Winc Academy

Project assignment

CO2 Emissions

Data Analytics with Python

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Project Assignment - CO2 Emissions

Description of the Assignment

This goal of this assignment is to create an assessment in which I can proof my Python skills learned in the “Data Analytics with Python” course, supplied by Winc Academy.

The assignments consists of solving the three questions below:

1. Biggest predictor of CO2 output
2. Biggest strides in decreasing CO2 output
3. Best future price for non-fossil fuel energy

The data used is coming from “Our world in data” webpage (https://ourworldindata.org).

The used datasets, together with the python scripts and report are uploaded in my personal Github environment: https://github.com/Opeth1973/Project_Assignement_CO2.

Question 1 – Biggest predictor of CO2 output

Is it true that the fossil fuel usage per capita rises if also the GDP per capita rises.
To be able to answer this question I looked at the correlation between the fossil fuel usage and the GDP.

I have used two data sources which I combined into one source:

1. Data source: gdp-per-capita-worldbank.csv
2. Data source: fossil-fuel-cons-per-capita.csv

Result of correlation:

Total Fossil Fuel Usage		
	Total Fossil Fuel	GDP
Total Fossil Fuel	1,000000	0,685141
GDP	0,685141	1,000000

Coal Fossil Fuel Usage		
	Coal Fossil Fuel	GDP
Coal Fossil Fuel	1,000000	0,087994
GDP	0,087994	1,000000

Oil Fossil Fuel Usage		
	Oil Fossil Fuel	GDP
Oil Fossil Fuel	1,000000	0,755838
GDP	0,755838	1,000000

Gas Fossil Fuel Usage		
	Gas Fossil Fuel	GDP
Gas Fossil Fuel	1,000000	0,381485
GDP	0,381485	1,000000

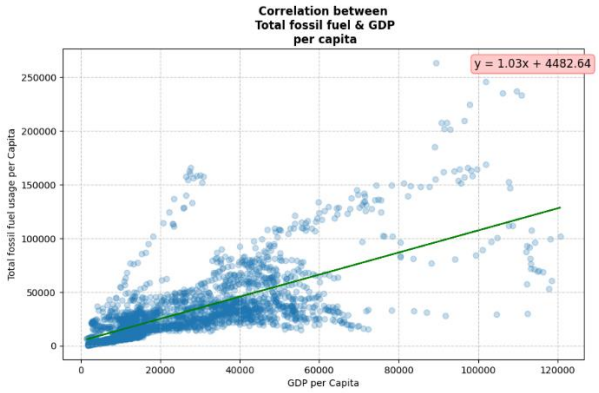
Conclusion:
The correlation coefficient between the GDP and total fossil fuel usage of 0.69 is fairly strong. It shows that they are associated.

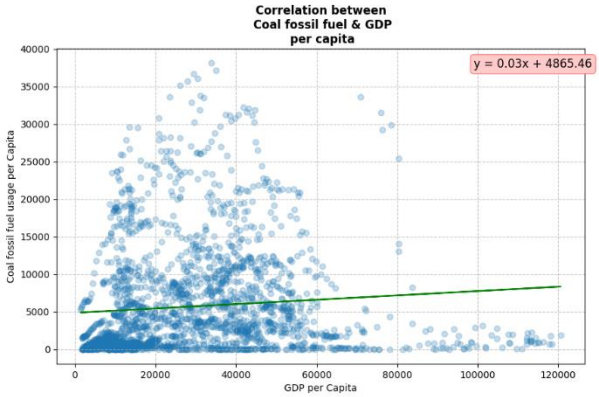
When looking the various fossil fuel types you will see different results:

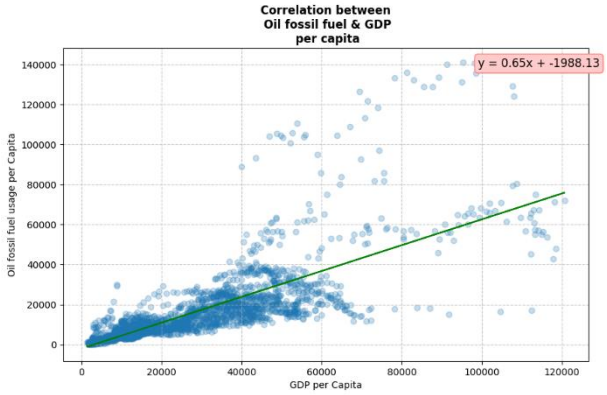
- Coal -> 0.09 -> no significant association,
- Oil -> 0.76 -> strong association,
- Gas -> 0.38 -> weak correlation

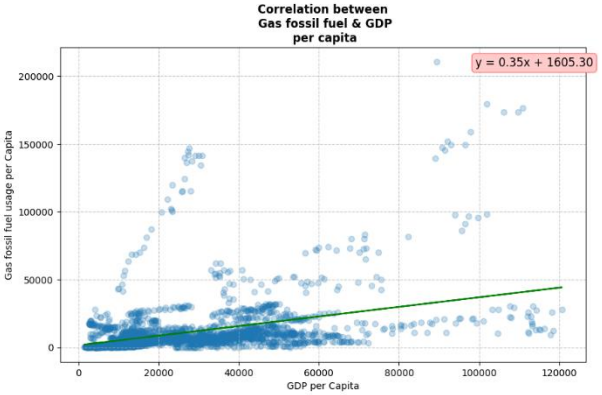
This correlation shows that, when the GDP per capita rises also the usage of fossil fuel rises. Especially the usage of Oil, and with the increased consumption of fossil fuels also the CO2 output rises.

Visuals:


Correlation between
Total fossil fuel & GDP
per capita
y = 1.03x + 4482.64
Total fossil fuel usage per Capita
GDP per Capita


Correlation between
Coal fossil fuel & GDP
per capita
y = 0.03x + 4865.46
Coal fossil fuel usage per Capita
GDP per Capita


Correlation between
Oil fossil fuel & GDP
per capita
y = 0.65x + -1988.13
Oil fossil fuel usage per Capita
GDP per Capita


Correlation between
Gas fossil fuel & GDP
per capita
y = 0.35x + 1605.30
Gas fossil fuel usage per Capita
GDP per Capita

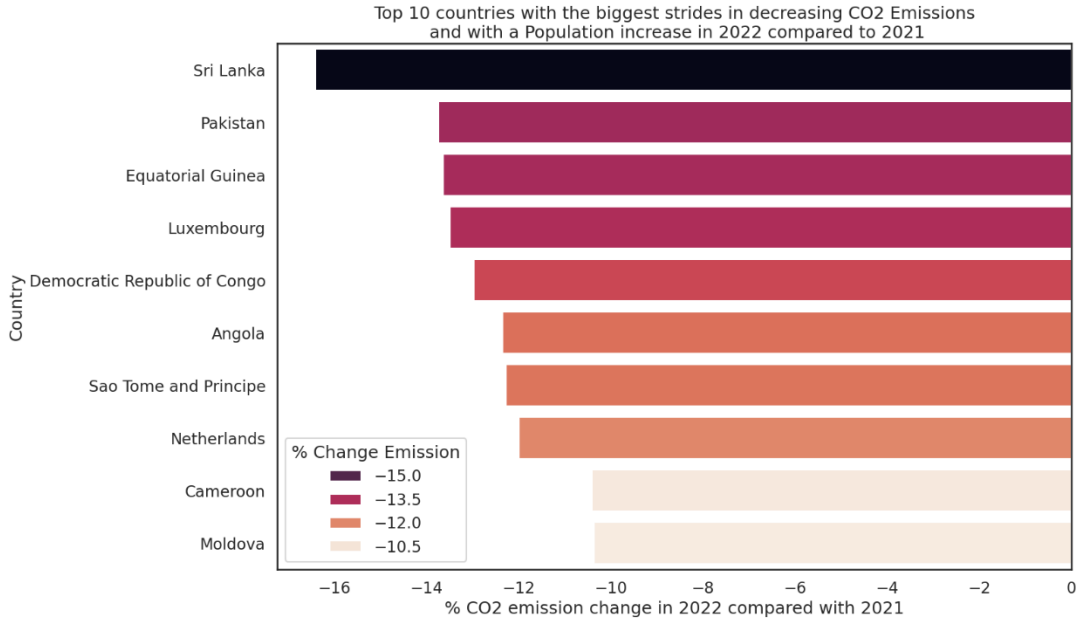
Question 2 – Biggest strides in decreasing the CO2 output

Which Countries realized the biggest relative decrease in the CO2 output?
To be able to answer this question I looked at the increase / decrease of the CO2 output in 2022, compared with the output in 2021. Also I only look at countries who had an increase in population.

I have used two data sources which I combined into one source:

1. Data source: co-emissions-per-capita.csv
2. Data source: population-and-demography.csv

Result of investigation:



As show in the graph, Sri Lanka managed to decrease the relative CO2 output by 15% for the countries which had an increase of population.

Question 3 – Best future price for non-fossil fuel energy

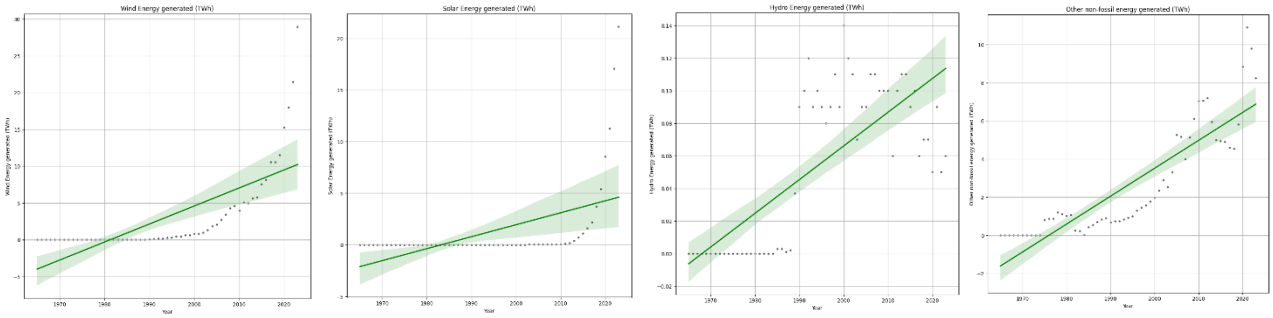
Which non-fossil fuel will have the best price in the future for The Netherlands?
In order to answer this question, I used the linear regression method on data which contains the production of renewable energy.
The focus will be on the following 4 categories:

1. Wind Energy
2. Solar Energy
3. Water Energy
4. Other, including Bio-energy

I have used one data source:

1. data source: modern-renewable-prod.csv

Result of investigation:



As shown in the graphs above, you can conclude that wind energy will have the best price for the future. Even though the Hydro and Other Energy show a bigger increase in the energy production, the amount of generated energy is low compared to wind and solar energy.