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Urban transit buses

Electrifying city buses reduces emissions and addresses climate equity issues.

The predictable schedule of transit buses means fleet charging doesn't depend on public charging stations. Across Canadian municipalities, a transition to electric transit buses is already underway, as switching away from diesel has been identified as key to city-wide net-zero emissions targets. The electrification of transit buses also addresses climate equity goals, by giving everyone access to non-polluting, affordable transportation.

Ease of electrification



While some minor operational challenges remain, Toronto Transit Commission's recent assessment of electric buses has demonstrated that the technology is market-ready based on metrics such as operator experience, customer satisfaction, charging reliability and compatibility with the existing electricity grid and physical infrastructure.



Used for

Transporting people in urban areas



Average distance travelled daily

150 to 300 km



Number on the road in Canada

32,000



Time to charge

- Slower charger (Level 2): 5-8 hours
- Faster charger (direct current): 3 hours (full charge), 5-20 minutes (top-up)



Annual emissions from one diesel-powered city bus

45 tonnes CO₂e (10 times as high as a passenger car)



Cost to buy now

Approximately 25% more expensive than a diesel bus



GHG savings if entire Canadian transit bus fleet is replaced with electric:

1.4 million tonnes CO₂e/year



Total lifetime cost by 2030 (without incentives)

Likely cheaper than a diesel bus



Charging location:

Charges overnight at a designated depot



Major North American suppliers

Proterra, GreenPower, NFI, BYD, Lion Electric, Blue Bird Corp



Roadblocks

- Electric transit buses may require new routes and schedules that optimize performance. Retrofitting depots to install charging equipment will also be required, and these changes will need to occur while minimizing service disruptions.
- Transit agencies will need to train bus operators and maintenance staff on the differences between diesel buses and electric buses. This is critical for ensuring safety and efficiency.
- The upfront cost of an electric transit bus is currently higher than that of a diesel equivalent. However, this is quickly changing and it is anticipated that electric transit buses will be cost-competitive with diesel in the near future.

Key to acceleration

The technology is market-ready; policy push by governments (e.g., requirement that all transit operators must electrify fleets) is the key to acceleration.

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
- Transit Supportive Development Along Bus Corridors: Opportunities for the Greater Toronto and Hamilton Area
pembina.org/pub/transit-supportive-development-along-bus-corridors
- A plug-and-play option for a county's transit needs
pembina.org/blog/plug-and-play-option-countys-transit-needs

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