**Judging by recent reports from the world’s media outlets, depending on where you live, you’re presumably either suffering from heat stroke from the hottest temperature your country has ever experienced, or wondering how you’re going to rebuild your house now that the wildfires have flattened your entire town, or perhaps you’re seriously considering going the full Kevin Costner and buying a houseboat to cope with the floods that seem to be arriving with ever increasing regularity. And don’t get me started on the food crisis and the crippling cost of fuel!**

**It can all sound a bit apocalyptic sometimes, can’t it? And apocalypses do tend to make us feel a little anxious about what the future holds and whether there’s anything we can do about it. And that’s not helped by the tidal wave of conflicting information in the press and on social media. The temptation is to do absolutely nothing at all, a bit like the proverbial rabbit in the headlights. And of course, just like the rabbit in the headlights, doing nothing at all is probably not your best option.**

**Transport is a great example, isn’t it? Should you get an electric vehicle or is it all just a big scam like some bloggers would have you believe. How about aviation? Are you really making climate change worse by flying off to your holiday destination once a year? And how about all the stuff we buy that comes from abroad? How can we really find out what impact that’s all having on the environment?**

**It’s all a bit of a minefield really. Thankfully though, some really thorough research has been carried out in recent months by a couple of well- respected organisations, analysing the full lifecycle carbon footprints of the main types of powered vehicles we use in modern day society. So, I thought it might be a good idea to dive in and have a look what they found out.**

**Hello and welcome to Just Have a Think,**

**Global transport emissions account for around twelve billion metric tonnes of CO2 equivalent going into the atmosphere each year. That’s about twenty five percent of all human-induced greenhouse gases. Without a step change in policy, those emissions are set to nearly double by twenty-fifty. If we really wanted to limit global warming to only one-point-five degrees Celsius above eighteen-fifty temperatures, then we would need to reduce those emissions by about eighty percent from today’s levels, taking them down to only about two point six billion tonnes by mid-century. But you can only know for sure if that strategy would be successful if you have some way of properly measuring the full lifecycle impact of each type of vehicle.**

**That’s precisely the sort of data that this 2021 report seeks to clarify. It was produced by the International Council on Clean Transport, or ICCT. They’re the folks who, back in twenty fourteen, accurately assessed the genuine emissions from VW diesel cars and alerted the US EPA that there might be some skulduggery going on. A finding which led to the notorious diesel gate scandal, costing Volkswagen upwards of twenty billion dollars to rectify.**

**This latest study considers the whole range of environmental factors, from the lifetime average carbon intensity of fuels and electricity mixes, including biofuels and biogas, through to the carbon intensity during the useful lifetime of the vehicles. And it takes average real-world usage to derive its data, instead of relying on official test values.**

**And very importantly, it includes the near-term global warming potential of methane leakage emissions from natural gas and natural gas-derived hydrogen fuels.**

**All of that gets combined with greenhouse gas emissions from vehicle production, maintenance, and recycling to give a single value for each vehicle type, measured in grams of carbon dioxide equivalent for every kilometre the vehicle travels.**

**What the analysis doesn’t factor in is any emissions from building factories, distribution centres and recycling plants, or the fuel for transporting vehicles and installing filling stations and vehicle chargers. And it doesn’t account for road building either. And that’s because all of those variables are pretty similar, whichever type of vehicle you use, so they don’t have a significant influence on total life-cycle comparisons.**

**The ICCT carried out all that analysis for each of the four major passenger vehicle regions - the USA, Europe India and China, and they arrived at three fundamental conclusions…**

**Number one - Only battery electric and hydrogen fuel cell electric vehicles have the potential to achieve the reductions in life-cycle emissions needed to meet the Paris Agreement goals. In fact , life-cycle emissions for battery electric vehicles registered today in all four regions are already lower than comparable internal combustion engine cars. In Europe they’re sixty-six to sixty-nine percent lower and in the States the difference is sixty to eighty percent.**

**China’s grid is still dominated by coal, so the difference is not so stark there, but even with dirty black stuff accounting from most of the electricity generation, overall lifetime emissions are still thirty-seven to forty-five percent lower for electric vehicles. India is also very coal dominant, and they don’t tend to have the most efficient vehicles, but nevertheless electric vehicles there still produce between nineteen and thirty-four percent fewer emissions than gas guzzlers.**

**And of course, as electricity grids continue to decarbonise rapidly through the rest of this decade, the gulf between EVs and combustion engines will only get wider and wider. For medium-size cars registered in 2030, life-cycle emissions for European electric vehicles are seventy to seventy seven percent lower than fossil fuels cars, American EVs are sixty-two to seventy-seven percent lower. China improves to between forty-eight and sixty four percent, and even Indian electric vehicles achieve emissions that are thirty-four to fifty six percent lower than internal combustion engines.**

**Conclusion number two from the ICCT is that there is no realistic pathway for deep decarbonization of combustion engines. The so called ‘self-charging’ hybrid vehicles only get to an average global reduction of about twenty percent over internal combustion engine vehicles at best. And even the more common plug-in hybrids vary from about a forty percent reduction in the States, to around twenty-five percent in Europe and only about six to twelve percent in China. Vehicles using blends of biofuel and biogas in fossil diesel, gasoline, and natural gas by 2030 will only result in a maximum lifetime emissions reduction of nine percent over fossil fuel cars. The study found that it’s just not feasible to supply enough low-carbon biofuels from residues and waste-based biodiesel, ethanol, or biomethane to substantially displace fossil fuels in combustion engine cars. Plus, the very high production cost of these e-fuels means they’re not likely to contribute substantially to decarbonization of the fuel mix within the lifetimes of 2021 or 2030 cars.**

**The third and final conclusion from the ICCT is that to align with Paris Agreement targets, the registration of new combustion engine vehicles needs to be phased out in the twenty-thirty to twenty-thirty-five time frame. Only battery electric vehicles powered by renewables, and Fuel Cell vehicles powered by genuinely green hydrogen will get us to the reductions required, according to the ICCT’s assessment.**

**Now there are of course still plenty of naysayers who dispute the idea that EVs are really much better for the climate than conventional internal combustion engines. Those folks still focus on the energy intensive nature of lithium-ion battery production and point to the predominantly fossil fuel powered grids that provide electricity for battery charging. The ICCT analysis shows that even with those variables factored in, both of which are rapidly improving by the way, but even with them factored in, battery electric vehicles still massively outperform gas guzzlers across their lifetime.**

**What those naysayers also conveniently forget to mention, is the carbon emissions related to producing and transporting fuel for those gas guzzlers. For petrol and diesel, those upstream emissions add about 20% to the emissions of fuel combustion itself.**

**Electric vehicle motors are about eighty percent efficient, partly due to the fact that as the vehicle brakes or goes down a hill, energy can be sent back into the battery to charge it back up a bit as you’re driving. Combustion engine cars don’t have that option and the engines themselves, even after more than a hundred years of fettling by the automotive industry, are still only about thirty percent efficient at best. A typical mid-range EV like a VW ID-3 or a Chevvy Bolt uses about twenty kilowatt hours for every hundred kilometres, or sixty miles, travelled. That’s equivalent to a hundred and four miles per U.S. gallon. That means an Electric Vehicle quickly pays back the higher manufacturing-phase emissions. An average European EV would payback after twelve thousand miles, and in the USA it would take about twelve and a half thousand miles. That’s about a year and half of driving for the average motorist.**

**Those still determined not to be convinced may point to China’s coal dependent electricity grid and ask the classic school yard question “why should we be good boys and girls if those kids over here are being naughty”. Now of course any rational adult would tell you that two wrongs don’t make a right, and that setting a good example is the best way to change the behaviour of others. But if that doesn’t do it for you, then how about this report from the World Resources Institute, which finds that if China enacts its three major national decarbonisation policies, which knowing China, is highly likely, then petroleum consumption in that country would peak by twenty-twenty-seven, and with a big push that peak could come as early as twenty -twenty-four. Over the longer term, those policies can reduce China’s road transport emissions by as much as ninety five percent by twenty sixty, in line with China’s Net Zero commitment. Now this video would get pretty long if I went through the whole report, so I won’t do that, but I will leave a link in the description section below so you can take a look for yourself.**

**But of course, we don’t all travel exclusively by car, do we? What about emissions from other forms of transport?**

**Well, that’s where the folks at a website called Visual Capitalist can help us out. Back in February twenty-twenty-two, they gave us this little offering , based on data from the UK Department of Business Energy and Industrial Strategy, via the Our World in Data website. It shows the carbon footprint of all the main transport types, again measured in grams of carbon dioxide equivalent per person per kilometre travelled. The worst offenders are short haul flights and driving alone with no passengers.**

**Of course, not owning any kind of car at all, and walking or riding a bicycle, or taking public transport instead, are the very lowest-carbon ways of getting from A to B. Not everyone can use those options of course, but millions of us can and yet most of us don’t. So, if you’re looking for the answer to the question I posed at the start of the video, “what can I do to make a difference”… maybe think about ditching the car altogether and getting yourself a nice shiny new two-wheeler. You’ll certainly be fitter and healthier as a result!**

**No doubt you’ve got your own views on this thorny issue though, so as always, the place to leave you thoughts is in the comments section below.**

**That’s it for this week though.**

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**As always, thanks very much for watching, have a great week, and remember to Just Have a Think.
See you next week**