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| **Equivalency Problem** | #4: Honda or Tesla? |
| **Student** | Suraj Sehgal |
| **Assumptions:** | |
| * Combined Honda Civic MPG: 36 MPG Combined and average of 148.0 g CO2 emitted/km * Tesla Model 3: 6.6 kM/kWh for the efficiency of the Tesla (website also says 341 mile (range), 15min recharge for 175 miles) * Driving this vehicle for 10 years, driving 30,000 km/year or 18,641.14 miles * standard mid-sized gasoline ICE (internal combustion engine) vehicle the embedded carbon in production will be around 5.6tCO2e * Tesla 3 Embodied Carbon is 10.2 tons CO2e (assuming the UK one is similar to the US model) * PG&E: .16 lbs CO2 per kWh | |
| **Calculation:** | |
| * Honda Civic Carbon Footprint in 10 years   + 148g CO2/km \* 30,000 km/year \* 10 years = 44,400,000 g CO2 = 44,440 kg CO2 = 48.94t CO2   + Embodied carbon = 5.6tCO2e   + Combined = 48.94t + 5.6t = **54.54t CO2** * Tesla Model 3 Carbon Footprint in 10 years   + 30,000 km/year \* 10 years / (6.6 km/kWh) \* .16 lbs CO2/kWh = 7272.72 lbs CO2 = 3.64t CO2   + Embodied carbon = 10.2 tons CO2e   + Combined = 3.64t + 10.2t = **13.84t CO2** * Decision based on carbon footprint: **Tesla Model 3** | |
| **Reflection:** | |
| I was personally surprised to see the much higher embodied carbon amount for the Tesla Model 3 versus the Honda Civic. However, as I calculated the carbon emissions for driving over the next 10 years, that quickly showed how much more emissions are emitted from the Honda versus the Tesla. Further analysis could be done on whether electricity from another state (not PG&E’s mix) would drastically change the CO2 emitted for Tesla. | |
| **Sources:** | |
| * <https://www.firsttexashonda.com/honda-research/honda-civic-mpg/#:~:text=33%20city%2F42%20highway%2F36,on%202022%20EPA%20mileage%20ratings>. * <https://www.car-emissions.com/cars/model/HONDA/Civic> * <https://www.tesla.com/model3> * <https://www.zemo.org.uk/assets/workingdocuments/MC-P-11-15a%20Lifecycle%20emissions%20report.pdf> * <https://brusselsblog.co.uk/PDF/CarFootprintM.pdf> * <https://sites.uci.edu/energyobserver/2017/11/24/comparisons-of-california-utilities-2016-power-sources-and-emissions/#:~:text=There%20is%20a%20range%20for,hydro%20to%20pure%20natural%20gas>. * <https://www.tesla.com/en_eu/support/european-union-energy-label> | |