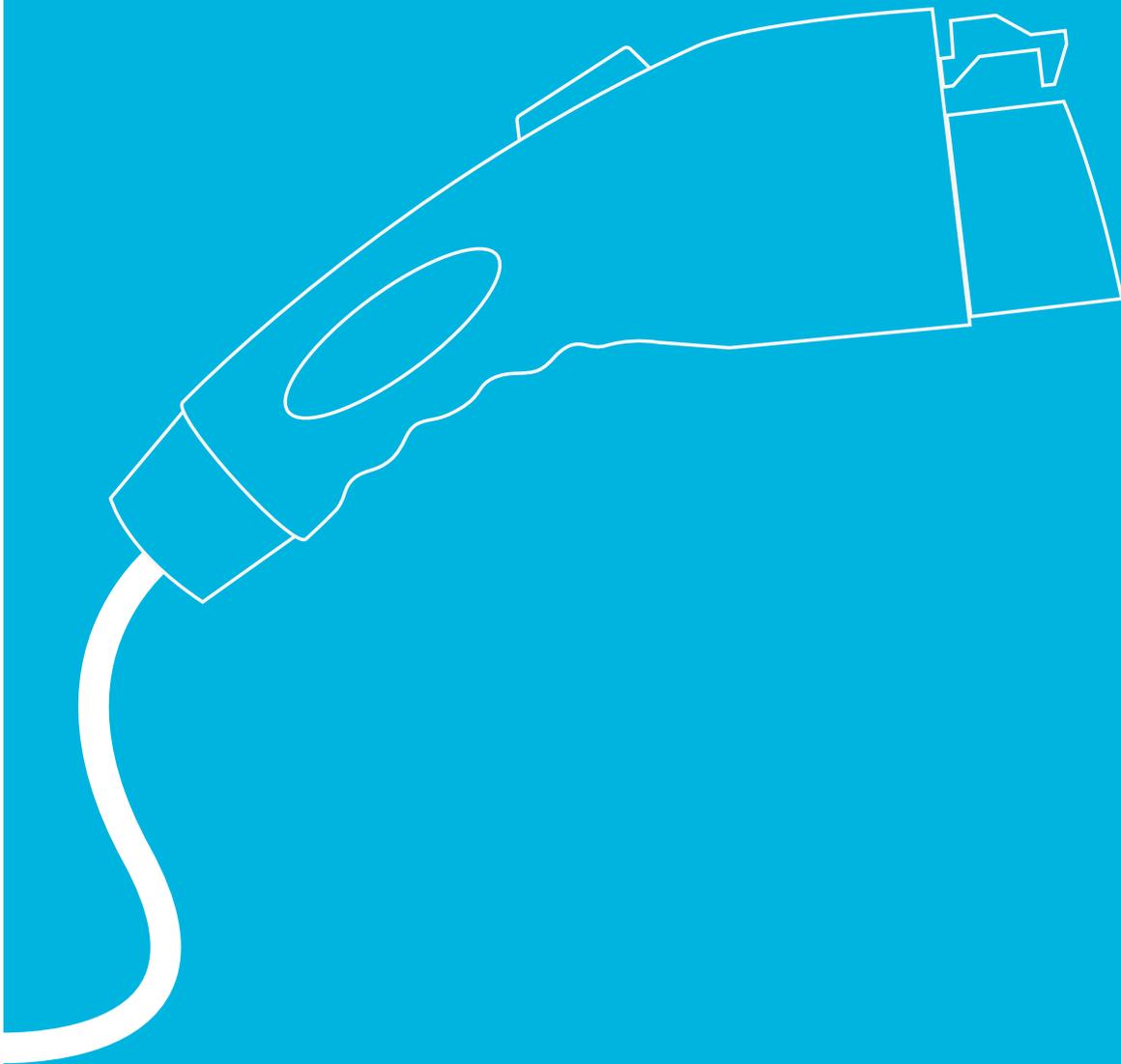


Old habits drive hard: How British Columbians' fueling habits are driving misconceptions about EV charging



Report

October 2019

BCH19-932

 **BC Hydro**
Power smart

Old habits drive hard: How British Columbians' fueling habits are driving misconceptions about EV charging

A new survey¹ conducted by BC Hydro found British Columbians' approach to fueling their gas-powered vehicles may be driving misconceptions around EV charging, leading to hesitation in making the switch to one.

Highlights

- A survey conducted for BC Hydro found around 70% of non-EV owners stop to fuel their gas-powered vehicle at least once per week.
 - In addition, approximately 70% of non-EV owners also listed concerns around the availability of public charging as the main reason they are hesitant to switch to an EV.
- However, the survey found EV owners use public charging sparingly, with 60% of owners charging most often at home or at work.
 - In fact, less than 10% surveyed said they charge at a public charging station on a daily basis, with around half using a public station less than four times a month.
- The survey results suggest non-EV owners' fueling habits may be leading them to think EV owners must use public charging stations – just as they would a gas station – a lot more often than they do.
- The survey also found around one-quarter of non-EV owners are hesitant to switch to an EV because of concerns with the added electricity use and associated cost of charging at home.
- Based on current BC Hydro rates, charging a Nissan Leaf at home everyday costs around \$35 a month² compared to the approximate \$170³ a month the average British Columbian spends to fuel a comparable gas-powered vehicle.
- In addition, almost 60% of non-EV owners and EV owners who have not purchased a Level 2 EV home charger think the average cost to purchase and install one is more than it is:
 - Almost 40% think that average cost to purchase and install one is around \$1,000 to \$2,500, and another 16% think the cost is between \$2,500–5,000 for a single family home.
 - While individual factors of a home can impact costs, the average cost to purchase and install a Level 2 charger for a single family home is actually between \$700 and \$2,000.
 - With the savings in charging at home vs. paying for gas, the average payback period for a Level 2 charger is around eight months.⁴

Solutions

- BC Hydro and the Province of B.C. are offering up to \$700 in rebates on the purchase of a Level 2 EV home charger for a single-family home (including townhomes and duplexes with a private garage or dedicated parking).
 - These chargers can fully charge the average EV in 6 to 8 hours.
- The Province is also offering up to \$2,000 in rebates on the installation of a Level 2 charging station in condo, apartment or office building and up to 5 hours of free support services from an EV Charging Station Advisor.

¹ Online survey conducted by Majid Khoury on behalf of BC Hydro of 1162 drivers in British Columbia from July 29–August 5, 2019.

² Calculation based on a 2018 Nissan Leaf SV/SL driven 20,000 kilometres a year and including eligible rebates.

³ Based on a gas-powered 2018 Honda Civic driven 20,000 kilometres a year.

⁴ Calculation based on a 2018 Nissan Leaf SV/SL driven 20,000 kilometres a year and including eligible rebates.

Old habits drive hard

British Columbia has one of the highest electric vehicle adoption rates in Canada⁵. There are now close to 26,000 electric vehicles on the road in B.C. and BC Hydro predicts that by 2030, that number will rise to close to 400,000.

Despite high EV adoption numbers, misconceptions about EVs still exist amongst British Columbians, and some of the most common are around charging. With fueling a vehicle at a gas station being second nature for many having built the habit since they first began driving, the process and requirements for charging an EV are unfamiliar.

This report will explore how non-EV owners may mistakenly be using their knowledge and experience with fueling-up a gas-powered vehicle as a basis for false assumptions about how EV charging works.

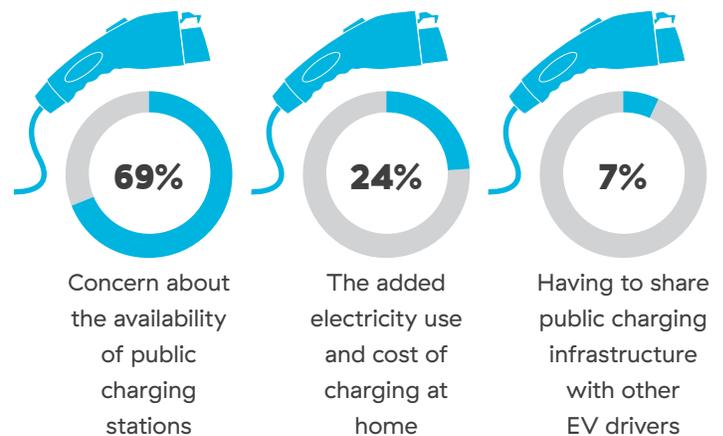
The false freedom of fuelling

For over a century, gas-powered vehicles have played an important role in British Columbians' day-to-day lives, and the behaviours associated with driving one are firmly entrenched in society. From classic movie scenes like the drive-in movie theatre and school auto shop in *Grease*, to the speedy and exhaust-fumed races in *The Fast and the Furious* – there is a deep-rooted sense of freedom that comes with a set of wheels and an engine.

The survey conducted for BC Hydro also found owners of gas-powered vehicles are used to frequent oil changes and maintenance, as well as frequent stops to fuel up at gas stations. In fact, the survey found nearly 70% of owners of gas-powered vehicles stop to fuel up at least once per week. On average, this adds up to more than a typical workday – about 8 hours – spent at the gas pump each year. Although most British Columbians are very familiar with stopping to gas up, many seem to avoid it – with one quarter surveyed saying they avoid filling up until the fuel level warning light comes on.

All this time spent at the gas station, or thinking about where to fuel up next may be leading to misconceptions about what is involved in charging an EV. In fact, the survey found about 70% of non-EV owners are concerned with the availability of public charging stations and point to this as the main reason they are hesitant to switch to an EV. However, the survey found around 60% of EV owners actually do most of their charging at home or at their workplace, and use public charging sparingly – with less than half using public chargers only once a week.

What aspect of charging makes you most hesitant to purchase an EV?



Charging a vehicle like charging a phone

According to 2016 Census data⁶, three-quarters of Canadian commuters drive to work, and about 1.5 million Canadians spend at least one hour commuting each day.

The ability to fuel a vehicle at home, at the driver's convenience is a huge benefit of owning an EV, especially for commuters. The amount of fuel—and associated cost—used to make the average 20 kilometre commute in a gas-powered vehicle twice daily, five times a week certainly adds up.

⁵ Fleet Karma

⁶ Statistics Canada

For instance, at the equivalent of \$0.25 per litre in gas, fueling an electric vehicle at home costs about 80% less than fueling a gas-powered vehicle. This means commuting 20 kilometres a day in a Nissan Leaf costs about \$2 a week, which is less than the average British Columbian spends on a cup of coffee at \$3.60.

EV owners can arrive home from a commute from work, plug in the car and charge it overnight just like they would a cellphone after a day of talking, texting and Instagramming. EV owners have two options to recharge at home:

- Plugging into a standard 120-volt outlet (the same that you use to plug in a lamp or cell charger), that can charge the average EV for a 40 kilometre drive in around eight to 12 hours⁷.
- A Level 2 charger plugged into a 240-volt outlet that can fully charge the average EV in six to eight hours.

Charging on the go

The survey commissioned by BC Hydro found most non-EV owners think the majority of charging takes place at public charging stations. However, less than 10% of EV owners surveyed said they charge at a public station on a daily basis, with around half using a public station less than four times a month.

Instead, public charging acts as an important supplement to home and workplace charging, and most often occurs on infrequent road trips. Since about 95% of all car trips in B.C. are less than 30 kilometres, an EV with a 400 kilometre range could last ten days on one charge. This means that even without access to a home charger, an EV owner is still likely to use public charging less frequently than a driver would stop to fuel a gas-powered vehicle.

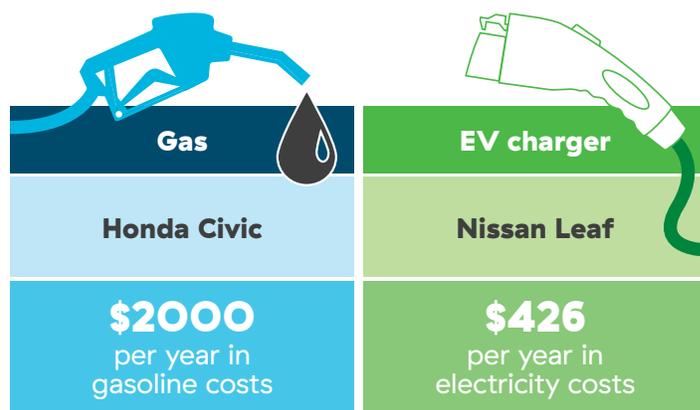
Fuel's gold – the cost of charging vs. fuelling

Cost is another factor that continues to drive misconceptions around EV ownership. The survey conducted for BC Hydro found around one-quarter of British Columbians are hesitant to switch from a gas-powered vehicle to an EV because of concerns with the added electricity use and associated cost of charging at home.

Charging the average EV – such as the Nissan Leaf – at home on a daily basis would add around \$35 a month to the average BC Hydro customer's electricity bill that travels around 20,000 km per year. For the average commuter who drives about 23 kms a day, just five days a week, the cost in electricity per month is even less, at about \$20 a month. In comparison, driving a standard gas-powered vehicle such as the Honda Civic costs around \$170 a month in fuel. Another benefit of EVs is the lower maintenance costs because they have less fluids to change and fewer moving parts that need to be repaired or replaced.

In addition to the added electricity costs, about 60% of those surveyed think the average Level 2 home charger costs more than it actually does. Of those surveyed, almost 40% of British Columbians think the average cost to purchase and install a Level 2 home charger for a single-family home would be around \$1,000 to \$2,500, when the actual average cost is around \$700 to \$2,000. Buying and installing a charging station at a condo, apartment or office building can range from \$2000 to \$12,000.

GAS VS. CHARGING



* Based on 20,000 kilometres a year of driving with gas prices at \$1.45 per litre and current BC Hydro rates.

⁷ BC Hydro

Charging challenges for condos and apartments

The survey commissioned by BC Hydro found around a quarter of EV owners who have not installed a Level 2 charger live in a condo, apartment or townhome where there is no place to install one. The requirement for EV charging infrastructure in new condo and apartment buildings is governed at the municipal level, and opportunities to install EV charging infrastructure are improving as new requirements are helping to make it more accessible.

For instance, since 2011 the City of Vancouver requires 20% of the parking stalls at new buildings to be “EV ready”, and other municipalities have followed suit. The City of Richmond now requires 100% EV readiness for example.

The definition of “EV ready” varies by jurisdiction but it essentially requires developers to provide the infrastructure for EV charging during construction as it would be more costly to retrofit the building later once its constructed. The infrastructure includes items such as conduit for wiring to the parking stall and additional transformer capacity, or the space for future transformers in the building’s electrical room. The result is intended to make adding a Level 2 charging station to a parking stall as simple as installing a clothes dryer.

Stratas and property managers can also apply to upgrade the electrical service at an older building to meet the demand of EV charging, and many have done so. Members of the **BC Hydro Alliance of Energy Professionals** have provided quotes for retrofitting older buildings for EV chargers at over 2,000 condos, apartments and townhomes over the past four years. This includes low, medium and high rise buildings with a varying number of tenants.

Current public charging infrastructure is an important component in dense urban areas with fewer single-family homes, while home charging infrastructure for condo and apartments continues to grow. In addition to the more than 1,700 public charging stations across the province, BC Hydro has a network of 60 fast-charging stations that can charge the average EV battery to 80% in 30 minutes, and is in the process of adding an additional 26 stations by the end of the year.

Solutions

Rely on rebates to reduce home charger costs

BC Hydro and the Province of B.C. are offering rebates on the purchase of Level 2 EV chargers for single-family homes and condo, apartment and office buildings that can charge the average EV in just six to eight hours. Rebates include:

- Single-family home (including townhomes and duplexes with private garages or dedicated parking):
 - The Province is offering a \$350 rebate on the purchase and installation of an eligible EV Level 2 charger, and for a limited time, BC Hydro is matching this with an additional \$350 off.
- Condos, and apartment buildings:
 - The Province is offering up to 50% off the purchase and installation costs of eligible Level 2 charging stations, or energized outlets. This includes up to \$2,000 per station, to a maximum of \$14,000 in total for multiple stations.
- Workplaces and office buildings:
 - The Province is offering up to 50% off the purchase and installation costs of eligible Level 2 charging stations, or energized outlets. This includes up to \$2,000 per station, to a maximum of \$14,000 in total for multiple stations.

Complete details on the rebates available are at bchydro.com/evcharger.

Hire a professional to install an EV charging station at home or work

A qualified electrician has the knowledge and expertise to install an EV charging station properly. Through its **Alliance Program**, BC Hydro can refer its customers to a qualified electrician with experience and training specific to EV charging infrastructure, which includes:

- Determining charger needs based on vehicle model and individual driving habits.
- Determining if electrical upgrades are required based on a home or building's existing electrical load
- Determining the best place to install the charger based on where existing circuit and plugs are located.