

Charging Electric Cars

The first question most people ask me about my Tesla Model 3 Long Range battery-electric car (BEV = fully electric) is: “How long does it take to charge it?” They do not realize that that is not a proper question to ask about a battery-electric car. It is a more reasonable question for a plug-in hybrid-electric car (PHEV = gasoline and electric with plug). The term “electric car” usually includes both BEVs and PHEVs. The term “electrified” is used in the auto business to include BEVs, PHEVs and hybrid-electric cars (HEVs), such as the standard Prius. (The Prius Prime is a PHEV.) It is important for car buyers to understand this terminology when deciding what car to buy or lease since there are going to be many new BEVs and PHEVs introduced by car companies in the next few years.

PHEVs have a much smaller battery and electric motor than do BEVs and have a modest-sized gasoline engine to help the motor propel the car and to charge the battery, and have the capability of the battery being charged at a power outlet. When plugged into a power outlet PHEVs are usually charged to full, but probably not starting at empty because the gasoline engine keeps the battery charged to higher than empty when on the road. So, even for PHEVs the question mentioned above is not quite appropriate because it is uncertain what the starting percentage is.

BEVs have no gasoline engine; they have only a large battery and large electric motor for propulsion. Most of the time BEVs are charged in garages or driveways, in my case about 95% of the time. This wonderful feature cannot be fully appreciated until one has the experience of not having to go regularly to smelly gasoline stations! When my BEV gets to about 20% charge I charge it overnight at 10-kW power to about 80% charge unless I have a long trip planned the next day, then I charge it to 100%. (Batteries lose less capacity over time if they are charged to 100% only when needed.) I do an overnight charge of my BEV about once a week.

On long trips, after I tell my Tesla where I want it to go, it shows me on its 15” screen where to stop at Tesla Superchargers (145 kW peak power) and how long to charge there to get me to the next Supercharger in order to minimize the total time for the trip. It also shows me how many stalls are not in use at the next Supercharger! Almost never does the Tesla start at near empty and charge to full at a Supercharger; it usually charges to considerably less than full. Fast charging stations, such as Tesla Superchargers, charge very fast when the battery is low in charge but much slower when the battery is close to full. So, it makes sense to not charge to full at a fast charger. I only charge to full in our garage the night before a long trip and at a hotel overnight while on a long trip. (Many hotels have slower charging stations similar to what I have in my garage, with no user fee.)

In none of the charging events described above is the Tesla charged from nearly empty to full; thus, the question mentioned above is not an appropriate question. The appropriate question is “Can you make long comfortable trips in your Tesla?” The answer is a strong “Yes!” because of the existence of Tesla Superchargers with 6 or more stalls each, which cover all major highways in the U.S. and are being increased at about one a day. I have used them comfortably on trips from Virginia to Texas and Florida. When in Richmond Virginia I charge at one of the two Superchargers with 20 stalls each!

Tesla is installing “urban Superchargers” (72-kW peak power) in large cities; I have charged at one of them in Atlanta. Apartment dwellers in cities with an urban Supercharger can charge their Tesla cars there.

My Tesla Model 3 Long Range BEV has an EPA-rated full-battery range of 325 miles; so, I usually need to stop driving more often for personal reasons than my Tesla needs to stop to be charged! Its energy efficiency is equivalent to a 130-mpg gasoline car, which has resulted in electricity cost of \$0.03 per mile for 15,000 miles of driving! And its top acceleration is quick. Tesla’s Autopilot makes long-trip driving easy.