**Electric Vehicles: Charging and Range Anxiety Toolbox Talk**

Changing to driving an electric vehicle or hybrid is a big step for most drivers as all prior knowledge and understanding of vehicle power, gears and fuel consumption do not apply.

Many new Electric Vehicle (EV) drivers worry not only about their familiarisation with the vehicle but also adjusting to the internal dashboard workings plus ongoing concern about their vehicle’s range. The fear of the battery running out of power is probably the primary concern for many EV drivers.

As technology advances so do improvements to battery charge speed and range, so in the future drivers will feel more relaxed and less concerned about their vehicle’s reliability.

**Battery range**

A typical question for any EV driver will be “What is the range of my EV? Here is some useful for those who are new to electric vehicles:

* Vehicle ranges quoted by the manufacturers are based upon ideal driving conditions and should be viewed as maximum distances rather than expected distances.
* Range can be measured per kW or kWh. (kW is the rate of electricity used, kWh is the amount of electricity used per hour by the vehicle)
* An electric vehicle’s range is dependent on it’s battery size and battery type. Today's EV batteries start from around 30 kWh up to the largest at around 100 kWh plus. But advancements mean this upper battery power will increase over time.
* The smaller batteries are capable of up to 130 km /80 miles) per charge and suit short trips around town, whereas the larger batteries provide 200 miles plus of range per charge which suit longer journeys.

There is always going to be some variance across different models of vehicles and different battery types. It is only ever possible to give averages as all EVs and hybrids vary and their driving range will be affected by the following factors:

* High and low temperature
* Sharp acceleration, sharp braking and high speed
* Winding and hilly roads
* Driving on under inflated tyres
* Vehicle loading
* Regenerative braking

**Charging**

Filling your vehicle with petrol takes just a couple of minutes no matter what the vehicle. With electric vehicles the charger speeds and battery size all vary so charging times differ. Here are a few thoughts:

* If you have a drive and charger where you live, overnight charging can be a practical option as it can take 11 hours or more using a 7kW home charger and you’re ready to go in the morning.
* There are various charging networks across the UK, the fastest are currently Ionity charge points offering rapid 10 – 15 minute charging times using powerful 350kW chargers.
* Less powerful chargers of 50 kW up to 150 kW will take up to an hour or more to charge up your vehicle battery depending on battery size.
* Across all vehicles, empty batteries charge fastest but once they reach around 80% charged the rate of charge slows significantly.
* Manufacturers will quote charge times when filling a battery from under 20% up to 80% knowing that the final 20% may take a disproportionate time to charge.
* Importantly, your vehicle does not require a full or necessarily high level of battery charge to work efficiently. A practical strategy is to keep your vehicle battery charged between 20% and 60% in short, frequent charging sessions. This strategy goes a long way to removing the issue of range anxiety.
* Making short frequent stops to charge your vehicle also helps you manage any feelings of fatigue.

Build in charging times into your work diary to also reduce any additional anxiety around journey times and time keeping. If you take the approach of ‘topping up’ the battery regularly then you can avoid lengthy infrequent recharging waits that cause inconvenience add to your range anxiety.

What is certain is that as you become a more experienced EV driver your range anxiety will reduce and often disappear completely.

# Key Points to Remember

# Get to know the charging times for your vehicle battery and your charging network

# Try to keep your battery charged between 20% and 60% with short regular charging stops.

# Keep in mind the key factors to affect driving range e.g. temperature, acceleration, load etc

# Driver’s discussion questions

1. Do you know the full range of your EV battery when it is 80 – 100% charged?
2. Did you know about the factors that influence vehicle range?
3. Are you planning your journey to incorporate battery charging stops?

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