



## URBAN FREIGHT SOLUTIONS

Reducing impacts from delivery vehicles

# 5. Zero-emission vehicles (ZEVs)



Photo: Roberta Franchuk, Pembina Institute

Zero-emission vehicles include battery-electric vehicles such as e-bikes, plug-in hybrid electric vehicles, and hydrogen fuel cell vehicles.

**Challenge:** Over half of the world's population lives in cities, and the number of vehicles required to service urban areas is significant, leading to rising greenhouse gases and air contaminants. However, high costs and the lack of supportive policies have resulted in slow adoption of zero-emission commercial vehicles.

**Solution:** **Zero-emission vehicles (ZEVs)** are defined as vehicles that produce zero tailpipe emissions. These include battery-electric vehicles (including e-bikes), plug-in hybrid electric vehicles, and hydrogen fuel cell vehicles. Given the readiness of current technology, the transition to ZEVs can start with ZEV adoption in urban delivery vehicles. Lessons learned can then help pilot efforts to electrify vehicles in the regional and longer-haul sector.

### Taking Action

Develop a technology roadmap

Adopt a ZEV sales mandate

Introduce financial incentives

Invest in charging infrastructure

Build partnerships with industry on charging infrastructures

**Why:** Zero-emission vehicles produce zero tailpipe emissions and the switch to such technologies would lead to significant reductions in fuel consumption and subsequent emissions. Data collected by New York City shows that air emissions from trucks and buses in high poverty neighborhoods are 70 percent higher than in low poverty neighborhoods. ZEVs offer an opportunity to provide clean air solutions to neighborhoods, including neighborhoods disproportionately affected by pollution, without having to implement a LEZ.

**City spotlights:** City of Rotterdam, Netherlands; State of California, U.S.

In the Netherlands, the City of Rotterdam developed a zero-emission city logistics by 2025 [roadmap](#) to transition freight transport in the city to zero-emission vehicles. The strategy includes a tailored approach for each freight segment (fresh produce, general freight, waste, express/parcels, facilities/service, construction) and across alternative fuel types (battery electric, hydrogen electric, hybrid electric, biofuels).

In June 2020, the California Air Resources Board adopted a [new state-wide sales mandate](#) for medium and heavy-duty vehicles starting in 2024. The requirement starts at five to nine percent of truck sales to be ZEVs in 2024 based on vehicle class and ramps up to 40 to 75 percent in 2035. This mandate is estimated to put 300,000 zero-emission trucks on the road by 2035.

**For implementation:**

- Develop a technology roadmap that describes which ZEV technologies best fit commercial vehicle uses in the city, for instance which alternative fuel types are best suited for each vehicle size.
- High purchase costs are a significant barrier to ZEV adoption. Introduce financial incentives that make ZEV vehicles cost competitive with traditional combustion engine vehicles such as purchase rebates.
- Invest in charging infrastructure that enables fleet operators that adopt ZEVs to recharge at convenient times and locations.
- A collaborative effort is needed to deploy charging infrastructure. Build partnerships with industry on infrastructure buildout, consulting with relevant stakeholders in the goods-movement and electricity distribution sectors.
- Support a ZEV sales mandate for commercial vehicles which requires a certain percentage of vehicles sales by a specific date to be ZEVs.

**Business spotlight:** Rolling out ZEVs

Global furniture retailer IKEA has committed to fulfill all home deliveries and services requests across [30 markets using zero-emission vehicles](#). Shanghai was the first city to reach this goal with IKEA, performing 900 daily deliveries using zero-emission vehicles.

Fashion retailer [H&M teamed up with Dutch delivery service Fietskoeriers.nl](#) to deliver online orders in 30 cities across the Netherlands using bicycles at the same price and speed as normal deliveries.

