

# ELECTRIC VEHICLES - MYTHS AND TRUTHS



Electric Vehicles (EVs) reduce planet warming Greenhouse Gas (GHG) emissions. In 2023, 10,000,000 million EVs were manufactured worldwide. EV sales have grown at double digits for many years now, and continue to do so in 2024. Worldwide January 2024 EV sales are up 50% from January 2023. These are the facts. The many myths touted about EVs make some people hesitant to buy one.

This document specifically applies to “EVs”, that is, vehicle that only use a battery, and no gasoline. Plug in hybrids (PHEVs), although helping to reduce emissions, generally use about half the gasoline of pure gasoline vehicles and therefor still produce significant Greenhouse Gas Emissions (GHG).

## MYTH #1

### EVs are expensive.

When compared to a very efficient hybrid gasoline car, a similarly sized EV will save you about \$15,000 in energy costs over 200,000 km. That's \$20,000 of gasoline purchases avoided, minus the approximate \$5,000 you'll spend on electricity. On a lifecycle cost basis, when compared to a similarly equipped non-EV vehicle, driven 15,000 or more km/year, an EV will cost you less to own and operate over its lifecycle. The savings in gasoline plus reduced brake and oil change costs more than make up the initial purchase price difference. With several EVs having MSRPs in the \$40 - \$50 k range, there is an EV for many new car buyers. Although there are also many EVs costing more than \$50k, these must be compared against similarly well equipped and more luxurious gasoline powered vehicles that typically cost more.

Here are good cost studies.

[https://cleanenergycanada.org/wp-content/uploads/2022/03/Report\\_TheTrueCost.pdf](https://cleanenergycanada.org/wp-content/uploads/2022/03/Report_TheTrueCost.pdf)

## MYTH #2

### EVs don't reduce GHGs because they use electricity made with natural gas or coal.

Study after study has shown that over the life cycle of an EV, there are fewer GHGs produced than hybrid, PHEV or gasoline vehicles. This is true even for regions that use coal and natural gas for electricity generation. It seems counterintuitive that an EV running on coal generated electricity can produce fewer emissions than a gasoline powered vehicle, but it is because even modern high tech gasoline engines are very inefficient. In actual usage conditions only 10% to 20% of the gasoline energy propels the vehicle, while the rest is wasted as heat, an EV uses about 80% of its electricity to propel the vehicle.

Here's a reference on life cycle GHG emissions.

<https://www.bloomberg.com/news/newsletters/2024-03-21/evs-are-much-lower-emitting-than-combustion-cars>

## **TRUTH #1**

### **EVs don't have the same driving range as a gasoline car.**

EVs have maximum good weather ranges of 300 to 600 km with the majority around 400 km. (see the chart on the last page). It's true that in the most severe winter weather of southern Ontario i.e. those days with -25C, range may be reduced 40% to 50%. Contrary to popular belief, the reduction in EV winter range is not so much from having to heat the vehicle interior as from the higher friction of cold stiffer tires, cold oil and grease in the vehicle's mechanical parts, denser cold air increasing aerodynamic drag and reduced battery energy delivery in cold battery conditions.

EV owners just need to remember in winter conditions to charge sooner than in summer conditions.

A bonus feature of an EV in winter is that the heating can be turned on and the car warmed up for a few pennies worth of electricity, even if it is in a closed garage. And EVs can precool in the summer.

## **MYTH #3**

### **There are not enough high power "Level 3" chargers to travel long distances.**

Thousands of EV owners travel long distances. Along the major travelled routes in Canada and the USA, there are now tens of thousands of high-rate Level 3 chargers. There are many different charger companies installing these chargers and although some chargers allow payment with credit cards, others require you to have their company's smart phone app and an active paid-up account. This requires on very long trips that you have installed several EV charging apps and you have patience as you learn which apps you require in each region. Keep in mind that most of us use familiar routes for many of our longer trips and you will learn where appropriate chargers are. The Canadian Tesla network that has been proprietary to Tesla cars is, as of 2024, being opened up in stages to non-Teslas.

Prices for Level 3 charging have increased in the last few years and most Level 3 chargers now charge about the same as it would cost to drive an efficient hybrid car. Charging at home is still the most cost-effective option,

but apps such as Plugshare, Chargepoint, ABRP and others allow you to find chargers, and search for motels/hotels that have free overnight charging.

## **MYTH #4**

### **It takes too long to charge an EVs.**

Newer EVs when charging on long trips can add about 200 km of range in 10 to 20 minutes. When at home, all EVs can fully charge overnight on an appropriately sized 240 Volt AC charger. Time for a bathroom break and to check your texts!

## **MYTH #5**

### **EV batteries will need to be replaced.**

Manufacturer battery warranties are from 8 to 10 years and 160,000 km at typically 70% of original battery capacity. In Canada's cooler average temperatures, battery life will be optimized. Google "Geotab battery health" for good quality information on EV battery life. Battery life of 15 or more years is being forecast.

## **MYTH #6**

### **The manufacturing impact of making EVs negates their benefits.**

Despite the growing body of studies that show quite the opposite this continues to be one of the most pervasive myths surrounding EV. Total life cycle emissions depend on the energy sources used by the factory and upstream parts suppliers, but even on high carbon energy such as coal power, the EV wins on life cycle GHG emissions.

It's the gasoline used in the life of the gasoline vehicle that cause it to always lose the GHG emissions battle. Our gasoline powered personal vehicles produce in the order of 50 to 100 tonnes of GHG over their lifetime. On typical USA or Canadian energy sources, over it's life, an EV will be responsible for 20 to 80 tonnes fewer GHG emissions than a gasoline vehicle. EVs will only look better as we develop lower carbon intensity electricity grids.

Google "bloomberg ev lifecycle energy" to learn more.

## **MYTH #6 / TRUTH #2**

### **EVs batteries will end up in landfills at the end of their life and exploitive labour practices are used for minerals in batteries.**

Worldwide there is a relatively small stream of used EV batteries at present, but successfully helping reduce GHG emissions by the electrification of the world's vehicles will mean 10's of millions used batteries by 2050. Anticipating a much larger flow of used batteries are about 200 recycling companies worldwide. Some materials in the batteries will be sought after for their value, such as nickel, lithium, copper, aluminum and cobalt, others, such as plastic, may have little value.

We will require environmental regulations on the disposal of EV batteries just as wrecking yards currently must deal with lead, oil, antifreeze, plastic and other substances.

Cobalt free batteries are being introduced into mainstream EVs. Exploitive mining employment must be stopped in all sectors, not just the minerals needed for EVs.

## **MYTH #8**

### **Charging EVs will crash the electricity grid.**

Grid operators are well aware of the growing load that EVs will present as we move into the era of low GHG emissions towards 2050. In March 2024 Ontario's Independent Electricity System Operator (IESO) published their Annual Planning Outlook report that projects grid demands for the scenario of Ontario achieving net zero GHG emissions by 2050.

The IESO projects 11,500,000 car/trucks/SUVs on the road by year 2050 and their combined electricity demand is projected to be less than 18% of the then total provincial annual demand of 245 TWh. We must use low/zero carbon electricity generation for these EVs. That's partly why the IESO is building out 5000 MW of wind/solar and storage in the next few years alone. EVs will not crash the grid because we are planning to develop the capacity to meet this demand.

Running our vehicles on electricity will avoid the many 10's of billions of dollars now spent on gasoline.

Google "ieso 2024 APO report" for fun reading about how we must develop our electricity grid.

## **MYTH #9**

### **EVs catch fire.**

Depending on the data source, gasoline vehicles are about 10 to 30 times more likely to catch fire than an EV. EV fires start slowly. EV fires do take time to put out due to the nature of how a damaged battery burns, but they initially burn slowly, once gasoline is spilled, it burns extremely quickly.

You should worry more about your gasoline car and fires, than an EV and fire.

## **MYTH #9**

### **EVs are expensive to repair.**

Most EVs require very infrequent scheduled maintenance and do not require oil changes. You'll save money and time waiting at dealerships.

Due to regenerative braking, the friction materials in brake pads wear very slowly to almost negligibly in EVs. However, Ontario's road salt and moisture will still cause eventual damage to some parts, particularly brakes, so expect some eventual non-routine maintenance.

## **TRUTH #3**

### **Motorized personal vehicles are a problem.**

EVs are not a perfect solution, but EVs do helpfully address GHG emissions from motorized personal transport. BUT – that doesn't mean we do not need to improve bike lanes, develop low carbon public transit such as electric trains and buses, address grid lock, parking, and many other transport related challenges.

Driving less is good, not driving at all, better.

## **TRUTH #4**

This fact sheet was produced by Steve Lapp. Check out my website for more GHG reduction info.

[Carbontakedown.com](http://Carbontakedown.com)

Below is cost (in \$1000's of Can \$) versus range for most of the EVs that available in Canada. The cost is from the manufacturer websites as of March 2024 MSRP and includes delivery and sales tax, minus the available federal \$5k rebate when applicable. (i.e. the \$ amount shown is what the total cost of a vehicle should be.). There are many versions of some models, so check the exact model specs for range and battery size.

