

Electrical Vehicles: Advantages and Improvements

By Spencer Putnam, CEAC Board

The disruption to our lives from the coronavirus may offer you an opportunity to investigate a switch to electric vehicles (EVs) for business or personal use. EVs can reduce your carbon footprint and lower your transportation costs.

I've been "driving electric" since my wife and I bought a Nissan Leaf in 2015. From a climate perspective the main advantage of an electric vehicle is that it emits no greenhouse gases (GHG) while in operation. By contrast, conventional automobiles with internal combustion engines are responsible for nearly half of all CO₂ emissions in the state of Vermont.



This is why increasing the fleet of EVs in Vermont from the current registration of just over 3500 to 80,000 or so ¹ is a key part of the state's strategy to reach our greenhouse gas (GHG) reduction goals by 2050. In addition, all of the fuel for internal combustion vehicles comes from outside Vermont, from oil wells in western United States, Canada, or the Middle East.

Much of the electricity that powers Vermont's electric vehicles comes from renewable sources - wind power, solar generation, or hydro--and often it is generated very close to where it is consumed. The state's major power company, Green Mountain Power, has set a goal of sourcing 100% of its power from renewable sources by 2030, and our Leaf is largely powered by the solar panels on our roof: Hence our license plate "SUN PWR."

Beyond the climate advantages of electric vehicles, they have many operational advantages. A typical internal combustion automobile has 2,000 moving parts in the engine -- an EV has 20. Mechanically simple, an electric vehicle requires far less routine maintenance than a gasoline car -- no oil changes and no tune-ups required. Tires, windshield wiper blades--these are the first components needing replacement. EVs currently on the road have engines that are projected to last for some 500,000 miles, assuming the bodies can last that long.

Other advantages of EVs are that they are extremely quiet, and because of the instant torque of an electric motor, they are remarkably peppy. The electric energy to keep an EV running is

¹ For more detail go to https://www.driveelectricvt.com/Media/Default/docs/maps/vt_ev_registration_trends.pdf
About 60% of these cars are plug-in hybrids, not fully electric EVs.

generally much less expensive than gasoline, especially if the vehicle is plugged in overnight at home.

The main disadvantage of electric vehicles is the high initial purchase price. Technological advances, increased volume, and the inexorable increase in the cost of conventional vehicles are gradually reducing the difference in cost between EVs and conventional automobiles.

The high initial cost of EVs has been partially offset in recent years with state and federal tax credits and various promotions by electric utilities and dealers. These promotions come and go, may depend on an individual's tax situation, vary regionally, and may be different for different makes of automobiles. This means that purchasers need to do their own research when they are ready to make a purchase.

One of the best places to start research on EVs is at Drive Electric Vermont, which can be found [here](#). This site provides basic information on driving electric, gives comparisons of the many electric models on the market, and even has a map showing where charging stations are located.

A second disadvantage is what is known as "range anxiety," the concern that the car's electric charge will run out before a charging station is reached. This is a pretty real concern with my 2015 Leaf, which has a range of around 100 miles in the summer, more like 60 or 70 in cold weather. This works just fine around town, but it creates a challenge for road trips. A trip of any great length requires careful planning and allowing time to re-charge the battery en route.

Several things have changed in recent years to alleviate this problem. Many EVs being sold today have ranges up to 260 miles (Teslas even more), charging stations are more plentiful, and the newest models can be recharged much more quickly than models of only two or three years ago. Many apps are available to help show the locations of charging stations, and some cars have on-board navigators to direct the driver to the nearest one. There is no doubt, however, that driving an all-electric car does take some getting used to.

The next frontier for electric vehicles is the commercial sector. Heavy duty electric vehicles are now coming on the market around the world, and electric buses have just made an appearance on the streets of Burlington. Electric trucks, buses, and construction equipment are all in development, but currently they are not competitively priced. However, by the end of this decade many predict that the internal combustion engine will be largely gone. Now would be a good time to look into the many options available now--and quickly coming to market.