

CO2 emissions of an electric car

It is often stated that pure electric vehicles do not emit any CO2, (the UK government taxation system rates them at 0 gm/km, i.e. 0 grams of CO2 per kilometre travelled. This is misleading hogwash. First of all, they emit about the same as a modern diesel but secondly, they emit it elsewhere. They emit it where their electricity is generated.

How much CO2 do they emit ?

The first step is to figure out with a typical energy mix, how much CO2 is emitted per generated kWh (kilowatt hour) of electricity. (In the UK, this mix is about 50% carbon based, about 20% nuclear and the rest from wind, solar, biomass and so on.)

The US EPA (Environmental Protection Agency) rates this at 1.52 lbs per kWh, (i.e. 0.69 kg per kWh) (<https://blueskymodel.org/kilowatt-hour>, production data, excluding line-losses from most power plants in the US).

With Germany's current energy mix, it is estimated at 0.596 kg per kWh, https://www.wingas.com › Energieversorgung_und_Energiewende_en.pdf

So we have estimates of 0.596 – 0.690 kg per kWh. Assume the middle of this range = 0.645 kg/kWh.

Now take a typical electric car with a 90kWh battery and a range of about 450 km.

Total CO2 produced by generating 90kWh = $90 * 0.645 \text{ kg} = 90 * 0.645 * 1000 \text{ gm} = 58,050 \text{ gm}$.

This is spread over the car's range of 450km, giving the following real value of CO2 usage:-

90 kWh Electric vehicle = $58050 / 450 = 129 \text{ gm/km}$.

How do EV compare with modern EUR6 diesels ?

Now compare this with a Mercedes C220d SE saloon, <https://www.mercedes-benz.co.uk/passengercars>, and we finish up with.

CO2 gm/kg, Tesla Model S, 90 kWh	CO2 gm/kg, Mercedes C220d SE saloon
129	119

So, an EUR6 diesel is cleaner than a pure electric, but pure electric simply dumps its carbon footprint elsewhere, and this is de-carbonisation ?