



# *ZeroX2040*

A strategy to decarbonize medium- and heavy-duty vehicles

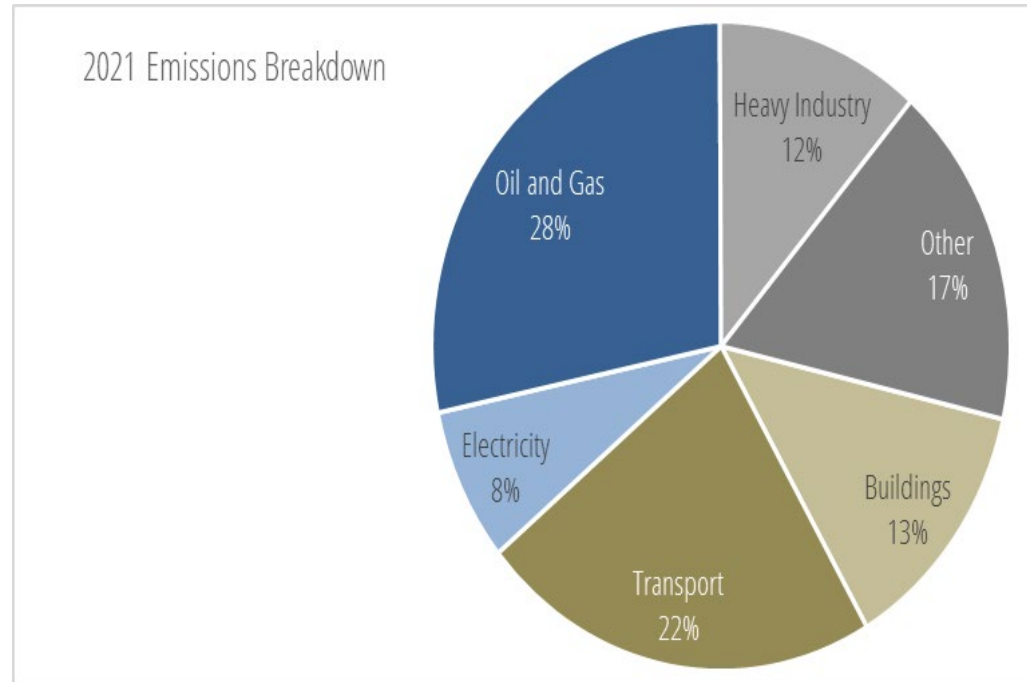
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# Leading Canada's transition to clean energy

The Pembina Institute is a non-profit think-tank that advocates for strong, effective policies to support Canada's clean energy transition.



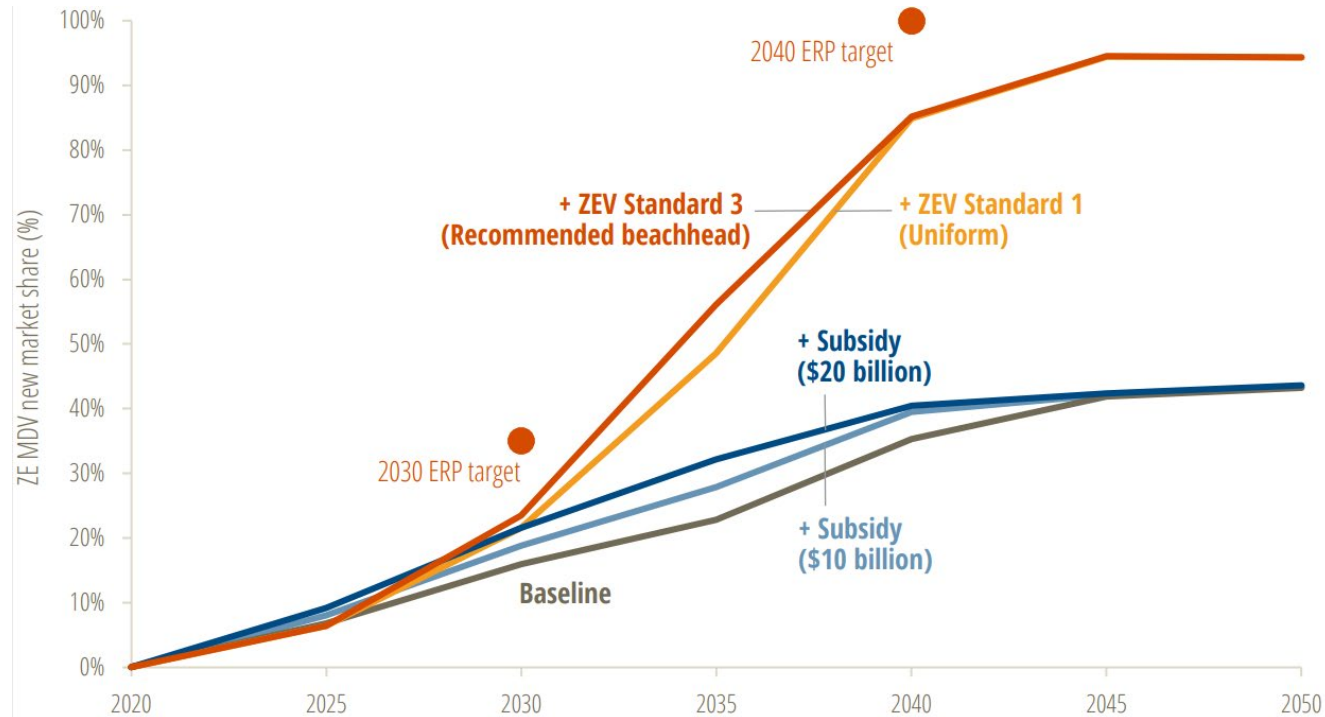
# Transportation Emissions in Canada



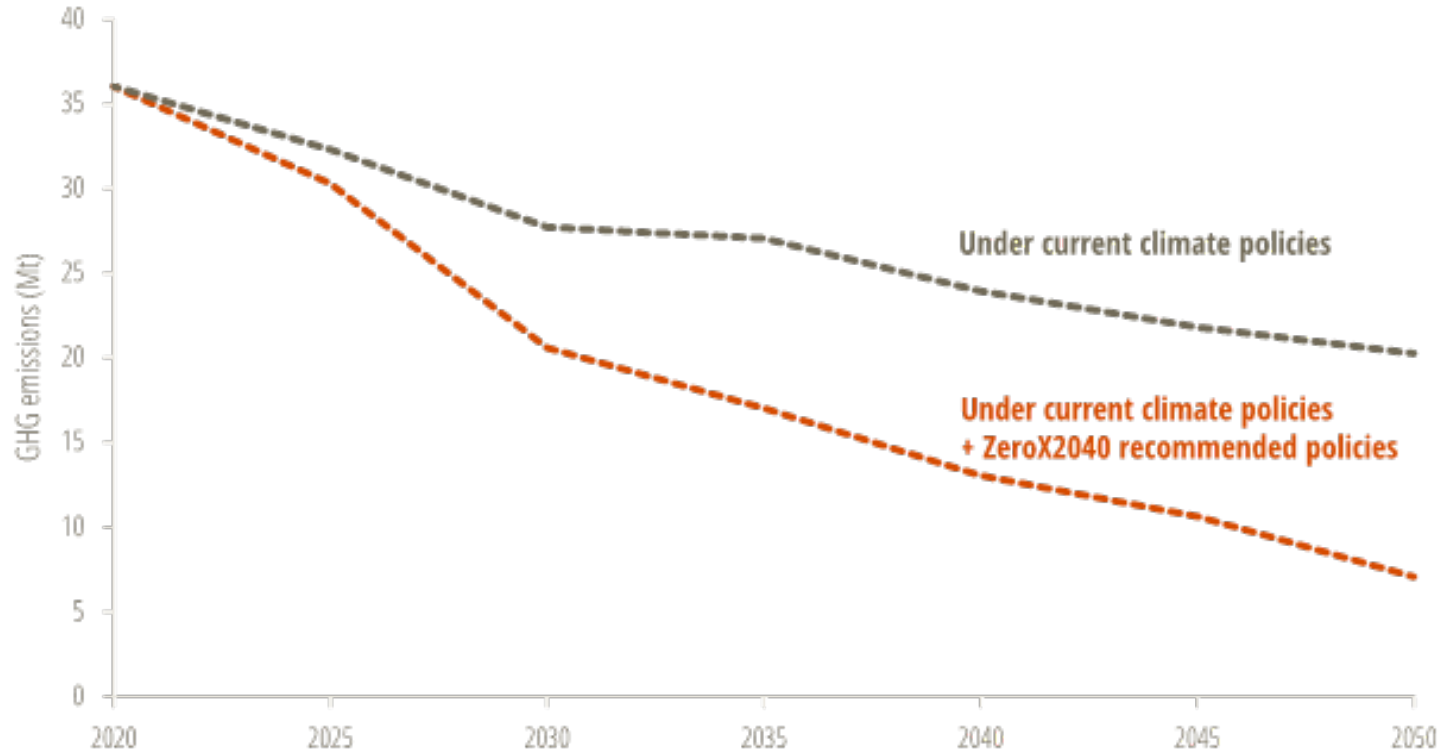
# Decarbonizing Canada's MHDVS

- The Canadian government (ERP) has committed to a target of 35% of all new sales of MHDVs be ZE by 2035 and 100% where feasible by 2040
- Pembina has released a strategy to help meet this target: *ZeroX2040*
  - Part I of the ZeroX2040 strategy focuses on zero-emission vehicles
  - Part II of the ZeroX2040 strategy focuses on charging and refueling infrastructure
- Key recommendation is a ZE MHDV Sales Standard

# ZE MHDV sales shares under policy scenarios



# Greenhouse gas emissions from the MHDV sector under current policies compared to ZeroX2040 recommended policies





## Benefits of meeting ZE MHDV sales goals

- **A substantial reduction in GHG emissions by 2040** (as much as an 80% decline relative to business-as-usual). MHDV emissions would decline from 35 Mt in 2020 to 10 Mt or less in 2050.
- **Energy consumption will be reduced** by more than 25% from 500 PJ in 2015 to 400 PJ in 2050. By 2050, demand for oil in the MHDV sector would decrease by 80% relative to 2020 levels.
- **Investments in ZEV-related R&D and supply chains will accelerate**, which help drive innovation and economies of scale.
- **Positive health outcomes** will result with the decline in air pollution caused by diesel exhaust. Health Canada estimates 63% of the 1200 premature deaths from TRAP come from MHDVs.



# Electrification pathways for MHDVs not uniform

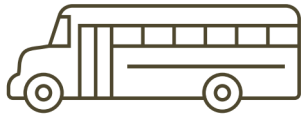
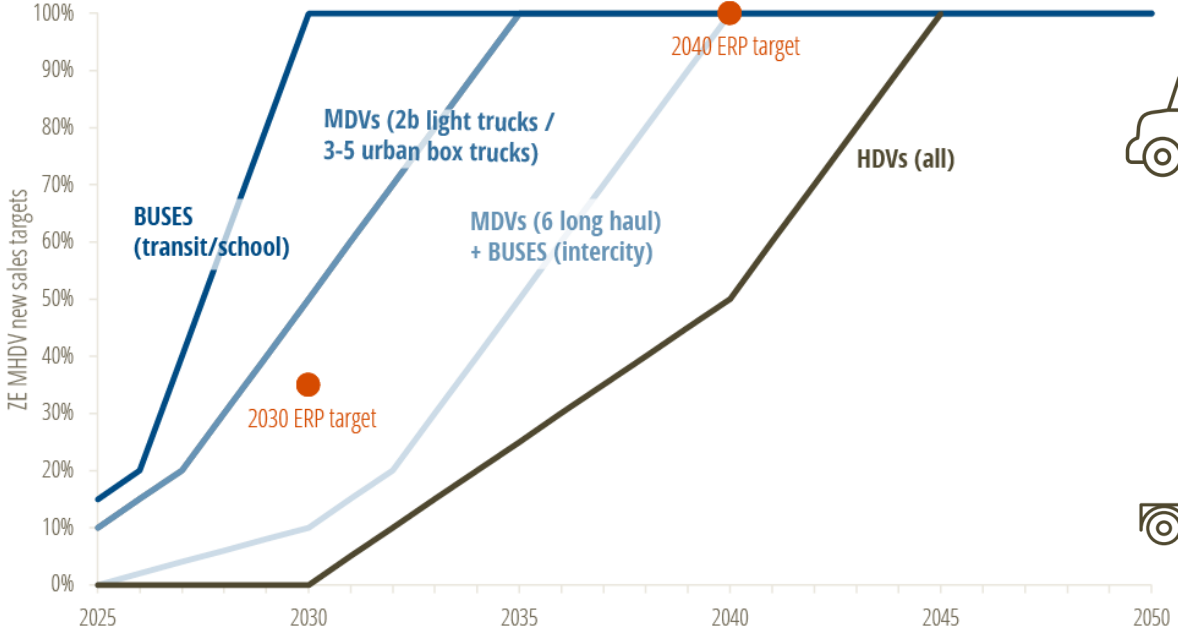
- **Buses:** transit and school buses well suited for electrification given their overnight charging, short- to medium-distance service routes.
- **Medium-duty vehicles:** service short- distance routes, can charge overnight in depots, predicted to have a competitive TCO.
- **Heavy-duty vehicles:** Stickier and more expensive challenges remain. Need for publicly accessible, high-capacity charging and fueling networks.





# Decarbonizing Medium- AND Heavy-Duty Vehicles

## The Pembina ZeroX2040 Approach



Most buses reach 100% ZEV sales by 2030.

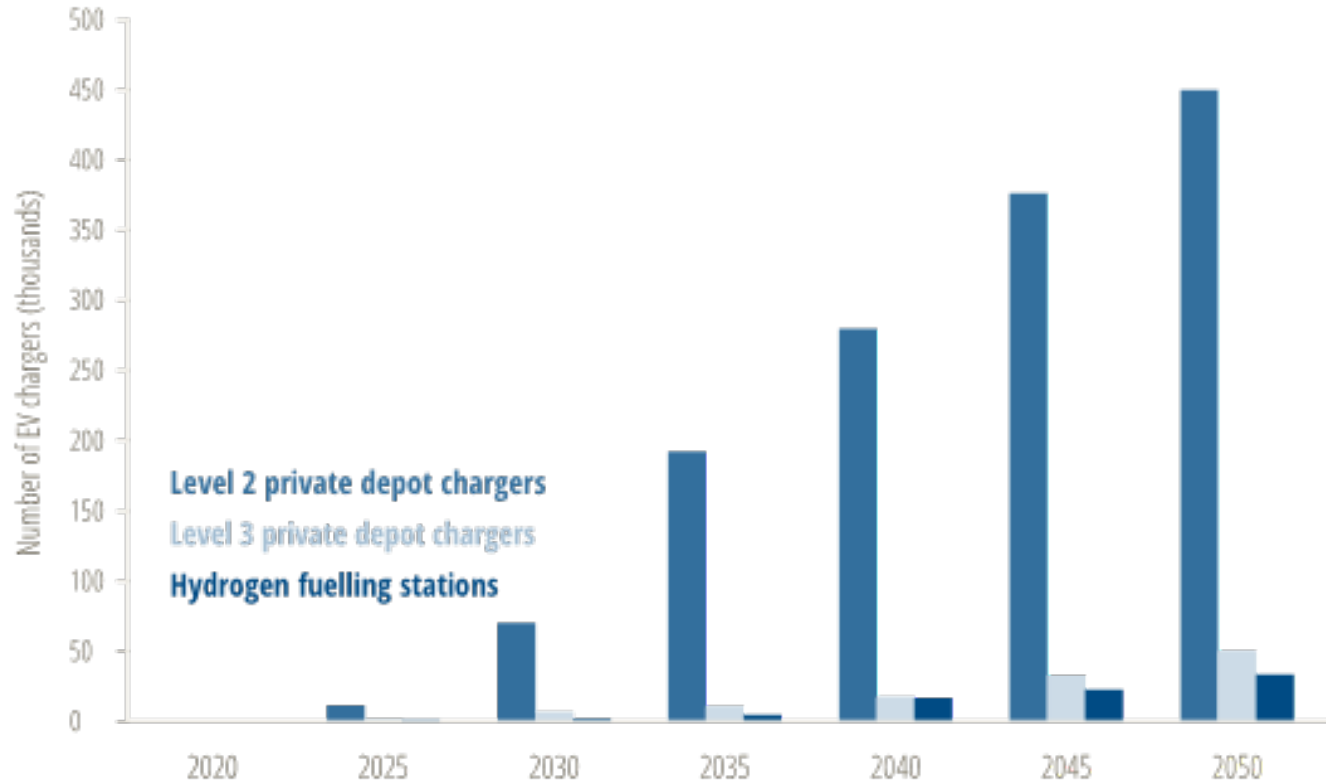


Most MDVs reach 50% ZEV sales by 2030, and near 100% by 2040.



HDVs reach up to 10% ZEV sales by 2032, and near 100% by 2045.

# Number of chargers and fuelling stations needed in Canada to support new ZE MHDVs.



# Barriers to the Rapid Uptake of ZEVS

- Charging infrastructure is still a significant hurdle
  - Federal funding will help but will ultimately fall to provinces, utilities, and municipalities
  - Capacity and technical challenges
- Financing the transition
  - Vehicle incentives until TCO parity
  - Infrastructure support
  - Innovative finance tools

# Advancing a MHDV Sales Mandate

- Informing the regulatory process: research and advocacy to support sales targets
  - Minister's office
  - Working with regulatory development group
- Coalition development: working with allies to align advocacy messaging on a stringent and well-designed regulation
  - Industry
  - Health focused organizations
  - Fleets and operators

# Urban Delivery Solutions Initiative



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