

# British Columbia's Medium- and Heavy-Duty Zero-Emission Vehicles 2023 Consultation Paper

## Pembina Institute comments and recommendations

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### Recommendation summary

The Pembina Institute respectfully submits the following recommendations for consideration as the Government of British Columbia finalizes its proposal to implement sales and purchase requirements of zero-emitting medium- and heavy-duty vehicles:

- That the proposed sales targets be adjusted as per Table 1 below
- That the definition of a ZEV be expanded to include plug-in hybrid electric vehicles (PHEVs)
- That the credit modifier for Class 3 (where Class 3 vehicles are those that weigh more than 4,500 kg but less than 6,350 kg) MHD ZEVs be increased to a full credit
- That there be a five-year limit to the credit lifetime, where a credit earned by selling a ZEV cannot be used to comply with ZEV sales requirement beyond five years
- That the start date for private fleets' compliance with the purchase requirements be shifted from January 1, 2024, to January 1, 2028

In addition, we recommend that the B.C government address two key issues to successfully support the transition to MHD ZEVs: market readiness of vehicle subclasses and charging/refuelling needs.

### Context

The Pembina Institute welcomes the opportunity to provide input on British Columbia's (B.C.) Medium- and Heavy-Duty Zero-Emission Vehicles (MHD ZEV) Consultation Paper, which outlines the key design features of proposed MHD ZEV legislation, with emphasis on zero-emission vehicle (ZEV) sales and fleet purchase requirements. The Pembina Institute is, in principle, supportive of the B.C. government's intent to legislate MHD ZEV sales requirements.

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Further, we fully support the government's proposal to supplement the sales requirements with fleet and stock purchase requirements. The supply-side sales requirements and the demand-side purchase requirements will help create market conditions that are conducive to the swift uptake of ZEVs in the MHD vehicle sector.

## Additional issues

### Recommendations to address market readiness

While the proposed legislation takes notable steps in addressing vehicle supply, the policy design lacks adequate consideration of the differences in market readiness of MHD ZEV subclasses. Different segments of the MHD vehicle market are at different stages of market readiness for the transition to ZEVs. Buses, especially transit and school buses, are currently the most ready to switch to electric fleets. Many zero-emission bus (ZEB) models are currently available, bus services tend to follow relatively short and predictable routes, and buses are returned to a depot at the end of the day and can be recharged overnight. Lighter, medium-duty vehicles (MDVs), such as urban delivery vans, share similar characteristics with perhaps fewer models on the market.

On the other hand, there are few suitable models of heavy-duty vehicles (HDVs) on the market. Long-haul trucks travel considerable distances and need very fast recharging or refuelling capacity. Applying the same sales targets to all sub-classes (e.g., 30% ZEV sales target for both class 3 vehicles and for class 7&8 long-haul tractors), as proposed in the consultation paper, does not account for real-world market constraints.

In recognition of the variation in market readiness, the Pembina Institute recommends:

- **MHD ZEV sales and fleet purchase requirements** that take into consideration the variability in market readiness of different MHD vehicle subclasses, setting more stringent targets for those MHDVs that are readiest to transition to ZEVs, and less stringent targets for vehicle categories where the commercialization of ZEV technologies is a few years away.
- **Capacity-building measures** for the production and maintenance of MHD ZEVs, including support for the ZEV supply chain and the development of the skills needed to build and maintain ZEVs.

### Recommendations to address charging/refuelling needs

The proposed legislation does not adequately address the need to build out charging and refuelling infrastructure without which the transition to zero-emission MHDVs cannot successfully occur. Our review of B.C.'s heavy-duty vehicle sector shows that the current

policies, programs and funding in support of the build-out of publicly accessible charging and fuelling infrastructure for MHD ZEVs in B.C. is limited.<sup>1</sup> Credits granted to infrastructure developers through the B.C.'s Low Carbon Fuel Standard (LCFS) have increased the number of commercial charging and hydrogen fuelling stations, and changes to the LCFS offer opportunities to finance new stations. Nevertheless, the number of stations remain few and far between. To truly accelerate adoption of MHD ZEVs, private and public sector investment in charging infrastructure, along with interprovincial coordination, will be needed. But the proposed legislation fails to provide a clear path forward showing how the province will address the insufficiencies in charging and refuelling stations.

The Pembina Institute recommends that four sets of policy tools be incorporated to initiate actions that will address charging and refuelling infrastructure-related challenges:

- **Financial incentives to encourage** increased investment in infrastructure build-out.
- **Targets and associated milestones** to increase the number of charging and refuelling stations.
- **Standardization of protocols and clear responsibilities and roles assigned to utilities** to support a well-connected and reliable network.
- **Capacity-building initiatives** for skills development in the workforce in response to the lack of trained professionals with expertise in building and/or maintaining charging infrastructure.

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<sup>1</sup> Colton Kasteel, Maddy Ewing, *How to Lighten the Climate Load: Technology and policy options to decarbonize B.C.'s heaviest trucks* (Pembina Institute, 2021). <https://www.pembina.org/pub/how-lighten-climate-load>

Table 1. Detailed responses to B.C.'s Medium- and Heavy-Duty Zero-Emission Vehicles 2023 Consultation Paper and Proposal

Proposal	Comment/Rationale
<b>Appendix 1. ZEV Sales Targets for Medium- and Heavy-Duty Vehicles</b>	
<ul style="list-style-type: none"> <li>B.C.'s new MHD sales requirements define MHD vehicles as on-road motor vehicles with a GVWR greater than 4,536 kg (to include class 3 to class 8 vehicles), including tractors and all buses.</li> <li>"On-road vehicle" would have the same meaning as in Canada's On-Road Vehicle and Engine Emission Regulation.</li> <li>"Motor vehicle" would have the same meaning as in section 1 of the Motor Vehicle Act Regulations, aligned with the definition in the B.C. ZEV Act.</li> <li>"GVWR" would have the same meaning as in section 1 of the Motor Vehicle Act Regulations, aligned with the definition in the B.C. ZEV Act.</li> <li>"Tractors" would have the same meaning as in section 1 of the Commercial Transport Act.</li> </ul>	<p><b>Support.</b> No comment.</p>
<p>Please comment on the following proposed application of who would be regulated under B.C.'s new MHD ZEV sales requirement:</p> <ul style="list-style-type: none"> <li>Apply to motor vehicle suppliers that certify complete or incomplete motor vehicles with a GVWR of more than 4,536 kg (Class 3 and above) and supply those vehicles into B.C.</li> <li>Exempt low volume suppliers from the ZEV sales requirement.</li> </ul>	<p><b>Support.</b> No comment.</p>
<ul style="list-style-type: none"> <li>Define low volume suppliers as those that do not exceed 100 average annual sales for the 3 prior model years. Should a different low volume threshold be established for bus suppliers versus other MHD vehicle suppliers?</li> <li>Allow low volume suppliers to voluntarily opt-in to generate credits via ZEV sales under the regulation.</li> </ul>	<p>The proposed definition of low volume suppliers seems reasonable.</p> <p>Pembina Institute supports the voluntary opt-in for low volume suppliers to generate credits via ZEV sales under the regulation.</p>
<p>It is proposed that B.C.'s new MHD ZEV sales requirement:</p> <ul style="list-style-type: none"> <li>Set calendar year 2026 as the first compliance year.</li> <li>This would mean that MHD vehicle sales made starting January 1, 2026 through December 31,</li> </ul>	<p>The Pembina Institute supports setting calendar year 2026 as the first compliance year. While it is recommended that the sales targets themselves be modified (see below), setting an early start date ensures that clear transformative signals are sent to all stakeholders in the market early, who</p>

<p>2026, would be subject to the proposed regulated requirements.</p>	<p>can then start to make necessary changes (e.g. capital investments in new infrastructure and manufacturing plants).</p>
<p>It is proposed that B.C.'s new MHD ZEV sales requirement:</p> <ul style="list-style-type: none"> <li>• Define a MHD ZEV as a vehicle that produces no tailpipe emissions while in operation (i.e., exclude MHD PHEVs and EREVs from the definition of MHD ZEV).</li> <li>• Within the definition, include exemptions from the no-PHEV rule for some vehicle types/use cases, e.g. authorized emergency vehicles. Please include in your feedback what exemptions the Ministry should consider.</li> </ul>	<p>The Pembina Institute believes the exclusion of PHEVs from the definition of MHD ZEVs is unnecessary at this stage. Currently, PHEVs have a <a href="#">small</a> (2% to 4%) but non-negligible share in trucks and vans. While ZE buses and vans are primarily battery-electric vehicles (BEVs), the technology winner for long-haul trucks is far from clear. Multiple pilot <a href="#">projects</a> continue to demonstrate the viability of PHEV trucks, and <a href="#">companies/organizations</a> continue to invest in hybrid technologies. Disincentivizing PHEV technology is not recommended at this stage. We instead recommend that B.C.:</p> <ul style="list-style-type: none"> <li>• Follow the federal government's definition of ZEVs which includes PHEVs.</li> <li>• Allocate 0.75 credits to PHEVs (compared to a full credit for BEVs) until 2030 and commit to a review in 2028/2030.</li> </ul>
<p>Table 2 presents the proposed B.C. MHD ZEV sales requirements. The proposed sales targets align with California's but allow for a phase-in period with requirements only starting in 2026. It is proposed that authorized emergency vehicles would be exempt from the 100% targets.</p>	<p>The Pembina Institute supports the view that there should be clear sales targets. However, the proposed targets do not accurately account for the real-world challenges in ZEV uptake and should be modified.</p> <p>As we discuss in greater detail <a href="#">here</a>, MHD vehicles, particularly in Class 4-8, differ significantly in ease of conversion to ZEVs. Buses, especially transit and school buses, have now met the necessary market conditions to transition to zero-emitting. There are many ZEB models available; commercial buses tend to operate on relatively short and predictable routes; buses return to a depot at the end of the day where they can be recharged overnight.</p> <p>Recommended sales targets for Classes 4-8:</p> <ul style="list-style-type: none"> <li>• Most urban buses (mainly school and transit) reach 100% ZEV sales by 2030</li> <li>• Most urban MDVs (mainly Class 4-6 box trucks) reach 50% ZEV sales by 2030, and near 100% by 2040</li> <li>• HDVs (Class 7-8; non-tractors) reach up to 10% ZEV sales by 2030 and near 100% by 2040.</li> </ul> <p>Further, sales targets for Class 7-8 tractors should be modified to 2% in 2026, 4% in 2027, 6% in 2028, 8% in 2029, and 10% in 2030, 15% in 2031,</p>

	<p>20% in 2032, 25% in 2033, 30% in 2034, 40% in 2035, 50% in 2036, 60% in 2037, 70% in 2038, 80% in 2039, 90% in 2040, and 100% in 2041.</p> <p>We support the exemption of authorized emergency vehicles from the ZEV sales requirements.</p>
<p>It is proposed that, in B.C.'s new MHD ZEV regulated unit system:</p> <ul style="list-style-type: none"> <li>• ZEV credits are earned for each ZEV sold and registered in B.C.</li> <li>• Credits generated per vehicle = 1 ZEV credit for each ZEV sold multiplied by the weight class modifier according to vehicle class. See Table 3 for proposed weight class modifiers. In this system, Class 3 ZEVs would earn 0.8 credits per sale, and class 7 &amp; 8 tractor ZEVs would earn 2.5 credits per sale.</li> <li>• Compliance obligations in any year will be calculated as the number of vehicles sold, multiplied by the percent sale requirement, multiplied by the weight class modifier according to vehicle class.</li> <li>• Compliance obligations arising from class 3 - 8 vehicles can be offset by class 3 - 8 credits.</li> <li>• That class 7 &amp; 8 tractor debits can only be offset by class 7 &amp; 8 tractor credits, except where the supplier produces less than 25 class 7 &amp; 8 tractors in a compliance period, in which case class 3 - 8 credits can offset their class 7 &amp; 8 tractor debits.</li> </ul>	<p>The Pembina Institute supports the use of weight class modifiers. We recommend, however, changing the credit modifier for Class 3 vehicles from 0.8 to 1. The currently proposed partial (0.8) credit sends only a weak incentive to Class 3-only suppliers. We believe a stronger (and more fair) incentive would be to assign a credit modifier of 1.</p> <p>We also support allowing compliance obligations arising from class 3 - 8 vehicles to be offset by class 3 - 8 credits.</p>
<p>It is proposed that in B.C.'s new MHD ZEV sales requirement:</p> <ul style="list-style-type: none"> <li>• Early ZEV credits can be generated for ZEV sales in calendar years 2024 and 2025, to encourage ZEV sales to occur before the regulated targets begin in 2026.</li> <li>• Early credits will not be granted to vehicles that have already generated credits through Initiative Agreements under the ZEV Act.</li> </ul>	<p>The Pembina Institute supports the generation of early action credits in 2024 and 2025 prior to the start of the regulation in 2026. We support the exclusion of those vehicles that have already earned credits under the ZEV Act.</p>
<p>It is proposed that in B.C.'s new MHD ZEV sales requirement credits may be transferred between suppliers upon approval by the Director.</p>	<p>The Pembina Institute supports allowing credit trading between suppliers as it reduces compliance costs for the regulated parties, which improves the efficiency of the proposed policy.</p>
<p>It is proposed that B.C.'s new MHD ZEV sales requirement:</p>	<p>The Pembina Institute supports flexibility accorded to suppliers to earn credits via purchase agreements, but recommends a cap of 10%,</p>

<ul style="list-style-type: none"> <li>• Provide authority to the Director under the ZEV act to issue credits to a supplier under a purchase agreement, in extenuating circumstances.</li> <li>• The price of such credits would be the prescribed penalty rate per credit, plus an additional value.</li> </ul>	<p>whereby no more than 10% of the credits in a year can be earned via purchase agreements.</p>
<p>To further encourage early sales of MHD ZEVs into B.C., it is proposed that, in B.C.'s new MHD ZEV sales requirement, credits generated do not have a lifetime limit.</p>	<p>The Pembina Institute does not support the proposed indefinite lifetime for ZEV credits. Instead, we recommend a credit lifetime of five years, where a credit generated in year N cannot be used to satisfy credit requirements beyond year N+5.</p>
<p>It is proposed that in B.C.'s new MHD ZEV sales regulation:</p> <ul style="list-style-type: none"> <li>• Compliance will be assessed each year on the same date, based on a calendar year of sales, not model year.</li> <li>• The compliance date will be December 31<sup>st</sup> of each year.</li> <li>• The reporting date will be January 31<sup>st</sup> of each year.</li> <li>• The compliance reports will include the following information for the calendar year: <ul style="list-style-type: none"> <li>○ Total MHD vehicles sold and registered in B.C., by vehicle class, and by vehicle type, including MHD ZEVs</li> <li>○ Credits generated, offset, transferred, and those not yet issued;</li> <li>○ Compliance reduction;</li> <li>○ Credit bank balance; and</li> <li>○ MHD vehicle sales for the previous years</li> </ul> </li> </ul>	<p><b>Support.</b> No comment.</p>
<p>It is proposed that the new MHD ZEV sales requirement set the penalty of \$30,000 CAD per credit out of compliance (adjusted for inflation using the Consumer Price Index).</p>	<p>The Pembina Institute supports the use of a financial penalty as the mechanism for ensuring compliance. We note that some jurisdictions impose a penalty per vehicle, rather than per credit as proposed. However, we understand that this is largely an accounting mechanism, and leave it to the discretion of the government on how they want to manage the credits.</p> <p>We note that for a financial penalty to adequately function as a deterrent, it cannot be routinely used as a substitute for producing ZE MDVs. Rather, the penalty should be undertaken as a last resort means of compliance.</p>

## Appendix 2. Fleet ZEV Requirements

The Ministry is seeking general comments on the application in B.C. of high priority fleet requirements similar to those proposed in California, but for Class 3 and above. It is proposed that B.C.'s MHD ZEV requirements include fleet purchase and stock requirements, with phased-in targets starting for January 1, 2026, aligning with California's targets starting in 2028. Due to jurisdictional authority, federal government fleets are proposed to be exempt from the B.C. rules.

The Pembina Institute supports in principle the proposal to implement fleet and stock purchase requirements for high priority fleets. However, we raise a concern that private fleet operators will likely find it difficult to comply with the currently proposed ZEV purchase requirements. The constraints stem from currently insufficient charging infrastructure and grid readiness to support ZEV uptake, the lack of a skilled workforce to operate, repair and maintain MHD ZEVs; and the absence of market-ready ZEV options, particularly in the heavy-haul trucking segment.

We recommend that the start date for the purchase and retirement requirements be shifted from January 1, 2024 (as currently proposed) to January 1, 2028, at which point we anticipate Class 4-6 battery-electric trucks and MDVs to reach parity with diesel vehicles when the total cost of ownership is assessed. We recommend that the government require that 50% of new vehicle purchases are ZEV or near zero-emission (NZEV) starting January 1, 2028, increasing to 100% of new vehicle purchases starting January 1, 2032.

Further, we strongly recommend including school buses (currently exempt) in the high priority fleet category. ZE school buses (mainly electric school buses) are already at a stage of commercial scale market readiness. The vehicles travel along short, predictable routes, which means they pose low (if any) electric range risks, and energy/charging requirements can be met with slow, Level 2 chargers overnight at the home base depot, requiring little or no public charging infrastructure.

We acknowledge the differences in size and capacity of different school bus fleets, and we support accommodating the unique needs of smaller, rural, remote and northern fleets.

The Ministry is seeking general comments on the application of similar ZEV purchase stock requirements for provincial and local government agency fleets in B.C., including any exemptions, in the proposed MHD ZEV legislation. It is proposed that B.C.'s MHD ZEV fleet purchase and stock requirements for provincial and local agencies start for January 1, 2026, and phase in to align with California's targets starting in 2029. In

The Pembina Institute supports the MHD ZEV fleet purchase and stock requirements for provincial and local agencies starting on January 1, 2026. We also support extending the scope of the requirements to include other public bodies in B.C., such as public utilities, public agencies of the Province of B.C., and crown corporations. It is incumbent upon governments to be seen as adhering to their own MHD ZEV sales and fleet



<p>providing comments and input, please also consider the following:</p> <ul style="list-style-type: none"> <li>• If the requirements should apply to similar public bodies in B.C., such as local governments, public utilities, public agencies of the Province of B.C., and crown corporations; and,</li> <li>• Recognizing the differences in size and capacity of different provincial and local government fleets, how the requirements could be tailored to accommodate the unique needs of smaller, rural, remote and northern fleets.</li> </ul>	<p>purchase legislation; leadership is clearly evident when government fleets are ZEVs, including provincial and municipal agency fleets, and will incentivize private fleets to do likewise.</p> <p>We recommend that, under the proposed purchase requirement option, the government require 50% of new vehicle purchases to be ZEV starting January 1, 2026, and increasing to 100% of new vehicle purchases to be ZEV starting January 1, 2030.</p> <p>We acknowledge there exists differences in size and capacity of different provincial and local government fleets, and support tailoring requirements to accommodate the unique needs of smaller, rural, remote and northern fleets.</p>
<p>The Ministry is seeking comments on the application of similar provisions to high priority, provincial and local government entities in B.C. It is however proposed that, similar to the MHD ZEV sales requirements, NZEVs also be excluded from the MHD ZEV fleet requirements in B.C.</p>	<p>As noted earlier, the Pembina Institute does not recommend exclusion of NZEVs at this stage.</p>
<p>The Ministry is seeking general comments on how similar ZEV drayage provisions could be applied in B.C., and what modifications could be made to reflect the B.C. market. The B.C. MHD ZEV requirements for drayage trucks are proposed to start slightly later than California's, on January 1, 2026, and include the 2035 requirement to be fully ZEV.</p>	<p>The Pembina Institute supports the implementation of drayage provisions, with adequate consideration to feasibility.</p>

**Appendix 3. Public Transit Agency ZEV Requirements**

<p>It is proposed that B.C.'s MHD ZEV legislation include public transit agency ZEV requirements that apply to all transit authorities that own, operate, lease, rent, or contract with another entity to operate buses over 6,350 kg.</p>	<p><b>Support.</b> No comment.</p>
<p>It is proposed that B.C.'s new public transit agency ZEB requirement:</p> <ul style="list-style-type: none"> <li>• Apply to all buses with a GVWR greater than 6,350 kg (to include Class 4 to Class 8 buses), used for transit services including articulated, over-the-road, double-decker, and cutaway buses.</li> <li>• Exclude trolleybuses or school buses, even if operated by a transit authority.</li> <li>• Require the ZEB to emit zero tailpipe emissions (be either a battery electric bus or a fuel cell electric bus).</li> </ul>	<p>For the reasons discussed above, the Pembina Institute recommends the inclusion of school buses in the ZEB requirement. In addition, we do not support limiting the ZEB requirement to include only battery electric and hydrogen fuel cell vehicles. Instead, we recommend including NZEVs.</p>

<p>It is proposed that B.C.'s new public transit agency ZEB requirement:</p> <ul style="list-style-type: none"> <li>• Require that 50% of new bus purchases be ZEBs in 2026, 2027 and 2028, and 100% be ZEBs starting in 2029 and beyond.</li> <li>• Require the transit agencies have 41% ZEV fleets by 2030 and 100% ZEV fleets by 2040.</li> <li>• Allow for exemptions to the above rules, in extenuating circumstances, on application to, and approval by, the Director designated under the ZEV Act.</li> <li>• Include similar reporting and record-keeping provisions as are in the California rules.</li> </ul>	<p>The Pembina Institute recommends changing the requirements to require 100% of new purchases be ZEBs starting in 2030 and beyond.</p> <p>We support the exemptions to these rules in extenuating circumstances.</p> <p>We recommend that B.C. follows California in reporting and record-keeping provisions.</p>
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## Conclusion

We are most appreciative to have had the opportunity to provide written comments on British Columbia’s Medium- and Heavy-Duty Zero-Emission Vehicles 2023 Consultation Paper. The B.C. government has demonstrated true leadership in taking these initial steps towards replacing fossil-fuelled trucks and buses with zero-emitting ones. This is a commendable initiative in tackling the source of Canada’s second highest emitting sector.

During the government’s process of finalizing the legislation to curb transportation pollution, the two points we wish to emphasize most strongly are, first, a recognition, incorporated into the regulations, that different categories of MHDVs are at vastly different stages of market readiness and therefore cannot be subject to a uniform set of requirements and target dates.

Second, an approach that focuses entirely on the supply and purchase of vehicles must be complemented with plans that place equal emphasis on building out charging and refuelling infrastructure. The successful uptake of ZE MDVs depends on adequate infrastructure, and vice-versa.

The Pembina Institute thanks the Government of British Columbia for its shared desire to move quickly to a low-carbon economy; we look forward to opportunities for further engagement on this issue.