

EVs and PHEVs: Fast-forwarding the adoption curve



Imagine if you had to plug in your TV every evening if you wanted to watch a game or the news or your favorite soap and then unplug it from the wall after watching your program. Now imagine if you had to plug in your TV hours before you wanted to watch a program. This is the predicament that consumers who buy EVs and PHEVs face. They have to remember to plug in their vehicles diligently every night, or else face the possibility of not being able to get to the office the next day.

This is one of the questions that EV and PHEV auto manufacturers are losing sleep over. Will consumers put up with the tedious chore of plugging in and out conscientiously? If consumers are not diligent, there is the real possibility that these vehicles can fail in the marketplace.

Additionally, a typical urban consumer's usage pattern is commuting to the office and also short drives to malls, grocery stores etc. So, to maximize electricity based miles and minimize gasoline miles, the consumer would have to plug in the car multiple times a day.

In addition to auto buyers and auto manufacturers, the utility industry too has an important concern, and that is the load on the grid as vehicles are plugged in and the ability to manage this load.

Let's take a closer look at what auto manufacturers are grappling with just now. Range extension is being addressed by auto manufacturers with measures such as improved battery technology and fast charging circuitry. Battery technology progress has been steady but is weighed down by multiple constraints like added cost, safety and disposal of these batteries in an ecologically safe way. Fast charging too has its limitations; it is not a practical solution for home recharging since it involves rewiring the home, and perhaps rewiring the grid too to handle the higher current load. So car manufacturers are struggling with the cost vs performance tradeoff of batteries and are apprehensive of fast charging. "Slow charging" i.e. charging in 5-7 hours with 110 volt household circuits has the benefit of using an already existing infrastructure, and imposing less strain on the grid.

So, while "slow charging" is a good solution, specially at home and the office, it also poses the million dollar question for car manufacturers, "Will consumers put up with the hassle of plugging in their cars every day?" This question is important since with an EV, if a consumer forgets to plug in the car on the previous night, then he will not be able to get to his office the next morning. In the case of PHEVs, if consumers neglect to plug in their cars, this will lead to more usage of gasoline, which leads to higher costs and a perception that the PHEV does not deliver great savings.

The utility industry has two key concerns:

- Metering usage. They are looking for ways to efficiently meter the usage of electricity

All truth passes through three stages: First, it is ridiculed. Second, it is violently opposed. Third, it is accepted as self-evident.

— Schopenhauer

used by EVs and PHEVs and ways to bill this usage effectively.

Load management: This is another key concern that utilities have. In the medium term, as more vehicles that use electric power enter the mainstream, they can place a heavy and unbalanced load on the grid. It is important to utilities that they be able to schedule recharging of vehicles during off-peak hours as this would enable them to smooth out their peaks and valleys in power demand and also efficiently serve the needs of the automotive sector.

Clearly each constituency is coming from a different perspective and has a different agenda, and in order for EVs and PHEVs to succeed, all of these varying agendas and needs must be met.

So, what is the solution? The industry, still in a nascent evolving stage, is searching for effective answers. Different vendors have come up with different solutions, some interesting and useful and others less practical.

SemaConnect has an innovative take on this issue, and that is with an automated charging system. Imagine a device mounted at a parking spot that wirelessly communicates with an automobile as it stops at the parking spot and then plugs itself into the car and charges it... all without any human intervention!

Let's take a closer look at this technology and some its consequences.

- It totally takes consumer behavior out of the picture; we no longer have to depend on consumers to plug in their cars. By taking the task of human behavior change out of the picture, we are now assured of 100% compliance; no more consumers going, "Oh my gosh, I forgot to plug in my car last night!"
- This solution is an "out of the box" range extension technology. Given that most consumers driving patterns are short drives (10-20 miles) interleaved with long parking times (office, home, shopping mall), a system that hooks up with the automobile automatically maximizes recharging, and this gives the consumer additional range without any additional hassle.
- From a car manufacturer's point of view, when consumers are able to maximize electric miles and minimize gas miles with automated recharging, this helps to create a positive impression about EVs and PHEVs and accelerates the momentum to adopt these vehicles. From a utility's perspective, these automated recharge stations can help with billing for electricity, and the need for consumers to carry coins, or credit cards to pay for electricity usage is obviated. Utilities are also able to control these devices and perform load scheduling, load management and interface these devices to smart meters.

So, the bottomline is, automated recharging is key to the success of EVs and PHEVs. Automated recharging can make it effortless for consumers to switch from gasoline powered autos to EVs and PHEVs, enable auto manufacturers to use today's battery technology to wring the maximum range out of vehicles, and dramatically increase the market share of eco-friendly autos.



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