

Global Warming and Electric Vehicles (EV) - Why buy an EV? –

By Walt Wojcik, a GROW Commissioner

As you may already know and have read in previous GROW articles in this newspaper, the earth is experiencing global warming. Our local temperatures, on average, are warmer now than decades ago. I grew up in Chicago and have seen the warming winters with less snowfall and the increasing severity of storms, all consequences of rising temperatures. Are we (humans) the cause for this warming? The vast majority of climate scientists agree that burning of coal to create electricity, the burning of refined oil to create gasoline/diesel-powered cars/trucks/trains/planes and the burning of natural gas to heat buildings and to cook have caused a **rapid buildup** of carbon dioxide (CO₂) and other greenhouse gases in the atmosphere. (99.966% of the peer-reviewed scientific papers in the last decade are in agreement with human activity as the cause of climate change. Ref 1) With the onset of the industrial revolution, humans unknowingly extracted these fossil fuels (i.e. coal, oil, and natural gas) which were then thought to be a gold mine of energy from the earth. But, in reality, today we now know that although burning fossil fuels created energy, a comfortable life style, and wealth, it also released back into the air the buried carbon causing global warming (Ref 2, 3).

I have asked myself, but what more can I do to reduce my CO₂ emissions? The Congressional Budget Office recently reports that transportation is a major emitter of CO₂. Personal vehicles (cars, light trucks such as sport utility vehicles/SUV, and motorcycles) are responsible for about 22% of all energy-related emissions of CO₂ (16% originates from buses, commercial trucks, aviation, rail, and ships)(Ref 4). Thus, my solution was to reduce our high transportation carbon footprint. But what would it be like to not use any gasoline to commute. Well, one can walk or bike, but this was not very convenient when commuting to work or when taking my son to and from school.

In 2012, when my 12 year old full size, gas powered sedan developed a major repair, we decided to buy a hybrid plug-in electric vehicle, the Chevy Volt. The price of the car was reduced with both Federal and State rebates. The car was small in size, but it worked. With a fully charged battery, the Volt would drive off of the battery until out of charge. Then, a gasoline engine would turn on to power the battery that propelled the car. Initially, it had a 50 mile range off of the battery and a 260 mile range off of the gasoline engine. With the gas engine running, the Volt got about 40 mpg. I charged the car in my garage overnight using a 110 volt line 1-2 times per week. I would drive months without needing the gas engine. In the past twelve years, I only drove about 2000 miles using the gas engine. The downside of charging the battery was that the electricity came from coal burning power plants. In 2013, my wife found and we gladly converted our electricity from coal burning plants to wind farms in Indiana.

Also in 2013, my wife's small gas powered SUV developed a major repair. Then, because we appreciated not having to buy a lot of gasoline for the Volt, we decided to buy an all electric Tesla with its longer range 280 mile battery. At that time, Tesla had a series of supercharging stations already built through parts of the USA. As of 2023, Tesla alone has nearly 22,000 superchargers in every state of the USA (Ref 5). There are > 145,000 gas fueling stations in the USA (Ref 6) because owners of gas powered vehicles cannot refuel their vehicle at home. Most EV owners charge their car's battery in their home garage. With the Tesla, we have only gone to a supercharger once or twice per year. The high number of superchargers made it easy for my family to take longer trips without worrying about running out of battery charge. As with the Volt, the cost of the Tesla was reduced by tax rebates from the Federal and State governments. Because of the larger battery on the Tesla, a 220 volt line was installed in the

garage. My wife charges the Tesla overnight about every other week. When charging either car, the cost of renewable electricity per miles driven is about a third of the cost of gasoline used per miles driven.

Over the past 11 years of driving the Volt, I filled the 9 gal gas tank approximately 10 times. Only twice did I need to change the gas engine oil, brakes and tires. I replaced the smaller 12 volt battery once and had two repairs on the larger battery – the first time the battery problem was covered under warranty (a blockage in the battery coolant system needed to be flushed), while the second time a \$260 battery sensor was replaced.

A few months ago, we decided to change cars from the hybrid plug-in Volt to a fully electric vehicle. Imagine, I would no longer pump gas into a tank nor change the engine oil. Today's EVs even have longer battery ranges than my wife's car and can be supercharged in under 30 minutes. Now with more reports on EVs in the social media, some acquaintances advised me not to buy an EV. These reports complain that the mining of lithium and other rare elements used in making the battery is environmentally unfriendly. Also, the EV is so heavy that there is excessive wear of the tires creating another different environmental problem which is the increased formation of microplastics and nanoplastics from tire wear.

Firstly, the concern over mining of lithium and other rare elements is bad for the environment is correct. However, after making the battery, it is used and charged often without emitting any CO₂ or greenhouse gases when driving and that battery lasts for more than ten years in our experience. Our 2013 Tesla still runs off of the original battery needing no repairs, so far. In contrast, I see more harm to the environment from the continuous removal of crude oil from the earth to make gasoline. One realizes that there is a carbon footprint with oil extraction and the common oil spills, the refining of crude oil to gasoline, the transportation of refined gas by tanker trucks to stations, and the burning of gasoline. All of these environmentally unfriendly steps are needed for everyday use of a gas-powered vehicle and occur for the life of the vehicle. (For a somewhat technical review on EVs and gas-powered cars, I refer you to the article by Massachusetts Institute of Technology/MIT Climate scientist. Ref 7.)

Secondly, I considered buying a Tesla Model Y SUV that has a 75 kilowatt hour battery but NO gas powered engine, transmission, exhaust system, etc. that would add to the overall curb weight. My new EV weighs 4,400 pounds, while other SUVs with gas engines have similar weights (for example, the Jeep Grand Cherokee, Ford Explorer, and Toyota RAV4 - data obtained from manufacturers website). In addition, all drivers are aware that tire wear also depends on how one drives. Hard stops and fast starts will wear the tire tread rapidly too.

Another advantage of an EV vs a gasoline powered car is that the EV has less parts to break. The EV has mainly a large battery and an electric motor. Of course, both cars have a chassis, brakes, windows, etc. The EV has no spark plugs, wiring to the plugs, fuel injectors that can foul, heater hoses that can leak, engine belts that wear and slip, starting motors, mufflers, catalytic converters that some like to steal, gas tanks and fuel lines that can leak, and more. In a recent Consumer Reports article by Jeff Bartlett, Teslas were found to have the lowest maintenance costs over a ten year evaluation (Ref 8).

It is important to be aware that in cold weather, the driving range of an EV's battery is LESS. This was true for the Volt and the Tesla. You may expect a 30 to 40% drop in the battery's driving range on days when the temperature drops below 30-20 degree Fahrenheit. A lot of the decreased range is due to the battery's charge being used to warm the cabin and the battery itself. The battery will charge slower

because ions (electricity) move slower in the cold. I have never had any difficulty starting our cars in the winter.

Thus, when weighing the pros and cons of buying an EV, my decision is that driving an EV is a good choice to help fight climate change. We were the first to buy a Hybrid Plug-in EV and later a full EV on our block, but now we have five neighbors driving EVs and many others have hybrid cars. Even to this day, my wife and I love the quiet in the car's cabin, especially when the road has been recently paved. Then there is only the road noise. I ask you to consider buying an EV or start with a Hybrid plug-in EV as I did. Also, consider changing your electricity over from coal burning to renewable energy coming from wind or solar sources.

In the next few months, GROW and I will be notifying you of free EV showings so you can stop and talk with various owners about their experiences driving an EV.

References

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Walt Wojcik obtained his PhD in pharmacology with scientific training at the University of Illinois Medical Center in Chicago and later at the National Institute of Health in Washington DC. Afterward, he was Chief of a research lab at Georgetown University in Washington DC while faculty in the medical school. Later, he received his MD at University of Maryland and then trained in neurology at University of Chicago Hospitals. He worked as a neurologist at MacNeal Hospital in Berwyn and, more recently, was faculty at Loyola University before recently retiring.