

**COMMENTS OF THE
MANUFACTURERS OF EMISSION CONTROLS ASSOCIATION
ON THE ENVIRONMENT AND CLIMATE CHANGE CANADA
DISCUSSION PAPER FOR HEAVY-DUTY VEHICLES AND ENGINES IN CANADA:
TRANSITIONING TO A ZERO-EMISSION FUTURE**

January 21, 2022

The Manufacturers of Emission Controls Association (MECA) is pleased to provide comments on the Environment and Climate Change Canada's (ECCC) Discussion Paper regarding the federal approach to further reducing Canadian emissions from medium-duty and heavy-duty vehicles (HDVs). We understand that the objective of the consultation is to identify an approach for reducing emissions from the sector in a manner that is consistent with Canada's emissions reduction targets of a 40% to 45% reduction in greenhouse gas (GHG) emissions below 2005 levels by 2030 and reaching net zero emissions by 2050.

We support ECCC's ongoing leadership in the effort to reduce the environmental footprint of transportation to meet Canada's emission reduction and climate goals, including technology advancing strategies that provide pathways, including electrification, to progress the heavy-duty vehicle sector towards zero emissions. We believe an important opportunity exists to continue to reduce greenhouse gas emissions from medium- and heavy-duty engines and vehicles through the application of innovative technologies and fuels. MECA would like to share some suggestions, based on concepts proven during our long and successful partnerships with North American regulators, which we believe will strengthen near term Canadian programs intended to advance technologies that reduce emissions and support zero emissions vehicle penetration.

MECA is an industry trade association of the world's leading manufacturers of clean mobility technology. MECA is technology agnostic and our members are focused on delivering all mobility solutions to improve the overall emissions footprint of all vehicles, including internal combustion engines, battery and fuel cell materials, as well as components for hybrid and all-electric commercial vehicles. Our members have nearly 50 years of experience and a proven track record in developing and commercializing technologies that enable heavy-duty on-road vehicles to meet the most stringent NO_x and PM emission standards as well as electrification requirements. Our industry continues to play an important role in the environmental success story associated with light- and heavy-duty vehicles in North America and has continually supported efforts to develop innovative, technology-forcing, regulatory programs to deal with air quality and climate challenges.

Regulatory Approach

There is a long track record of meeting environmental goals through the implementation of performance-based standards and competing technology solutions to provide flexibility. While technology-specific mandates have been used to provide certainty in selected markets, they reduce flexibility for markets and end-users and often result in premature barriers to investment and

innovation in promising parallel pathways to achieving equivalent environmental goals. This has the unintended effect of destabilizing other markets for potentially cost-effective technologies and constraining the technology solution options to meet air quality and GHG emissions goals.

Canada has historically aligned its heavy-duty vehicle GHG regulations with the fuel neutral regulations of the US EPA. Indeed, in the near future, the EPA is to issue its Clean Trucks Plan (on-highway heavy-duty vehicle) proposal, which will incorporate elements of California's Low-NOx Omnibus along with potentially tighter U.S. Phase 2 heavy-duty GHG standards. MECA believes that the US EPA proposal may provide broader opportunities and flexibilities for additional technology pathways, a larger overall market and a reasonable timeline worthy of ECCC's full consideration. MECA's comments on EPA's Advanced Notice of Proposed Rulemaking for heavy-duty truck engine standards can be found at https://www.meca.org/wp-content/uploads/attachments/3472/MECA_comments_on_EPA_CTI_02202020.pdf.

The EPA On-highway Heavy Duty Vehicle emissions proposal is likely to be heavily informed by the California Heavy-Duty Omnibus Regulation (the Omnibus). MECA's comments on the Omnibus can be found at https://www.meca.org/wp-content/uploads/attachments/3552/MECA_Low-NOx_Omnibus_Comments_08272020_Final.pdf.

The emission limits in the CARB regulations have been derived from years of heavy-duty low NOx technology demonstration (program information at <https://ww2.arb.ca.gov/our-work/programs/heavy-duty-low-nox>) and testing at Southwest Research Institute that began in 2014 and has been enhanced under multiple phases to expand duty cycles, technologies and engines to address and ensure low real-world emissions. This seminal demonstration program of integrated engine and emission controls technologies has included the technical and financial participation of CARB, the US EPA, South Coast AQMD, the Truck and Engine Manufacturers Association (EMA), and MECA among others to deliver a robust technology feasibility demonstration of multiple pathways for meeting a 90% reduction in NOx while not increasing GHG emissions and controlling other regulated and unregulated pollutants. The scope and duration of this demonstration program is the largest to ever precede a U.S. mobile source rulemaking and the first to take a systems approach that considers CO₂, as well as, criterial pollutant emissions.

MECA has published two white papers (https://www.meca.org/wp-content/uploads/resources/MECA_MY_2024_HD_Low_NOx_Report_061019.pdf and https://www.meca.org/wp-content/uploads/resources/MECA_2027_Low_NOx_White_Paper_FINAL.pdf) that provide detailed information on technology feasibility and cost-effectiveness. The first paper focuses on achieving a 0.05 g/bhp-hr limit on certification cycles while adding a low load test cycle and revised compliance program beginning with model year (MY) 2024 engines. The compliance path relies on the use of current system architectures and the latest generation of commercial catalysts hardware (MECA, 2019). The second paper focuses on achieving a 0.02 g/bhp-hr limit on the current certification cycles and low-load test cycle beginning with MY 2027 engines (MECA, 2020).

MECA also supports streamlining and modernizing regulatory requirements such that emission reductions are achieved during heavy duty engine and vehicle certification. For example, MECA

supports taking lessons learned from EPA's upcoming changes to Heavy-duty Phase 2 technical amendments to allow novel testing to certify hybrid electric vehicles and apply these to criteria emission certification procedures for engines to be incorporated into electrified vehicles.

These state-of-the-art California and U.S. regulations highlight the importance of continuing to reduce the in-use emissions from those non-electric heavy-duty vehicles which will continue to employ diesel powertrains during the electrification of the transportation industry. In addition, these regulations will significantly further address and amplify air quality benefits in large metropolitan areas and in particular communities near freeways, freight corridors and ports which experience acute environmental impacts due to high heavy-duty truck traffic.

What will be the challenges and benefits of aligning with the sales targets in the California ACT?

MECA is generally supportive of the California Air Resources Board's (CARB) ACT regulation. It is important to note that the ACT regulation is part of a triad of California regulations which also includes the Advanced Clean Fleets (ACF) regulation and the Heavy-Duty Omnibus regulation (Omnibus). It is vital that these three regulations should be considered together by ECCC to ensure a comprehensive plan to address heavy duty mobile source GHG and criteria pollutant emissions. In addition, California's Low Carbon Fuel Standard is a complementary statewide program that also plays an important role alongside the ACT, ACF and Omnibus.

Currently, the ACT and Omnibus regulations have been approved by the California Air Resources Board and finalized by the California's Office of Administrative Law. However, the ACF Rule remains under development at this time and has the potential in its final form to impact the ACT and Omnibus regulations.

California and 14 other states and the District of Columbia announced a joint memorandum of understanding (MOU) in July 2020, committing to work collaboratively to advance and accelerate the market for electric medium- and heavy-duty vehicles, including large pickup trucks and vans, delivery trucks, box trucks, school and transit buses, and long-haul transport trucks. The multi-state coalition goal is to ensure that 100 percent of all new medium- and heavy-duty vehicle sales be zero emission vehicles by 2050 with an interim target of 30 percent zero emission vehicle sales by 2030. As of January 2022, California, and five other states- Oregon, Washington, New Jersey, New York and Massachusetts - have adopted the ACT regulation.

The primary benefit of Canada's aligning with the ACT rule would be approximate regulatory consistency with California and at least five additional states (note that up to nine additional states may yet also approve the ACT Rule). Moreover, at first glance, the ACT goals appear consistent with Canada's national goals.

With regards to challenges, it is also imperative to assess and consider the many billions of dollars in financial investments that California is making in charging infrastructure and purchase incentives to support implementation of these rules and consider that despite similar populations between Canada and California, that Canada potentially will need to develop a larger incentive and infrastructure budget simply due to its more extensive geography and variable climate. These

regulatory and economic factors are vital elements that ECCC needs to evaluate and confirm that the Canadian market and federal and provincial budgets are suitably aligned for implementation of similar requirements.

MECA members that are producing the battery and fuel cell components, electronic controls, transmissions and motors for these zero emission truck applications have made and continue to make significant investments in developing, improving and commercializing these components. MECA supports the use of incentives to promote innovative technologies during their early market introduction. However, in order for a technology to be a sustainable and durable solution, it must ultimately demonstrate the ability to compete on the same basis with other non-incentivized technologies to allow consumers the choice that meets their needs.

The expansion of a ZEV policy model into MD and HD commercial vehicle applications is also challenged by the more diverse and demanding vehicle uses. The states joining California in adopting the ACT regulation believe that aggressive targets and a larger combined market serve as a signal to industry as to the direction that government is heading in the future and hopes to serve as an investment motivator. Collectively, the states that have presently adopted the ACT rule represent 22% of all currently U.S. registered trucks, whereas all states and the District of Columbia who have signed the ACT MOU would represent a 35% (using data from the U.S. Federal Highway Administration at https://www.fhwa.dot.gov/policy_information/statistics/2018/mv1.cfm). It should be noted that Class 8 long haul / interstate trucks have some flexibility as to the state they register in.

As governments and industry address the electrification of the heavy-duty fleet, we must continue to make progress in improving the efficiency and reducing emissions from all in-use commercial trucks as some segments of trucks pose electrification challenges and will continue to use diesel engines for some time.

What classes and uses of HDV are now technically ready, or close to being ready, for adoption of an HDZEV-specific sales requirement?

There are a wide number of medium and heavy-duty trucks reported to be under development, in pre-production and production. Vehicle model market readiness resources can be found on a variety of internet resources including the U.S. EPA Smartway Heavy-Duty Truck Program (www.epa.gov/smartway/smartway-heavy-duty-truck-electrification-resources), Calstart Global Drive to Zero Program (globaldrivetozero.org/tools/zero-emission-technology-inventory/), North American Council on Freight Efficiency-NACFE (<https://nacfe.org/emerging-technology/electric-trucks-2/viable-class-7-8/>) and utilities such as San Diego Gas and Electric (www.sdge.com/sites/default/files/2021_sdge_electric_vehicle_availability_guide_1.pdf).

In general, MD vehicles in Classes 2 through 6 and urban buses are generally accepted as closest to achieving a commercially competitive market in the next few years. These vehicles used in delivery operations, and other urban fleet activities typically have drive cycles with high periods of idle, creep, and/or stop-and-go operation. Class 7 and 8 HD trucks used in similar shorter distance, lower speed duty cycles are also being increasingly demonstrated in applications such as

drayage and municipal/utility fleets. It is important to note that the MD vehicles can typically utilize the same or similar charging equipment as light duty vehicles. However, HD trucks will typically require unique dedicated infrastructure including higher voltage chargers to reduce charging times and expanded facilities areas to afford their maneuvering with trailers. In addition, the implementation of vehicles and construction of charging infrastructure needs to be coordinated.

What criteria should go into the assessment of readiness?

Based on MECA's participation in various California Advanced Clean Fleet workshops, private and public fleets convey that they require vehicles to be fit for their intended service roles and be supplied within the same budget year as the order is placed and grant funds are available. It is important to note that manufacturers are accepting orders but many are not providing firm delivery dates at this time, even for orders made two and three years ago.

Failure to supply vehicles and infrastructure simultaneously, means that fleets will be hampered by an insufficient number of new vehicles while having to retain existing vehicles which have reached the end of their service life and as such are more expensive to operate, have more downtime and potentially higher emissions.

What other elements or measures are required to enable a swift transition? What level of certainty is required to support investments in production capacity?

Adequate flexibility, long term regulatory certainty and stability of funding programs with sufficient financial resource commitments are required to support vehicle and component manufacturer investments. Regulations regarding the supply of vehicles to the market should ideally provide five years lead time and a ten-year regulated period once implemented. It is vital that funding programs cover the breadth of the supply chain from mines to consumers.

What regulatory flexibilities would ease the transition?

Given the uncertainties in the lifecycle climate impacts of battery production as well as infrastructure needs with the shift to electrification, MECA recommends that ECCC remain open to multiple technology options and strategies in its pursuit of a net zero-emission vehicle future.

While PHEV vehicles have a short-term compliance pathway in California's ACT regulation, non-plug-in hybrid electric vehicles (HEV) and those operating on low carbon or renewable fuels do not. MECA believes that hybridization and lower carbon and renewable fuels can deliver sustainable and significant benefits regionally or in applications that are hard to electrify. We also support innovative Low Carbon Fuel Standards (LCFS), which incorporate life cycle analysis, as a parallel pathway towards the goals of decarbonization of the in-use fleet during the transition. The inclusion of parallel compliance paths for the non-electric fleet would encourage continued investment in these areas and provide resiliency to Canada's decarbonization strategy. MECA suggests that ECCC consider additional pathways for partial compliance via combined vehicle and

low carbon fuel approaches, such as hybrids, and ultra-low NOx trucks compliant with US EPA MY2027 GHG standards fueled by lower or net zero-carbon fuels under a Canadian regulation or a complementary in-use fleet regulation.

As an example, Canadian winters represent greater challenges to the operation and charging of MD and HD electric vehicles as well as passenger cabin climate control. This is particularly important with regards to intercity, intracity and school buses which impact electric vehicle range to a more significant degree. As a result, vehicles deemed commercial in California (new production EVs and retrofits) may not be practical in Canada during the winter months if used in their California market configurations and may not yield equivalent benefits.

In conclusion, MECA commends ECCC's efforts towards the goal of reducing emissions of criteria and climate pollutants. The heavy-duty transportation sector is responsible for a significant portion of Canada's emissions inventory. These emissions are forecast to continue increasing, reflecting the anticipated impact of factors such as economic growth, increased movement of freight by trucks, ships, and rail, and continued growth in personal travel. There are significant opportunities to continue to reduce greenhouse gas emissions from medium- and heavy-duty engines and vehicles through the application of innovative technologies and fuels, including all-electric trucks. We believe the inclusion of additional compliance pathways will strengthen this proposal and advance complementary technologies that can be implemented to meet the Canada's air quality goals.

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