

Moving to Electric

A guide to your electric vehicle journey



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PEMBINA
Institute



Why switch to an electric truck?

Customer demand is increasingly moving global corporations toward sustainable transportation services where zero-emission vehicles will become vital.

Besides reducing greenhouse gas emissions, electric trucks and vans cost less to operate and offer improved efficiency and comfort.

We talked with fleet operators and owners across Canada to find out what topics and information about electric trucks are important to them.

This guide provides clear and comprehensive answers to their biggest questions and may help with your business decisions about using an electric truck or van.

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Zero-emission vehicles do not emit any air polluting emissions.

By the numbers:

- **More than 150 models** of zero-emission trucks, vans and buses are available for sale in Canada in 2024.
- In 2023, **40,000** medium- and heavy-duty vehicles (trucks, vans and buses) sold in Canada were zero-emission — and this number is growing every year.
- If all the trucks, vans and buses in Canada were zero-emission, greenhouse gas emissions would be about **80% lower by 2050** than they were in 2020.



What are the different types of electric vehicles?

In this guide, we are focused on two types of electric trucks and vans:



Battery electric vehicle: These run entirely on electricity. They must be plugged in to recharge and they produce no emissions because they don't burn fuel.



Plug-in hybrid: These vehicles have both a traditional internal combustion engine and an electric motor with battery. The battery can be recharged by plugging into an electrical outlet, so the vehicle can run on electric power for a limited time before the gasoline engine kicks in.

Other types of zero-emission vehicles are being tried out, but these are not discussed in this guide.








“Another rumor about EVs [electric vehicles] is that they are slower than diesel trucks. That is 100% wrong. As we take off, there is no lag time. The acceleration is immediate [...] EV trucks pack even more torque, pulling power, and faster acceleration than their diesel counterparts [...] It's quiet, it doesn't smell and it's comfortable.”

Sharae Moore – Owner-Operator, SHE Trucking
From *Cal Fleet Advisor*

Pick the vehicle that's right for you

More than 150 models of zero-emission vans, trucks and buses are available from 34 different vehicle manufacturers in Canada.

Type	# of models	Range per charge	Example manufacturers
 Cargo van	11	200 – 400 km	Brightdrop, Ford, Mercedes-Benz
 Shuttle bus	8	160 – 370 km	GreenPower Motor Company, Micro Bird, Unique Electric Solutions
 Medium-duty step van	19	95 – 350 km	Freightliner, Motiv, Unique Electric Solutions
 Medium-duty truck	32	95 – 440 km	Kenworth, Lion Electric, Motiv, Peterbilt, Unique Electric Solutions
 Heavy-duty truck	22	160 – 530 km	Battle Motors, International, Kenworth, Lion Electric



See the full range of electric trucks and vans available in Canada in the [Zero-Emission Medium- and Heavy-Duty Vehicle: Canadian Model Availability Catalogue](#) or in the interactive [Zero-Emission Technology Inventory](#) dashboard by the Drive to Zero initiative.

“Do your homework first on understanding your fleet needs and select a vehicle that is best suited to the route (e.g., payload, range, battery size, weight, battery charge time). A fleet and business needs assessment are so important to inform purchase decision.”

Nathan Close – District Manager, Pacific Purolator

Rebates and incentives to lower the cost

Take advantage of significant savings with these federal and provincial rebates that can make your transition to an electric vehicle easier and more affordable. Some incentives can be used to buy and install chargers, as well.

Typical cost of electric vehicles in Canada

Type	Cost range
 Cargo van	\$68,000 to \$137,000
 Shuttle bus	\$198,000 to \$305,000
 Medium-duty step van	\$211,000 to \$350,000
 Medium-duty truck	\$159,000 to \$427,000
 Yard tractor	\$406,000 to \$467,000
 Heavy-duty truck	\$427,000 to \$834,000

Federal incentive programs

- The **iMHZEV** program offers \$10,000 to \$200,000 for eligible commercial electric trucks and vans.
- The **Capital Cost Allowance (CCA)** allows small business owners to write off 55% to 100% of eligible electric vehicle purchases on their business tax returns.
- The **ZEVIP** program covers 50% of the cost of installing chargers for vehicle fleets.

Provincial incentive programs

These provinces offer rebates on electric trucks and vans from \$3,000 to \$175,000, depending on vehicle type (i.e., Class 2b–8). Program funding may be limited each year.

British Columbia

- [CleanBC Go Electric rebates for fleets and organizations'](#)
- [Go Electric Fleet Charging Program](#)
- [Commercial Vehicle Pilots Program](#)
- [EV Ready by BC Hydro](#)

Quebec

- [Écocamionnage](#)
- [Transportez Vert](#)

Nova Scotia

- [Electrify Nova Scotia MHZEV Rebate Program](#)

Newfoundland and Labrador

- [EV Rebate Program](#)

Rebate example



A Ford E-Transit with a sticker price of \$74,790 would only cost \$54,790 if the buyer combined rebates from the Canadian government with incentives offered in B.C.



Photo: Roberta Franchuk

Where to charge your vehicle

Charging on-site or at home

If you plan to operate an electric truck or van mostly in the city, you can charge it easily on-site at a depot, or home during off-shift hours.

Installing a charger: what to know

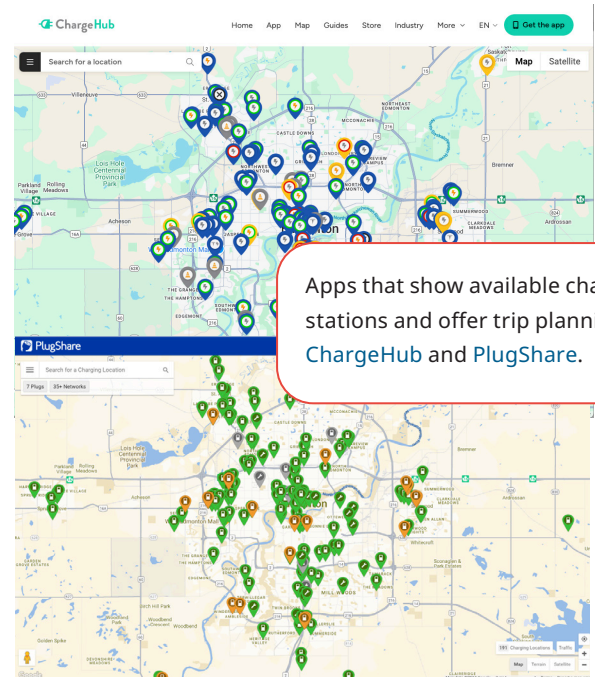
The size, type and number of vehicles you use will determine what kind of charger setup you need.

- Consult a licensed electrician to assess your electrical service. Your current power supply may need a service upgrade from the utility, which will add to the cost and time of the project.
- Home chargers typically cost a few hundred dollars to up to a thousand dollars.
- Depots may need higher-powered chargers, which are also more expensive.
- Total installation costs may range between \$1,000 to \$7,000, depending on whether you need a service and/or electrical panel upgrade.
- Federal and provincial programs can provide technical support and cover up to 50% of the cost of installation.

Charging at public chargers

There are over 27,000 public chargers in Canada, including more than 5,000 fast (Level 3) chargers and nearly 22,600 slower (Level 2) chargers. More chargers are being added every day and planning is taking place for even higher-power charging for heavy-duty trucks.

You can easily locate these public chargers using various apps and websites, many of which also offer route-planning features. A few public chargers are free to use, while the cost for others varies.



Apps that show available charging stations and offer trip planning include ChargeHub and PlugShare.



For considerations about installing chargers, see our factsheet, [Charging an electric medium- or heavy duty vehicle](#).

Cost to charge your vehicle

Charging an electric truck or van costs less than fuelling with gasoline or diesel. The actual cost of charging depends on where and when you charge.

Charging on-site or at home

Home or depot charging is typically the most convenient and low-cost solution. If your province charges extra for using electricity at peak times, you can save even more by charging at off-peak times.

Charging at public chargers

Public charging costs vary based on the network and pricing program. You may pay by the time spent charging, by the amount of power delivered, by the number of sessions — or by a combination of these factors. Low-power Level 2 chargers may cost only a few dollars per hour while fast, high-power Level 3 chargers may cost \$15 to \$25 per hour (or up to 60 cents/km) — still less expensive than diesel.

Some cities offer overnight flat fees for Level 2 chargers, making street charging comparable to home charging. Toronto is currently exploring a \$3 overnight fee, and North Vancouver offers free overnight public charging.

Save up to 70% on your fuel bill by switching to electric:

Pickup truck:

⚡ Electric: **6** cents/km

🔴 Gas or diesel: **21** cents/km

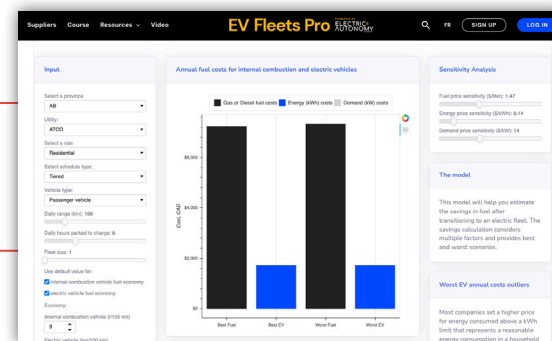
All types of vehicles:

⚡ Electric: **18** cents/km

🔴 Gas or diesel: **69** cents/km

A switch to an electric truck or van also means you don't have to plan for big changes in the cost of gasoline or diesel.

This [EV Fleets Pro fuel cost calculator](#) helps you compare the operating costs of electric vehicles against those of gas or diesel vehicles.








“Since we began electrifying our fleet, we’ve saved on time spent fueling up. If a gasoline or diesel fleet were to run 200 to 250 km a day, that would mean daily trips to the gas station to refuel. With an electric truck that you can charge overnight, you can save nearly 15 minutes a day, 5 days a week. That is a lot of time.”

Nathan Close – District Manager, Pacific Purolator

Time to charge your vehicle

Estimate charge time by dividing the vehicle's battery capacity (in kWh) by the charger's power output (in kW). Keep in mind that charging speed often slows down once the battery reaches about 80% capacity.

Comparison of charging times for different types of vehicles

	Type	Average battery size	Approximate time to fully charge*		
			Level 2 charger (19.2 kW)	Level 3 charger (90 kW)	Level 3 charger (250 kW)
	Cargo van	125 kWh	8.0 hours	1.5 hours	0.9 hours
	Shuttle bus	186 kWh	11.6 hours	2.5 hours	1.0 hours
	Medium-duty step van	131 kWh	8.0 hours	1.7 hours	0.9 hours
	Medium-duty truck	170 kWh	11.0 hours	2.5 hours	1.0 hours
	Heavy-duty truck	400 kWh	22.0 hours	5.0 hours	2.0 hours

*Once the battery reaches 80% of full charge, the charging speed will slow down. The 19.2 and the 90 kW chargers will slow to 50% of the original speed, while the 250 kW fast charger will run at 33% of the original speed.



Charging example

A cargo van would take almost 8 hours to charge with a slow Level 2 charger, but less than an hour to charge with a high-power Level 3 charger.

Charging is getting faster






The next generation of superfast chargers is already being deployed. The new Megawatt Charging System chargers will eventually be able to deliver up to 3 MW of power and will reduce charging time dramatically, potentially making recharging as quick as fuelling at a gas station.



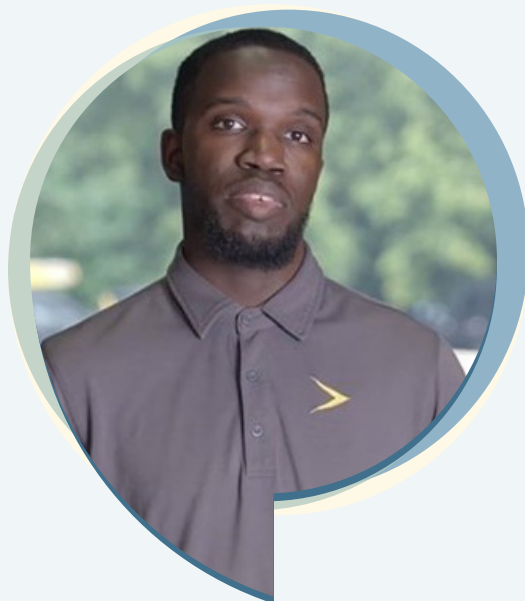
Topping up

If you need to charge your vehicle during the day but you can't get to a depot or residential charger, you can “top up” or partly charge your vehicle at a public charging station. For example, a 30-minute top-up at a 90 kW Level 3 charger can provide enough range to complete your day.

Usually, only one top-up stop might be needed in a workday. This can usually be during a lunch break. When planning routes, consider the availability of public charging stations if on-the-go charging is required. Charging for longer periods may require small adjustments to dispatch schedules and driver routines.

	Type	Average battery size	Average range	Added range with top-up*
	Cargo van	125 kWh	310 km	110 km
	Shuttle bus	186 kWh	230 km	60 km
	Medium-duty step van	131 kWh	210 km	70 km
	Medium-duty truck	170 kWh	260 km	70 km
	Heavy-duty truck	400 kWh	300 km	40 km

* Top-up means the approximate added range with a 30-minute charge at a 90 kW Level 3 charger.



“All it takes is one day of practice—by the second day, I was already comfortable with [the electric truck]. At the end of day, I no longer need to rush to the gas station to fill up. I can just go back at my own pace and simply plug in my vehicle.”

Edzer Anescar – Technician, Videotron
From *Electric Autonomy's EV Fleets course*

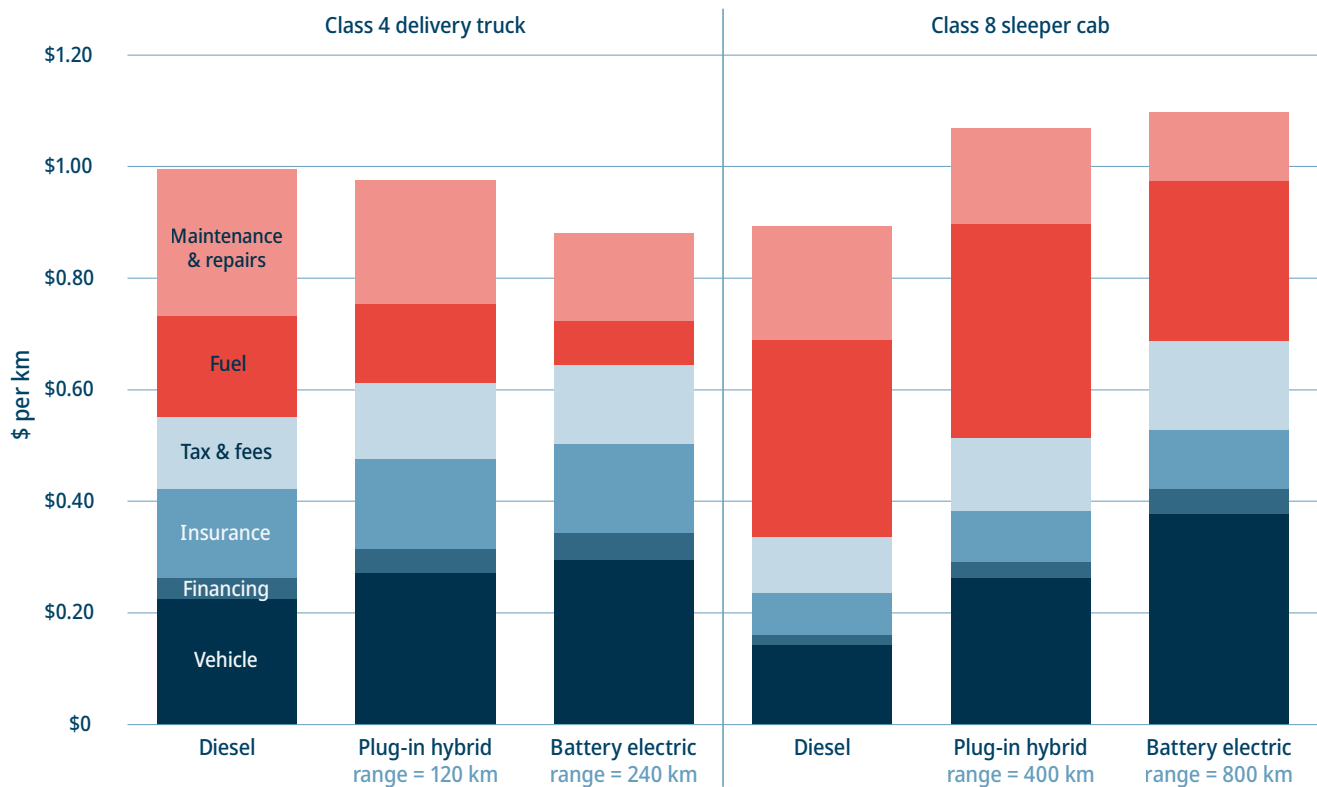
Cost of owning your vehicle

Total cost of ownership

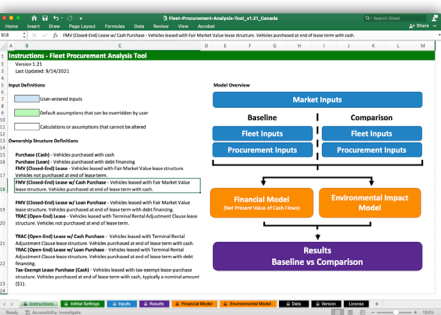
The total cost of owning a vehicle is more than just the cost of buying it – fuel costs and ongoing maintenance are a big part. And those fuel and maintenance costs are lower for electric medium-duty (class 2b, 3 and 4) trucks and vans than for diesel- or gas-powered ones.

Currently, it is a little different for larger class 8 vehicles. The cost of buying an electric heavy-duty vehicle is still high, so the overall cost of ownership is higher than that of a diesel vehicle. Electric models are expected to become cost-competitive within the next decade.

Modelled average cost of driving delivery truck and sleeper cab



Note: Modelled ten-year average costs in 2025. Ranges are assumed. Cost estimates converted at the rate US\$1 = C\$1.3988 and from miles to kilometres. Data source: Argonne National Laboratory, *Comprehensive Total Cost of Ownership Quantification for Vehicles with Different Size Classes and Powertrains*.



Use the **Fleet Procurement Analysis Tool** by Atlas Public Policy to evaluate the costs and environmental impacts.

Operators can reduce upfront costs of electrifying their fleets by using an external provider to handle vehicle leasing, charger installation, software or other needs. Providers include 7Gen, Evolve Fleet and Hwisel EV.



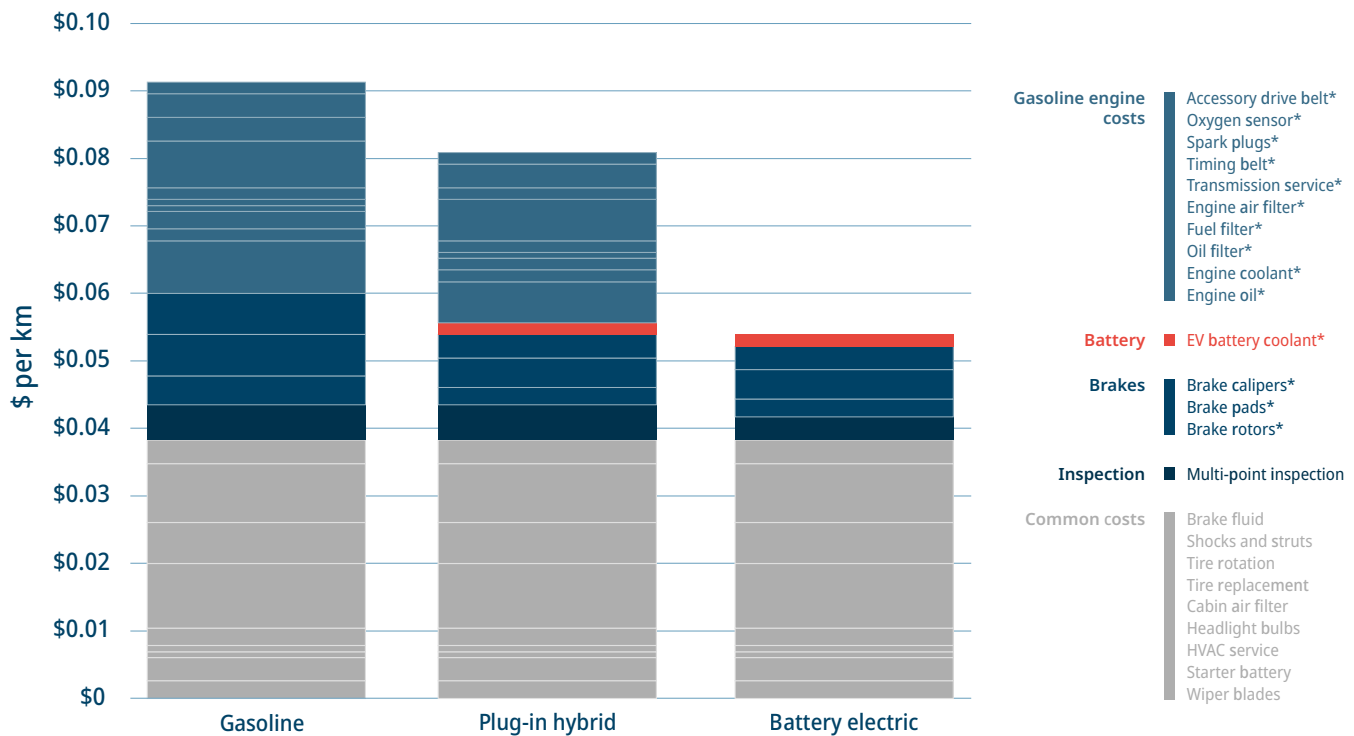
Maintenance

Electric trucks and vans have fewer parts, so maintenance is simpler and less expensive — in some cases up to 40% less than for gasoline or diesel vehicles.

This graph shows a detailed breakdown of service and maintenance costs per kilometre for light-duty vehicles (costs should be similar for medium-duty vehicles, like larger trucks or vans). Battery electric vehicles have significantly lower maintenance costs than either gasoline or plug-in hybrid vehicles.

Most routine maintenance tasks, such as tire rotation, tire changes, and filter changes can be handled by general vehicle service shops. However, technical colleges in B.C., Ontario and Quebec have introduced new electric vehicle technician programs to meet the growing demand for electric vehicle maintenance.

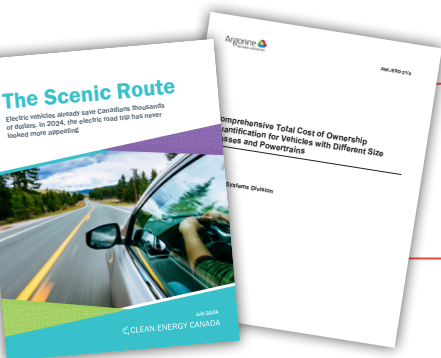
Service and maintenance costs per km for light-duty vehicles



* Service intervals may vary by powertrain.

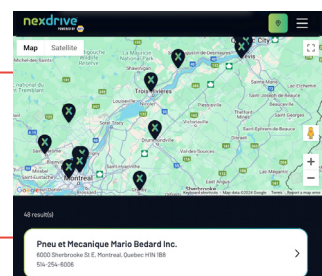
Note: Cost estimates converted at the rate US\$1 = C\$1.3988 and from miles to kilometres.

Data source: Argonne National Laboratory, *Comprehensive Total Cost of Ownership Quantification for Vehicles with Different Size Classes and Powertrains*.



For more detailed information, see [Clean Energy Canada's The Scenic Route](#) and the Argonne National Laboratory's report on total costs of ownership.

NAPA has launched [NexDrive](#), a network of independent repair shops specializing in electric and hybrid vehicle repair.



What about batteries?

Battery life

The battery is the most expensive component of an electric vehicle, so it's natural to have concerns about its health. However, battery repairs and replacements are quite rare.

In fact, regulations require manufacturers to warranty batteries for eight years or up to 160,000 kilometres, offering peace of mind. [New research from Geotab](#) shows that electric vehicle batteries degrade at the rate of only 1.8% per year, meaning they could last 20 years or more.

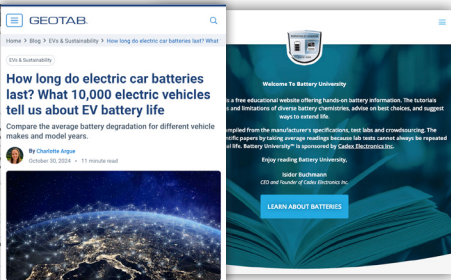
Some simple practices can extend battery life:

- Drive smoothly.
- Limit ultra-fast charging.
- Keep your battery between 20% and 80% charged.
- Allow your battery to reach optimum temperature before charging.

Range

Battery range (how far you can drive on a single charge) is also improving. Driving behaviour and other factors affect both fuel consumption in gas or diesel vehicles, and the range of electric trucks and vans. Range estimates provided by manufacturers are based on ideal conditions.

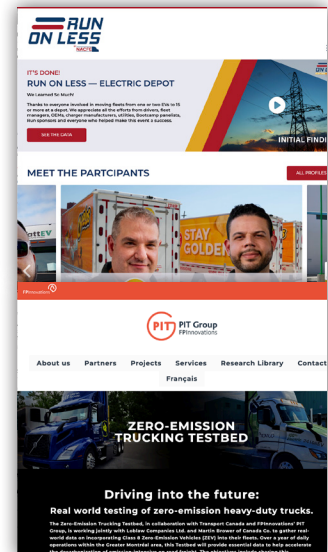
Most commercial trucks drive less than about 80 km daily. Current and upcoming electric trucks and vans meet the needs of most businesses without compromising towing or payload capacity.



You can compare average battery life using Geotab's comparison tool. For more on battery technology, visit the [Battery University](#).



Geotab's blog describes how temperature and speed impact EV range.



Electric trucks are meeting and surpassing expectations.

[Run on Less - Electric Depot](#) and the [Zero-Emission Trucking Testbed](#) provide real-world demonstrations.

Typical range for different types of vehicles

Type	Range	Payload
 Cargo van	200 – 400 km	1,000 – 4,300 kg
 Shuttle bus	160 – 370 km	19 – 33 passengers
 Medium-duty step van	100 – 350 km	1,800 – 9,000 kg
 Medium-duty truck	100 – 440 km	900 – 15,000 kg
 Heavy-duty truck	160 – 530 km	5,900 – 30,000 kg



What about cold weather?

Cold harsh winters are an inescapable part of Canada. While cold weather can impact the performance of electric vehicles, they do have some advantages over gas or diesel vehicles. For example, their cabin warms up faster without idling, their low centre of mass makes them more stable on the snow, and they never fail to start, even at -40°C .

At -15°C , the range of an electric vehicle drops to around 54% of its rated range. For something like the Mercedes-Benz eSprinter or the Brightdrop Zevo 400 that could normally travel 400 km on one charge, that means the cold-weather range is around 216 km — still enough for most daily travel.

In 2019, the [American Automobile Association tested electric vehicles in cold conditions](#) and reported an average 12% range decrease at -7°C without cabin heating, and up to a 40% decrease when the heater was fully on.

Winter electric vehicle stories

- [Alaska's first electric school bus has demonstrated excellent performance, even at temperatures as low as \$-40^{\circ}\text{C}\$.](#)
- [Electric trucks handle daily winter routes in Montreal effectively.](#)

To get the best performance from your electric vehicle in the winter:

- Pre-heat your battery by turning it on ahead of time to improve charging.
- Warm up your cabin before driving and use seat and steering wheel warmers to stay comfortable without relying heavily on the heating system.
- Map out charging stations along your route to ensure you have enough power for your trip.
- Reduce speed to extend range by cutting down drag.



How low temperatures affect battery performance

A battery stores energy through a reversible electrochemical reaction between two electrodes, with an electrolyte allowing lithium ions to move between them. While none of the battery components will freeze, the chemical reactions slow down as temperatures drop. This reduces the vehicle's ability to accept and deliver energy, leading to shorter ranges and longer charging times in winter.

What about the environment?

Batteries and the environment

While electric vehicles are transforming transportation by reducing emissions and lowering air pollution, one of the biggest challenges to resolve is battery manufacturing. But even accounting for the impacts of battery manufacturing, electric vehicles have a lower overall greenhouse gas footprint over their lifetime compared to gasoline and diesel vehicles.

The environmental impact of batteries is expected to continue to decrease as battery technologies improve and the recycling and repurposing sector expands.

Canadian company [Li-Cycle](#) is leading the way by developing robust processes to recycle batteries into critical materials. [As more recycling centres come online](#), the environmental impact of mining the critical minerals used in batteries will decrease.

Some manufacturers are also repurposing batteries for secondary uses: Nissan is using decommissioned Leaf batteries to [power a stadium in Amsterdam](#) and Toyota is repurposing batteries for [backup power at 7-Eleven stores in Japan](#).

Assessing impacts over the entire life cycle

Life cycle assessment is a standardized method used to estimate the environmental impacts of a product through the entire life cycle, from manufacturing to disposal. These assessments are essential for evaluating both the benefits and potential shortcomings of electric vehicles. Learn more about how these assessments are conducted from [Ecochain](#).

The [Fuels Institute](#) has done a [life cycle analysis comparison](#) of emissions and costs between internal combustion and electric vehicles.

Emissions reductions and other benefits

- [Transport and Environment's study](#) shows that electric vehicles use 58% less energy and generate 64% fewer greenhouse gas emissions over their lifetime.
- [A 2018 City of Vancouver study](#) shows that electric vehicles produce 48% less greenhouse gas emissions over 150,000 km compared to traditional gasoline vehicles.
- [A 2018 study](#) found that emissions from driving are 50% lower for an electric vehicle compared to a gasoline car in Alberta. Emissions generated from driving an electric vehicle in Alberta are even less now and will decline further as Alberta continues to decarbonize its electricity grid.

Beyond reduced greenhouse gas emissions, electric vehicles also produce significantly less air pollution. Electric vehicles do not produce exhaust with harmful pollutants like nitric oxide and carbon monoxide, which means cleaner air and better public health. Operators even get to skip the fumes from refilling their vehicle with gasoline or diesel. For drivers, this translates into a healthier work environment, less exposure to harmful pollutants and a more comfortable ride. In all, there are tremendous benefits for both the driver and the public.

Learn more about the health benefits for truck drivers in NRDC's expert blog, "[Breathing Easy: Truckers' Health and the Rise of Zero-Emission Trucks](#)."





“We forecast that an electric vehicle... will be 60% less expensive to maintain than our current vehicles. So, the financial aspect is just as important as the environmental aspect.”

Stephane Labrecque – Fleet Director, Videotron
From Electric Autonomy’s EV Fleets course

“We generally run 75 routes per day for Richmond in class 3 and 5 vehicles. Of those routes, 58 are now serviced by electric trucks, like the Ford E-Transit and GM BrightDrop. Because we are electrifying our fleet, customers are looking to use our low-carbon delivery services to help meet their own sustainability goals. We are seeing a tremendous increase in the demand for green delivery methods, and as a result our volumes and routes serviced by electric trucks continues to expand.”

Nathan Close – District Manager, Pacific Purolator

More resources

Explore these resources to support your transition to zero-emission vehicles and optimize your electrification journey.

- [EV Fleets Pro](#): Free online course
- [Zero-emission Medium- and Heavy-Duty Vehicles Catalogue](#): Models available in Canada
- [Fleet electrification knowledge center](#): Resources to plan your own EV fleet adoption strategy
- [Electric trucks](#): Guides outlining benefits and challenges
- [Businesses driving electric](#): fact sheets for small businesses
- [Fleet electrification guide](#): Developing a fleet electrification plan in B.C.
- [Cal Fleet Advisor](#): Resources to help small businesses transition to electric vehicles
- [Delivery FLEET 1.0 First/Last-Mile Emissions Estimation Tool](#): Online tool to calculate the benefits of switching to zero-emission delivery vehicles
- [ZEV Council Dashboard](#): Growth trends for chargers and electric vehicles



“With all EV vehicles, you get a sticker that allows you to use HOV lane [in certain regions] even if it’s just one person in the vehicle. So that definitely saves a lot of time because if traffic’s backed up [...] you’re allowed to just bypass all of that and you can easily save 20 minutes getting to a place.”

Riana Purcell – Project Manager, ISC
From Electric Autonomy’s EV Fleets course



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