Mobility Blog

Q&A - EV

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Fleet Manager

1. How to compare ICE, PHEV and EV in terms of TCO?

Whether ICE, PHEV or EV is the best option for you, and what the exact tipping point is in terms of mileage, depends on various factors, and requires in-depth and country-related analysis.
But three factors stand out as crucial in any context:

First, the choice of the vehicles themselves, including their trim, exact engine, power output, energy consumption, any additional equipment, etc... Can your vehicles really be considered equals?

Second: the country and its economic situation: incentives, energy cost (fuel and electricity) and taxation, which can vary quite widely.

Lastly: drivers and driving behaviour. What charging options do your drivers have,
and how calm, smooth, or sporty is their way of driving? Is it mainly motorway driving or more city-oriented? Such considerations have a big impact on the optimal powertrain, and the actual TCO.

2. Will electric cars have an impact on my drivers' safety?

Driving an electric car is a different experience compared to a pure ICE model. The way an electric drivetrain is setup it encourages a smoother and more relaxed way of driving. The lack of engine noise also creates a peaceful environment, which is more suitable for quiet cruising than a revving engine.

Fully electric vehicles are also equipped with specific features that can improve your driver’s safety. For example, regenerative braking is a great asset compared to ICE vehicles, as the car automatically starts to slow down as soon as the driver takes the foot off the accelerator. In the event of a driver braking to avoid a dangerous situation, an electric car will start decelerating earlier than an ICE car.

3. What is the most affordable method of charging?

Charging an electric car can seem not as simple as refuelling an ICE vehicle. It’s not a mere matter of finding a petrol station and paying a certain amount per litre. However, it can be done in various ways, depending on the driver’s needs and available infrastructure – at home, at the office, on the street or on motorways.

From a pure cost perspective, charging at home or at the office is the most affordable solution, as the price of a kWh is contractual and cheaper than electricity on offer in public spaces. Charging in the street is very convenient but it is hampered by a lack of regulation and transparency in terms of pricing approaches. The price per kWh can vary from one operator to another, and in some countries your drivers will be charged a price per minute instead of or in addition to the price per kWh. In a slow-charging situation, the bill can be higher and less predictable than at home or the office. The most expensive way to charge is fast-charging. However, fast charging is quite limited in scope and is mainly used for long journeys.

It is therefore highly recommended to provide office and home charging facilities for your employees. That enables you to monitor charging sessions closely and ensures that you benefit from the low cost of electricity versus fuel costs.

4. How reliable is the WLTP range given by the OEM?

The WLTP range, like WLTP fuel consumption estimations for ICE vehicles, is measured under “ideal circumstances”, which almost never exist on public roads. This means the real range of an EV is lower – on average 15%-20% beneath the WLTP range. The exact figure depends on a number of other factors such as temperature, topography, speed and the usage of features like air conditioning, heating and seat heating – with speed as the most important of these.

5. What happens to the batteries at the end of the vehicle's lifecycle, and are EVs 100% CO2 neutral? What is the environmental impact of an EV?

Like any man-made product, electric vehicles are not totally emission-free. In fact, the extraction of raw materials, the production of the cars, shipping and even electricity production itself is a source of CO2. But this technology must be weighed up against ICE vehicles whose production cycle is also a source of CO2 emissions, but which emit significantly more CO2 throughout their post-production lifecycle. They burn fuel to move – fuel which has been extracted, shipped, refined and processed, generating high levels of CO2 in the process.

Moreover, car batteries can have a second life when they reach a 70% level of their initial charging capacity (considered insufficient for car usage). They can be used as energy storage and continue to do their job of preventing high CO2 emissions. Finally, like all batteries, they will be recycled.

6. How do I choose the vehicle with the best range for my employees?

EVs nowadays come in many shapes and sizes, and with a variety of battery capacities and electric motors. Some brands use more efficient powertrain technology than others. These factors all affect the actual range of an EV.

Ideally, you would select an EV that offers the best combination of weight (lighter = better), battery capacity (more = better), and power (less power = more range, though often linked to higher battery capacities), in addition to its aerodynamic capabilities (often expressed as «Cd», the drag coefficient, lower = better).

Furthermore, certain options can extend the range of an EV such as a heat pump – standard in some models, but an optional extra in others – which assists in optimising battery and interior temperature, especially on colder winter days.

Also, be sure to use the fast-charging capacity that enables charging at speeds of 100 kW (or higher, and if the vehicle is capable of it) on direct current (DC), for longer trips.

The best range for your employees does not necessarily mean the highest range. If a high range is not needed, investing in a car with a higher range is not the most economical option. Choose a range that fits the average usage of the vehicle, not the peak usage. If an employee drives 100 km per day with home and office charging capabilities, there is no need to invest in a vehicle with a range of 250+ km. Of course, do not choose a vehicle with a range of 100-150 km in this case; because some reserve capacity is recommended for unexpected situations.

7. Do I have to worry about battery capacity decrease during the lease period?

Like any lithium-ion battery, an electric vehicle battery will lose capacity over time, although the deterioration of EV batteries cannot be compared to a laptop or cell phone, since EVs have on average better battery management systems compared to laptops and cell phones. These prevent the individual battery cells from operating outside of their safe operating window – for example extreme heat during charging - and in this way extend the battery life. Several studies and customer reports over the past decade have offered evidence that an EV's battery deterioration is generally insignificant in the first few

years of the vehicle's lifecycle, with an average of only 2-3% capacity decrease per year. Thanks to continuous advancements in the field of battery development, manufacturers provide around 7-8 years of warranty for on average 150,000 to 160,000 kms depending on OEM and country.

Simple tips to prolong the EV's battery life:

- Only charge the battery to a level required for the daily commute. It is optimal to use the battery in the 20-80% state of the charge range.
- Use fast-charging only when taking longer trips and when the battery level is low.
  Fast charging will contribute more to battery degradation than slow charging due to the heat it generates when charging the battery.
- Avoid charging to 100% when not necessary.
- Avoid fully discharging the battery – charge the EV more frequently
- Rather than keeping your EV's battery at a higher level of charge when you know you will not be using it for a long period, keep it at a lower level and charge directly before use.

From drivers

8. What are the main factors to bear in mind when changing from ICE to EV?

The conventional ICE approach cannot be applied when selecting an EV as there is no one-size-fits-all solution. A thorough analysis must be conducted to determine the best possible fit for each driver.

The most important considerations are as follows:

- Even though subsidies and monetary benefits exist for EVs, they are still more expensive than their ICE counterparts. Given the rapid development of technology and wider range of application of new technologies, price parity is expected by 2025.
- Because you can't rely on a fuel station network, you must be aware of the various available charging options from home charging to your charging network.
- EV's are generally less expensive to own than ICE equivalents given the total cost of ownership but the cost of various charging options must be factored in.
- Charging the battery takes more time than filling the fuel tank, so charging must be planned ahead.
- The most common EVs have lower ranges than ICE vehicles, so charging is required more frequently than refuelling.

9. What is the difference between charging at home, the office, public slow-charging or public fast-charging?

As an electric vehicle driver, you will have access to a variety of charging solutions and might be wondering which is the most efficient and the most affordable. One key difference between an ICE and an EV is that most of the time you will charge your car when it is not being used, whether at the office or at home at night. So, most of your charging should normally be using a slow charger. However, standards can differ between countries. For example, in France the home charger standard is 7.4 kWh compared with 22 kWh in the Netherlands or Germany. Although this will impact charging speeds, charging at home or at the office remains the most efficient solution for your car and for your employer.

Charging on a public network can also have advantages, as you can gain some extra kilometres while visiting a customer, on a lunch break or even shopping. However, the cost of public charging is still less regulated (although this will change in time) and currently works out as relatively more expensive than at home or at the office.

You will also embark on some long journeys with your EV, whether for professional purposes or on holiday with your family. At such times you can charge your car using fast-chargers. Those chargers represent a clear added value as you can charge approximately 80% of your battery within 30 minutes or less. However, they are expensive compared to slow charging.

10. Can you charge an EV from a household socket and what is the impact?

The short answer is "yes", but it's not the best way to charge an electric vehicle. Charging from a household socket is the slowest way to charge your EV, and whilst your household socket is capable of delivering 13amps, most vehicles will only draw 10amps to ensure the cables don't overheat. This means that your car will take longer to charge (it adds up to about 2.5kWh per hour – for example a Nissan Leaf with a 40 kWh battery will take up to 16 hours to be fully charged. You also need to be careful of sockets that are "spurs", i.e. where a socket may have been added as an extension and may be more at risk of overheating. Finally, don't use an extension cord when you're charging your EV at home, as these are not designed for vehicle charging.

11. Are electric vehicles safe?

Yes, just like their ICE equivalents, electric vehicles have to comply with the same minimum legal safety standards. The cars are designed and built to ensure a high level of safety for drivers and to preserve the battery's integrity in case of accidents. A glance at the Top Ten vehicles rated by Euro NCap (a European voluntary car safety performance assessment programme based in Belgium) shows that most of those listed are electric. The high voltage electric systems are designed to be safe in a crash. Even in case an EV hits water, the occupants will not be electrocuted. Although EV fires frequently make the news, research in several countries shows that EVs do not have a higher risk of vehicle fires. Beside the car itself, electric technology will also change the way you drive, the characteristics of the EV powertrain encourage a smoother and more relax driving style.

12. How do I choose the right charger power?

Charging an electric vehicle is obviously a matter of charger power or capacity. You can plug your car into a domestic socket which will deliver 2-3 kWh, or alternatively into a supercharger that will deliver up to 300 kWh. However, bear in mind that this amount of charging power can prove totally useless if your vehicle's onboard charger doesn't accept more than a certain amount of kWh. In fact, each vehicle is equipped with two onboard chargers, one for slow charging (AC) and another for fast charging (DC). Most vehicles don't accept more than 11 kWh on AC and are limited to 100 or 150 kWh on DC but state higher capacities in their options catalogue. Our recommendation is to focus more on the charging capacities of the vehicles themselves rather than the chargers.

13. Is it realistic to use EVs on long distances within speed limits (120-130 km/h)?

EVs perform best in urban environments because they can regain battery charge using regenerative braking. Their energy consumption greatly increases whenever they are used at high speeds. Since there is little braking, the electric motor can't make use of recuperation and is therefore constantly using up electricity.

Heavy motorway and high-speed usage therefore require planning. As the charging network is constantly developing across Europe, EV drivers must stay abreast of the latest information as to where they can use chargers on the most popular motorway routes. These are usually ultra-fast DC chargers, offering over 100kW charging.

Based on your EV's consumption and battery size you should be able to calculate your range until the first charging station. The average consumption of motorway usage for most EVs is around 25 kWh per 100 kilometres. This can be improved by driving in the slipstream of other vehicles.

14. What kind of electrical cable do I need?

In most situations, a Mode 3 charging cable will be needed but you also might need some adaptors if you want to plug your car into a domestic socket or similar. Once again, the charging cable is subject to local regulations as in some countries such as France the law forbids AC chargers from having an integrated cable. The driver must therefore ensure that are carrying the right cable in their boot. Our recommendation is to ensure that the cables are included in the car configuration or choose optional ones. Then ensure that the cables provided are long enough – this can help avoid tricky situations when the charging station is too far from the car...

15. What is the impact on my electrical bill when charging an EV?

Your electricity bill will certainly increase, and you could end up with "bill shock" if you don't take this into account in the early days of owning an EV. How much your bill increases by depends on how often you charge your vehicle, but it is certainly possible to calculate how much electricity your car is using. If you have a smart home charger fitted you should be able to see how many kWh's of electricity your vehicle uses on each charge. This enables you to calculate how much you are spending on your electricity for your car. If you don't have a smart meter, you can base it on the size of your battery and do an approximate calculation. See the example below:

Tesla Model 3 Long Range = 70.0kWh battery
Electricity cost per kWh = 0.18* €/kWh
Battery size (70) x Electricity cost (0.18€) = Total (12.60€)

It’s unlikely that you’ll be charging a completely depleted battery all of the time, but it’s worth thinking about the increase in your electricity bill and preparing for an increase.

*Check your own electricity bill for the actual cost. Prices may vary at different times of the day and it could be cheaper to charge overnight.

Contact:

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