

# Electric highway:

Road trip range anxiety is pumping the brakes on EV adoption in B.C.



**Report**

June 2019

BCH19-563

 **BC Hydro**  
Power smart

# Electric highway: Road trip range anxiety is pumping the brakes on EV adoption in B.C.

B.C. has one of the highest electric vehicle adoption rates in Canada, however many British Columbians are still hesitant to make the switch from a gas-powered vehicle because of misconceptions around the range the vehicles can travel – especially when it comes to infrequent out-of-town road trips.

## Highlights

- A new survey commissioned by BC Hydro found misconceptions around electric vehicle (EV) range limitations for out-of-town road trips is a significant factor in British Columbians' hesitation to purchase an electric vehicle.
- In fact, almost 70% of those surveyed said they would be hesitant to purchase an EV because they do not think they can take it on a road trip.
- The survey also found only 30% of British Columbians would consider taking a road trip in an EV, while the majority would hesitate to do so because they do not think the vehicle can travel the distance they want to go, and are concerned about the availability of charging stations on their route.
- This despite the survey finding the majority of the road trips British Columbians are taking are less than 300 kilometres one-way – well within the range the latest EVs can travel on a single charge, including the 2019 models of the Nissan Leaf, Chevy Bolt and Hyundai Kona.
- Even in a gas-powered vehicle, fewer than one in 10 British Columbians are taking road trips of this length without stopping with the majority making stops for other reasons besides to fill up the gas tank, including:
  - More than 75% make additional stops for bathroom breaks.
  - More than 50% make additional stops for food.
  - Around 40% make regular stops to walk around and stretch their legs.
- According to Destination BC data, B.C. residents took more than 13 million trips within the province in 2016, the majority of these were overnight trips of an average of 2.9 days with over 80% doing so in a car or truck.
- Many of the most popular routes British Columbians travel for overnight road trips as shown by Destination BC data are supported by BC Hydro's EV fast-charging network, including:
  - Victoria to Tofino
  - Vancouver to Kelowna
  - Abbotsford to Whistler
  - Kamloops to Vancouver
  - Cranbrook to Revelstoke
- Besides the destination, BC Hydro's survey found cost was the biggest factors when it comes to how British Columbians decide to take vacation, with around 70% saying it is their top consideration.
  - Making a road trip in an EV costs significantly less than travelling in a gas-powered vehicle. In fact, driving a Nissan Leaf from Vancouver to Whistler costs around \$5 – less than the price of one drive-thru meal.

## Solutions

- BC Hydro has over 58 Level 3 fast-charging stations in addition to over 200 installed by other providers in the province that are capable of charging the average EV battery to 80% in around 30 minutes. BC Hydro will be adding 26 more fast chargers by the end of 2019.
  - These fast-charging stations are in addition to the over 1,000 Level 2 public charging stations available across the province, which are expected to double in number by 2020.
- Over 96% of BC Hydro's charging stations are located within 300 metres of a major road or highway corridor and around 80% are conveniently located within 50 metres of services, such as food, washrooms or other shopping.
- BC Hydro has a mobile app available in the Apple App Store and Google Play that lists the locations of every fast-charging station within its network, which makes planning a road trip route and charging stops easy.
- As EV technology continues to improve, so too does the range the vehicles can travel on a single charge. For example, the 2013 Nissan Leaf has a range of around 120 kilometres, while the 2019 model has tripled that with a range of 363 kilometres.
  - According to Plug N' Drive.ca, the average EV on the market in Canada has a range of around 250 kilometres. By 2022, the newest EV models are estimated to have an average range of around 440 kilometres.

## EV sales are up, range concerns still loom

B.C. has one of the highest electric vehicle (EV) sale rates in Canada. According to Electric Mobility Canada<sup>1</sup>, EV sales in B.C. increased 100% in the first three months of 2019 compared to the same time period last year. There are now close to 20,000 electric vehicles on the road in B.C. and BC Hydro predicts by 2030, that number will rise to over 350,000.

While EV sales are on the rise in the province, a survey<sup>2</sup> commissioned by BC Hydro found one of the main deterrents for purchasing an EV are concerns around the distance the vehicles can travel—specifically for infrequent annual road trips. In fact, close to 70% of respondents said they would not consider purchasing an EV because they do not think they could take an out-of-town road trip in one.

## British Columbians enjoy exploring their own province—but are hesitant to hit the road in an EV

With the arrival of summer road trip season, many British Columbians will hit the road to explore the province. According to Destination BC data<sup>3</sup>, B.C. residents took more than 13 million overnight trips within the province in 2016 for an average of 2.9 nights. And to get their destination, the data shows B.C. residents overwhelmingly opted to drive rather than fly or take a bus, with over 80% doing so in a passenger vehicle, such as a car or truck.

While British Columbians are choosing to drive to get to their destination within the province, it seems most are hesitant to forgo the comfort and familiarity of their gas-powered vehicle when making these trips, with the survey finding close to 70% of British Columbians would hesitate to take a road trip in an EV.

The survey identified three main factors in British Columbians' hesitation to take a road trip in an EV, including:

- Concerns the vehicle will not go the distance they want;
- uncertainty around the availability of charging infrastructure on their route; and,
- the assumption that stopping to charge would add significantly to their travel time.

<sup>1</sup> Electric Mobility Canada Electric Vehicles Sales in Canada Report (Q1 2019).

<sup>2</sup> Online survey conducted by Angus Reid on behalf of BC Hydro of 800 British Columbians from June 1 to 5, 2019.

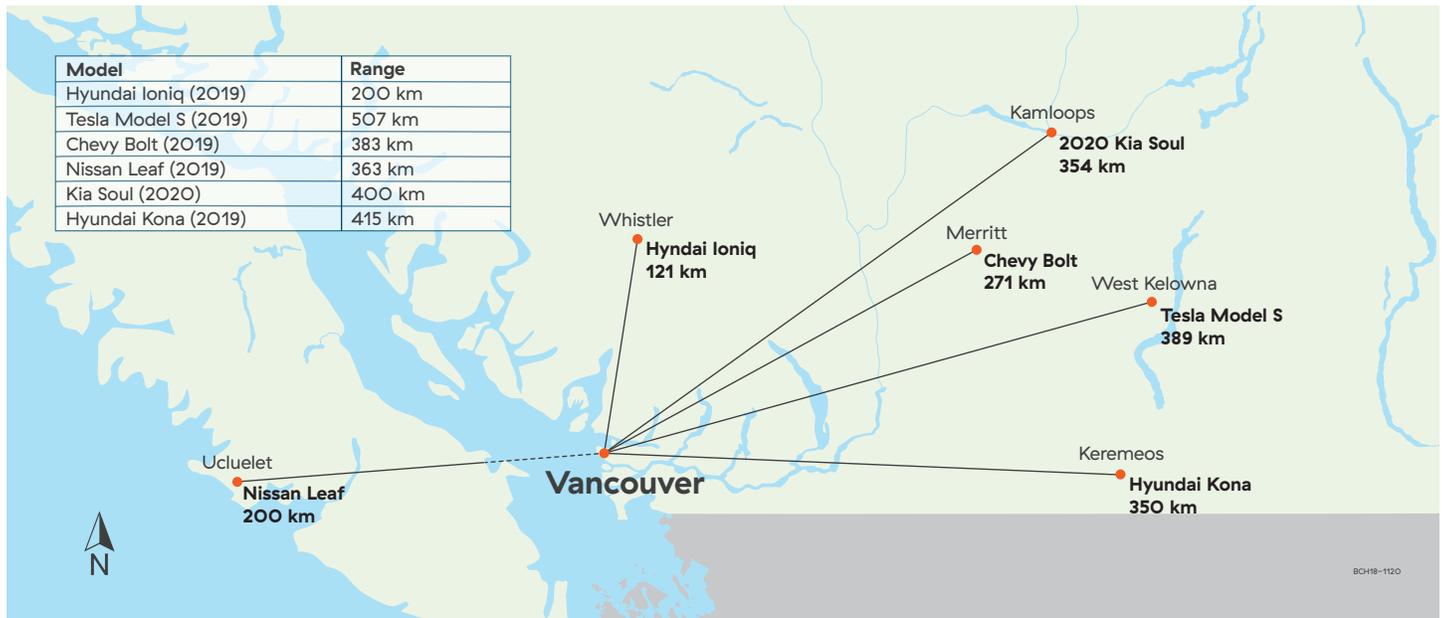
<sup>3</sup> Destination BC's 2017 British Columbia Market Profile report

## Electric vehicles can go further than many British Columbians think

The survey commissioned by BC Hydro found one in four British Columbians are hesitant to take a road trip in an EV because they do not think it would go the distance they want to travel. However, the survey found the majority of the trips British Columbians are taking via car are less than 300 kilometres (or three hours) one-way, which is within the range the latest most popular EV models can travel on a single charge, including:

- 2019 Nissan Leaf: 363 km range
- 2019 Chevy Bolt: 383 km range
- 2020 Kia Soul: 400 km range
- 2019 Hyundai Kona: 415 km range
- 2019 Tesla Model S: 507 km range

## How far will it go on a single charge?



## Road trips and EV range hesitations

More than half of those surveyed by BC Hydro said the uncertainty around the availability of charging stations on their route makes them hesitant to road trip in an EV.

HelloBC.com lists the top five most scenic drives in B.C., which are all around 150 kilometres one-way. Three of the five trips are supported by BC Hydro's fast-charging network, providing EV drivers with options to stop and charge if needed along the route. These include: Vancouver to Pemberton, Revelstoke to Golden and Hope to Cache Creek<sup>4</sup>.

Destination BC data<sup>5</sup> shows many of the most popular trips B.C. residents from southern regions of the province are taking are also supported by BC Hydro's charging network, these include Vancouver to Kelowna, Victoria to Tofino, Abbotsford to Whistler, Kamloops to Vancouver and Cranbrook to Revelstoke.

BC Hydro's EV charging station network includes over 58 Level 3 fast chargers, with 26 more being added by the end of 2019. This is in addition to the over 200 Level 3 fast chargers installed by other providers, and the over 1,000 Level 2 charging stations also available across the province.

<sup>4</sup> BC Hydro will be adding an EV fast charging station in Cache Creek in June, 2019.

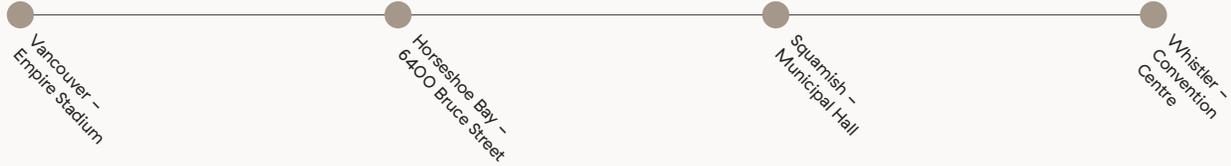
<sup>5</sup> Destination BC tabulations from the 2017 Travel Survey of Residents of Canada (Statistics Canada)

# Popular out-of-town trips

● BC Hydro fast-charging station options

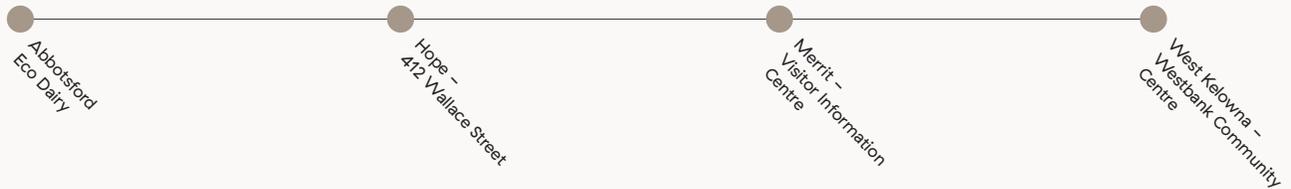
## Abbotsford to Whistler via Trans-Canada Hwy/BC- and BC-99 N

Distance 190 km



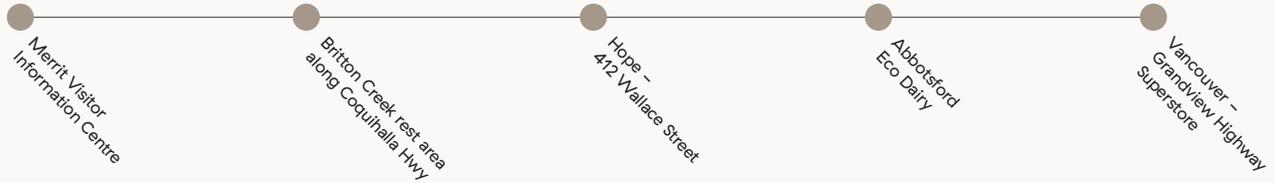
## Vancouver to Kelowna via Trans-Canada Hwy/BC-1 E, BC-5 No and BC-97C

Distance 390 km



## Kamloops to Vancouver via BC-5S and Trans-Canada Hwy/BC-W

Distance 354 km



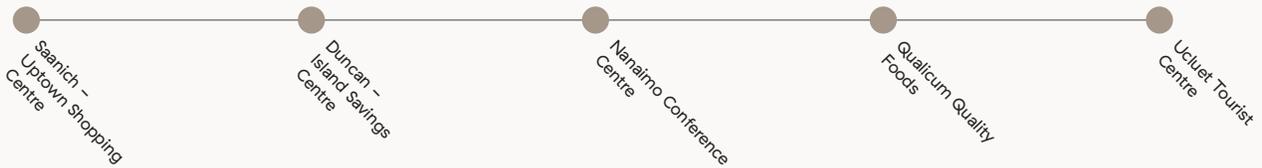
## Cranbrook to Revelstoke via BC-93 N/BC-95 N and Trans-Canada Hwy/BC-1W

Distance 395 km



## Victoria to Tofino via Trans-Canada Hwy/BC-1N and BC-4W

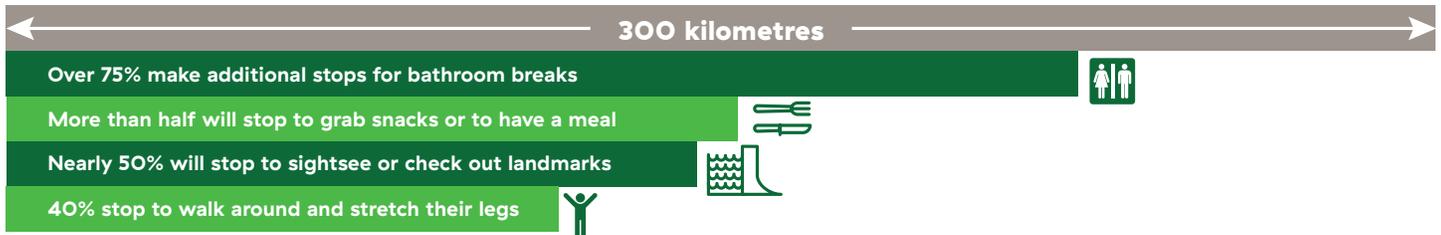
Distance 317 km



## EV charging and British Columbians' road trip habits

The need to stop and charge an EV is another factor in British Columbians' hesitation when it comes to taking a road trip in one. This is because many think it will add significantly to the time it will take to get to their destination. However, BC Hydro's survey found that when it comes to travelling by car within the province, only one in 10 British Columbians will drive as far as they can, as fast as they can on a road trip without making any stops.

On trips with a one-way distance of more than three hours (or 300 kilometres) in a gas-powered vehicle, the vast majority of British Columbians will make stops in addition to stopping to fuel-up, including:



BC Hydro's 58 fast-charging stations in the province can charge the average EV battery to 80% in around 30 minutes. This means stopping to charge does not have to add significant time to a trip. In addition, over 96% of these stations are within 300 metres of a major road or highway, which means EV drivers do not have to veer too far off route to find a charger. And once they are there, close to 80% of the chargers are within 50 metres of services, such as food, washrooms or other shopping. This means an EV road tripper can grab snacks, stretch their legs and check out the sites – all reasons why most are stopping anyway—while they wait for their vehicle to charge up.

## Road tripping in an electric vehicle costs less

Besides the destination, the survey found cost was the biggest factor when it comes to how British Columbians decide to take vacation. Taking a road trip in an EV costs significantly less than taking the same trip in a gas-powered vehicle due to EVs having a significantly lower fueling cost. For example, charging an EV at home based on BC Hydro's current residential rates prior to a road trip costs the equivalent to \$0.25 a litre – or 80% less than gas. Once on the road, the cost to charge at public charging stations can vary with many of BC Hydro's fast charging stations currently being free to charge, while some cost up to 35 cents per kilowatt hour.

The cost to fuel<sup>6</sup> a 340 kilometre road trip in one of latest most popular EV models can save close to \$40—around the same as four drive-thru meals—when compared to making the same trip in a 2019 Honda Civic<sup>7</sup>. For example:

- Nissan Leaf saves \$37
- Hyundai Ioniq saves \$35
- Kia Soul saves \$37
- VW e-golf saves \$34
- Hyundai Kona saves \$37

<sup>6</sup> Cost to charge is based on charging at home prior to a trip using BC Hydro's residential rate.

<sup>7</sup> Calculation is based on Honda Civic fuel economy of 7l/100k on a 340km trip using a gas price of \$1.55/litre.

## Electric vehicle road trip considerations

There are some considerations EV drivers should keep in mind when taking an out-of-town trip in an EV, including:

**Planning ahead:** EV road trippers should plan their route and identify the locations of charging stations. To help with this, many EV charging station providers – including BC Hydro – have mobile apps that list all the stations in their network.

**Knowing when to charge:** Just as is recommended for fueling a gas-powered car, an EV should be charged when it reaches close to 75% of its range. This helps ensure peace of mind and reduces stress if the unexpected happens.

**Keeping a steady state speed:** While EVs do have better off-the-line acceleration than gas-powered models, it is recommended that EV drivers use cruise control when travelling on highways to help keep their speed a steady pace and drivers avoid a lot of unnecessary accelerating. This is because the more a vehicle accelerates, the faster the battery will deplete.

**Controlling the temperature:** Turning the air conditioning on a full blast decreases an EV's range. It is recommended that the A/C is kept on at a low level or used intermittently to help increase the car's battery range on longer trips.

### Does cold weather reduce an EV's range?

According to Consumer Reports, EV batteries do lose range in cold weather. This is not because the cold affects the vehicle's battery, rather it is due to the added power demand of operating a vehicle in cold weather. The amount range is reduced depends on the make and model of the vehicle and the driver's driving habits.

### Can an EV keep up with the speed of highway traffic?

According to the Canadian Automobile Association, EVs are more than capable of maintaining highway speeds upwards of 150 kilometres per hour.

