

BASIC GUIDE TO ELECTRIC VEHICLES



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The information captured in this document is based on information produced and shared by government ministries to provide detailed information on electric vehicle operations and technologies for staff who will be driving Zero-Emission Vehicles (ZEVs).

This document is not comprised of policy, directives, or rules, but rather best practices, suggestions, basic information, and recommendations.

This document is a "point in time" document. It represents the best information available to us as of the date of publication.

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INTRO AND OVERVIEW

We understand that driving an EV for the first time can be intimidating and we want to provide fleet operators with some quick tips and helpful resources to get you on your way and make the transition to a greener fleet more seamless.

Know the EV Basics - <https://pluginbc.ca/ev101/>

Check out the benefits of driving an EV - <https://electricvehicles.bchydro.com/learn/benefits-of-driving-EV>

TRIP PLANNING

Trip planning is very important when driving an EV unit, and there are resources available to help you. Planning will help you identify the most efficient route and be aware of the locations of charging stations along your way. You should be sure to also check if the office you are visiting has a charging station available for your use while you are there. If staying overnight, also consider booking a hotel with electric charging options available. How do I find charging stations and how do I pay?

In practice, most of your charging will be done at your vehicle's home office and most trips are generally 200 km round trip, or less, and can therefore be done on a full charge.

If you are planning a longer trip (over 200 km total) it is recommended that you know the locations of charging stations along your way. To find a public or private charging station near you, these helpful trip planning resources/apps can be explored/downloaded to your smartphone: [flo.com](https://www.flo.com), [PlugShare.com](https://www.plugshare.com) and [ChargeHub.com](https://www.chargehub.com). Simply enter your location, and each will show you a map of nearby stations and any other available information, such as plug type.

Public charging stations require an account linked to a membership card or smartphone app to activate. Most service networks have adopted a roaming agreement so you can use one card or app to access other networks. There are, however, a few older stations still active, so EV drivers in BC are recommended to sign up for at least two service networks' accounts. These are recommended to include [BC Hydro EV](https://www.bchydro.com/ev), [ChargePoint](https://www.chargepoint.com) or [Flo](https://www.flo.com). Most stations on these networks are covered by a roaming agreement.

A few [Greenlots](https://www.greenlots.com) are stations are still in use. They are not covered by a roaming agreement but are being replaced with newer units. For now, keep this account handy if you are travelling in the lower mainland or on Vancouver Island.

The B.C. Ministry of Transportation and Infrastructure has installed fast charging stations at rest areas. Follow the instructions posted on-site or on [PlugShare](https://www.plugshare.com).

CHARGING

WHAT ARE CHARGING LEVELS (OR SPEEDS) OF CHARGING?

- Level 1 (Standard power point) uses a regular household wall outlet to charge your vehicle. All electric vehicles come with a cord-set that lets you charge using Level 1. This is the slowest speed of charging. A 28kWh battery would be 14hrs.
- Level 2 (Wall mounted home, office or public AC) is the most common level of charging. Level 2 charging stations use 240 Volts and 30 Amps to effectively cut your charging time. A 28kWh battery would be 4hrs.
- Level 3 (Direct Current Fast Charger or DCFC) is the fastest level of charging that will charge your vehicle from empty to 80% in 30-45 minutes. Level 3 charging stations, like a gas station, can be found along highways and major travel routes across Canada to allow for inter-city travel or long commutes.

The time it takes a "Level 3" DC Fast Charger to bring an EV's battery up to 80% of its capacity can depend on the vehicle and the outside temperature (a cold battery charges slower than does a warm one).

HOW DO I CHARGE AN EV?

1. Stop and turn off the vehicle.
2. Open the charge port on the vehicle (press the charge port button inside the unit or on your FOB).
3. Swipe the charging station card to unlock the charger if required. To unlock a charging station, swipe the card in front of the station and wait for an unlocking sound.
4. Plug the charger into the vehicle. For a level 2 station, this will be a port on the front or side of your vehicle. Close the charge port hatch slightly.



A Level 2 charger plugs into the right charge port in a Nissan Leaf. The left port is for fast charging.

5. Ensure the vehicle is charging. The vehicle may make beeping sounds when the plug is connected and charging. Some units will have a set of battery charging lights inside the dash to indicate the level of charge.

6. If you do not have access to a Level 2 charger, the EV also has a portable charging unit generally located in the vehicle, which can be plugged into any 120V wall outlet (normal outlet) or a 240 V outlet to charge overnight. If you are using a wall outlet, plug the portable charging unit into the wall first, then into the EV to avoid an increased risk of electric shock.
7. If you are using a Level 3 or fast charger, only charge the battery to 80%, even on long-distance trips). Level 3 charging can be hard on the battery and should be used sparingly, as a last resort!



HOW FAR CAN I DRIVE BEFORE HAVING TO RECHARGE MY ELECTRIC VEHICLE?

EV's have a gauge, like fuel vehicles, so you can see the percentage of charged battery capacity, as well as an estimated range in kilometers. The EV will alert you long before you get close to losing power. While range is affected by road conditions, weather conditions, heating and cooling usage, and driving habits, most electric vehicle models have a rated range between 250-400 km on a full charge with some models capable of 500+ km of driving on a single charge. With many public fast charging stations in BC, chances are that even if you did get low, you would be able to find somewhere in your area to charge. A DC fast charging station will get you on the road quickly (usually within 40 minutes) if you don't have time to park your vehicle at an office or home location for 4-14 hours.

Remember that the range shown on the dash is just an estimate calculated based on previous, recent driving conditions, i.e. if you've just climbed a mountain pass in freezing temps, the range will read on the low side; if you've just cruised down a long, warm pass, the range will read higher.

WHAT IS THE CHARGING PROTOCOL/ETIQUETTE?

Book the unit to include charge time! Booking a vehicle can be different in many locations. Check to see if there are specific charging procedures in your building, and if not, use the following:

- Plug the vehicle in after every use, so that it is fully charged for the next person (unless you are taking a fully charged unit and only taking a short trip). Recommended best

practice is to charge only to 80% and top up to 100% prior to a longer trip – this protects battery capacity and prolongs battery lifespan.

- Book the vehicle for the time you need it, plus adequate charging time; If your trip is 200 km or more, add 6 hours to your booking for charging time. 100-200km, add 4 hours; 50-100 km, add 2 hours; less than 50 km, add 0.5 hour
- If in doubt, book 6 extra hours for charging time. This ensures the vehicle will be fully charged for the next person.

Check out these videos - <https://pluginbc.ca/charging/charging-station-etiquette/>

CAN ANYTHING BAD/DANGEROUS HAPPEN DURING CHARGING?

Charging your EV in the rain is totally safe, but if there is lightning nearby, please stay indoors.

Always avoid touching the insides of the charge port and plugs (just like you would avoid sticking your fingers in a normal wall outlet).

Unlike gas-fed cars and trucks that will happily let you zoom away with a fuel hose connected to the tank; your EV is smart enough not to let you make the same extremely dangerous mistake. The vehicle will recognize a charger is connected to it and will not move out of park with the device connected to it.

More info on charging - <https://chargehub.com/en/electric-car-charging-guide.html#publiccharging>

OPERATION AND MAINTENANCE

Electric vehicles have “instant torque” and smooth acceleration because they don’t need to “rev up” or shift gears. Electric motors are very powerful, despite their compact size, and have great handling.

Their batteries are evenly distributed along the bottom of their chassis, giving them a low centre-of-gravity for excellent control.

Electric vehicles also use regenerative braking so when you ease up on the accelerator, the electric motor provides resistance which slows the vehicle down and generates power at the same time. Since an electric vehicle gets rid of complicated engine and drivetrain systems, there is much less vibration and sound.

HOW IS MAINTENANCE DIFFERENT FOR AN EV?

Unlike internal combustion units, electric motors require very little maintenance, but they still need to be serviced. The best place to take your EV for regular servicing/maintenance will likely be your local dealership.

How to keep your EV in perfect shape - <https://electricvehicles.bchydro.com/buying/EV-maintenance-and-battery#EV%20maintenance>

HOW DO EXTREME TEMPERATURES AFFECT MY RANGE?

Take advantage of the amenities that come with your vehicle – heat or cool the human, not the air. Be sure to use heated seats and steering wheel, if equipped. Heating the cabin air can draw 3000-5000 watts and is much less efficient than heating your seat and steering wheel (around 75 watts) which transfers heat to your body via conduction. Using these increasingly common features can keep you comfortable without resorting to the cabin heater. However, in very cold temperatures, minimizing cabin heating can only take you so far, and you will still lose energy from your battery thermal management system.

Pre-condition your vehicle. Just like you would before exercise, warm up before a long trip! If it's hot, cool down. Turning on your vehicle's heater while it's still plugged in will minimize the auxiliary load by warming (or cooling) your vehicle before it starts its trip. Take advantage of the guilt-free pre-conditioning that EVs allow. If the option is available to you, park in a temperature-controlled garage to get a similar effect.

Keep your vehicle plugged in on extreme cold or hot days. In addition to the benefits of preconditioning before your trip, automakers recommend that vehicles are plugged in during very hot or very cold days when the vehicle is not in use. Having the vehicle plugged in allows the internal system to maintain battery temperature controls, prolonging the life of your battery in the long run.

Temperature tool for EV range: <https://www.geotab.com/fleet-management-solutions/ev-temperature-tool/>. This tool is current up to 2019.

HOW CAN I PRESERVE RANGE?

Conserving range is crucial when operating electric vehicles, and driving style has a direct impact on battery depletion. Try to accelerate smoothly and to not brake suddenly, as this method of driving protects against energy loss.

How you heat and cool the vehicle also plays a role in preserving battery power. During winter months, EVs may lose over 25% range in cold weather. To combat the effects of winter weather, drivers can utilize heated seats and wear coats while driving to conserve range.

Extreme heat and air conditioning has a similar range-draining effect on electric vehicles, so consider rolling down the windows if you have limited range to avoid having to stop to charge before reaching your destination.

Use of the sound system and other onboard apps will also draw energy from the battery.

EV's can regenerate range while braking or going downhill. This is called 'regenerative braking'. Regeneration is the best way to slow down, since it extends range, and significantly extends the life of the braking system as the mechanical parts wear out less quickly. Save the foot pedal brake for that kitty darting out in front of the vehicle.

EV's use multiple methods to brake, but not all are regenerative. Braking can feel very different in each EV so read about the difference in your EV's user manual.

Regenerative braking doesn't work when the battery is full (there's nowhere for the power to go).

CAN I JUMP START MY ELECTRIC VEHICLE OR OTHERS?

It's recommended that you do not use an electric or plug-in hybrid vehicle to jump start another vehicle. It is also not recommended to jump start the 12-volt battery in the EV. Doing either can put the electronics at risk and potentially cause serious damage.

HELPFUL LINKS/RESOURCES

- EVs 101 - <https://pluginbc.ca/ev101/> and Charging 101 - <https://pluginbc.ca/charging/>
- Plugin BC Resources - <https://pluginbc.ca/resources/>
- EV Knowledge Guide - <https://mccac.ca/app/uploads/EV-Knowledge-Guide.pdf>
- Trip planning - <https://electricvehicles.bchydro.com/charge/EV-road-trip-ideas-and-advice>
- Q&A with EV Owners - <https://electricvehicles.bchydro.com/learn/EV-owner-reviews-and-tips#Switching%20to%20an%20electric%20vehicle>