CHOOSE A PLUG-IN VEHICLE THAT MEETS YOUR NEEDS



2019 EDITION

running electric

Québec

Roulez électrique / Branché au travail



Financial assistance
for the purchase of an electric vehicle or charging station

Transition énergétique Québec offers

- **up to $8,000** for the purchase or lease of an **electric vehicle**
- **up to $600** for the purchase and installation of a **home charging station**
- **up to $5,000** for the purchase and installation of a **charging station in the workplace**

vehiculeselectriques.gouv.qc.ca

Fondsvert

Québec

MESSAGE FROM THE GOUVERNEMENT DU QUÉBEC



Jonatan Julien
Minister of Energy
and Natural Resources

The transportation sector accounts for 30% of all energy consumed in Québec. In this perspective, the Québec government is resolutely committed to transportation electrification in order to reduce both dependence on fossil energies and greenhouse gas emissions.

To accelerate the energy transition to which it is already committed, the government has adopted the Energy Transition, Innovation and Efficiency Master Plan, which stems from a collaborative effort by major energy distributors and government departments and bodies. It presents measures that will enable Québec to attain its energy efficiency objectives and to reduce its consumption of petroleum products. Several measures concern passenger transportation and seek to mobilize all stakeholders in the application of innovative solutions to modernize and decarbonize the sector.

All energy consumers large and small, from individuals to businesses, not to mention institutions and municipalities, are concerned and all of them can and must participate in the energy transition. Doing so will enhance Quebecers' quality of life and contribute to the attainment of greenhouse gas emission reduction targets.

The transportation sector must considerably reduce its carbon dioxide footprint. Québec, which is one of the world's biggest hydroelectricity producers, can rely on clean, renewable, abundant, competitively priced energy. For this reason, it must pursue the transition to vehicles with lower carbon footprints, including electric vehicles, which will considerably reduce its greenhouse gas emissions and contribute to enhancing its energy balance and ecobalance.

AN ELECTRIC CAR IS...

ECONOMIC



You could save up to $7,500 over five years!
Yes, this takes into account the higher initial cost of the vehicle.
See pages 8 to 12 for more information.

EASY



Driving is easy and charging is done at home!
Charging an electric vehicle is as easy as charging a cellphone.
See pages 16 to 19 for more information.

PRACTICAL



The current supply of plug-in vehicles includes 43 models from 21 brands!
Find the one that suits you best.
See pages 24 to 40 for more information.

CLEAN



In Québec, electric vehicles emit 80% less CO_2!
Even when taking into account the complete life cycle.
See pages 22 and 23 for more information.

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MESSAGES FROM OUR PARTNERS

The Running Electric campaign, coordinated by Équiterre, benefits from the support and collaboration of several partners.

AVÉQ

The *Association des véhicules électriques du Québec* (AVÉQ)–the reference for electric mobility in the province since 2013–is there to offer neutral and objective information on the use of an electric vehicle, as well as to represent the interests of present and future EV drivers to stakeholders in this field. It is also a large active community comprising over 10,000 members.

CAA-Québec

CAA-Québec believes in diversity of transportation solutions to ensure better mobility, to reduce travel-related pollution and to meet users' needs. That's why it seems crucial to us to continue making electric and plug-in hybrid vehicles better known by consumers.

CCAM

The *Corporation des concessionnaires d'automobiles de Montréal*, through its Montreal International Auto Show, presents and showcases technological advancements in mobility, providing consumers with every opportunity to make a conscientious decision regarding their transportation needs.

CCAQ

At the *Corporation des concessionnaires d'automobiles du Québec* (CCAQ), we believe that acquiring a fully electric vehicle (EV) or plug-in hybrid vehicle (PHEV) is a choice for a new society: greener, more environmentally friendly.

Hydro-Québec

By producing clean and renewable electricity, Hydro-Québec is actively involved in transport electrification and the decarbonisation of Québec. By developing innovative technologies for batteries and electric vehicle motors and by deploying a network of charging stations, we are also paving the way for electric transport.

RNCREQ

In Quebec's energy context, using the electric car offers great opportunities for consolidating the transportation cocktail.

UMQ

Municipalities are key players in the development of sustainable mobility and transport. They play a pivotal role in achieving the common goals of reducing greenhouse gas emissions. Transport electrification is indeed a global priority, but above all it is a local one!

PROMOTERS' MESSAGES



François Adam
Director General
Innovative Vehicle Institute

The Innovative Vehicle Institute (IVI) is proud to have collaborated on the 2019 edition of this electric mobility brochure.

As with previous editions, published as part of our Branchez-Vous events, you will find a wealth of information on everything related to plug-in vehicles as well as a presentation of models available or coming soon in Québec.

While wishing you a pleasant reading, I encourage you to also experience an electric vehicle at a test drive event or at a dealership near you. Besides their economic and environmental benefits, it's at the wheel that you can really get a taste of the pleasures of driving a plug-in vehicle.



Sidney Ribaux
Co-Founder and Director General
Équiterre

A pioneer in many fields, Équiterre has been talking for over 25 years about the importance of limiting the impacts of climate change. Sustainable mobility, which includes transport electrification, is obviously one of the solutions to achieve the GHG reduction target and improve living environments.

It is in this spirit that for the past 5 years, we have been organizing test drive events throughout the province with the *Rendez-vous branchés*.

Thus, it is with enthusiasm that we accepted the mandate from *Transition énergétique* Québec to conduct a major national campaign to educate about and promote electric vehicles.

Fully Electric or Plug-In Hybrid?

Depending on your transportation habits, your reality and your preferences, you can opt for a fully electric model or a plug-in hybrid model.

Fully Electric Vehicle (EV)

A frequent choice for:

- Two-vehicle households;
- Two-vehicle households that already have a plug-in vehicle;
- Motorists who travel over 85 km a day and occasionally travel longer journeys (more than 300 km).

Characteristics:

- Consumes no fossil fuel;
- Runs at all times on electricity;
- Range proportional to battery size (kWh), varying from 100 to 500 km depending on the model;
- Compatible with fast charging (50 kW and above), with some exceptions. See table on pages 40 to 43.

Main Advantages:

- Highly reduced maintenance costs;
- Highly reduced energy costs;
- Access to fast charging;
- Runs quietly and vibration-free;
- Never uses gasoline;
- Zero greenhouse gas (GHG) emissions.

Plug-In Hybrid Electric Vehicle (PHEV)

A frequent choice for:

- Single-vehicle households;
- First purchase of a plug-in vehicle;
- Motorists who travel less than 85 km a day, but who often travel longer journeys.

Characteristics:

- Both electric motor and combustion engine;
- Rechargeable electric range[1] from 20 to 85 km depending on the model;
- Total range comparable to combustion vehicles thanks to classic fuel tank.

Main Advantages:

- Reduced maintenance costs;
- Reduced energy costs;
- Electric/gasoline compromise for more frequent long journeys;
- Fully electric short trips;
- Reduced GHG emissions.

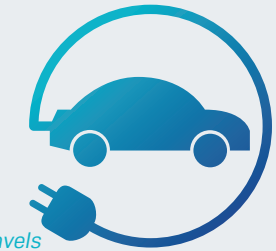
[1] *Not to be confused with «non plug-in» hybrids that include a battery but generate electricity from gasoline only.*

Large or Small Battery?

Like the choice between a fully electric vehicle or plug-in hybrid vehicle, the ideal battery size depends on your transport habits and your reality.

A Full Battery Every Day

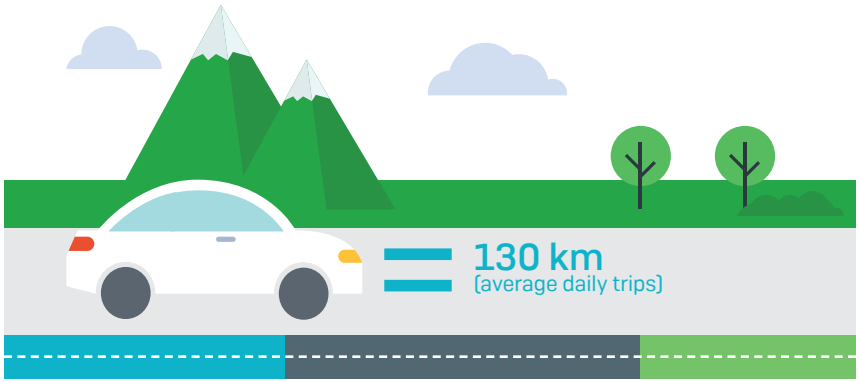
Thanks to home charging, the battery is full every day.
Thus, daily commutes determine the required range and therefore, the ideal battery size.
A larger battery will provide greater range, but the vehicle's cost will be higher.



A battery with a larger capacity than necessary for actual travels will be difficult to justify financially, since savings are mostly proportional to the number of kilometres travelled.

Evaluate Your Daily Travels

In this typical example, the driver can choose from several models with a range of 150 to 200 kilometres, thus saving several thousand dollars on the vehicle's acquisition cost compared to models offering greater range.



Round trip for work: 50 km + Frequent outings: 50 km + Approximate 30% margin: 30 km

However, a person who daily travels more kilometres will have to consider a model with a greater range. Savings on usage-related costs will quickly compensate for the higher cost of acquisition, which is justified in this case.

Savings on Energy Costs

Among the savings on usage-related costs, savings on energy costs are the most significant. Energy costs for an electric vehicle's are generally cut by more than 75%.

Driving 100 Kilometres: Gasoline Vehicle Versus Electric Vehicle



VEHICLE CONSUMPTION:
8 L/100 km

PRICE PER LITRE:
$ 1,25

COST PER 100 KM:
8 L x $ 1,25

= $10

5X more expensive

VEHICLE CONSUMPTION:
20 kWh/100 km

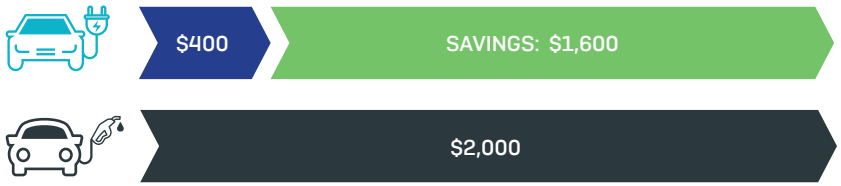
PRICE PER KWH:
$0.10

COST PER 100 KM:
20 kWh x 0,10 $

= $2

$8 savings

Energy Costs and Savings over 20,000 Kilometres



By comparing with a vehicle consuming 8 L/100 km, an EV driver will have saved $1,600 after 20,000 kilometres.

Additional Information – Energy Costs

Compare costs of driving 20,000 kilometres, depending on vehicle fuel consumption and energy prices (gasoline or electricity).

A. Gasoline

Cost for driving 20,000 km, depending on vehicle fuel consumption and price of gas.

Consumption (L/100 km)	GAS COSTS FOR DRIVING 20,000 KM			
	$1,20	$1,25	$1,35	$1,45
4.00	$960	$1,000	$1,080	$1,160
5.00	$1,200	$1,250	$1,350	$1,450
6.00	$1,440	$1,500	$1,620	$1,740
7.00	$1,680	$1,750	$1,890	$2,030
8.00	$1,920	$2,000	$2,160	$2,320
9.00	$2,160	$2,250	$2,430	$2,610
10.00	$2,400	$2,500	$2,700	$2,900
11.00	$2,640	$2,750	$2,970	$3,190
12.00	$2,880	$3,000	$3,240	$3,480
13.00	$3,120	$3,250	$3,510	$3,770

B. Electricity

Cost for driving 20,000 km, depending on vehicle consumption and electricity cost.

Consumption kWh/100 km	Typical Vehicle	ELECTRICITY COSTS FOR DRIVING 20,000 KM[1]			
		Home	Public Charging Stations		EXAMPLE[2]
			240 V Station	50 kW DCFC	85 %/5 %/10 %
14.00	Ioniq EV	$280	$420	$840	$385
16.00	Bolt EV	$320	$480	$960	$440
18.00	LEAF	$360	$540	$1,080	$495
20.00	Model S	$400	$600	$1,200	$550
22.00	Model X	$440	$660	$1,320	$605
24.00		$480	$720	$1,440	$660
26.00		$520	$780	$1,560	$715
28.00	I-Pace	$560	$840	$1,680	$770
30.00		$600	$900	$1,800	$825
32.00		$640	$960	$1,920	$880

[1] *Electricity cost: residential rate (home) = $0.10/kWh; public charging station 240 V ($1/h) = average of $0.15/kWh; 50 kW fast charging station ($10/h) = average of $0.30/kWh.*

[2] *Typical example where charging is done 85% of the time at home, 5% on a 240 V public charging station, and 10% on a 50 kW fast charging station.*

Savings on Maintenance Costs

In addition to saving money on energy, EV drivers also save money on vehicle maintenance, particularly on oil and brakes.

Oil Changes

With a fully electric vehicle, there are no more oil changes. With a plug-in hybrid vehicle, oil changes are generally less frequent.



Brake Wear

One notable feature of electric vehicles is the regenerative braking, an energy recovery mechanism used to slowdown or stop which does not employ discs and pads. Thus, brake life is extended.



Maintenance Costs Distributed over 20,000 km



Note: See table at the bottom of page 12 for data used to compare the maintenance costs (oil changes and brake replacement) of plug-in vehicles versus those of gasoline vehicles

Other Parts

As part of thermal vehicle maintenance, several parts and liquids are periodically replaced: belts, filters, spark plugs, muffler, coolants and others.

Comparing Total Costs

The reduced energy and maintenance costs mean that even if monthly payments are higher, a plug-in vehicle can end up costing 10% to 20% less!

Monthly Payments

It is very likely that monthly payments for the purchase or leasing of a plug-in vehicle will be higher than those for a gasoline vehicle. A plug-in vehicle's base price is indeed 20% to 30% higher than that of a comparable gasoline model. However, usage-related costs are significantly reduced and the resulting savings make it so that the total monthly expenses for your travels might still be lower.

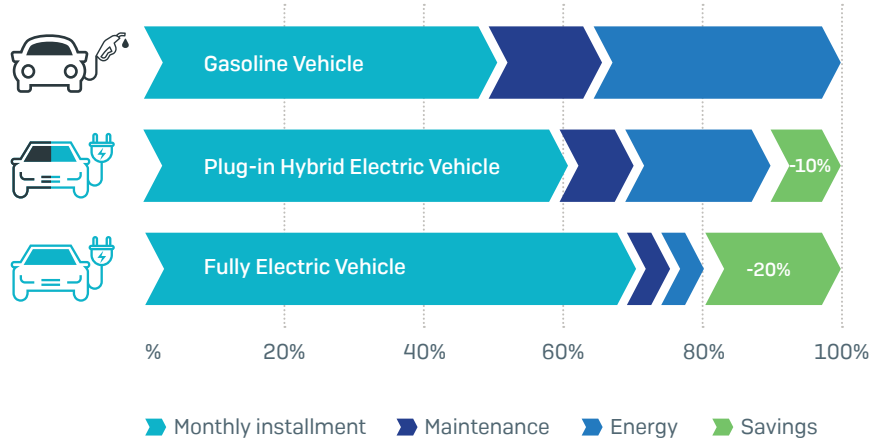
Use-Related Expenses

Before plug-in vehicles became available, gasoline was considered an unavoidable expense which could be minimised only by opting for a more fuel-efficient vehicle.

The advent of plug-in vehicles breaks this paradigm by eliminating or greatly reducing gasoline expenses.

With a plug-in vehicle, energy costs can be reduced by more than 75% and the most frequent maintenance expenses (oil and brakes) can be reduced by at least 50%.

Breakdown of Monthly Expenses



Savings per 20,000 km: Comparison Indicator

Our «Savings per 20,000 km» indicator helps compare a plug-in vehicle with similar gasoline vehicles or other electric vehicles of the same category.



Up to $2,000 in Savings per 20,000 km

See the «Savings per 20,000 km» indicator for each vehicle in the presentation sheets (pages 24 to 39) and in the summary table (pages 40 to 43).

How Was the Indicator Calculated?

For each vehicle, a comparison indicator was calculated by taking into account energy costs and two maintenance operations (oil and brakes). For this calculation, the following data was used:

A. Savings on Energy Costs

The consumption of a plug-in vehicle is calculated based on its efficiency rating (source: Natural Resources Canada), then savings on gasoline are derived by comparing it with gasoline costs according to the average fuel consumption ratings of the 10 most efficient models of the category.

AVERAGE CONSUMPTION PER CATEGORY (TOP 10 MOST EFFICIENT MODELS)			
CATEGORY	L/100 KM	CATEGORY	L/100 KM
Two-seater	9,13	Station wagon: Small	7,53
Subcompact	7,89	Small SUV	7,96
Compact	6,80	SUV	10,04
Mid-size	5,79	Minivan	11,27
Full-size	7,12		

For plug-in hybrids, energy costs are distributed between gasoline and electricity while taking into account the vehicle's electrical range: the greater the range, the greater the electric share.

B. Savings on Maintenance Costs

Savings on maintenance are calculated by comparing the maintenance costs of a gasoline vehicle with those of an electric vehicle. The cost of such operations can obviously vary from one model to another and from one company to another. For ease of comparison, data are standardised as follows:

COST AND FREQUENCY ACCORDING TO TYPE OF VEHICLE			
Operation	Gasoline	Plug-In Hybrid	Fully Electric
Oil	$60/10,000 km	$60/20,000 km	$0
Brakes	$500/50,000 km	$500/80,000 km	$500/ 120,000 km

Used Vehicle Market

The first modern plug-in models entered the market in 2011-2012. We can now find vehicles that are 8 years old and under on the used market.

Demonstrated Reliability

According to a study conducted by Consumer Reports in 2017, electric vehicles are apparently MORE RELIABLE than those equipped with a combustion engine. This is mainly due to their simpler design and the absence of any fuel or cooling systems or wear parts such as belts, filters and spark plugs.



A Fast-Growing Demand

More and more second-hand plug-in vehicles are available at dealerships and other companies involved in the sale of used vehicles. Some are even specialized in the field of electric vehicles.

Second-hand plug-in vehicles often find takers faster. Among the 10 fastest-selling used models in 2018 are the Chevrolet Volt, BMW i3 and Tesla Model S (source: AutoGuide.com).

An Accessible Option

A used plug-in vehicle is a more accessible choice since the first owner has already absorbed the initial depreciation. First-generation models (2011 to 2015), which generally have a smaller range compared to more recent models, can be excellent options for a household's second vehicle, or for a complementary vehicle to public transportation. Here are some examples of vehicles going for under $15,000 (Fall 2018) :

- Chevrolet Spark EV 2015 (EV) at $13,300;
- Chevrolet Volt 2012 (PHEV) at $9,900;
- Ford Focus Electric 2012 (EV) at $12,900;
- Ford C-MAX 2014 (PHEV) at $13,900;
- Nissan LEAF 2013 (EV) at $14,900.



Green Plate Benefits

The numbers and letters on a plug-in vehicle's license plate are of a green hue, which entails multiple benefits.



Access to Reserved Lanes

In the metropolitan areas of Montréal and Québec City, plug-in vehicles with a green license plate can use high occupancy vehicle lanes regardless of the number of passengers.

For example:

- MONTRÉAL :
  autoroutes 15 Nord, 20 Est, 25 Nord, 25 Sud and Route 112 Est;
- QUÉBEC :
  autoroutes 740 Nord, 740 Sud, 440 Est, and Route 116 Nord and 132 Est.



Toll Exemptions

Plug-in vehicles benefit from free access to the toll bridges of autoroutes 25 and 30, as well as paying ferry services of the S*ociété des traversiers du Québec*:

- For toll bridges, visit www.a25.com/en/ and www.a30express.com/en;
- For ferries, visit www.traversiers.com/en/home/ (the fee exemption on ferries applies to vehicle only).



Free Parking

In the cities of Joliette, Saint-Jérôme and Victoriaville, parking may be free for plug-in vehicles.
Contact the concerned municipalities for details.



Important note : Spaces next to public charging stations are reserved for charging vehicles. It is therefore possible to park there while charging, but you must move the car once the charging session is over.

Financial Incentives

Through Transition énergétique Québec, the Gouvernement du Québec offers several financial incentives to encourage the adoption of plug-in vehicles:

For more information, visit www.vehiculeselectriques.gouv.qc.ca/english/

Drive Electric Program



Rebate on the Purchase or Lease of a new Plug-In Vehicle

- Fully electric vehicles: up to $8,000;
- Plug-in hybrid vehicles: up to $8,000;
- Electric motorcycles: $2,000.

Other rebates may be available. For example the City of Laval is offering an additional $2,000 and Cascades refunds $2,000 to company employees who purchase a plug-in vehicle.



Refund on Acquisition and Installation Costs of a Charging Station

A motorist who purchases or leases a plug-in vehicle may receive up to $600 in financial support for the acquisition and installation of a charging station (240 V) at home.

An additional refund is also available in some municipalities: Joliette (up to $250), Sherbrooke (up to $500), Granby (up to $250), Prévost (up to $100) and Magog (up to $500).



Branché Au Travail Program (employers)

Financial assistance may be granted for the purchase and installation of workplace charging stations: 50% of eligible expenses, up to a maximum of $5,000 per charging station.





Filling Up at Home

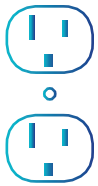
One of the characteristics of the plug-in vehicle is that you can "fill up" at home. Therefore, the battery is 100% full every day.

It Takes Just A Few Seconds

Upon arriving home, a few seconds are enough to plug the vehicle to the charging station. The next morning, the vehicle's battery is 100% full again.

Two Home Charging Options

A plug-in vehicle's equipment always includes a 120 V charging station that plugs into a standard household outlet. Models with a battery of over 20 kWh may not always reach 100% overnight when recharging at 120 V. For faster charging, some EV drivers thus opt for a 240 V charging station.



Choosing a 240 V Charging Station

Québec is home to several manufacturers of residential charging stations. Other North American models are also available. Prices range from $700 to $1,300 depending on the models and their options. The main benefit of a 240 V charging station is its greater charging speed, which is three to five times faster than 120 V charging (see charging times table on page 19).

Installing a 240 V Charging Station Is a Simple Operation

Installing a 240 V charging station requires a master electrician. However, it is a relatively simple operation, comparable to the installation of a stove outlet. Installation costs vary depending on context, but the average is about $500.

Scheduling Charging and Avoiding Rush Hours

With the vehicle's dashboard or mobile application, it is possible to schedule specific charging hours, making it possible, among other things, to optimize battery conditioning according to a planned departure time. This function also helps **avoid peak periods** during Winter months, following Hydro-Québec's recommendations.



Charging on the Road

For charging on the road, an EV driver plans breaks according to charging needs. A stop at a touristic destination, a meal break or a quick snack all become opportunities to plug in.

Finding Public Charging Stations

Several online tools and mobile applications help find charging stations from different charging networks. The most commonly used in Québec are chargehub.com and plugshare.com. They include charging stations of all public charging networks, the main ones being : The Electric Circuit, Flo, EVduty, Tesla and ChargePoint.



Good Public Charging Practices

Spaces next to charging stations are reserved for charging electric vehicles*. Once a charging session is completed, the vehicle must be moved to free up the charging station. It is not necessary to remain near the vehicle while recharging. An EV driver takes note of the time by which the charging session is estimated to be completed– indicated by the car or in the charging station's mobile application–and thus makes sure to be back before then.





*** IT'S THE LAW:** *since May 18th, 2018, article 388.1 of the Highway Safety Code stipulates that «Only electric road vehicles and plug-in hybrid road vehicles may stop in a space reserved for recharging electric vehicles [...] when they are plugged into a charging station».*



At DC fast charging stations (DCFC), it is recommended to stop charging once the battery level is around 80%, as the charging speed decreases when approaching this point. If more energy is needed, it might be more efficient to continue charging on a 240 V station.

Planning Steps

During long trips, the EV driver will plan steps while taking into account the vehicle's range and the density of charging networks along the itinerary. Some roads are better covered and include several options. In other areas, choices are limited. As when going through a region without gas stations, one has to fill-up according to available services.

Charging Speed

How long does it take to charge an electric vehicle? Actually, we only rarely have to worry about that, since charging is almost always done at home.

Factors That Influence Charging Speed

Charging speed is the number of kilometres added to a vehicle's range per hour of charging (see additional information on the next page).

Factors that influence charging speed are:

- Charging station power level;
- State of charge of the battery;
- Battery temperature;
- Power of the on-board charger (vehicle equipment).

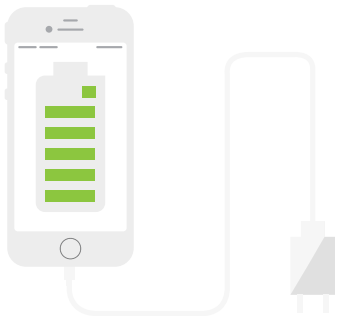
In the image below, driver activity indicates whether the driver usually remains on standby while charging or if he/she plugs his/her car at the charging station and leaves for other activities while charging. Perception of time shows how the duration is perceived by the driver: 20 seconds to plug the vehicle and start charging, or 30 minutes of waiting.

Recharge contexts

LOCATION OR ACTIVITY	CHARGE DURATION AND SPEED	TYPE OF CHARGING STATION	DRIVER ACTIVITY	PERCEPTION OF TIME
Highways and main roads/travelling	30 min TRAVEL — Up to 200 or 400 km per hour	50 kW (DCFC) Superchargeur	Waiting	30 minutes
Shopping, visits, meals	1 to 2 h PUBLIC PLACES — Up to 40 or 200 km per hour	240 V or 50 kwh (DCFC)	Parked	20 seconds
Work, bus, train	4 to 8 h WORKPLACE — Up to 40 km per hour	240 V	Parked	20 seconds
Home	8 to 12 h HOME — Up to 6 or 40 km per hour	120 V or 240 V	Parked	20 seconds

Just Like a Cellphone

Once plugged in, just like a cellphone, the electric car charges itself; no monitoring needed.



Additional Information – Charging Time

Taking into account the battery size and the vehicle's on-board charger power, here are examples of charging times for each type of charging station.

Battery	On-Board Charger	CHARGING TIME[1]			
		12 A/110 V	30 A/240 V	50 kW (DCFC)	120 KW (SC)[2]
(kWh)	(kW)	10 % to 100 %	10 % to 100 %	10 % to 80 %[3]	10 % to 80 %[3]
7.6	6.6	5 h 15	1 h 00		
8.8	3.3	6 h 00	2 h 30		
9.2	3.7	6 h 15	2 h 15		
10.4	3.7	7 h 00	2 h 30		
14.1	7.2	9 h 30	1 h 45		
17.2	6.6	11 h 45	2 h 30		
18.4	3.6	12 h 30	4 h 30		
21.4	6.6	14 h 30	3 h 00	0 h 30	
30.0	6.6	20 h 30	4 h 00	0 h 30	
33.5	6.6	22 h 45	4 h 30	0 h 45	
35.8	7.2	24 h 30	4 h 30	0 h 45	
40.0	6.6	27 h 15	5 h 30	0 h 45	
60.0	7.2	45 h 00	7 h 30	1 h 15	
75.0	10.0	51 h 00	9 h 30	1 h 30	0 h 45
100.0	10.0	68 h 00	12 h 30	2 h 00	1 h 00
Speed		Slow	Normal	Fast	Ultra fast
		ϟ	ϟϟ	ϟϟϟ	ϟϟϟϟ
Added Range per Hour of Charging		5 to 6 km	30 to 40 km	150 to 200 km	300 to 400 km
Context of Use		Home	Home/Work Outings	Excursion Long Distance	Long Distance

[1] *For the charging time estimate, average power is 35 kW for DCFCs and 65 kW for Superchargers.*
[2] *SC = Superchargers (exclusive to Tesla vehicles).*
[3] *DCFC and SC: it is recommended to terminate a fast charging session at 80%, since charging power is increasingly limited when nearing this point.*

Winter With an Electric Vehicle

Gasoline vehicles (also called thermal vehicles) sometimes have difficulty starting in cold weather; this is a well-known problem. So what about plug-in vehicles?

Cold Start

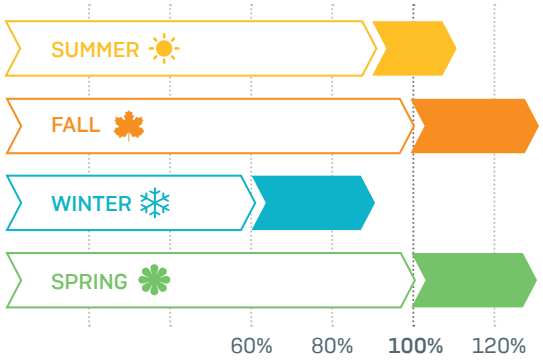
First of all, you must know that–like any electrical device–you do not start an electric vehicle; you turn it on! And it works very well, even in severely cold weather. In addition, it is possible to preheat and defrost without polluting. Many Québec municipalities limit idling to three minutes for thermal vehicles but for electric vehicles, this is not a problem.

Seasonal Range

Cold weather affects all vehicles' energy efficiency. Whether it is gasoline-fuelled or electric, a car will consume more in winter. This is partially due to the higher density of cold air, which offers greater resistance. With plug-in vehicles, heating the passenger compartment also draws on the reserve.

Electric range may vary from 10% to 40% depending on weather conditions. It is essential to consider this fact when choosing a vehicle. Each model's indicated range is actually an annual average: during spring, summer and autumn, the car will often yield a higher mileage, while in winter it will be lower.

Seasonal Variations of Electric Range (100% = range as announced by the manufacturer)





Real Time Information

Like with a fuel gauge in a gasoline car, the electric vehicle informs the motorist about its remaining range in real time. In addition, the vehicle will start displaying warnings once the energy level dips below a certain threshold (typically around 20%).

Warranty and Reliability

With an emerging technology such as that of the electric vehicles, it is natural to take a closer look at the manufacturer warranty and to review the product reliability.

Reassuring Warranty

Electrical and hybrid components –battery included– of plug-in models are covered by a generous warranty ranging from 8 to 10 years, or 100,000 to 200,000 kilometres (and in some cases even unlimited mileage).

Other components, which in fact are the same as in gasoline vehicles benefit from the usual manufacturers warranty.



Comparable or Superior Reliability

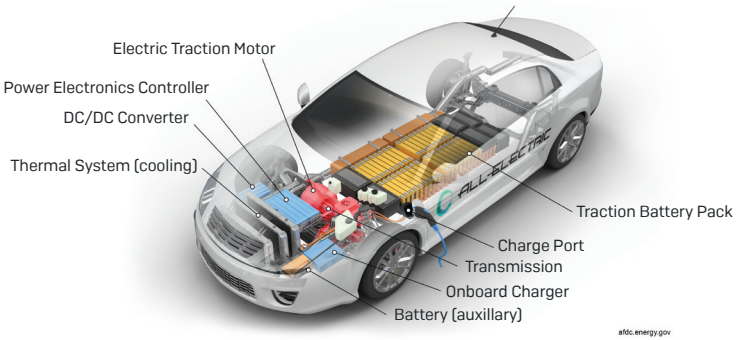


Components common to both electric and thermal vehicles, such as brakes, suspension and steering, of course have a comparable level of reliability.

Some parts, such as the fuel system or the muffler, are absent altogether (EV) or less stressed (PHEV). Here are some examples of the most frequently replaced parts in gasoline vehicles (source: Forbes, 2015): oxygen sensor, catalytic converter, coil and spark plugs, air mass flow sensor.

Components specific to plug-in vehicles, like the battery and electric motor, offer superior reliability which is reflected in the longer-term warranty offered by manufacturers.

All-Electric Vehicle



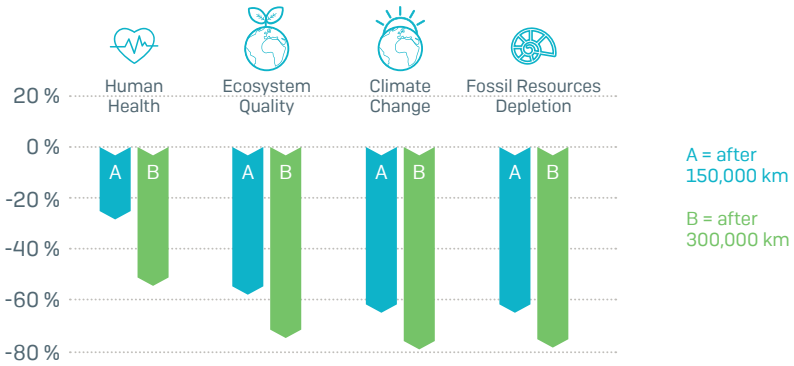
Life Cycle: Reduced Environmental Impacts

Though higher at the manufacturing stage, a life cycle analysis indicates that environmental impacts related to an electric vehicle are lower than those of a thermal vehicle.

Impacts 29% to 80% Lower Than For Conventional Vehicles

The environmental performance of electric vehicles compared to gasoline vehicles is positive in these four areas: human health, quality of ecosystems, climate change and depletion of fossil resources (source: CIRAIG, 2016[1]).
These data take into account production of vehicle parts, including the battery, transportation to end user, vehicle usage and end of life.

Environmental Impacts of an Electric Vehicle Compared to an Gasoline Vehicle



In terms of mineral resources depletion, electric vehicles however have a higher impact than gasoline vehicles (+ 25%).

Minimising Environmental Impacts

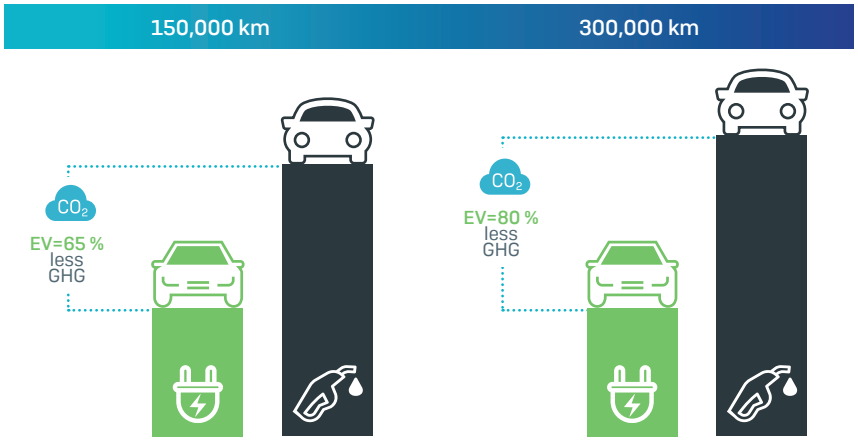
1. When possible, use public or active transportation, carpool or opt for car sharing.
2. Keep your current vehicle longer, especially if you don't drive a lot and if your vehicle is energy efficient.
3. If you are switching to an electric vehicle, choose a model whose range–and by extension, battery size–is adapted to your actual needs.
4. If you change to a newer gasoline model, choose a smaller size that matches your actual needs and–most importantly–consumes the least gasoline possible.

[1] *International Reference Centre for the Life Cycle of Products, Processes and Services (CIRAIG). (2016). Technical Report – Comparative life-cycle assessment: potential environmental impacts of electric vehicles and conventional vehicles in the Québec context. Online (in French only): http://www.hydroquebec.com/data/developpement-durable/pdf/analyse-comparaison-vehicule-electrique-vehicule-conventionnel.pdf.*

Québec's Clean Electricity

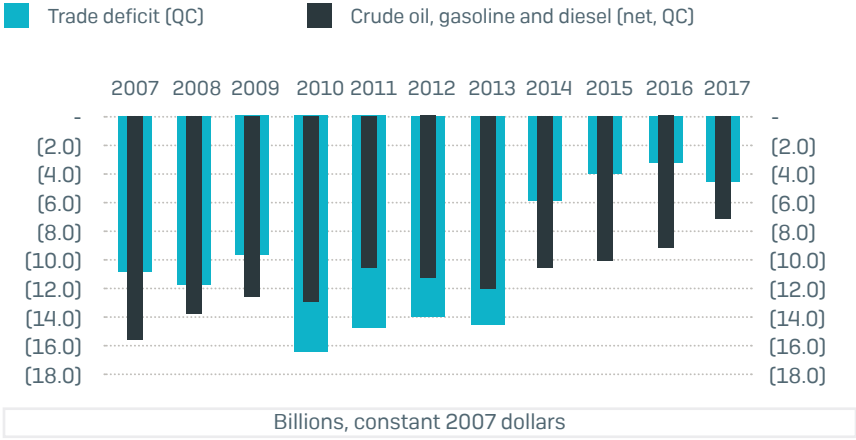
Energy produced in Québec is one of the cleanest in the world, 98% comes from renewable energy sources (source: Hydro-Québec).

Throughout its life cycle, an electric vehicle (EV) running on hydroelectricity emits less GHG than a gasoline vehicle.*



* *According to an analysis of the life cycle of electric and gasoline vehicles in the Québec context published by the International Reference Centre for the Life Cycle of Products, Processes and Services (CIRAIG) in 2016.*

Crude oil, gasoline and diesel imports significantly contribute to Québec's trade deficit. Each plug-in vehicle added to Québec's fleet contributes to the reduction of our trade deficit while also promoting Québec's clean and renewable energy (data source: Institut de la statistique du Québec).



PLUG-IN VEHICLES IN QUÉBEC

The following pages contain summary sheets for each plug-in model available or coming in 2019 in Québec.

Content of each summary sheet

	IDENTIFICATION	Vehicle make and model[1]
	Category	Vehicle category, determined by Natural Resources Canada
	Type	Fully electric or plug-in hybrid
	Battery	Battery capacity, expressed in kilowatthours (kWh)[2]
	Range	Number of kilometres of range, in electric mode
	Number of seats	Number of seats in the vehicle, including driver
	Base price	Selling price, before options[3].
	Savings per 20,000 km	Savings from vehicle use, per 20,000 km, compared to a gasoline vehicle of the same category[4].

Summary table

A summary table including more data for each model, such as fuel consumption and wheel traction, is presented on pages 40 to 43, following this summary sheets section.

1 *Photo does not necessarily correspond to base model, especially regarding color. In addition, it sometimes represents the 2018 model year.*
2 *Data presented (battery, range, number of seats and base price) corresponds to those available at the time of printing. In case of error or discrepancy, the car manufacturer's official documentation (websites and brochures) obviously takes precedence over the information in this document.*
3 *Base price: This price does not include taxes (GST, QST), transportation costs, air conditioning and tire taxes or additional dealer charges.*
4 *Savings per 20,000 km: See page 12 for this indicator's calculations parameters.*

AUDI A3 SPORTBACK E-TRON

	Compact
	Plug-in hybrid
	8.8 kWh
	26 km
	5
	$**43,200**
	$**778** / 20,000 km



AUDI E-TRON

	VUS
	Fully electric
	95 kWh
	400 km (estimate)
	5
	$**90,000**
	$**2,329** / 20,000 km



BMW 330e

	Compact
	Plug-in hybrid
	7.6 kWh
	23 km
	5
	$**51,500**
	$**547** / 20,000 km



BMW 530e XDRIVE

Compact	
Plug-in hybrid	
9.2 kWh	
24 km	
5	
$	$**68,000**
	$**486** / 20,000 km



BMW i8 COUPE

Subcompact	
Plug-in hybrid	
11.6 kWh	
29 km	
4	
$	$**149,000**
	$**756** / 20,000 km



BMW 740Le XDRIVE

Full-size	
Plug-in hybrid	
9.2 kWh	
23 km	
5	
$	$**110,400**
	$**473** / 20,000 km



BMW X5 XDRIVE40e

SUV	
Plug-in hybrid	
9.2 kWh	
23 km	
5	
$	$**74,950**
	$**1,015** / 20,000 km



BMW i3

Subcompact	
Fully electric	
42.2 kWh	
246 km	
4	
$	$**48,750**
	$**1,853** / 20,000 km



CHEVROLET BOLT EV

Station Wagon : Small	
Fully electric	
60 kWh	
383 km	
5	
$	$ **44,300**
	$**1,767** / 20,000 km



CHEVROLET VOLT

Compact	
Plug-in hybrid	
18.4 kWh	
85 km	
5	
$	$**38,995**
	$**1,344** / 20,000 km



End of production announced.

CHRYSLER PACIFICA HYBRID

Minivan	
Plug-in hybrid	
16 kWh	
51 km	
5 to 7	
$	$**51,745**
	$**1,952** / 20,000 km



FORD FOCUS ELECTRIC

Compact	
Fully electric	
33.5 kWh	
185 km	
5	
$	$**34,998**
	$**1,545** / 20,000 km



2019 model-year shown / End of production announced.

FORD FUSION ENERGI SE

Mid-size	
Plug-in hybrid	
9 kWh	
40 km	
5	
$	$**36,590**
	$**790** / 20,000 km



HONDA CLARITY PLUG-IN HYBRID

Mid-size	
Plug-in hybrid	
17 kWh	
76 km	
5	
$	Unavailable
	$**1,039** / 20,000 km



HYUNDAI IONIQ ELECTRIC

Mid-size	
Fully electric	
28 kWh	
200 km	
5	
$	$**37,449**
	$**1,374** / 20,000 km



HYUNDAI IONIQ ELECTRIC PLUS

	Mid-size
	Plug-in hybrid
	8.9 kWh
	46 km
	5
$	$**32,299**
	$**951** / 20,000 km



HYUNDAI KONA ELECTRIC

	SUV: Small
	VEE
	64 kWh
	400 km
	5
$	$45,599
	Unavailable



HYUNDAI SONATA PLUG-IN HYBRID

	Mid-size
	Plug-in hybrid
	9.8 kWh
	45 km
	5
$	$**44,799**
	$**768** / 20,000 km



JAGUAR I-PACE

	SUV: Small
	Fully electric
	90 kWh
	377 km
	5
$	$**86,500**
	$**1,677** / 20,000 km



KARMA REVERO

	Subcompact
	Plug-in hybrid
	20.8 kWh
	60 km
	4
$	$**149,000**
	$**832** / 20,000 km



KIA NIRO PHEV

	Station wagon: Small
	Plug-in hybrid
	8.9 kWh
	42 km
	5
$	Unavailable
	$**1,283** / 20,000 km



KIA OPTIMA PHEV

Mid-size	
Plug-in hybrid	
9.8 kWh	
47 km	
5	
$	$**42,995**
	$**799** / 20,000 km



KIA SOUL EV

Station wagon: Small	
Fully electric	
30 kWh	
179 km	
5	
$	$**35,895**
	$**1,733** / 20,000 km



LAND ROVER RANGE ROVER HSE P400E PHEV

SUV	
Plug-in hybrid	
13.1 kWh	
51 km	
5	
$	$**115,500**
	Unavailable



LAND ROVER RANGE ROVER SPORT HSE P400E PHEV

SUV	
Plug-in hybrid	
13.1 kWh	
51 km	
5	
$	$**93,000**
	Unavailable



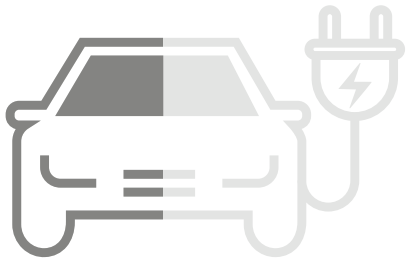
MERCEDES GLC 350E

SUV: Small	
Plug-in hybrid	
8.7 kWh	
21 km	
5	
$	$**60,200**
	Unavailable



MERCEDES S 560E

Full-size	
Plug-in hybrid	
13.5 kWh	
Unavailable	
5	
$	Unavailable
	Unavailable



MINI COOPER S E COUNTRYMAN ALL4

	Mid-size
	Plug-in hybrid
	7.6 kWh
	19 km
	5
$	$**44,390**
	$**133** / 20,000 km



MITSUBISHI OUTLANDER PHEV

	SUV: Small
	Plug-in hybrid
	12 kWh
	35 km
	5
$	$**42,998**
	$**814** / 20,000 km



NISSAN LEAF

	Mid-size
	Fully electric
	40 kWh
	243 km
	5
$	$**36,798**
	$**1,312** / 20,000 km



PORSCHE CAYENNE E-HYBRID

	SUV
	Plug-in hybrid
	14 kWh
	Unavailable
	5
$	$**91,700**
	Unavailable



PORSCHE PANAMERA 4 E-HYBRID

	Full-size
	Plug-in hybrid
	14 kWh
	Unavailable
	4
$	$**116,800**
	Unavailable



PORSCHE PANAMERA 4 E-HYBRID SPORT TURISMO

	Full-size
	Plug-in hybrid
	14 kWh
	Unavailable
	5
$	$**121,800**
	Unavailable



PORSCHE — PANAMERA TURBO S E-HYBRID

Full-size	
Plug-in hybrid	
14 kWh	
Unavailable	
4	
$	$**212,900**
Unavailable	



TESLA — MODEL S 75D

Full-size	
Fully electric	
75 kWh	
417 km	
5	
$	$**101,250**
$**1,611** / 20,000 km	



SMART — FORTWO COUPE

Two-seater	
Fully electric	
17.2 kWh	
93 km	
2	
$	$**29,050**
$**2,133** / 20,000 km	



TESLA — MODEL X 75D

SUV	
Fully electric	
75 kWh	
383 km	
5 à **7**	
$	$**108,200**
$**2,297** / 20,000 km	



TESLA — MODEL 3 MID RANGE

Mid-size	
Fully electric	
62 kWh	
418 km	
5	
$	$**60,100**
$**1,342** / 20,000 km	



TOYOTA — PRIUS PRIME

Mid-size	
Plug-in hybrid	
8.8 kWh	
40 km	
4	
$	$**32,990**
$**963** / 20,000 km	



VOLKSWAGEN E-GOLF

	Compact
	Fully electric
	35.8 kWh
	201 km
	5
$	$**36,720**
	$**1,589** / 20,000 km



VOLVO S90 T8 eAWD

	Mid-size
	Plug-in hybrid
	10.4 kWh
	34 km
	5
$	$**74,950**
	$**381** / 20,000 km



VOLVO XC60 T8

	SUV: Small
	Plug-in hybrid
	10.4 kWh
	27 km
	5
$	$**71,850**
	$**681** / 20,000 km



VOLVO XC90 T8 eAWD

	SUV
	Plug-in hybrid
	10.4 kWh
	27 km
	7
$	$**74,950**
	$**1,611** / 20,000 km

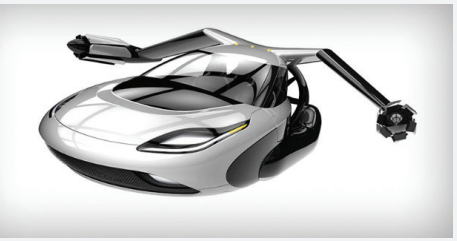


New arrivals announced or probable for 2019[1]

New models as well as variants of some existing models will be available in 2019. At **Kia**, an all-electric variant of the **Niro** has already been unveiled in the United States and may soon be available in Canada. At **Nissan**, an option with a bigger range is planned for the **LEAF**, as is the case at **Kia** for the **Soul EV** 2020. Finally, at **Tesla**, the entry-level **Model 3** should be available before summer.



[1] Not confirmed at the time of printing this document



For longer-term announcements...

Concept cars make us dream about the next best thing and can leave the impression that a newer technology is just around the corner. When it's time for a new car, this may bring some drivers to delay going electric. However, models presented in the previous pages demonstrate that "tomorrow's cars" are in fact already here today and that they can already answer a wide range of preferences and needs!

PLUG-IN VEHICLES TABLE

See legend on page 44.

Model	Type	Category	Base price	Batt. kWh	E-Range	Cons./100 km		Seats	WD	OBC kW	FC	Savings per 20,000 km		Savings per 100,000 km	
						kWh	L					$1,25/L	$1,35/L	$1,25/L	$1,35/L
AUDI															
A3 Sportback e-tron	PHEV	Compact	$43,200	8.8	26	25.2	6.5	5	FWD	3.3	N	$778	$850	$3,890	$4,249
e-tron	EV	SUV	$90,000	95	400	20.9	0	5	AWD	7.4	CCS	$2,329	$2,529	$11,643	$12,647
BMW															
330e	PHEV	Compact	$51,500	7.6	23	29.5	7.8	5	RWD	3.7	N	$547	$603	$2,734	$3,014
530e xDrive	PHEV	Compact	$68,000	9.2	24	30.2	8.3	5	AWD	3.7	N	$486	$538	$2,429	$2,688
740Le xDrive	PHEV	Full-size	$110,400	9.2	23	32.1	8.8	5	AWD	3.7	N	$473	$525	$2,366	$2,626
i3	EV	Subcompact	$48,750	42.2	246	17.8	0	4	RWD	7.4	CCS	$1,853	$2,011	$9,266	$10,055
i8 coupe	PHEV	Subcompact	$149,000	11.6	29	30.6	8.7	4	AWD	3.7	N	$756	$831	$3,778	$4,156
X5 xDrive40e	PHEV	SUV	$74,950	9.2	23	36.9	9.9	5	AWD	3.3	N	1,015	$1,115	$5,077	$5,573
CHEVROLET															
Bolt EV	EV	Station wagon -Small	$44,300	60	383	17.6	0	5	FWD	7.2	CCS	$1,767	$1,918	$8,836	$9,589
Volt	PHEV	Compact	$38,995	18.4	85	19.5	5.6	5	FWD	3.6	N	$1,344	$1,469	$6,720	$7,344
CHRYSLER															
Pacifica Hybrid	PHEV	Minivan	$51,745	16	51	25.8	8	5-7	FWD	6.6	N	$1,952	$2,125	$9,759	$10,624
FORD															
Focus Electric	EV	Compact	$34,998	33.5	185	19.6	0	5	FWD	6.6	CCS	$1,545	$1,681	$7,723	$8,403
Fusion Energi SE	PHEV	Mid-size	$35,088	9	40	20.5	5.6	5	FWD	3.3	N	$790	$862	$3,949	$4,311
HONDA															
Clarity plug-in hybrid	PHEV	Mid-size	n.a.	17	76	19	5.6	5	FWD	6.6	N	$1,039	$1,137	$5,197	$5,686
HYUNDAI															
IONIQ electric	EV	Mid-size	$37,449	28	200	15.5	0	5	FWD	6.6	CCS	$1,374	$1,490	$6,871	$7,450
IONIQ electric plus	PHEV	Mid-size	$32,299	8.9	46	17.7	4.5	5	FWD	3.3	N	$951	$1,034	$4,755	$5,172
Kona electric	EV	SUV - Small	$45,599	64	400	n.d.	n.d.	5	FWD	6.6	CCS	Data not available			
Sonata plug-in hybrid	PHEV	Mid-size	$44,799	9.8	45	20.9	6	5	FWD	3.3	N	$768	$840	$3,839	$4,198
JAGUAR															
I-Pace	EV	SUV - Small	$86,500	90	377	27.5	0	5	AWD	7.4	CSS	$1,677	$1,836	$8,383	$9,179
KARMA															
Revero	PHEV	Subcompact	$149,000	20.8	60	34.7	11.5	4	RWD	6.6	CSS	$832	$928	$4,160	$4,642
KIA															
Niro PHEV	PHEV	Station wagon -Small	n.a.	8.9	42	19.7	5.1	5	FWD	n.a.	N	$1,283	$1,394	$6,414	$6,970
Optima PHEV	PHEV	Mid-size	$42,995	9.8	47	20.3	5.9	5	FWD	3.3	N	$799	$873	$3,994	$4,364
Soul EV	EV	Station wagon -Small	$35,895	30	179	19.3	0	5	FWD	6.6	CHA	$1,733	$1,884	$8,666	$9,419

See legend on page 44.

Model	Type	Category	Base price	Batt. kWh	E-Range	Cons. / 100 km		Seats	WD	OBC kW	FC	Savings per 20,000 km		Savings per 100,000 km	
						kWh	L					$1,25/L	$1,35/L	$1,25/L	$1,35/L
LAND ROVER															
Range Rover HSE P400e VHR	PHEV	SUV	$115,500	13.1	51	n.a.	n.a.	5	AWD	n.a.	N	Data not available			
Range Rover Sport HSE P400e VHR	PHEV	SUV	$93,000	13.1	51	n.a.	n.a.	5	AWD	n.a.	N	Data not available			
MERCEDES															
GLC 350e	PHEV	SUV - Small	$60,200	8.7	21	n.a.	n.a.	5	AWD	3.7	N	Data not available			
S 560e	PHEV	Full Size	n.a.	13.5	n.a.	n.a.	n.a.	5	RWD	7.2	N	Data not available			
MINI															
Cooper S E Countryman ALL4	PHEV	Mid-size	$44,390	7.6	19	31.4	8.6	5	AWD	3.3	N	$133	$156	$663	$778
MITSUBISHI															
Outlander PHEV	PHEV	SUV - Small	$42,998	12	35	27.7	9.2	5	AWD	3.3	CHA	$814	$894	$4,072	$4,469
NISSAN															
LEAF	EV	Mid-size	$36,798	40	243	18.6	0	5	FWD	6.6	CHA	$1,312	$1,428	$6,561	$7,140
PORSCHE															
Cayenne E-Hybrid	PHEV	SUV	$91,700	14	n.a.	n.a.	n.a.	5	AWD	3.6	N	Data not available			
Panamera 4 E-Hybrid	PHEV	Full-size	$116,800	14	n.a.	n.a.	n.a.	4	AWD	3.6	N	Data not available			
Panamera 4 E-Hybrid Sport Turismo	PHEV	Full-size	$121,800	14	n.a.	n.a.	n.a.	5	AWD	3.6	N	Data not available			
Panamera Turbo S E-Hybrid	PHEV	Full-size	$212,900	14	n.a.	n.a.	n.a.	4	AWD	3.6	N	Data not available			
SMART															
Fortwo Coupe	EV	Two-seater	$29,050	17.2	93	19.3	0	2	RWD	7.2	N	$2,133	$2,316	$10,666	$11,579
TESLA															
Model 3 Mid Range	EV	Mid-size	$60,100	62	418	17.1	0	5	RWD	10	TA	$1,342	$1,458	$6,711	$7,290
Model S 75D	EV	Full-size	$101,250	75	417	20.3	0	5	AWD	10	TA	$1,611	$1,753	$8,053	$8,765
Model X 75D	EV	SUV	$108,200	75	383	22.5	0	5-7	AWD	10	TA	$2,297	$2,497	$11,483	$12,487
TOYOTA															
Prius Prime	PHEV	Mid-size	$32,990	8.8	40	15.8	4.3	4	FWD	3.3	N	$963	$1,044	$4,815	$5,222
VOLKSWAGEN															
e-Golf	EV	Compact	$36,720	35.8	201	17.4	0	5	FWD	7.2	CCS	$1,589	$1,725	$7,943	$8,623
VOLVO															
S90 T8 eAWD	PHEV	Mid-size	$74,950	10.4	34	27.7	8.1	5	AWD	3.7	N	$381	$426	$1,906	$2,129
XC60 T8	PHEV	SUV -Small	$71,850	10.4	27	34.0	9.0	5	AWD	3.7	N	$681	$753	$3,405	$3,763
XC90 T8 eAWD	PHEV	SUV	$74,950	10.4	27	34.3	9.3	7	AWD	3.7	N	$1,161	$1,272	$5,807	$6,358

LEGEND OF THE PLUG-IN VEHICLES TABLE[1]

Type	Fully electric vehicle (EV) or plug-in hybrid electric vehicle (PHEV).
Category	Vehicle category, determined by Natural Resources Canada.
Base price	Manufacturer's suggested retail price, for a base model without options. Delivery fees, air conditioning and tire taxes and any dealer charges not included.
Batt. kWh	Battery capacity, in kilowatthours (kWh).
E-Range	Electric range.
Cons./100 km	Energy consumption per 100 kilometres (combined city/highway) **kWh**: Number of kilowatthours (kWh) consumed per 100 km in electric mode. **L**: Number of litres consumed per 100 km in gasoline mode.
Seats	Seating capacity.
WD	Wheel drive: front-wheel drive (FWD), rear-wheel drive (RWD) or all-wheel drive (AWD).
OBC kW	On-board charger power, in kilowatts (kW). Influences charging speed at 240 V.
FC	Fast charging compatibility (50 kW or more): Combo (CCS), CHAdeMO (CHA), Tesla (TA) or not compatible (N).
Savings[2]	Per 20,000 km/Per 100,000 km Vehicle usage-related savings , per 20,000 or 100,000 kilometres. Variable: gas price $1,25/L or $1,35/L.

1. Data available in fall 2018. In case of error or discrepancy, car manufacturers' official documents (websites and brochures) obviously override the information in this document.
2. See page 12 to find out more about how savings were calculated.

THANKS TO THE PARTNERS

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AVEQ Association des Véhicules Électriques du Québec

CAA QUÉBEC MD

CORPORATION des concessionnaires d'automobiles de Montréal

Hydro Québec

Innovative Vehicle Institute

RNCREQ Regroupement national des conseils régionaux de l'environnement

UMQ Union des municipalités du Québec



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