

Long-haul trucks

A reliable charging network and range will be key to the transition to zero- and low-emitting long-haul trucks.

Long-haul trucks are some of the largest and heaviest vehicles on the road and travel long distances, posing substantial challenges in transitioning to ones that are zero emitting. Even so, there is significant opportunity to stem transportation emissions by switching to electric long-haul trucks, since these vehicles represent a large share of emissions produced in the sector.

Ease of electrification



Used for

Transporting the heaviest loads long distances, often travelling across multiple jurisdictions



Number on the road in Canada

489,000



Annual emissions from one diesel long-haul truck

80 tonnes CO₂e (17 times as high as a passenger car)



GHG savings if entire Canadian long-haul truck fleet is replaced with electric

39 million tonnes CO₂e/year



Charging location

Requires high-capacity, publicly accessible charging and refuelling infrastructure along service routes such as inter-provincial highways



Average distance travelled daily

600-1000 km



Time to charge

- Fast charger (direct current): 3-8 hours (full charge), 60-90 minutes (approx. 80% charge)
- Extremely fast charger (megawatt): 30-90 minutes
- Hydrogen fueling station: 8-60 minutes



Cost to buy now

Approximately 2 to 4 times as expensive as a diesel equivalent



Total lifetime cost by 2030 (without incentives)

Electric: could be as little as half the cost of a diesel model
Hydrogen-fuelled: costs may still be higher than diesel, but are declining quickly



Major North American suppliers

Paccar, Lion Electric, BYD, Volvo



Roadblocks

- The high upfront cost of zero-emission long-haul tractor trailers is a major barrier to uptake.
- Zero-emitting long-haul trucks will require a range between 600 km to 900 km. There are few models with ranges that can complete this distance today, although the technology is evolving quickly.
- A lack of a built-out network of high-power charging and hydrogen fueling stations remains a significant barrier to adoption. The cost of deploying such a network will be significant —installing a station can cost upwards of US\$1 million.

Key to acceleration

- Financial incentives will be required to overcome the purchase price barrier to uptake.
- A network of dedicated, high-power charging and refuelling infrastructure for long-haul trucks is needed, with coordination among provinces to support reliable access across key trucking corridors.
- Innovative financial products can increase uptake, such as financing that can be applied to the upfront cost of a vehicle and which is repaid through the savings realized throughout the lifetime of the vehicle.

Transportation is the second biggest source of greenhouse gas emissions after the oil and gas sector in Canada.

Replacing fossil-fuelled vehicles (from passenger cars to long-haul trucks) with low- or zero-emission vehicles is essential to lowering pollutants in the atmosphere and keeping global warming below a 1.5 degree C increase. The federal government is currently implementing policies to hasten the transition to electric passenger cars, but buses and trucks must also be electrified. These bigger vehicles make up 35% of overall emissions generated by the transportation sector. Regardless of the size, we can jumpstart the transition to zero-emission vehicles through policy that implements a sales mandate which includes specific quotas and firm deadlines.



Photo: Roberta Franchuck, Pembina Institute

Pembina Institute resources

- Laying the Groundwork: Exploring the challenges and opportunities in the transition to zero-emission medium- and heavy-duty vehicles
pembina.org/reports/laying-the-groundwork-mhdvs.pdf
- Towards Clean MHDVs: Preliminary policy solutions to decarbonize Canada's MHDVs
pembina.org/reports/towards-clean-mhdvs-recommendations.pdf
- How to Lighten the Climate Load: Technology and policy options to decarbonize B.C.'s heaviest trucks
pembina.org/pub/how-lighten-climate-load
- Long-haul trucking fleets take emission reductions into their own hands: Canadian companies adopt practices and devices that lower fuel use and costs
pembina.org/pub/long-haul-trucking-fleets-take-emission-reductions-their-own-hands

To learn more about the most effective means of transitioning Canada's biggest vehicles from fossil fuels to zero-emitting, see our policy analysis and recommendations at pembina.org/Decarbonizing-MHDVs



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