Impact of Renewable Energy Sources on Energy Mix: EU (1982-2022)

Discussion Draft: 27 September 2023

Overview

1. Energy Mix in the EU

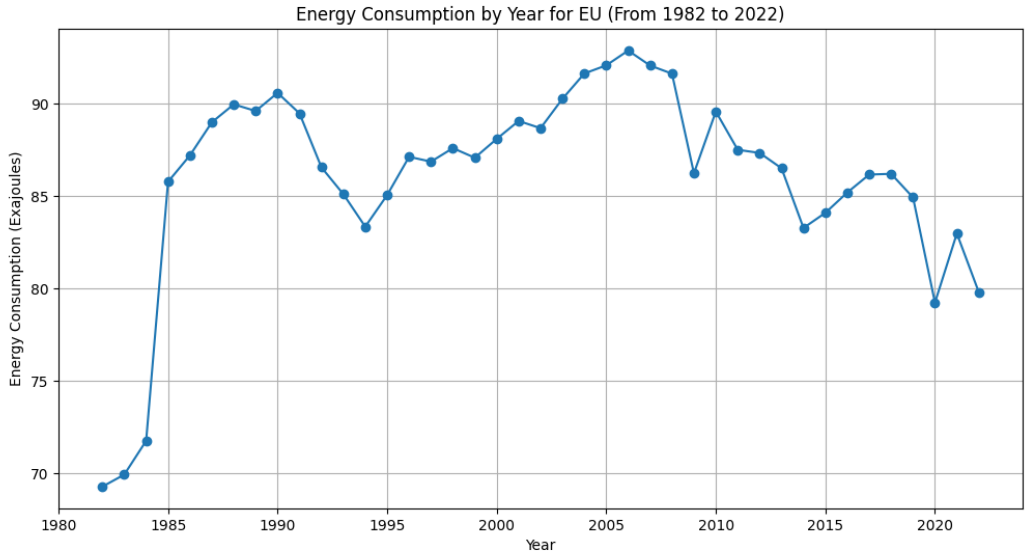
- The proportions of the different sources of energy production (the "**Energy Mix**") in the EU have changed over time as renewable energy sources have become more prevalent.
- Understanding the Energy Mix is vital as the Energy Mix has a direct impact on CO_2 emissions, and consequently, the rate of global warming.

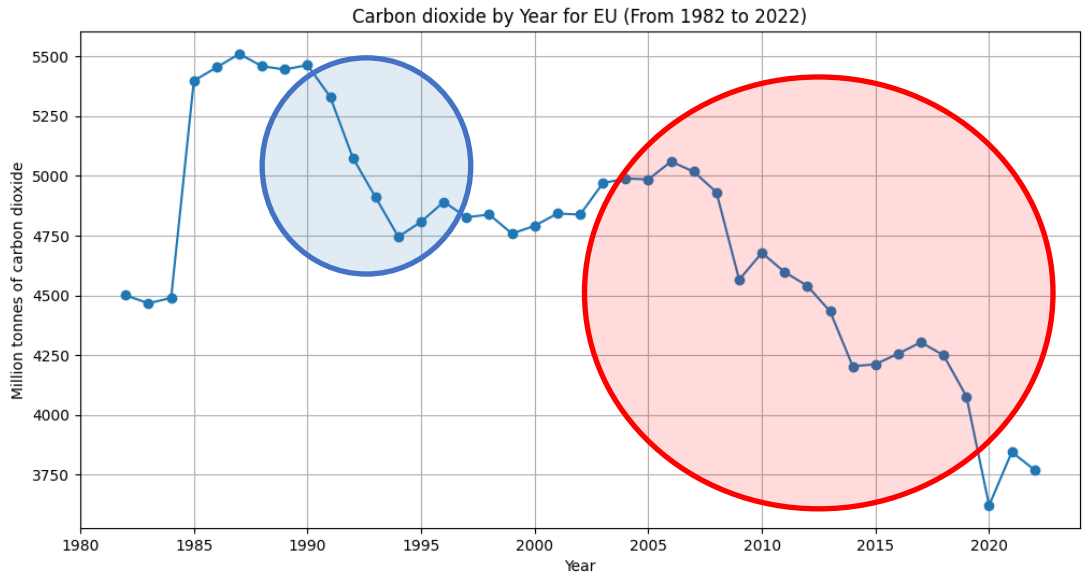
2. This Paper

- This paper considers how the Energy Mix in the EU has changed over the last four decades (from 1982 to 2022), and how this correlates with CO_2 emissions, using data from the Energy Institute.
- In summary, this paper notes that (i) the Energy Mix has changed over time, with a higher ratio of renewable energy sources to non-renewable energy sources and (ii) the change in the Energy Mix over time correlates with a gradual reduction in CO_2 emissions.

Background

- Over the last four decades, total energy consumption across the EU has risen significantly.
- CO_2 emissions have risen with total energy consumption.
- However, CO_2 emissions have historically dropped depending on which energy source was used.

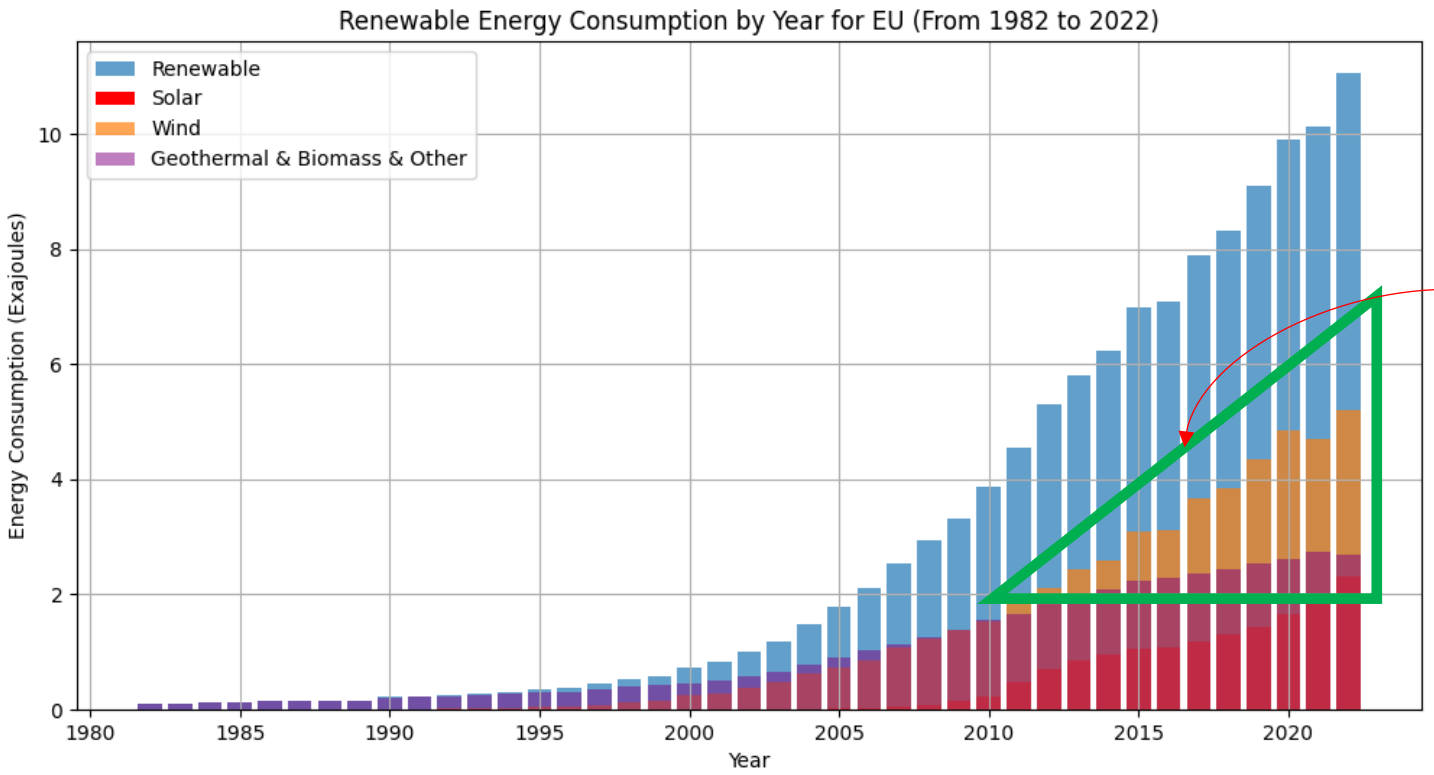




➢ 1 exajoule = 174 million barrels of oil equivalent (Rembrandt Koppelaar et al., 2020).

Renewable Energy Sources in the EU (1982 to 2022)

- Since 2000, total renewable energy consumption across the EU has risen significantly.
- This is especially true of wind-generated energy.



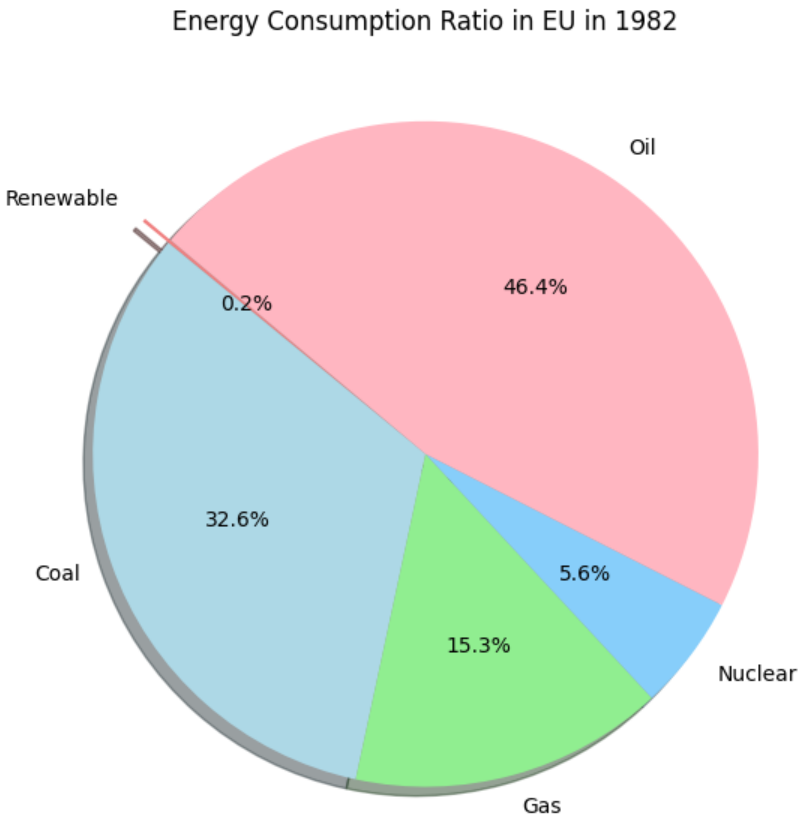
Wind-generated energy has significantly increased since 2010

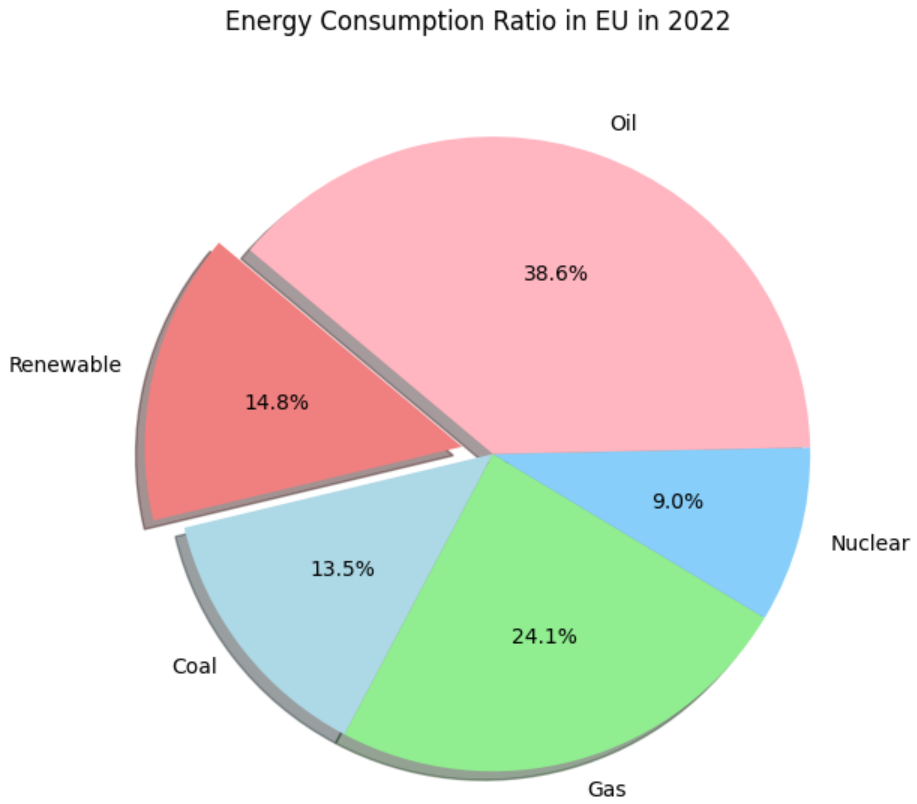
The ratio of renewable energy consumption in 2022

- Wind: 47.02%
- Geothermal & Biomass & other: 24.32%
- Solar: 20.89%

Energy Mix in the EU (1982 v 2022)

- As renewable energy consumption has increased, non-renewable energy consumption has decreased.





Energy Mix and CO_2 Emissions in the EU (1982 to 2022)

- CO_2 emissions have reduced as (i) renewable energy consumption has increased and (ii) non-renewable energy consumption has decreased.