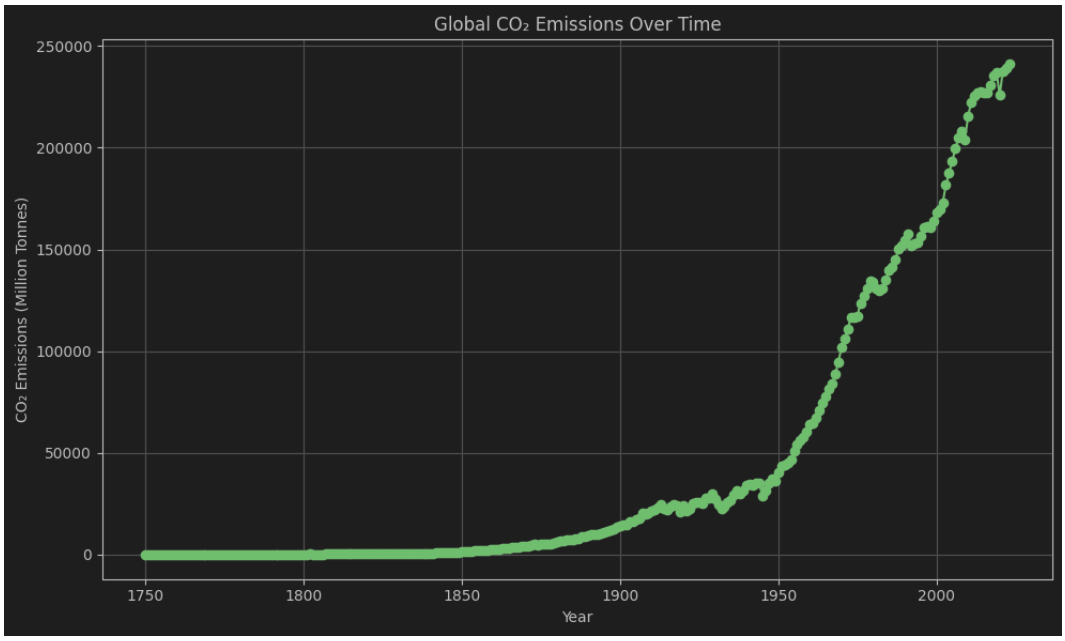
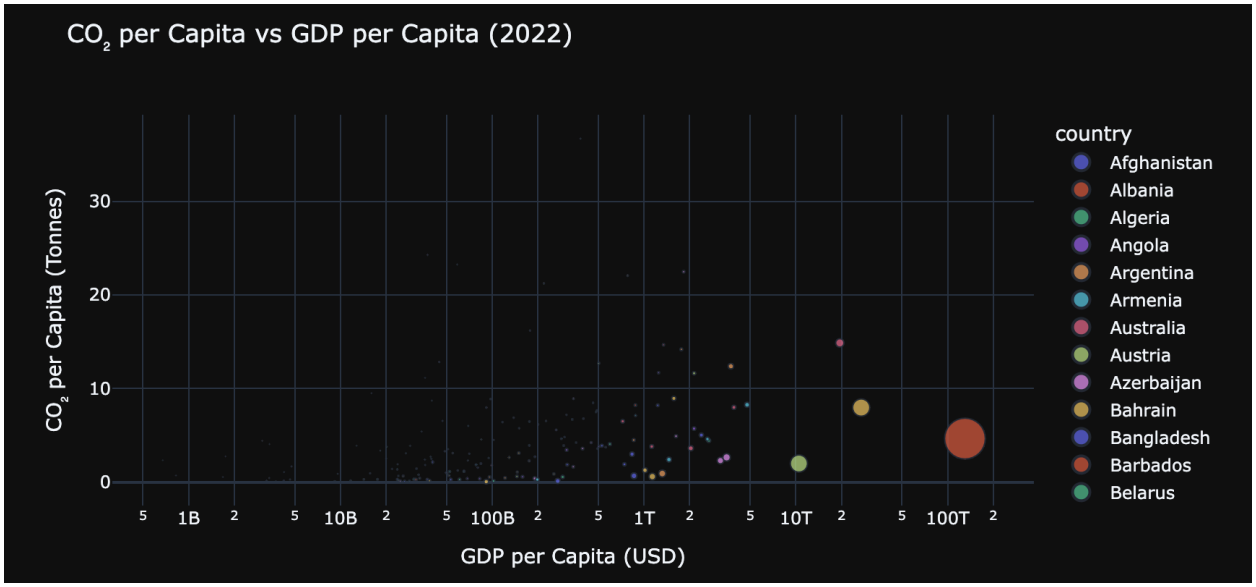
Figure 1: Global CO_2 Emissions Over Time



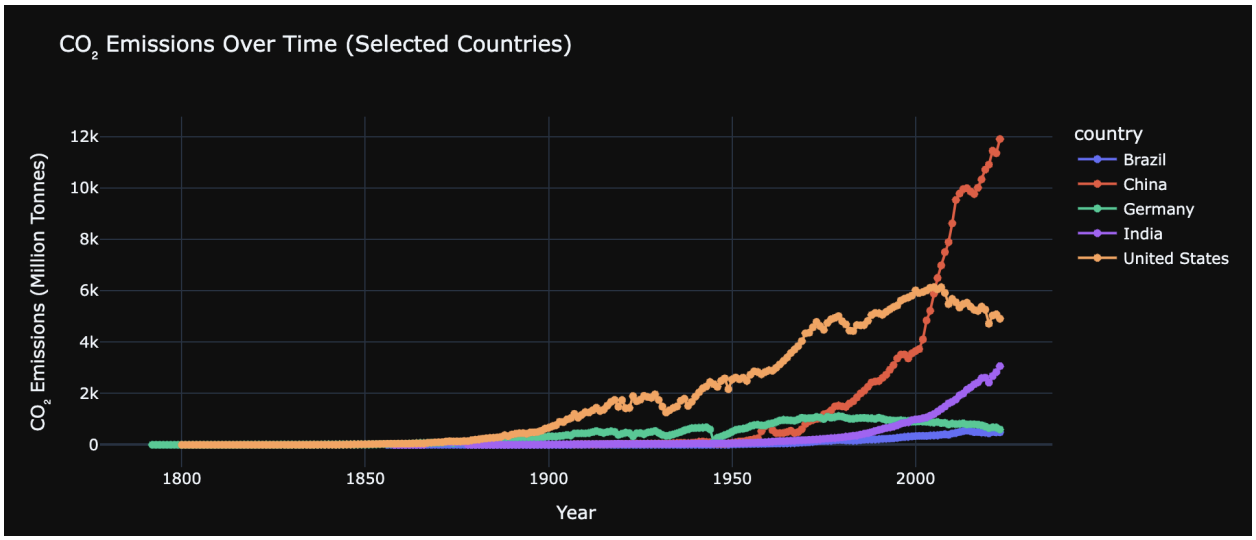
Caption: This line chart shows a dramatic rise in global CO_2 emissions since the Industrial Revolution, with the sharpest increases occurring post-1950. The use of a line with markers emphasizes the steady trend and year-over-year changes, helping viewers track how emissions have grown exponentially over time.

Figure 2: CO_2 per Capita vs GDP per Capita



Caption: This scatterplot highlights how wealthier countries tend to have higher per capita CO_2 emissions, though there is significant variation. The use of bubble size and color for each country helps quickly differentiate outliers and cluster patterns, revealing disparities between economic output and environmental impact.

Figure 3: National CO_2 Emission Trends



Caption: This multi-line chart compares the historical CO_2 emissions of Brazil, China, Germany, India, and the United States. The design choice to plot them on the same axis allows for a direct comparison of each country's emissions trajectory, showcasing how China recently overtook the U.S. while India's emissions have been rising steadily.

Conclusion

Redesigning these visualizations helped me better understand how visual encoding choices influence how data is perceived and interpreted. For instance, adding markers to the global CO_2 emissions line chart made the progression of change more tangible, especially in years with sudden increases or plateaus. In the GDP vs. CO_2 per capita scatterplot, switching to a bubble chart with color and size encoding allowed for more nuanced comparisons between countries, though it introduced some clutter that had to be balanced through careful axis scaling and filtering.

The most effective approach was using a consistent dark theme with labeled axes and legends, which improved readability and focus. However, I had to trade off simplicity for completeness in some cases—for example, the country comparison line chart became visually dense, but it was necessary to illustrate key differences in national emission trends. Overall, this project reinforced the importance of aligning visualization design with the story the data is meant to tell, and making deliberate choices about clarity, emphasis, and context.