

World Co2 Emissions Analysis

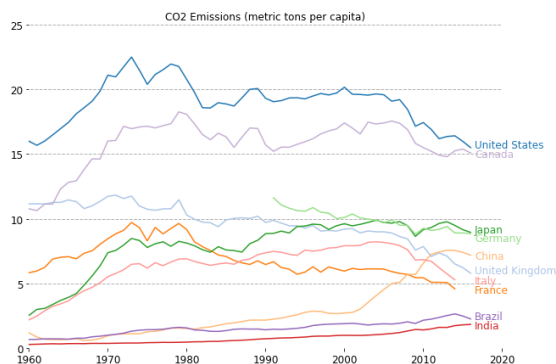
Global warming is one of the biggest challenges currently being faced by humans, although correlation is not causation a likely cause of global warming is due to increased atmospheric carbon dioxide from human activities. However, whether greenhouse gas emissions are the root cause of global warming is not the research question.

I will be using the "World Development Indicators" dataset, specifically the files "WDIData_T.csv" and "WDICountry.csv" to exploring the CO2 emissions data to answer the following questions.

- 1) which countries are the top 10 polluters in terms of CO2 emissions (kt) & CO2 emissions (metric tons per capita) indicators and what is their emissions trend?
- 2) what is the overall emissions trend of all the countries?
- 3) Which sectors contributed most heavily to emissions?

The data file being used contains 7,678,806 rows of data on 263 unique countries with 1437 different types of development indicators.

This visualization was created to ascertain the emissions levels of each of the top 10 countries, in terms of GDP, but does not significantly assist in answering the questions posed in the introduction. As you will see later GDP does not



directly translate to the highest CO2 emissions or CO2 emissions per capita. Let see the CO2 emissions indicator below.

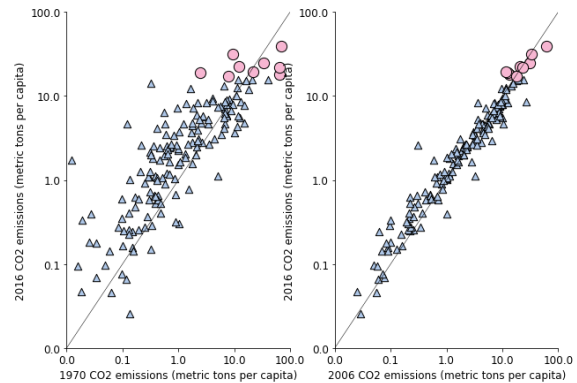
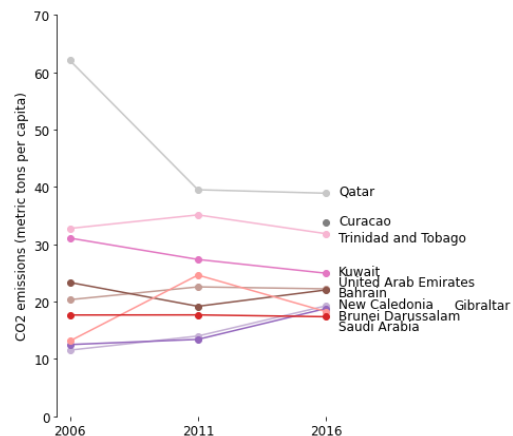


Figure 1: 72.5% of countries have seen an increase in CO2 emissions per capita when comparing their emissions from 1970 to 2016. If we carry out similar assessment for the timeframe between 2006 to 2016, we still find that 58.5% of countries have seen an increase in CO2 emissions per capita, although the magnitude of change is less when compared with the previously assessed timeframe it is still a discouraging trend when viewed from the perspective of combating global warming. The pink circles are used to highlight the top ten polluting countries which are named in the next visualization.



Of the top ten polluting countries (in 2016 in terms of CO2 emission per capita) Qatar, Kuwait, Trinidad and Tobago, Saudi Arabia can consider to have a steady or decreasing trend, while United Arab Emirates, Bahrain, New Caledonia, Gibraltar, Brunei Darussalam has an increasing trend.

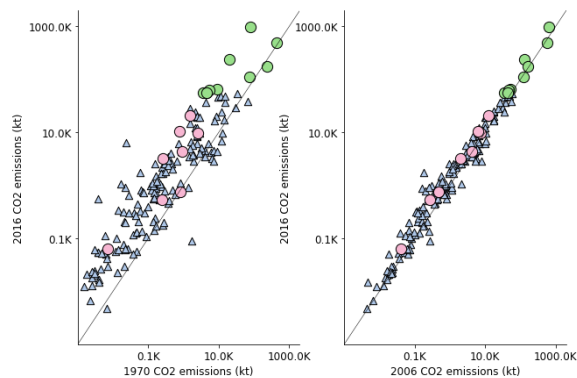
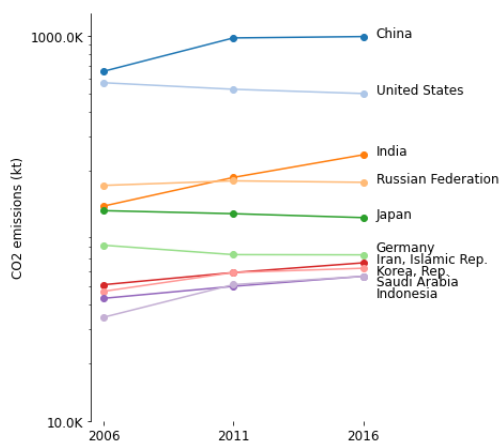


Figure 2: 89.1% of countries have seen an increase in absolute CO2 emissions (kt) when comparing their emissions from 1970 to 2016, Top ten polluting countries in terms of CO2 emissions (kt) shown as green circles and top ten polluting countries in terms of CO2 emissions (metric ton per capita) in pink. This highlights a danger in only viewing emissions in terms of per capita only, for example the mean difference between the countries in green and pink is 94217 times when viewed in terms of CO2 emissions (kt).

75.5% of countries have seen an increase in absolute CO2 emissions (kt) when comparing their emissions from 2006 to 2016.



Of the top ten polluting countries in terms of “CO2 emissions (kt)” in 2016, United States,

Russian Federation, Japan, Germany have a steady to decreasing trend. Whereas China, India, Iran, Korea, Saudi Arabia, Indonesia has an increasing trend.

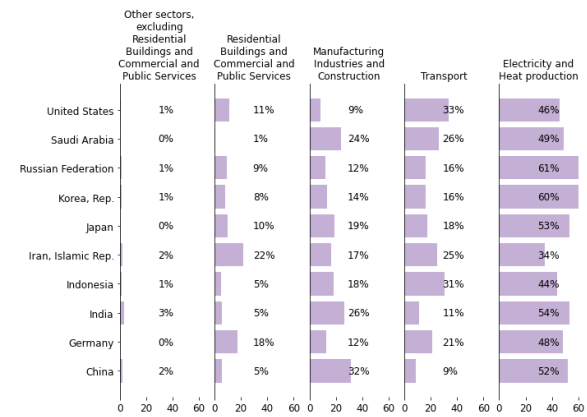


Figure 3: Transport, electricity and heat production account for an average of 70.93% of emissions of the top ten CO2 emitters (kt). Although there can be significant per sector emission differences between the different countries dependent on the type of economy they have.

Summary

Depending on the timeframes being reviewed, 2006 to 2016 or 1970 to 2016 respectively, between 58.5% to 72.5% of countries have seen an increase in CO2 emissions (metric tons per capita). Similarly, when this analysis is carried out for absolute CO2 emission (kt), between 75% to 89% of countries have seen an increase in emissions. Although for both different emissions measurement metrics the magnitude of change for 2006 to 2016 is less than 1970 to 2016, nevertheless the trend is still increasing. CO2 emissions (metric ton per capita) is good metric for measuring relative improvements between countries with different population sizes, however absolute CO2 emissions (kt) is the most important metric when considering which countries have the most impact on global emissions. Generally, there could be significant emissions reductions if adoption of renewable energy sources and electrical vehicles could be accelerated.