allow the North American integrated market to be leveraged. Providing larger economies of scale will offer Canadians greater access to the latest HD vehicle/engine GHG reduction technologies as well as safety improvements, at the lowest costs. Alignment will also promote adoption and fleet turnover; similar to that seen under the Passenger Automobile and Light Truck (LDV) GHG Emission Regulations. Canada and U.S. regulatory alignment is also essential in the interest of enhancing the competitiveness of our two countries and promotes greater job growth even within the context of transitioning to a Zero-Emission future. Our understanding is that the U.S. EPA is planning the Phase 3 HD Rule for the 2027-2030 model years to further reduce greenhouse gas emissions and will likely require high levels of electrification during this period and beyond<sup>3</sup>. Therefore, it is critical to follow developments with this new rule to ensure continued alignment and avoid unnecessary or divergent regulations. Also, it is important to consider the linkage of the HDVE regulations with the criteria emissions requirements under the On-road Vehicle and Engine Emission Regulations.

The HDV sector is a complex segment due to the vast range of truck and engine manufacturers and commercial end users with very specific needs, so the transition to zero emission vehicles in this area requires further analysis and discussion. We wish to highlight that the CVMA members build not only

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<sup>1</sup> Roadmap for a Renewed U.S.-Canada Partnership, <https://pm.gc.ca/en/news/statements/2021/02/23/roadmap-renewed-us-canada-partnership>

<sup>2</sup> Joint Statement by the U.S. Environmental Protection Agency and Environment and Climate Change Canada on Environment and Climate Change, <https://www.newswire.ca/news-releases/joint-statement-by-the-u-s-environmental-protection-agency-and-environment-and-climate-change-canada-on-environment-and-climate-change-871261327.html>

<sup>3</sup> President Biden Executive Order August 2021, Section 3 & 4; <https://www.whitehouse.gov/briefing-room/presidential-actions/2021/08/05/executive-order-on-strengthening-american-leadership-in-clean-cars-and-trucks/>

light-duty vehicles but also heavy-duty vehicles that cover the spectrum of classes from Class 2b and 3 through to Class 8.

To transition the HDV on-road fleet to a zero-emission future, similar to the light-duty vehicles, the following is required to achieve the intended GHG reduction objective:

- **Market readiness of HDV ZEV vehicles.** The technological feasibility and suitability for HDV uses needs to be considered and may not be available for all segments in the same time frame.
- **Infrastructure and Grid Readiness** to support the fueling (electricity or hydrogen) of these types of vehicles. The infrastructure will need to be in place and appropriately sized for medium and heavy-duty ZEVs. A sufficient number of chargers must be located where these vehicles are used; at fleet terminals where trucks are parked and along routes. The capability of the grid to handle the increased load needs to be assessed before sales targets can be developed.
- **Incentives, financial or other enablers** to assist those considering these vehicles to switch to the zero emissions HD vehicles. The cost of these vehicles is substantial, and purchase decisions are based on the economics.
- **Education and awareness** for fleets, businesses, or individuals who purchase HDV either for commercial or personal uses. This includes awareness of the total cost of ownership, the impact on current operating practices, and operating in colder Canadian climate conditions. The total cost of ownership will drive decision makers to replace or retain their current MD and HD vehicles.

The discussion paper outlines the current state of affairs, the issues, opportunities and challenges in order to achieve the increased ambition to 2030. The paper references the California HD Advanced Clean Truck (ACT) regulations but fails to mention these regulations are not yet in effect, as a waiver is required from EPA, and that the forthcoming U.S. EPA Phase 3 HD GHG rule is also expected to drive MD and HD ZEV adoption. As written, the discussion leaves the impression that HD ZEVs can be brought almost immediately into the market which is not the case and is inappropriate.

Also, the market readiness of HD ZEVs vary dramatically between HDV OEMs and across the needs of those in the Canada who use HDVs for a wide range of tasks. It is important to recognize that the HD fleet in Canada may have a different make up and usage characteristics than other jurisdictions, but the fleet still operates in the integrated North American market economy. While individual vehicle and engine emission requirements must continue to be aligned with the U.S., the overall fleet makeup needs to be recognized in this discussion. Manufacturers and importers of HDV and engines that are currently regulated will likely be the same in the future, however, it is important to note that issues or concerns from owners and fleet operators may be different between jurisdictions, including the size of the commercial fleets they operate.

We strongly recommend that Environment and Climate Change Canada (ECCC) and Transport Canada (TC) work closely with all involved in the HDVE ecosystem and that further work and discussion is needed with all involved, including the U.S. EPA. CVMA and its members wish to participate in this activity as it moves forward.

Our preliminary views on some the questions outlined in the discussion paper are provided below. We wish to highlight that the information provided is based on the current knowledge and is subject to change.

### 1. Regulatory Approach

- The alignment with the U.S. EPA regulation needs to be maintained and there are challenges from an economic and environmental perspective as the industry operates in a N.A. integrated market. The

U.S. has similar climate change objectives as Canada, and there is reason to believe that the forthcoming HD GHG Phase 3 regulations (2027-2030 model years) will be used to meet these goals, similar to the final 2023MY to 2026MY LDV GHG rule recently issued by the U.S. EPA and the pending 2027-2030 rules. One cannot assume that the sales targets of the California ACT regulations are applicable in the Canadian context and can simply be adopted without extensive review.

- The technology readiness and feasibility will need to be assessed from a Canadian point of view on a segment-by-segment basis, and even within a segment (i.e., short trip cargo vans might be technically ready before longer trip cargo vans, vocational vehicles used in urban centres vs. remote/colder climate regions) before sales targets can reasonably be determined.
- Our members have made significant financial investments and commitments to new electrified products including increased production and are bringing to market some Class 2b/3 ZEVs. Currently there is no historical sales data/information to base any future ZEV adoption/sales rates. Substantial development and validation time is needed prior to mass market entry and increased production.
- Any changes being contemplated on the HDVE regulation has many implications – complexity given the varied classes and a comprehensive cost-benefit-analysis would need to be undertaken on any move away from the harmonized approach.
- If the additional weight of an EV powerpack increases a vehicle’s curb weight excessively, thus potentially lowering available payload, additional provincial regulatory intervention on GVWR requirements could dissuade or create barriers for fleet consumers from replacing their HD internal combustion engine (ICE) trucks with electrified versions.
- Canada needs to take a holistic approach to HD ZEV adoption. The U.S. is developing and California has been working on a holistic approach and the needed supports (i.e., charging, refueling, education, incentives) to drive demand for ZEVs including HD ZEVs. Similar, if not additional, supports will be needed in Canada to drive the demand needed in the highly competitive and cost sensitive commercial sector. In particular, developing the required charging or refueling infrastructure between long distance destinations and for HDVs operating in colder climates.
- The expansion in availability of appropriate low carbon fuels that meet OEMs’ fuel specifications will also continue to support GHG reductions for the on-road HDV fleet and contribute to near-term reductions.

## 2. Supply and Demand

- The industry is still at the cusp of vehicle electrification and for HDV electrification it is in its infancy.
- Complementary demand enabling programs will need to be in place such as fleet purchase requirements, infrastructure incentives, and technician training will also provide some of the necessary supports for all classes of the HD segments should EVs be pursued for these classes of vehicles.
- Market enablers such as government commitments to longer term significant purchase and operational incentives that are reflective of these higher cost vehicles will be necessary to provide additional economic justification to customers. If these cost sensitive consumers do not perceive HD ZEV technology as cost-effective, they will likely choose a different technology or decide to maintain their existing trucks longer. What levels of investment might be needed will likely vary across the country and will need to be studied and considered in support of any adoption goals.
- Without proper consumer education of the total cost of ownership benefits the higher costs that are reflected in the purchase price of an HD ZEV will dissuade many fleet consumers.
- EV charging and hydrogen refueling infrastructure growth must align with the goal of increasing the number of vehicles that will require these services and will need to be assessed on an on-going basis. Not having the infrastructure and supporting education and awareness in place will require adjustments to meet the intended targets.

- Electrified vehicles experience reduced range in colder climate. Charging and refueling opportunities may be limited without adequate year round infrastructure.
- Repair facilities will need to be updated and possibly relocated to service these vehicles. Vehicle downtime costs in commercial fleets can be substantial and late delivery commercial penalties can be significant. Any increased risk of HD ZEV downtime due to limited HD ZEV repair could be a significant barrier to adoption.
- Similarly, “downtime” due to HDV charging must be considered as lost time means less revenues for fleets.
- In order to demonstrate that HD ZEVs are practical and economically feasible, governments (federal/provincial & territorial) must lead by example, as being undertaken with LD ZEVs, and incorporate these vehicles into their fleet.
- Demonstration projects should be undertaken, and specific usage and climate cases validated before policies/targets are developed.
- Significant government funding will be required to assist OEMs with assembly plant production implementation and capacity increases to expand supply of ZEVs, and this supply will in turn help create more jobs and grow the economy. Supply will need to be complemented by a commitment to increase the infrastructure necessary to increase demand for such vehicles.
- Industry is working to understand commercial vehicle needs and is fully engaged in the ZEV transition, with new opportunities and products coming to market.

### **3. Costs, Benefits and Barriers**

- **Key hurdles for transitioning fleets to HD ZEV:**
  - Vehicles must meet all consumer year around requirements and expectations regardless of class and utility otherwise there may be no vehicle in that segment until technology and cost targets are achieved.
  - Electrification must be technologically feasible for the various applications and range of vehicles across the different classes of MD/HD vehicles.
  - Canadian climate, geography and distances.
  - Confidence for fleet purchasers that transitioning provides benefits in the near and long term. Due to the higher costs of ZEVs, fleets may be inclined to retain their existing (higher GHG emitting) vehicles longer, incentives will be needed (as has been seen in the LD fleet).
  - Convenient public and even private fast charging infrastructure at destinations, along routes, or at the starting point need to be installed. Charging needs to be studied and evaluated as any vehicle to charger ratios used in the LD space likely would not apply. Infrastructure would need to be in place before these technologies are given any meaningful consideration especially for routes/trips that may exceed vehicle ranges in all climatic conditions. The lack of charging/fueling infrastructure across the country and particularly in northern/remote/rural areas, or between destinations will present hurdles to meeting targets in these areas.
  - Other infrastructure parameters:
    - Infrastructure growth must align or lead the fleet electrification so that fleet operation is not significantly impacted by the transition to ZEV technologies.
    - Lack of government metrics/information and accountability on the infrastructure availability across the county and assurance that the infrastructure is maintained and updated over time.
    - Chargers that are capable of the rate of charge demanded for these vehicle types; balance of where and how they charge. This will likely require further study as new vehicle and uses are electrified.

- Locations capable of specifically servicing and repairing HD ZEVs will need to be put in place and be increased over time.
  - Fleet mechanic retraining and specialized tools and resources/costs that may be required for servicing these vehicles.
  - Cost to manage a dual fleet (ICE & EV) could be challenging as companies transition to HD EV's.
  - Different provincial and territorial requirements specifically for HDV may present significant barriers if vehicles change weight classes due to additional hardware.
  - Reduced range in colder climates, even more for HD ZEVs especially with heavier payloads.
  - Education and awareness for owners/operators/fleets regarding electrified MD/HD vehicles.
  - Understanding and addressing any regulatory requirements or obstacles for charging installation and HD ZEV facilities approvals; start up knowledge may not be known by potential adopters.
  - The local grid capability to handle the change in electrical load for these vehicles.
- **Key opportunities for transitioning fleets to HD ZEV:**
    - Potentially lower operating and maintenance costs – and possibly lower total cost of ownership.
    - Assurance to commercial fleets and individual businesses on stable, affordable, electricity pricing.
  - **Other Considerations:**
    - If the anticipated total-cost of ownership would be equivalent or less than gasoline/diesel counterparts. The initial cost of entry could be a key barrier to HDV ZEV adoption.
    - Increased clean electrical generation capacity may be needed for different areas across the country to support electrification of transportation. The net emissions impact of vehicles being charged from less clean power source (i.e. diesel generator) would need to be considered.
    - In general, as with other new technologies, the overall cost may decrease over time. However, there is still a lot of work to be done to transition to the volumes of scale that would result in lower costs. Additionally, the costs associated with sufficient energy storage balanced with vehicle payloads and range requirements is a primary consideration.
    - Financing requires further discussion and study with potential near-term early adopters and in the longer term with both small and large operations that use HD vehicles.
    - All applicable standards related to the EV ecosystem must be regularly reviewed to ensure they keep pace with technology and are modified and/or the development of new standards is undertaken as the needs arise. This requires more discussion and information exchange with the appropriate stakeholders.

#### 4. Research and Information

- Including but not limited to, technology and research gaps for charging/fueling infrastructure include location and quantity of charging/refueling stations, as well as operation in extreme cold weather.

#### 5. Non-Regulatory Measures

- This requires further work and discussion with all involved. The regulatory and non-regulatory approaches should not be separated as issues are interlinked. A holistic approach is needed.
- Possible HD ZEV Centre of Excellence funded by government and coordinated by research institution with participation by stakeholders including the provincial/territorial governments.
- Any program that promotes the early retirement and removal from the road of older HD vehicles would support decarbonizing the existing fleet.

#### 6. Retrofitting the On-Road Fleet

- If retrofits are considered, it is imperative for vehicle and public safety that the retrofits do not degrade any of the emissions or safety systems of the vehicle.
- Non-OEM retrofits that are cheaper and may have questionable safety or durability will undermine the ability of OEMs to introduce and expand HD ZEVs into the market.
- OEMs spend years and billions of dollars developing and validating vehicles that meet all regulatory requirements and consumer expectations.
- Canada may be better served looking at programs that encourage the removal of older on-road fleets that are less efficient, instead of a retrofit program. There would likely be additional safety benefits.

In closing, CVMA is of the strong view that further discussion and work is needed with stakeholders on the transition of the MD/HD vehicle fleet towards electrification. It is imperative for the government to engage with the U.S. EPA on the expected changes on the HDV GHG rule and pursue continued alignment to reduce GHG emissions and accelerate the adoption of medium-duty and heavy-duty ZEVs.

CVMA wishes to participate in future consultations on all aspects outlined in the paper and emphasizes the need to take a holistic, coordinated approach on this file. Should you wish to discuss our input, please contact us at 416.364.9333.

Yours sincerely,



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