Electric Cars

Types of Electric Vehicle/Car

- Battery Electric Vehicle (BEV)
- Hybrid Electric Vehicles
  - Plug-in Hybrid Electric Vehicle (PHEV)
  - Self charging Hybrid Electric Vehicle (HEV)
  - Mild Hybrid Electric Vehicle (MHEV)
- Range-extended Electric Vehicle (RE-EV)
- Hydrogen vehicle (FCEV)

Battery Electric Vehicle (BEV) – Full Electric

- BEVs are powered solely by electricity stored in batteries, with no tailpipe emissions.
- BEVs have electric motors instead of petrol or diesel engines, getting their power from rechargeable battery packs.
- Most BEVs use lithium-ion batteries because they offer the best balance of energy density, weight, and safety.
- When fully charged, a battery electric vehicle can travel between 100 and 500 miles, depending on the model.
- As they produce no tailpipe emissions, BEVs are considered to be a zero-emissions vehicle.

Advantages of BEVs

- They generate zero emissions, which is great for the environment.
- They have lower running costs than petrol and diesel cars, as well as other electric car types.
- They're eligible for some government grants and tax benefits.
- They're quiet when running, making them ideal for city driving.

Things to keep in mind about (Disadvantages of?) BEVs

- They’re still relatively expensive to buy outright compared to traditional petrol and diesel cars - which makes EV leasing a really attractive option for most people when making the switch to electric.

- When using a slow charger it can take a good few hours to charge the battery all the way up, but you can make the most of this by charging overnight when fuel prices are cheaper. Rapid chargers can top a car battery up in as little as 30 minutes when you’re on the move.

- There’s currently a smaller range of models of EV available compared to traditional fuel powered cars, but this is changing as more manufacturers enter the market and there are loads of exciting models in the pipeline that have been announced over the coming years. There’s now an electric car on the market to suit every driver, and all major car manufacturers have committed to making electric models. The future of EVs is looking bright!

Plug-in Hybrid Electric Vehicles (PHEV)

- Plug-in hybrid electric vehicles are similar to battery electric vehicles, but they also rely on a petrol or diesel engine to give them longer range.
- This means that, when the battery is low, the PHEV can switch to using its conventional engine, just like a regular hybrid.
- The main difference is that PHEVs can be charged by plugging into the mains but hybrids cannot.
- PHEVs offer the ability to complete shorter journeys in electric mode, with a conventional engine for longer trips.

Advantages of PHEVs

- They can go further than BEVs, as they can switch to using their petrol or diesel engine when the battery is depleted.
- But, their zero emissions range (when they drive purely off battery alone) is much less than what a BEV can do.
- They may emit lower levels of CO2 than conventional petrol or diesel cars depending on the make and model, but that's not always the case.

Disadvantages of PHEVs

- They still produce emissions from the petrol or diesel engine, so they’re not as environmentally friendly as BEVs.
- They can be more expensive to buy than conventional cars.
- The weight of the batteries and engines affects the overall efficiency of the car.
- They have a smaller fuel tank than conventional cars, which can mean more frequent fill-ups on longer journeys.

Hybrid Electric Vehicles (HEV)

- HEVs are powered by a petrol or diesel engine and an electric motor.
- The electric motor is used to assist the engine, providing power when accelerating, overtaking another car or climbing hills.
- This means that HEVs tend to use less fuel than conventional petrol or diesel cars, and they emit lower levels of CO2 in a WLTP test cycle.
- This may not be the case in a real world example.

Advantages of HEVs

- They are slightly more efficient than conventional petrol or diesel cars, so they use less fuel and emit lower levels of CO2.
- Some have regenerative braking so the batteries are recharged when the brakes are applied. Both BEVs and PHEVs have this feature too.
- They are cheaper to buy than BEVs and PHEVs.

Disadvantages of HEVs

- They can be less efficient on longer journeys, as the electric motor is only used to assist the petrol or diesel engine.
- The battery is charged by a petrol or diesel engine which is one of the least efficient ways to generate electricity, and can't be plugged in to charge.
- The electric range is very limited, as the battery is only used to power the electric motor and not to drive the car on its own.
- Most new hybrid vehicles will only be sold until 2032, as sales of new diesel and petrol cars are set to end by then.

Mild Hybrid Electric Vehicles (MHEV)

- MHEVs are similar to HEVs, but the electric motor is less powerful and it can’t be used to drive the car on its own.
- The battery is also smaller, as it only needs to power the electric motor and not the whole car.

Advantages of MHEVs

- They’re cheaper to buy than HEVs and BEVs.
- They offer a small boost in fuel economy compared to conventional petrol or diesel cars.

Disadvantages of MHEVs

- They’re not true hybrids, as the electric motor cannot power the car on its own.
- They don’t offer the same fuel economy benefits as HEVs, PHEVs or BEVs.

Range-extended Electric Vehicle (RE-EV)

- RE-EVs are similar to BEVs, but they have a small petrol or diesel engine that is used to generate electricity to extend the range of the car.
- The engine isn't connected to the wheels, and it doesn't provide any power to the car.
- The engine only charges the battery.

Advantages of RE-EVs

- They’re more efficient than HEVs on longer journeys, as the electric motor is used to power the car and not just assist the petrol or diesel engine.
- The clever technology means that the engine is only used to generate electricity to give more miles of range in the electric battery.

Disadvantages of RE-EVs

- There's a limited choice of cars.
- The weight of the engine affects the overall efficiency of the car.

Hydrogen vehicle (FCEV)

- FCEVs, or hydrogen vehicles, are powered by a hydrogen fuel cell.
- The hydrogen is combined with oxygen from the air to create electricity, which powers an electric motor.
- In the past, many manufacturers thought that hydrogen was the future of mobility, but every major manufacturer is now developing BEVs faster and with more funding than FCEVs.

Advantages of FCEVs

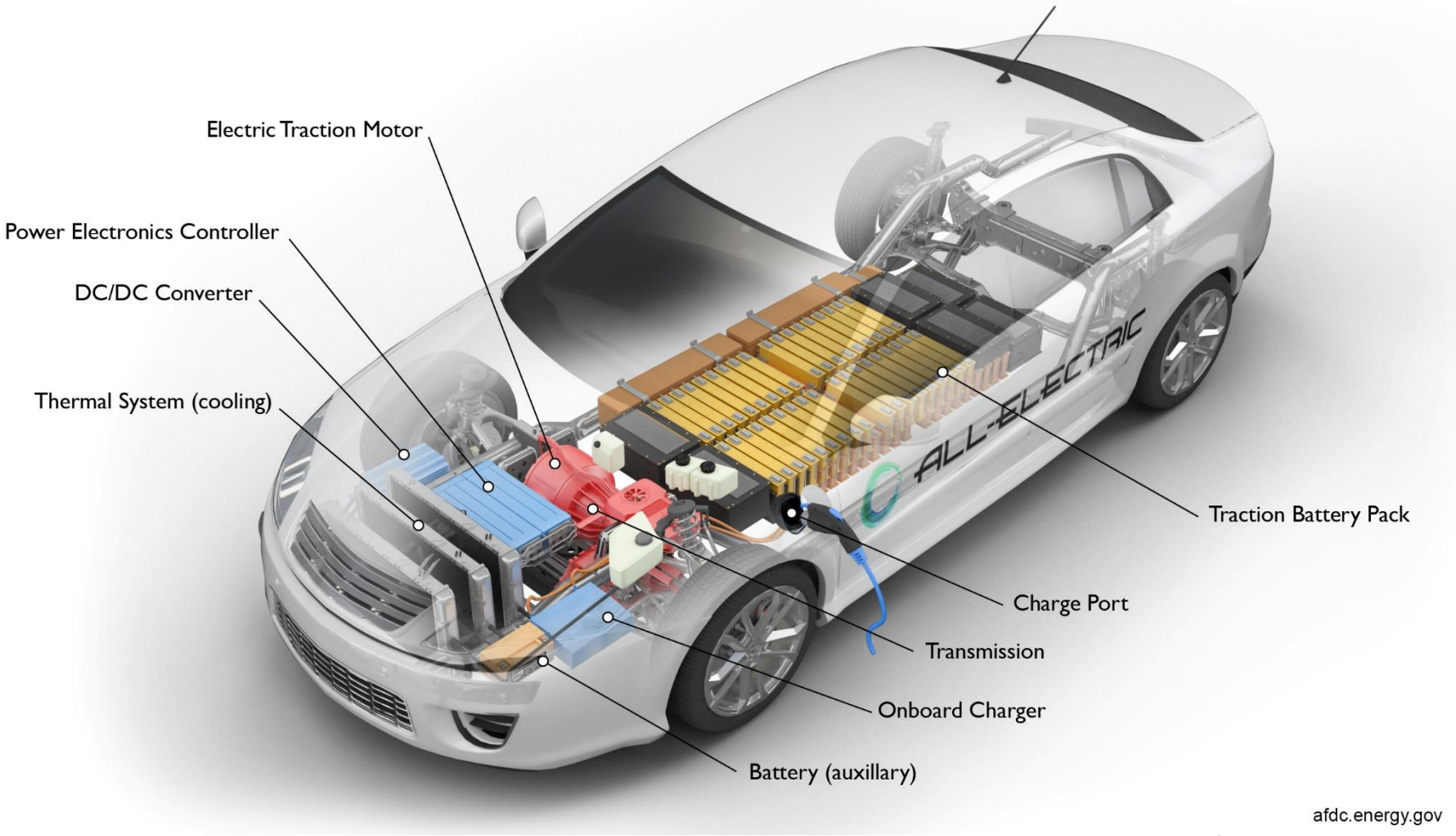
- They’re emissions-free, as the only by-product of the reaction is water vapour.
- The refuelling process is similar to petrol or diesel cars, so it’s easy and quick.
- Great range, similar to that of an EV.

Disadvantages of FCEVs

- The technology is expensive, so the cars are, too.
- There are only 14 filling stations in the whole of the UK, so it's highly likely you'll have to travel out of your way to find one - and who knows if you'd even make it to your final destination.

How do they work? - BEV

All-Electric Vehicle



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How do they work? - HEV