Electricity production and consumption in Germany (2017-2022)

Ironhack Midterm Project
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Introduction to project

A look at the Energiewende in Germany through electricity production and consumption from 2017 to 2022.

- Trends in the electricity sector are important to business models in manufacturing and other industries

Questions

- How has production by source changed?
- Are there any trends in the production?
- What are the consumption rates and have these rates changed?
- How do production and consumption compare?
- What is the trend for residential electricity prices?

Data preparation

- Two datasets were used in this project:
- Production and consumption of electricity 2017 to 2022
  - Biggest issue → data quality
  - UN collected data?
  - Production by source didn't sum to 'Total' column
  - Values were very different from other sources
  - Solution: found new data sets from official German sites
  - Changed quantity values from megawatt-hours to gigawatt-hours to improve readability
- Average residential prices for electricity
  - Data from 2019 was missing half a year
  - Rather than NaN, '-' character was used to indicate that there was no information
  - Dropped these rows

Sample of findings → to Tableau Story for complete viz

- In 2022, renewable energy sources made up 47% of the total.
- Solar production increased by almost 20% from 2021 to 2022.
- As of April 2023, Germany no longer generates electricity with nuclear reactors. We can see a significant decrease in production beginning in 2021.
- In 2022 wind made up 25% of electricity production.
- 2020 and 2022 saw the lowest production totals out of the six years.
- Consumption has been relatively steady.
- Production generally outpaces consumption, but not always.
- Residential electricity prices have been steadily increasing.

Possible next steps

- Get import and export data
  - Is unmet demand being met by imports?
- Get wholesale energy prices
  - I recently read that wholesale prices have decreased
- Get weather data
  - Avg wind speed per month and number of sunny days per month
  - To what extent do these features correlate with wind and solar production? Can they alone be used to forecast production or are there other important variables?
- Compare next-day predictions to actual demand