

# CHOOSING AN ELECTRIC/HYBRID VEHICLE

## Find What Best Suits You

Getting in to the electric market offers three major choices. They go from Hybrid (gas and electric, no plug), PHEV (Plug-in Hybrid Electric Vehicle) or BEV (Battery Electric Vehicle). The amount of fuel savings, carbon emissions and maintenance savings increase as you move from first to last. Purchase price also increases accordingly. But overall, the cost to own and operate these vehicles is lower than for the gasoline equivalent car.

No matter how much you want to save the planet, if you can't charge the vehicle, you can't get an all-electric. The most popular choice seems to be the PHEV where you can drive on electric most of the time but have the gas engine to take you on long trips. There is a lot of selection of vehicles including the used car market to suit everyone.

### **1. Do you have a home charger and/or can you charge at your destination or along the way?**

You can buy any Hybrid (gas and electric, no plug), PHEV (Plug-in Hybrid Electric Vehicle) that suits your budget. If you buy a BEV (Battery Electric Vehicle) you will be limited to 100 to 200 km trips with short range vehicles or 400 km with the high range. And if you take occasional long trips, you either have to rent a gasoline/diesel car, plan charging points carefully or stick to PHEVs and hybrids. See the diagrams below.

### **2. Do you have charging available only at your home or office?**

Your travel distance is limited with a BEV but you can choose any PHEV or Hybrid. See the Appendix for the vehicles that fit your needs. If you go BEV, the long-distance trip comment applies.

### **3. Sample Selection.**

You have a budget of \$25,000, you work 35 km from home with a charger at home only and you drive most summer weekends to a cottage 150 km away where you can charge. This is borderline on a full BEV and a PHEV. Your budget eliminates a long range BEV but several short range BEVs on the used market could travel 150 km on one charge in the summer. If there is a charging station on your way to the cottage and you can stop and have lunch, you could probably get enough of a charge to get the rest of the way. The Nissan LEAF would be a good choice although limited in passenger and cargo space. Any used PHEV or hybrid would be your next choice but would not save as much carbon and maintenance costs.

## Pictorial Diagrams

### Plug at Home and Work, 100 to 200 km Trip



Vehicles  
A. BEV-short range  
A1. BEV-long range  
B. PHEV  
C. Hybrid

100 to 200 km

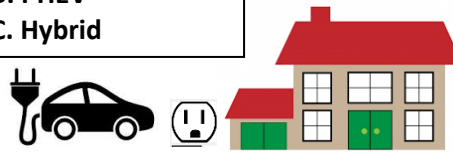


### Plug at Home Only, 50 to 100 km Trip



Vehicles  
A. BEV-short range  
A1. BEV-long range  
B. PHEV  
C. Hybrid

50 to 100 km



### Plug at Work Only, 50 to 100 km Trip

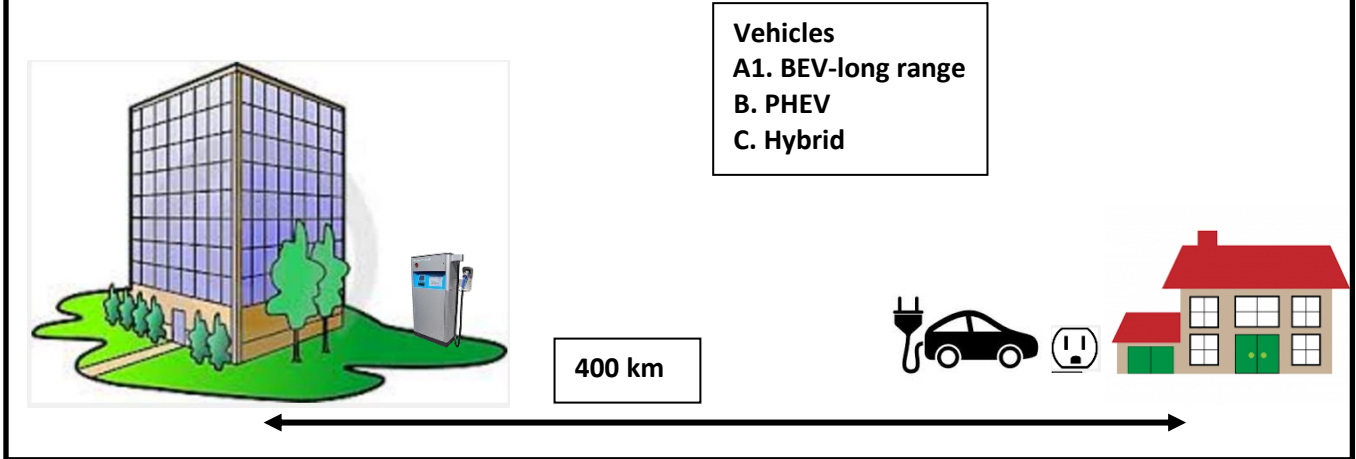


Vehicles  
A. BEV-short range  
A1. BEV-long range  
B. PHEV  
C. Hybrid

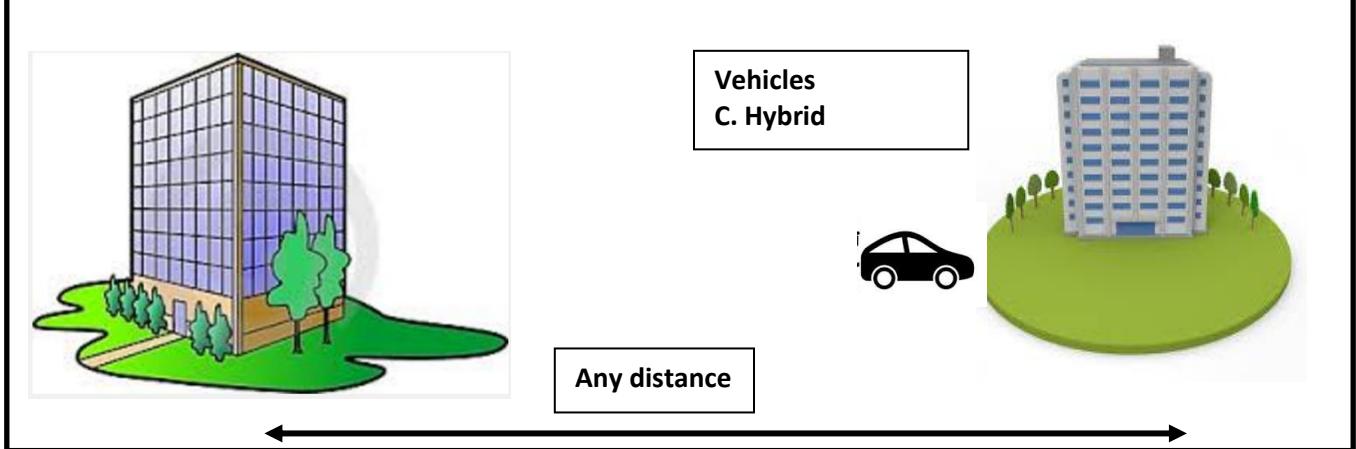
50 to 100 km



**Plug at Home and Work, 400 km Trip**



**No Plug, Any Distance Trip with Gasoline Available**



**Vehicles**

**A. BEV-short range:** Battery Electric Vehicle BMW i3, Chevrolet Spark, Mercedes SMART, Ford Focus EV, KIA Soul EV, Mitsubishi i-MiEV, Nissan Leaf **A1. BEV-long range:** Tesla S and X, Chevy Bolt **B. PHEV:** Plug-in Hybrid Electric Vehicle see list, **C. Hybrid:** see list

**Monthly 5 year average cost**

**A. BEV-short range, 100 to 200 km: \$400 to \$500** Chevrolet Spark, Mercedes SMART, Ford Focus EV, KIA Soul EV, Mitsubishi i-MiEV, Nissan Leaf. **\$1500 to \$2000** BMW i3, **A1. BEV-long range, 400 km: \$1500 to \$2000** Tesla S and X, Chevy Bolt **B. PHEV, 600 to 1000 km: \$500 to \$600** Toyota Prius, Chevrolet Volt, Ford C-Max Energi, Ford Fusion Energi. **\$1500 to \$2000** BMW i8, Cadillac ELR, Porsche Panamera S E-Hybrid. **C. Hybrid, 600 to 1000 km: \$600 to \$800** Ford C-MAX, Ford Fusion, Honda Accord, Honda Civic, Hyundai Sonata, KIA Optima, Toyota Camry, Toyota Prius, Prius C, Prius V, VW Jetta, Ford Escape SUV to 2012. **\$1000 to \$2000** Acura ILX, RLX, Infiniti Q50, Q70 Lexus CT 200h, ES 300h, GS 450h, LS 600h, Lincoln MKZ, Porsche 918 Spyder, Porsche Cayenne SE

Note: the data given is constantly changing. Check for updates regularly.

| Age  | Vehicle C             | Vehicle B       | Vehicle A        | Vehicle A1 |
|------|-----------------------|-----------------|------------------|------------|
|      | Hybrid                | PHEV            | BEV              | BEV        |
|      | Under \$23,000        | Under \$23,000  | Under \$23,000   |            |
| Used | Toyota Prius, C and V | Chevrolet Volt, | Chevrolet Spark, |            |

|      |  |   |  |                                 |
|------|--|---|--|---------------------------------|
|      | Ford C-MAX<br>Ford Fusion<br>Honda Accord<br>Honda Civic<br>Hyundai Sonata<br>KIA Optima<br>Toyota Camry<br>Toyota Prius, Prius C,<br>Prius V<br>VW Jetta<br>Ford Escape SUV to<br>2012                          | Ford C-Max Energi,<br>Ford Fusion Energi                    | Mercedes SMART,<br>Ford<br>Focus EV,<br>KIA Soul EV,<br>Mitsubishi<br>i-MiEV,<br>Nissan Leaf                                 |                                 |
|      | <b>\$24,000 to \$35,000</b>  | <b>\$24,000 to \$35,000</b>                                 | <b>\$24,000 to \$35,000</b>  | <b>\$24,000 to \$35,000</b>     |
| New  | Toyota Prius, C and V<br>Ford C-MAX<br>Ford Fusion<br>Honda Accord<br>Honda Civic<br>Hyundai Sonata<br>KIA Optima<br>Toyota Camry<br>Toyota Prius, Prius C,<br>Prius V<br>VW Jetta<br>Ford Escape SUV to<br>2012 | Chevrolet Volt,<br>Ford C-Max Energi,<br>Ford Fusion Energi | Chevrolet Spark,<br>Mercedes SMART,<br>Ford<br>Focus EV,<br>KIA Soul EV,<br>Mitsubishi<br>i-MiEV,<br>Nissan Leaf<br>VW eGolf |                                 |
| Used |  |   |  | Chevrolet Bolt                  |
|      | <b>\$35,000 or more</b>  | <b>\$35,000 or more</b>                                     | <b>\$35,000 or more</b>  | <b>\$35,000 or more</b>         |
| New  | Acura ILX, RLX<br>Infiniti Q50, Q70<br>Lexus CT 200h, ES<br>300h, GS 450h, LS<br>600h<br>Lincoln MKZ<br>Porsche 918 Spyder<br>Porsche Cayenne SE   | Cadillac ELR,<br>Porsche<br>Panamera S E-<br>Hybrid         | BMW i3<br>BMW i8   | Tesla S, X, 3<br>Chevrolet Bolt |
| Used |  | BMW i3X   |  |                                 |
|      |  |   |  |                                 |

**Current Emissions, avg. grams/km**

|                |           |
|----------------|-----------|
| Gasoline       | 214       |
| Hybrid         | 152       |
| Plug-in Hybrid | 20 to 150 |
| Electric       | 20        |

**Vehicle Comparison – here is one example below. The Bolt was included even though it is a year newer than the others.**

| Vehicle Life Cycle   |            | 5 Years        |                |                |                |                |
|--|------------|----------------|----------------|----------------|----------------|----------------|
| Date   | 1-Feb-2019 | BEV            | BEV            | PHEV           | Hybrid         | Gasoline       |
| Vehicle Year   |            | 2017           | 2016           | 2016           | 2016           | 2016           |
| Vehicle Make   |            | Chevy          | Nissan         | Chevy          | Chevy          | Chevy          |
| Vehicle Model  |            | Bolt           | LEAF           | Volt           | Malibu         | Cruze          |
| Purchase Price   |            | \$36,000       | \$23,000       | \$27,000       | \$18,000       | \$15,000       |
| HST  |            | \$4,680        | \$2,990        | \$3,510        | \$2,340        | \$1,950        |
| Government Rebate  |            | \$0            | \$0            | \$0            | \$0            | \$0            |
| Dealer Rebate  |            | \$0            | \$0            | \$0            | \$0            | \$0            |
| Net Cost   |            | \$40,680       | \$25,990       | \$30,510       | \$20,340       | \$16,950       |
| Annual mileage (km)  |            | 20,000         | 20,000         | 20,000         | 20,000         | 20,000         |
| Unit Gasoline Cost   |            |                |                | \$1.25         | \$1.25         | \$1.25         |
| Unit Electricity Cost  |            | \$0.09         | \$0.09         | \$0.09         |                |                |
| Annual Fuel Cost*  |            | \$385          | \$385          | \$439          | \$1,050        | \$1,900        |
| Annual Insurance   |            | \$700          | \$700          | \$800          | \$1,000        | \$1,318        |
| Annual License Fee   |            | \$120          | \$120          | \$120          | \$120          | \$120          |
| Annual Repairs   |            | \$50           | \$50           | \$100          | \$300          | \$336          |
| Annual Maintenance   |            | \$50           | \$50           | \$100          | \$500          | \$845          |
| Years of ownership   |            | 5              | 5              | 5              | 5              | 5              |
| Resale Value   |            | \$15,974       | \$10,206       | \$11,424       | \$7,987        | \$6,666        |
|  |            |                |                |                |                |                |
| Net Cost per Year  |            | <b>\$6,246</b> | <b>\$4,462</b> | <b>\$5,376</b> | <b>\$5,441</b> | <b>\$6,576</b> |
| Net cost per km  |            | \$0.31         | \$0.22         | \$0.27         | \$0.27         | \$0.33         |
| Monthly Purchase Cost**  |            | \$412          | \$263          | \$318          | \$206          | \$171          |
| Monthly Fuel Cost  |            | \$32           | \$32           | \$37           | \$88           | \$158          |
| Monthly Repair/Maint.  |            | \$8            | \$8            | \$17           | \$67           | \$98           |
| Total Monthly Cost   |            | <b>\$452</b>   | <b>\$304</b>   | <b>\$371</b>   | <b>\$360</b>   | <b>\$428</b>   |
|  |            | <b>-5.6%</b>   | <b>29.1%</b>   | <b>13.3%</b>   | <b>15.9%</b>   | <b>less</b>    |
| *For the Volt, assume 5,000 km using gas at 2 litres/100km<br>and 15,000 km using electric at 0.241 kWh/km |            |                |                |                |                |                |
| Gas  | \$150.00   |                |                |                |                |                |
| Electricity  | \$288.90   |                |                |                |                |                |
| Total  | \$438.90   |                |                |                |                |                |
| Litres/100 km  |            | 0              | 0              | 2.4            | 4.2            | 7.6            |
| GHG g/km gasoline  |            |                |                | 147.0          | 104.0          | 179.0          |
| GHG g/km electric  |            | 12             | 12             | 12.0           |                |                |
| GHG tonnes per year  |            | 0.24           | 0.24           | 0.92           | 2.08           | 3.58           |
| ** Purchase cost less rebate divided by months owned   |            |                |                |                |                |                |
|  |            |                |                |                |                |                |
| Annual Operating Cost  |            | \$1,305        | \$1,305        | \$1,559        | \$2,970        | \$4,519        |

## APPENDIX

Green vehicles for sale in Canada

<https://www.plugndrive.ca/electric-cars-available-in-canada>

| Make, Model  | Average Range On Electric | Avg. Cost Per 100 km: | Avg. Emissions Per 100 km: | Acceler-Ation (0-100 km/h) | Time To Charge: | Starting At |
|--|---------------------------|-----------------------|----------------------------|----------------------------|-----------------|-------------|
| <b>Battery Electric</b>  |                           |                       |                            |                            |                 |             |
| <a href="#">BMW i3</a>   | 130 KM                    | 2.16                  | 4.9 KG                     | 7.2S                       | 3.5 HOURS       | \$45,300    |
| Chevrolet Spark  |                           |                       |                            |                            |                 |             |
| Chevrolet Bolt   |                           |                       |                            |                            |                 |             |
| MERCEDES SMART   |                           |                       |                            |                            |                 |             |
| FORD <a href="#">Focus EV</a>                                    | 122 KM                    | \$2.57                | 5.9 KG                     | 8.6S                       | 4 HOURS         | \$31,999    |
| KIA <a href="#">Soul EV</a>                                      | 149 KM                    | 2.56                  | 5.9 KG                     | 11.5S                      | 4.5 HOURS       | \$34,995    |
| MITSUBISHI <a href="#">i-MiEV</a>                                | 100 KM                    | \$2.39                | 4.21 KG                    | 11.5S                      | 5 HOURS         | \$27,998    |
| NISSAN <a href="#">LEAF</a>                                      | 172 KM                    | \$2.36                | 5.3 KG                     | 9.9S                       | 5 HOURS         | \$37,398    |
| TESLA <a href="#">Model S</a>                                    | 435 KM                    | \$2.88                | 6.6 KG                     | 4.4S                       | 12.0 HOURS      | \$95,300    |
| TESLA <a href="#">Model X</a>                                    | 413 KM                    | 2.95                  | 10.8 KG                    | 6.2S                       | 12 HOURS        | \$132,000   |
| <b>Plug-In Electric Hybrid</b>                                   |                           |                       |                            |                            |                 |             |
| BMW <a href="#">i8</a>   | 24 KM                     | 7.26                  | 17.0 KG                    | 4.4S                       | 2.0 HOURS       | \$150,000   |
| CADILLAC <a href="#">ELR</a>                                     | 60 KM                     | 4.74                  | 11.3 KG                    | 9.0S                       | 5 HOURS         | \$78,250    |
| Toyota Prius   |                           |                       |                            |                            |                 |             |
| CHEVROLET Volt<br>CARGO CAPACITY, ALL SEATS IN PLACE 10.6 cu.ft. | 85 KM                     | 2.99                  | 6.9 KG                     | 8.4S                       | 4.5 HOURS       | \$39,590    |
| FORD <a href="#">C-Max Energi</a>                                | 32 KM                     | 5.02                  | 11.9 KG                    | 7.9S                       | 2.25 HOURS      | \$39,729    |
| FORD <a href="#">Fusion Energi</a>                               | 34 KM                     | 5.00                  | 11.7 KG                    | 7.9S                       | 2.5             | \$36,399    |
| PORSCHE <a href="#">Panamera S E-Hybrid</a>                      | 25 KM                     | 8.23                  | 19.3 KG                    | 5.2S                       | 2.5 HOURS       | \$106,600   |

|   |  |  |  |  |  |  |
|---|--|--|--|--|--|--|
| <u> <b> MITSUBISHI<br/> UPLANDER</b> </u>               |  |  |  |  |  |  |
| <u> <b> CHRYSLER<br/> PACIFICA</b> </u>                 |  |  |  |  |  |  |
| <b>Hybrid</b>   |  |  |  |  |  |  |
| Acura ILX,<br>RLX                                       |  |  |  |  |  |  |
| Ford C-MAX<br>52.5 c.f.                                 |  |  |  |  |  |  |
| Ford Fusion   |  |  |  |  |  |  |
| Honda Accord  |  |  |  |  |  |  |
| Honda civic   |  |  |  |  |  |  |
| Hyundai<br>Sonata                                       |  |  |  |  |  |  |
| Infiniti Q50,<br>Q70                                    |  |  |  |  |  |  |
| KIA Optima  |  |  |  |  |  |  |
| Lexus CT<br>200h, ES<br>300h, GS<br>450h, LS 600h       |  |  |  |  |  |  |
| Lincoln MKZ   |  |  |  |  |  |  |
| Porsche 918<br>Spyder                                   |  |  |  |  |  |  |
| Porsche<br>Cayenne SE                                   |  |  |  |  |  |  |
| Toyota Camry  |  |  |  |  |  |  |
| Toyota Prius<br>40 c.f., Prius<br>C, Prius V 67<br>c.f. |  |  |  |  |  |  |
| VW Jetta  |  |  |  |  |  |  |
| <b>SUV</b>  |  |  |  |  |  |  |
| Ford Escape<br>to 2012 (68<br>c.f.)                     |  |  |  |  |  |  |
| Mitsubishi<br>Uplander                                  |  |  |  |  |  |  |
|   |  |  |  |  |  |  |
| <b>Vans</b>   |  |  |  |  |  |  |
| Chrysler<br>Pacifica                                    |  |  |  |  |  |  |
|   |  |  |  |  |  |  |