My data comes from Our World in Data, CO2 Emissions Per Capita. 2023 Population, 2024 Share of Primary Energy Consumption From Low Carbon Sources (Nuclear + Total Renewables), and 2024 Total CO2 Emissions From Land Use Change - in Total Annual Tons. Climate Change is one of the most urgent crises of our era. The Paris Climate Agreement tried to get most countries around the world to agree to reduce emissions so that warming would be limited to two degrees centigrade. The goal of this investigation is to try to figure out who's responsible for solving the climate problem, what measures we can take to mitigate climate change, and what obstacles can get in the way of implementing climate change reduction measures.

I thought about using a scatter plot first, but I switched over to a world map with an overlay showing the emissions per capita. World maps made it easier not to get lost in the fog of the desert; the map told you where you are in the world with regard to carbon emissions. Also, putting a mouse pointer with the correct value of said country and looking at the color of the country, provided a very memorable image of the carbon emissions per capita, population, share of energy being low carbon, and land use emissions. It's also very interactive, and people tend to remember visuals with contrasting colors over a bunch of raw data. The map also makes it feel like a real-life interactive exhibit that is more interesting than a bunch of plots. Also, you can learn geography from it as well, and give people a mapping point to the numbers being presented

I asked people around in my friend group because they're interested in the topic, and they are the target population. Per capita measurement of CO2 is more of a macro measurement; thus, it would work better in convincing people to change their habits so that they become more carbon-friendly. I showed it to many people around me, and they thought it was pretty useful to visualize and process the climate crisis. Then I asked them if they could spot the correlation between CO2 per capita and the amount of low-carbon energy use. Then I asked them how they feel about the total land use emissions map. The population map was an easter egg added to show how population plays a factor in low-carbon energy adoption. All in all, people thought this exercise was interesting, and they really liked the tool tips and the heat map visualizations.

I wish I had more ability to get a more precise measurement of how much people need to reduce carbon emissions. Carbon emissions in most countries aren't equally spread across the population, and a better measurement mechanism could've been to use the median emissions per capita across a country. I was interested in this topic, and this was the best credible data I could find. If I had more time, I would make a custom dataset and plot the land use emissions per capita on a world map, that would've been interesting as well and that would be a nice side project to do.

I also included a share of 2024 Share of Primary Energy Consumption From Low Carbon Sources (Nuclear + Total Renewables) because I wanted to not only see what countries switched their electric grid to low carbon sources, but I also wanted to see if you can keep a nice lifestyle and still emit lower CO2 per capita. It turns out you can! France is a great example of that, as they use around ~55% low-carbon energy sources (mostly nuclear), but they have a CO2 per capita emissions amount

similar to that of Vietnam. It's much lower than Germany, its neighbor, at around 60% of their CO2 per capita, which uses more than 3rd party Russian oil (refined by China and India). Another way to reduce emissions is by creating carbon sinks; hence, I provided the Total CO2 Emissions From Land Use Change chart.

China, being the most populous nation in the world for many years, is doing a great job creating more green space and carbon sinks by mass planting millions of trees in order to stop desertification and erosion of its soils. That's why they top the charts in reduction in CO2 emissions from land use changes and by a wide margin. A lot of EU countries also have negative emissions from land use, as their laws prioritize conservation of the land. South Korea, Turkey and Mexico is also a high performer in that metric as well.

Lastly, I added population as a map to try to show that bigger countries in population tend to have lower carbon energy usage. It could just be that it's harder to convince people to adopt these new technologies. Some of the highest CO2 per capita emissions places (the US, Canada, Australia, Russia) are heavy oil drilling and mining countries, and they have lobbyists who lobby against green energy being adopted. The nations that peak in the CO2 per capita measurement are the Middle Eastern petro states, and they have less than 1% of low-carbon energy usage. The nations that top the charts in low-carbon energy adoption tend to be the Scandinavian states, and they have pretty small populations and it seems easier to convince people there to adopt low carbon technologies.

France made it possible for you to go low-carbon and still have a high standard of living and a relatively high population. Brazil (although it is cutting down the Amazon) is another example of being a middle-income country and being able to adopt renewables. Renewables, land use distribution actually do matter in combating climate change. What I found out through this exercise was that, Climate Change isn't hopeless and we still have time to make progress. Population is another factor, but I feel like once we get rid of lobbying and big oil tycoons controlling the politicians, these states can also adopt low carbon energy sources.