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FIT3179 DATA VISUALISATION 2

AN ANALYSIS ON GLOBAL ELECTRICITY

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Visualisation Available at: https://callumr2.github.io/3179_datavis_2/

Word Count: 1030 (including titles)

Report:

Please note, the visualisation was designed on a screen with 1920x1080 resolution.

Domain:

The domain of this visualisation is global Electrical Energy statistics. For this visualisation, two datasets were used.

1. https://www.kaggle.com/datasets/akhiljethwa/global-electricity-statistics - Author: Akhil Jethwa
2. https://www.kaggle.com/datasets/anshtanwar/global-data-on-sustainable-energy - Author: Ansh Tanwar

These datasets included data on global energy use and generation, as well as other relevant data to investigate relationships and trends.

Specifically, I utilised consumption, both total and separated by different sources, Co2 Emissions, GDP per capita and access to electricity separated by country and time to create my visualisation.

Why?:

I wanted to investigate which countries use the most or least electricity, and how this can have affect on or be affected by other variables. The datasets are a good choice for this as they have not only the raw data regarding electricity, but also other relevant data such that relationships can be investigated.

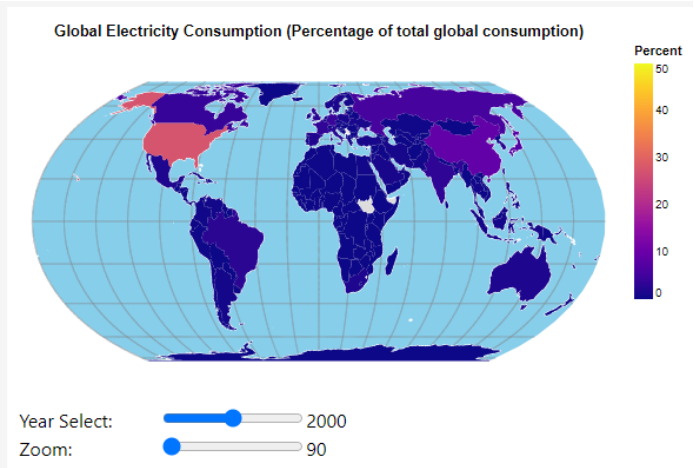
Who?:

The target audience for this visualisation is policy makers and government officials. This data can be used to make more informed decisions regarding policy, highlighting the problems of some nations and the strengths. This information can also be used to highlight the impact of the policies already in place in other nations, as well as to track the affects of a nations own policies throughout time.

What?:

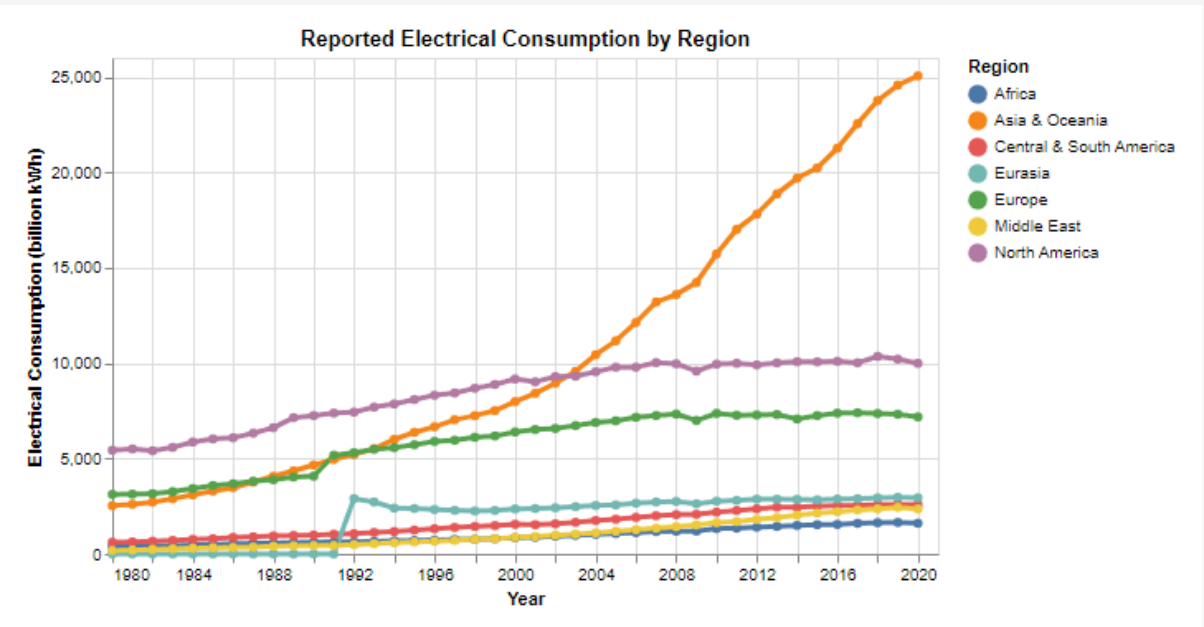
My visualisation investigates a few potential relationships between the different data, highlighting where the relationships do and do not exist.

Why and How?

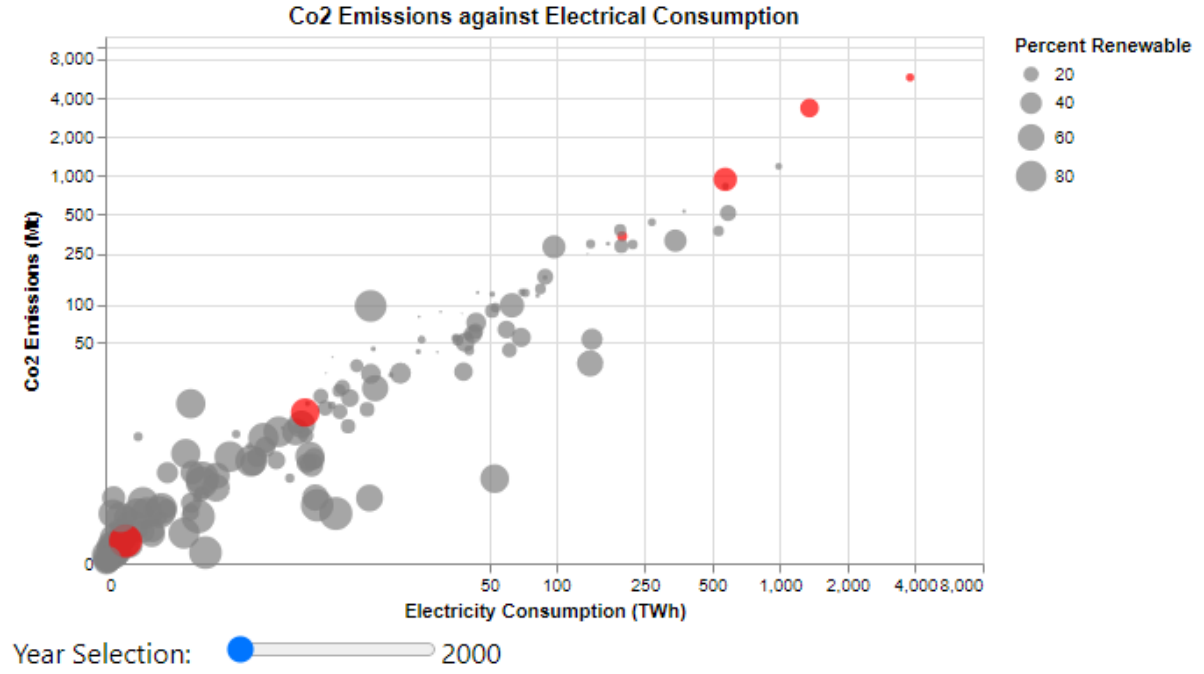


The choropleth map was chosen to show the trends of energy consumption throughout time. The data was normalised as a percentage of global consumption for that year. A choropleth map was chosen as it is ideal for showing data grouped by a region, in this case country, specifically

quantitative normalised data. This idiom conveys spatial patterns well, and by adding the slider for year select, users can see the change in trends over time. We can easily see which countries were the most active in terms of electrical consumption for a given time, and how the consumption of each country changed over time.

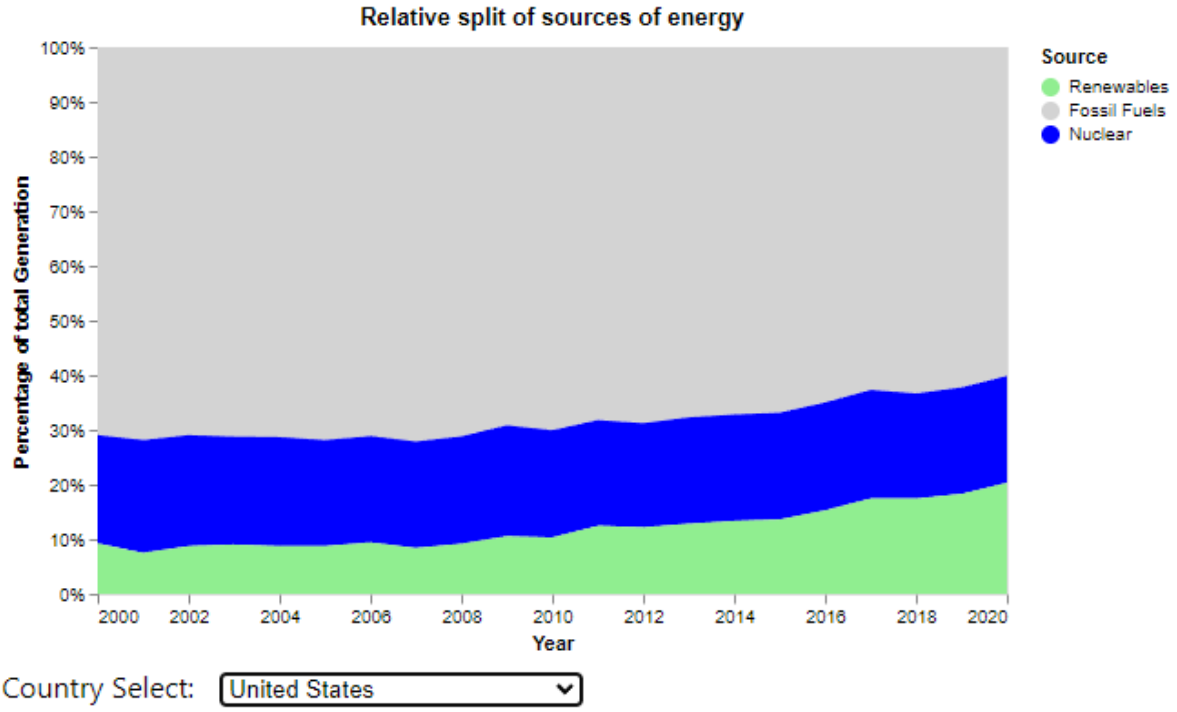


The line chart was chosen to give a different perspective on the same data. Here, we can see the absolute values of consumption for different regions, instead of split by country as with the choropleth map. This idiom allows for better comparison of data in a temporal setting, as well as looking at the rate of change of consumption for different regions.

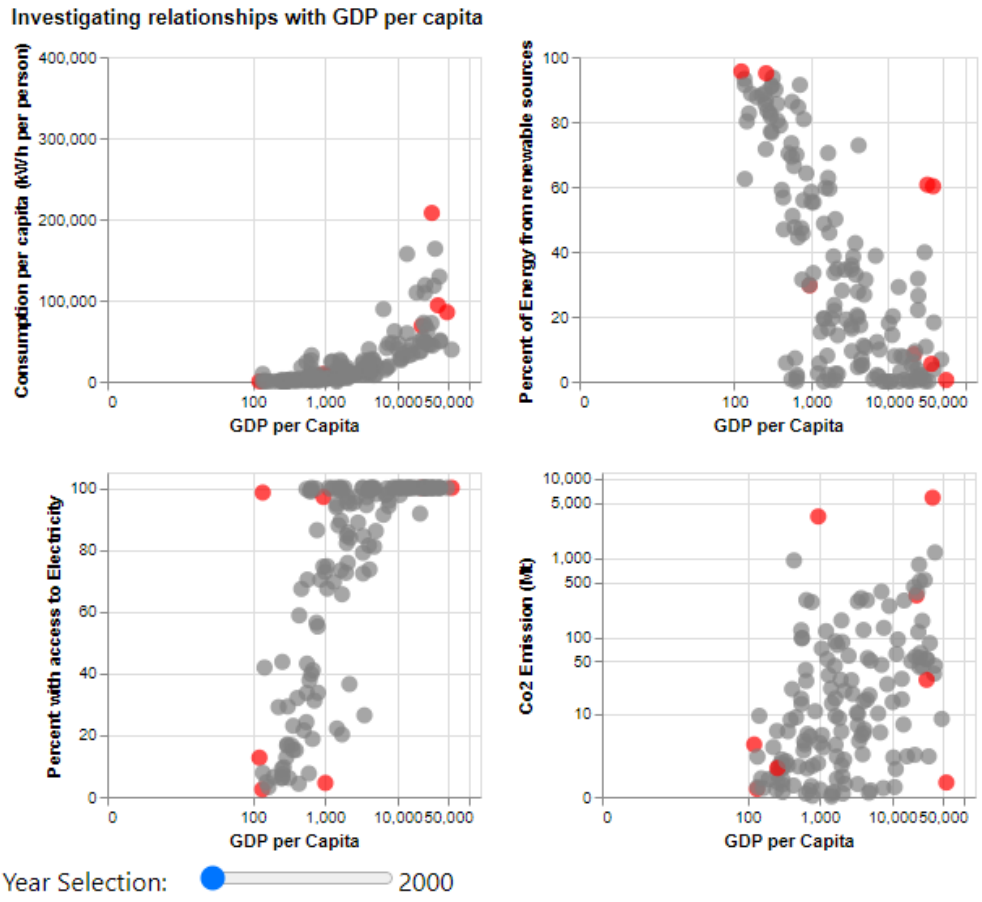


The bubble chart was chosen over a scatter plot for this chart as it allows the third attribute of size. Here, we can clearly see a positive trend on the log-log plot between the two variables which is why this idiom was chosen. The size of the marks are dependent on the percent of consumption from

renewable sources, which would have an affect on the Co2 emissions, hence why a bubble chart was chosen over a scatter plot.



The stacked area chart was intended as a tool for users to investigate the trends of countries they were interested in in terms of sources of energy. Unlike the other charts which visualise the data as grouped by country or region, this idiom is used to have a closer look at the trends of a country throughout time. This idiom is a good choice as it allows for easy temporal comparisons, and the normalised data still enables users to compare to other countries in a meaningful way.



Lastly, this grouping of scatterplots was chosen purely to investigate if different statistics have a relationship with a nations GDP per capita for a given year. This idiom is a good choice as the scatter plots allow users to easily recognise the existence or lack relationships present.

Design

- Layout
  - The layout chosen was simplistic to minimise distractions and lines of sight. The text all aligns with the charts, and is split into clear rows and columns. Spacing was used between the charts to include some whitespace and not overwhelm the users.
- Colour
  - A sequential colour scale was chosen for the quantitative data contained within the map. A categorical colour scale was chosen for the line chart to represent the different regions. For the bubble chart and scatter plots, a neutral grey colour was chosen, with red highlighted countries for major countries or countries with interesting datapoints. The red countries are the same throughout the plots to avoid confusion. For the stacked area chart, the colours were chosen to intuitively match the category, such as grey for fossil fuels (think coal), green for renewable energy (green energy), and blue was chosen for nuclear to enable access to users with common red-green colour blindness.
- Figure-ground
  - The charts are the prominent focus of the visualisation. Keeping in mind that English readers read left to right, top to bottom, the charts were aligned in the left column and text descriptions in the right. This keeps the focus on the chart. Additionally, the charts were ordered specifically from top to bottom in the order I wanted to tell my

story. The first two charts (map and line) give context. They provide raw data which can be investigated both over time and space. Next, the bubble chart to expand further on the context provided above and investigate a specific relationship. The stacked area chart and the scatter plot were intended to be used together. The stacked area chart can provide context for the scatter plots, which is why it was placed above.

- Typography
    - The typefaces chosen are all sans-serif to remain consistent. Font sizing was chosen to give hierarchical structure to headings, titles, and descriptions. In the descriptions, the key words of the text block are bolded. This enables users to skim read the paragraph while still being able to understand the main points made. This provides emphasis, readability, clarity and hierarchy to the text.
- Storytelling
    - The reader is guided through the visualisation through the use of the description annotations to the right of each chart. The bolded text adds emphasis on the key observations, such that readers will reach similar conclusions about the data. The idioms chosen also aid in the storytelling by allowing easy comprehension of temporal or spatial trends.

Bibliography

1. https://www.kaggle.com/datasets/akhiljethwa/global-electricity-statistics - Author: Akhil Jethwa
2. https://www.kaggle.com/datasets/anshtanwar/global-data-on-sustainable-energy - Author: Ansh Tanwar
3. ChatGPT was chosen to assist with different technical problems encountered, as well as integrating and generating some aspects of the Vega specifications.