



IS 597 PR

Final Project Presentation

Analysis of Energy Sources

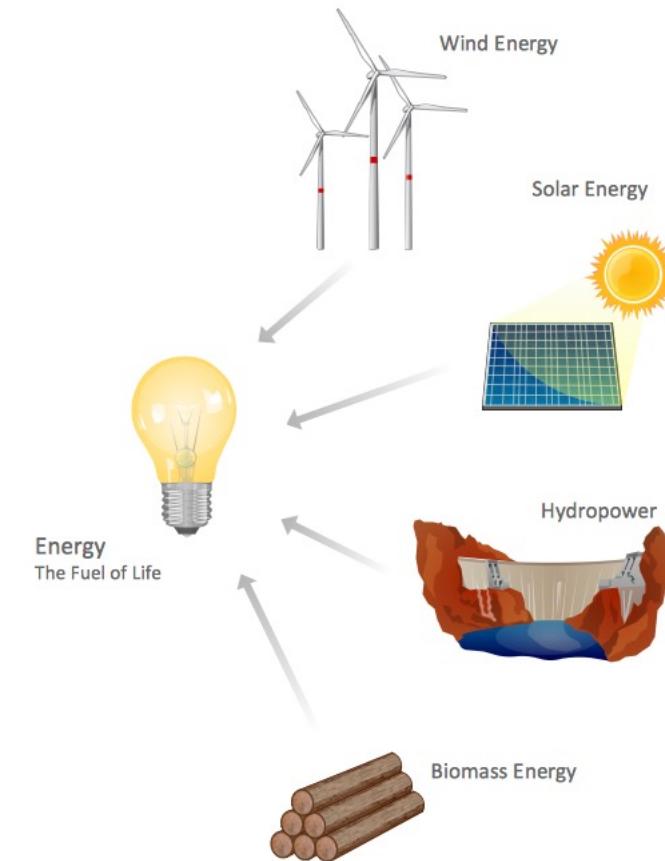
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Smit Malik

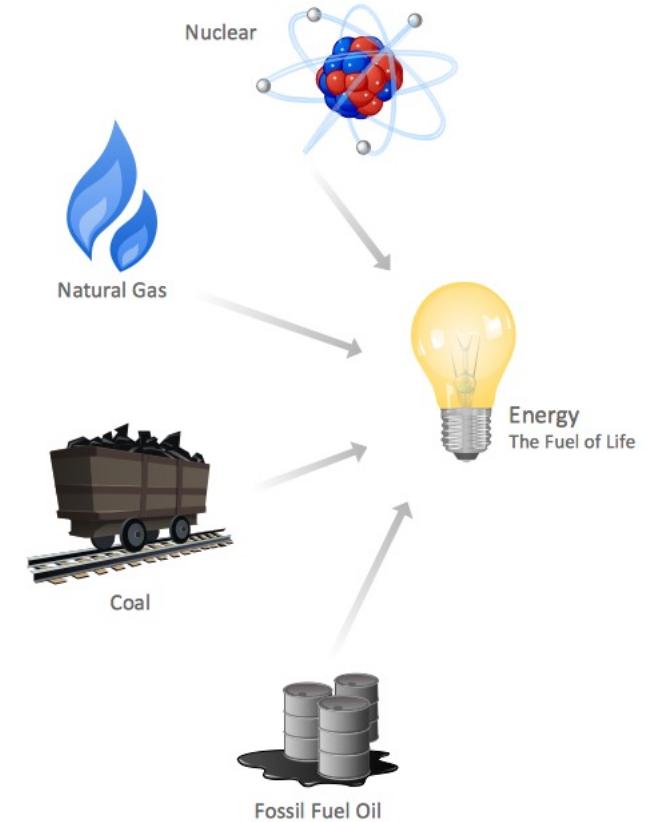
A Quick Introduction to our Topic

- Energy is the power or capacity to do work.
- Electric Energy is caused by the movement of electric charges called electrons.
- Electric Energy is used to power all the devices around us.
- These energy resources fall into two main categories, often called renewable and non-renewable energy resources.

Renewable Energy



Non-Renewable Energy



Dataset

- <https://data.oecd.org/energy/crude-oil-import-prices.htm>
- [ucdp-prio-acd-211-csv.zip](http://ucdp.prio.kit.edu/acd-211-csv.zip)
- <https://ucdp.uu.se/>
- <https://ourworldindata.org/renewable-energy>
- <https://ourworldindata.org/fossil-fuels>
- [City and Town Population Totals: 2010-2019 \(census.gov\)](https://www.census.gov/popest/town/2010/index.html)
- [Form EIA-860 detailed data with previous form data \(EIA-860A/860B\)](#)



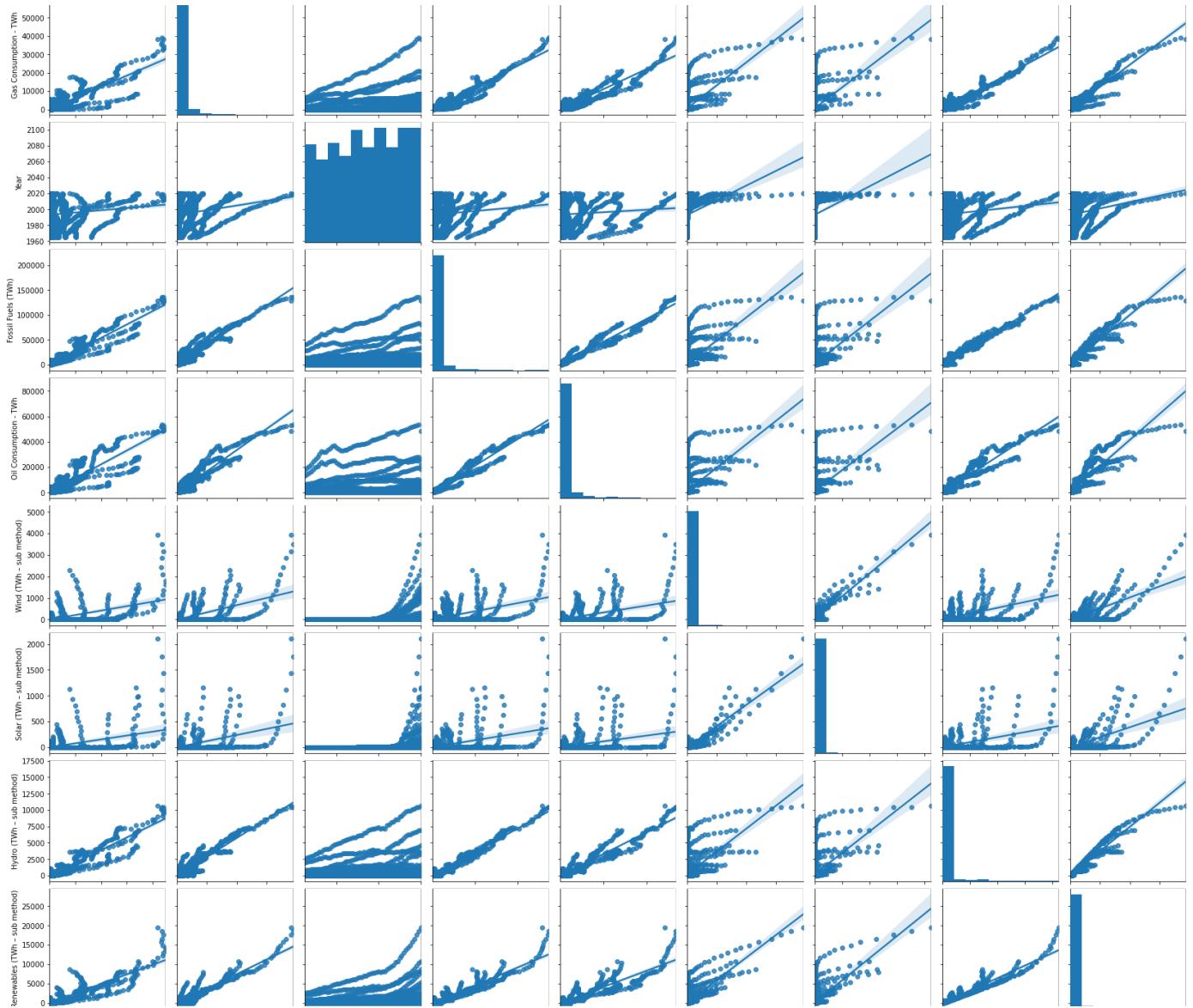
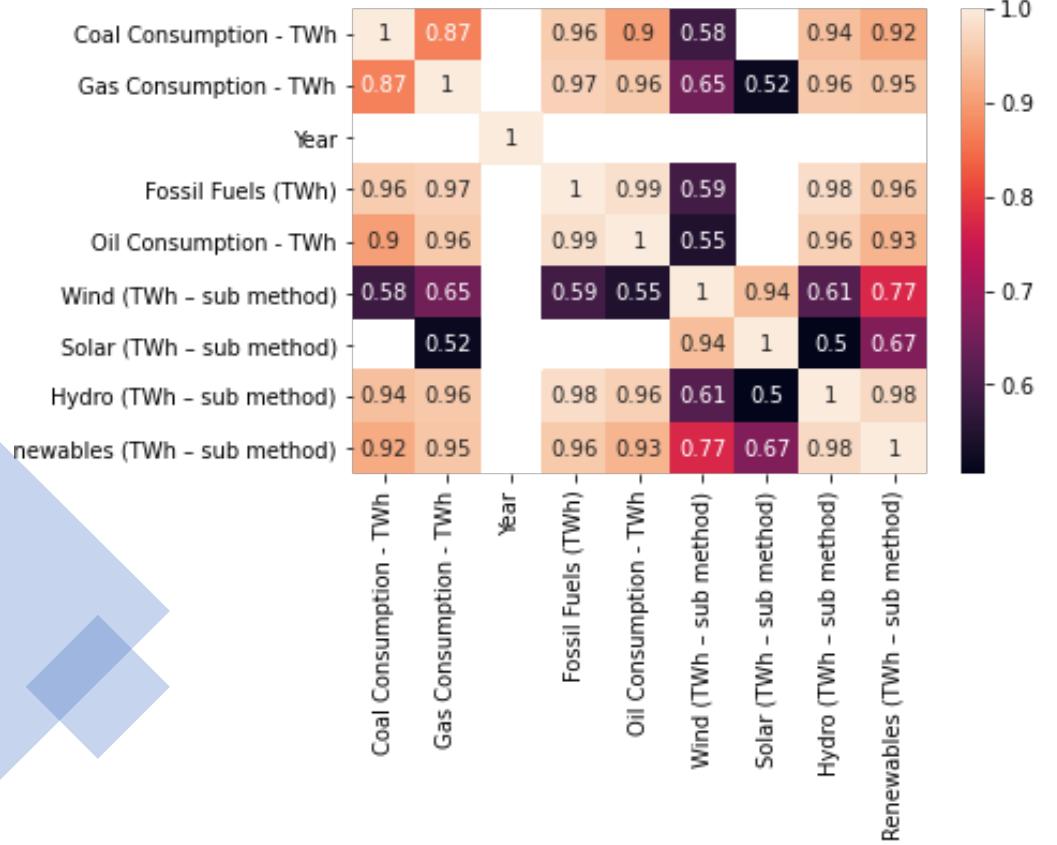


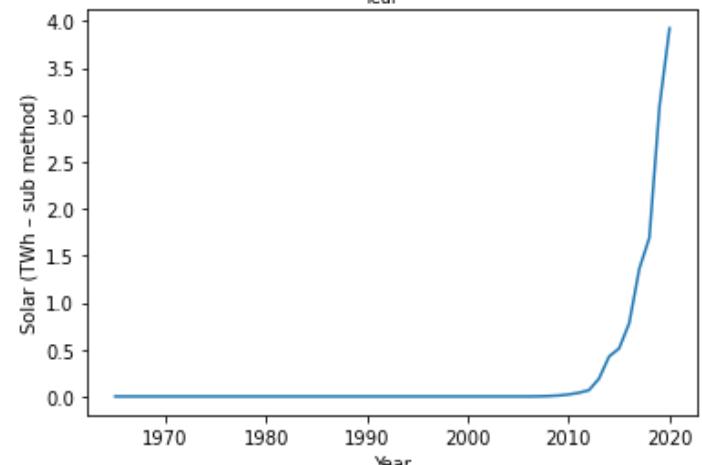
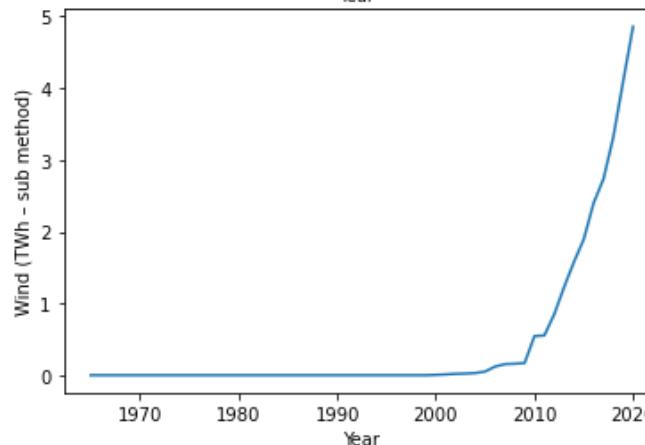
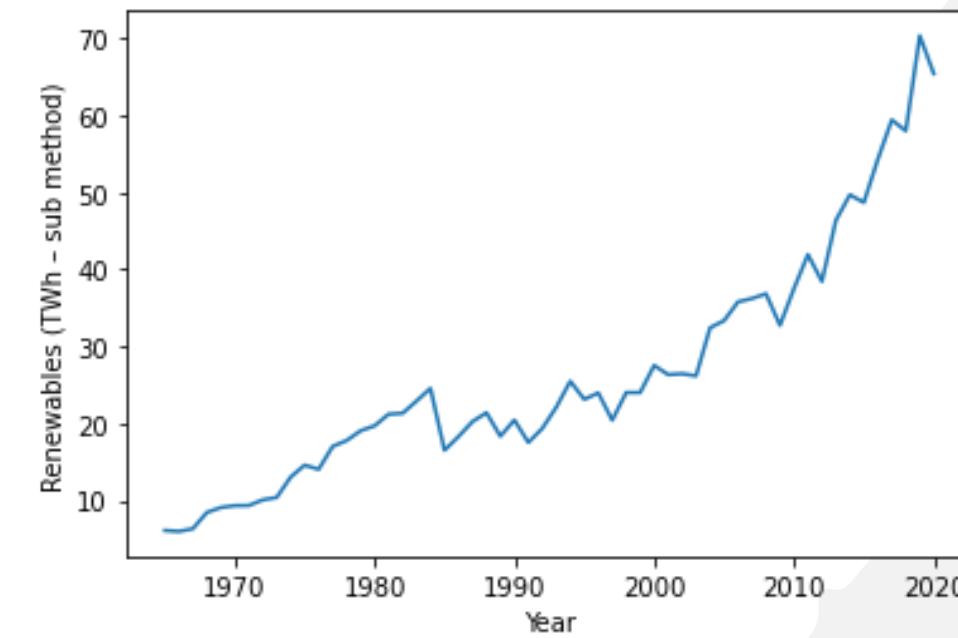
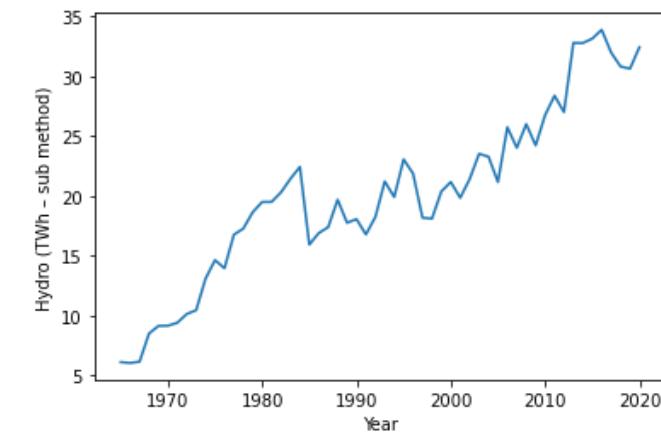
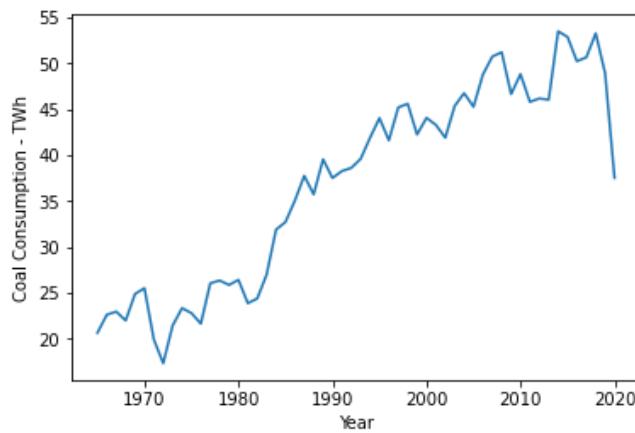
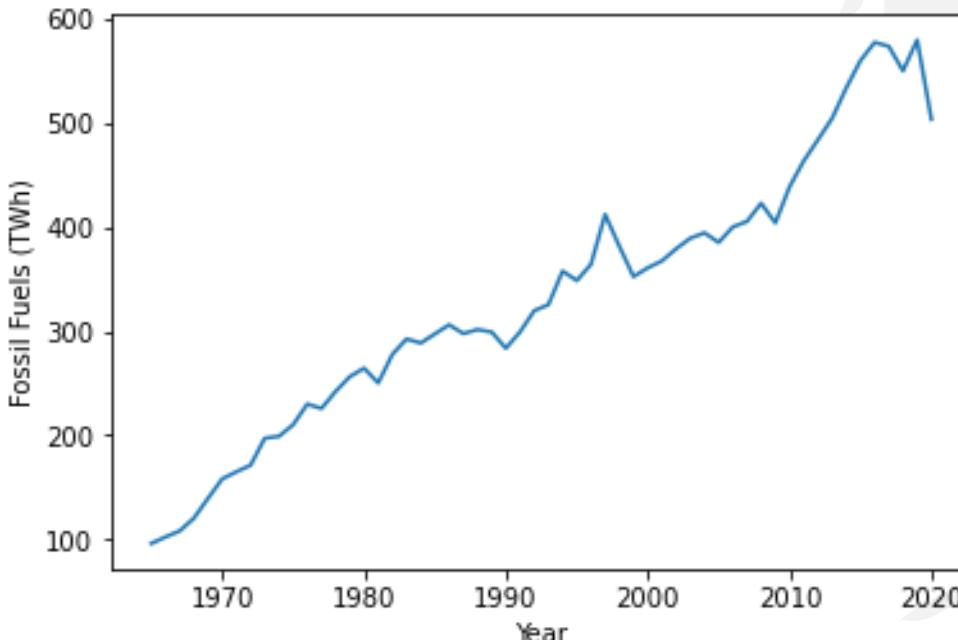
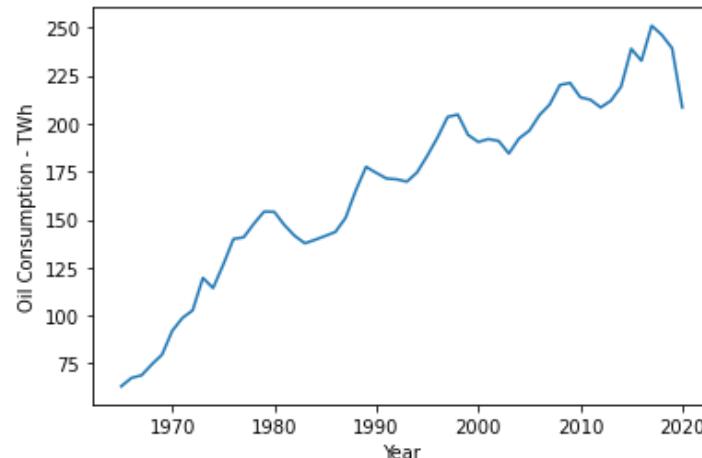
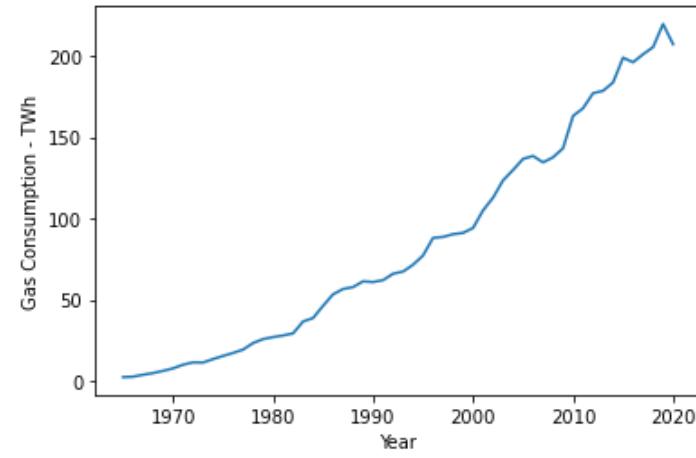
Hypothesis - 1

We anticipate that all countries or regions will reduce their non-renewable energy use. We'd also like to look at the use of non-renewable vs. renewable energy.

Do the attributes have any relation?

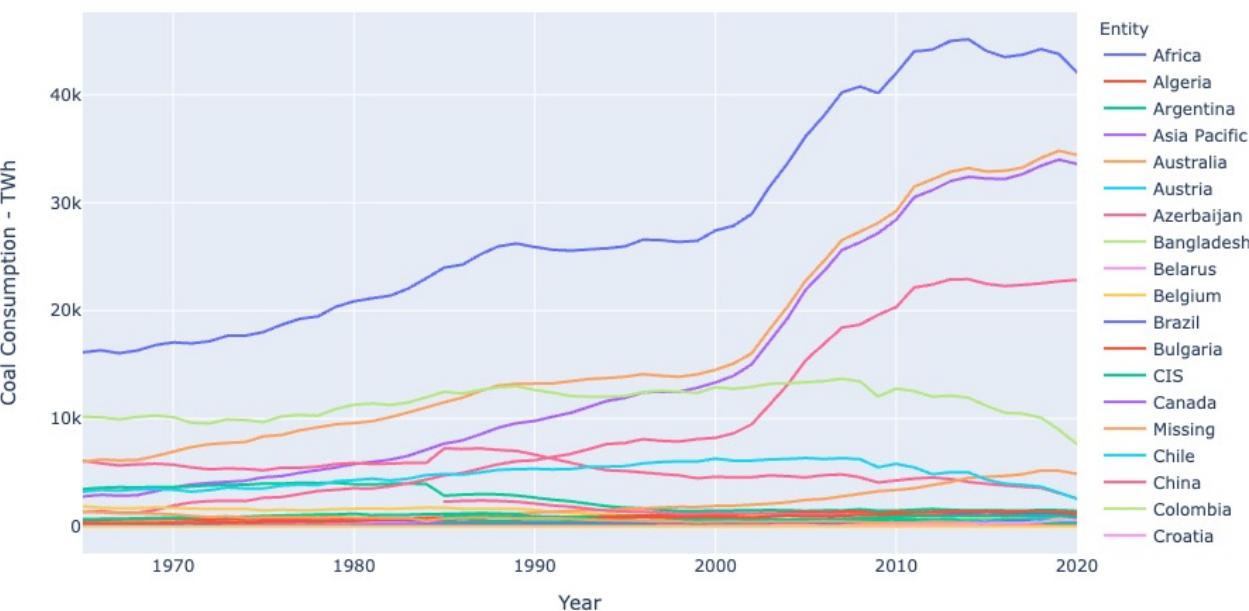
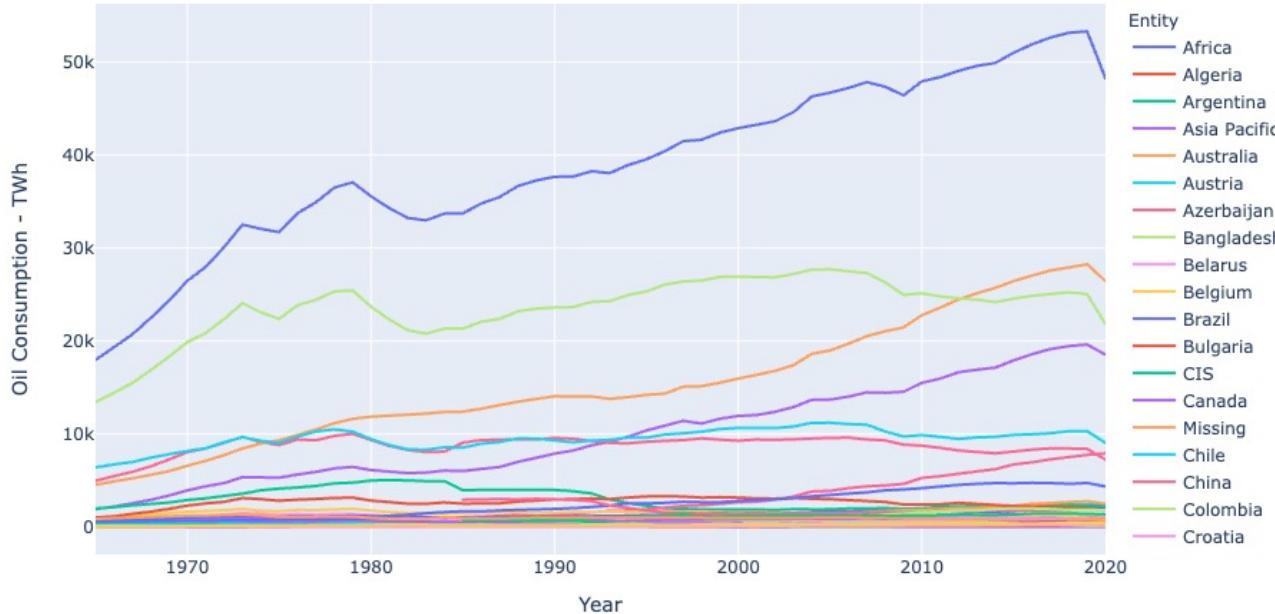
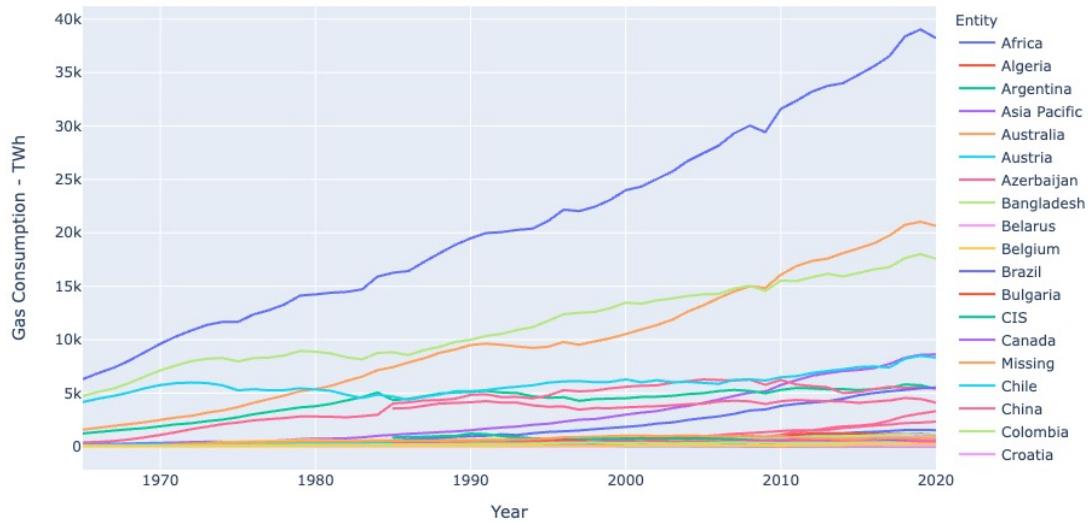
- All attributes are positively correlated with each other.
- But the amount of posterior data needs to be considered.





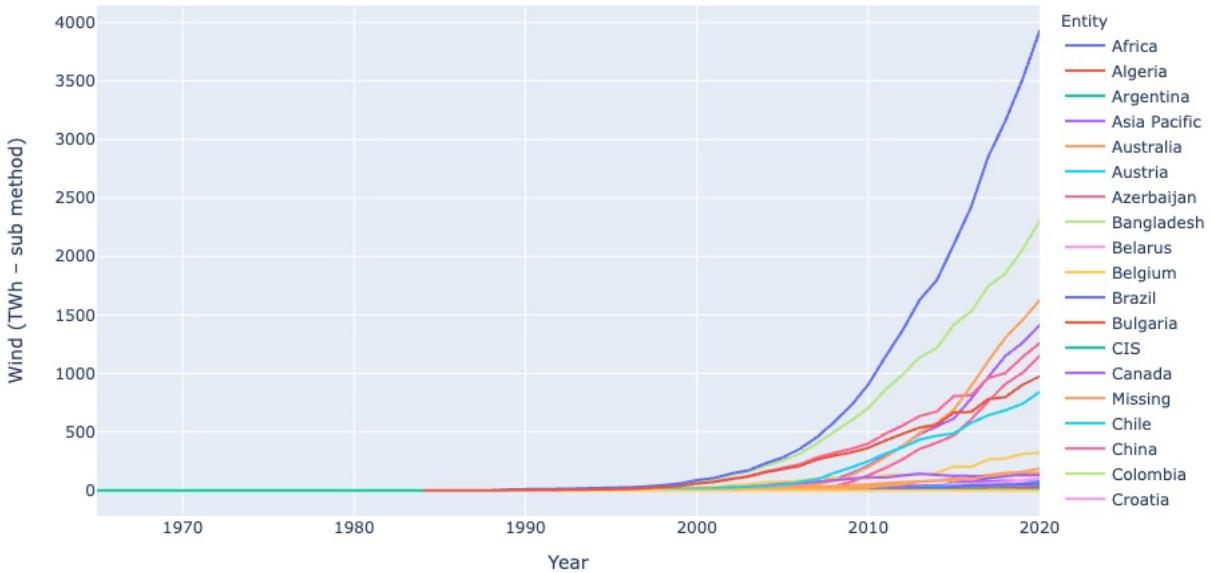
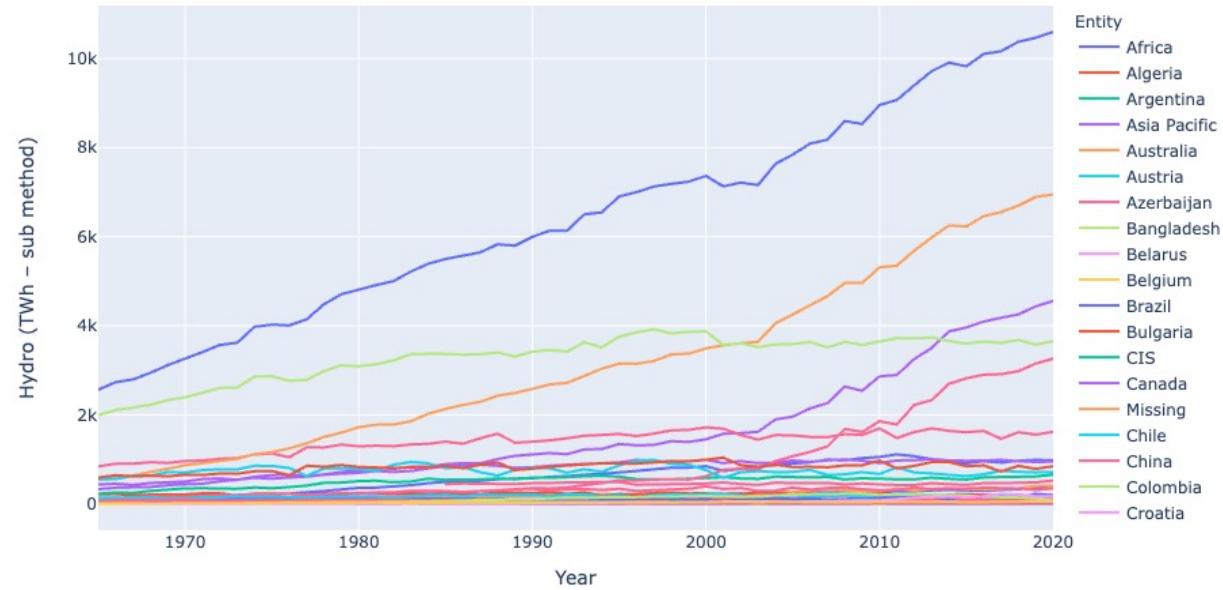
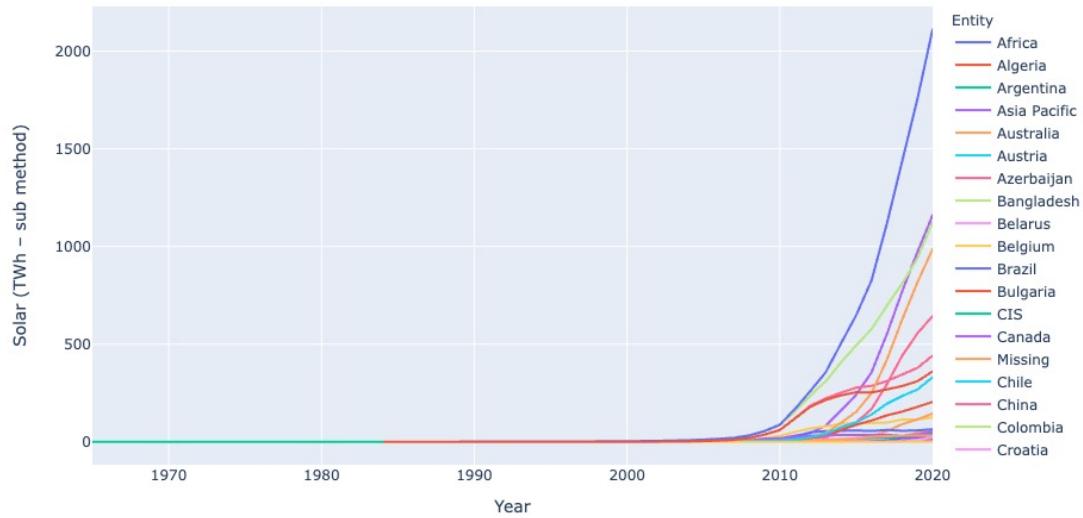


Non-Renewable Energy Consumption



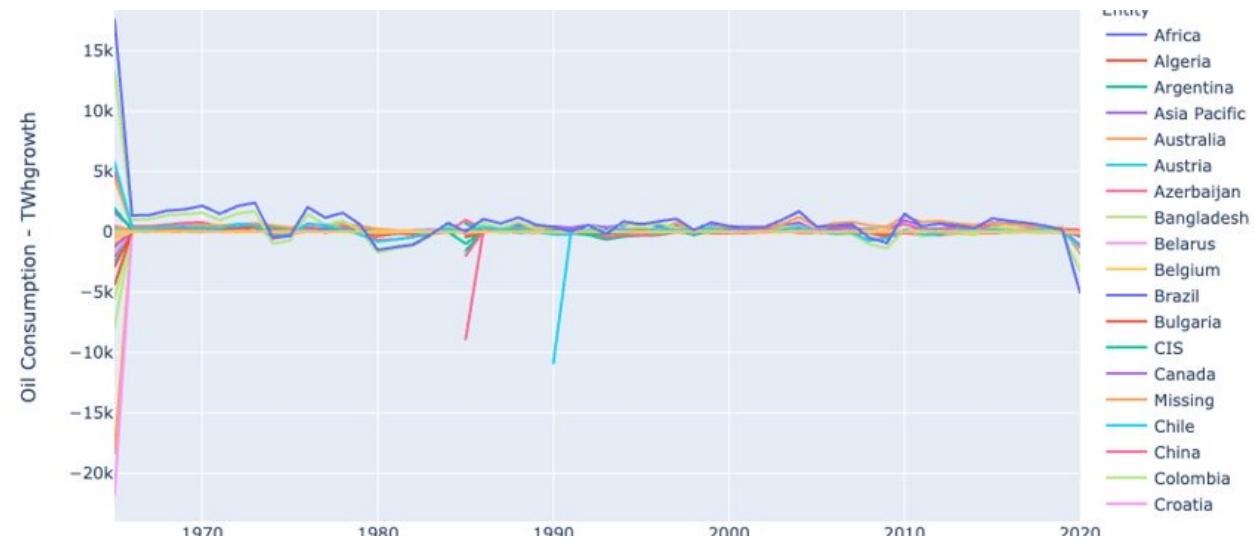
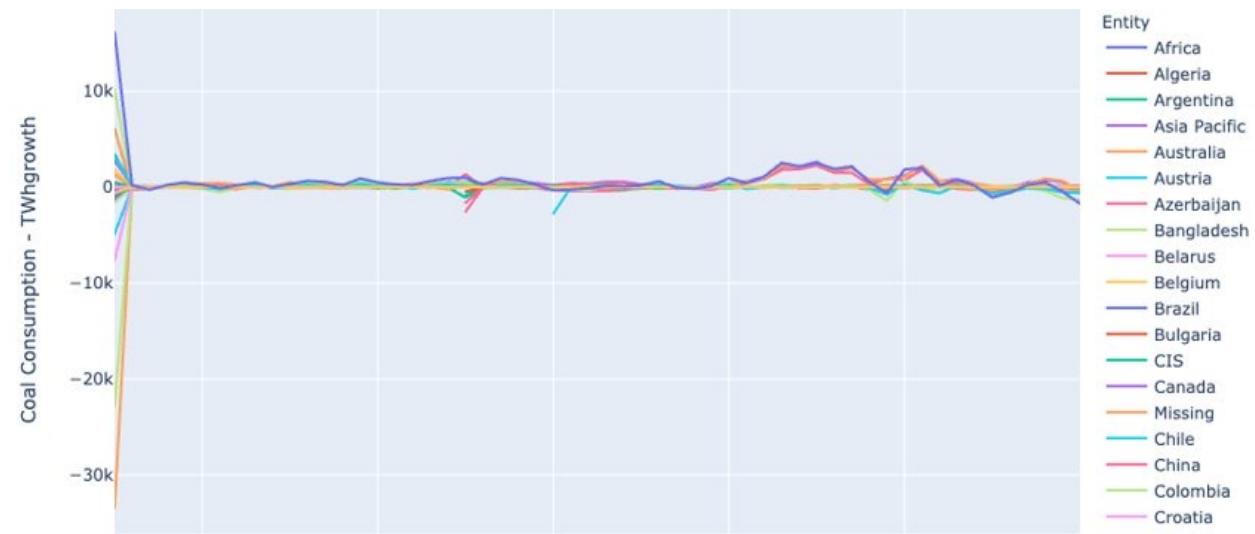
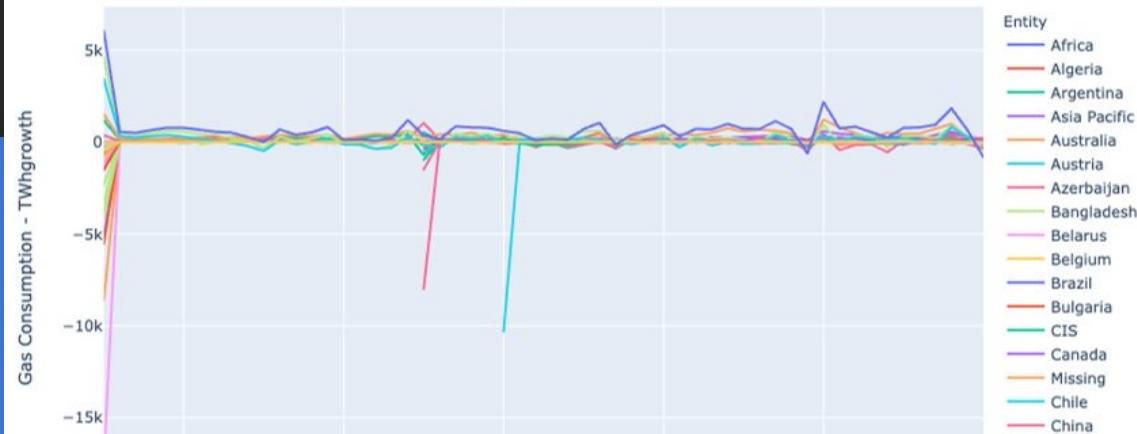


Renewable Energy Consumption



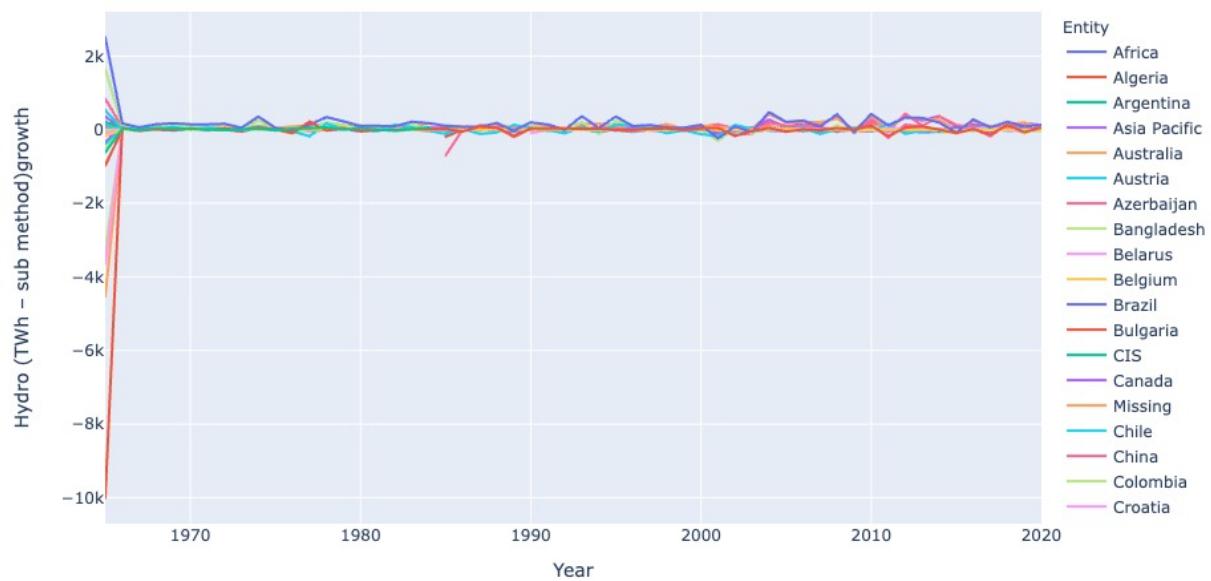
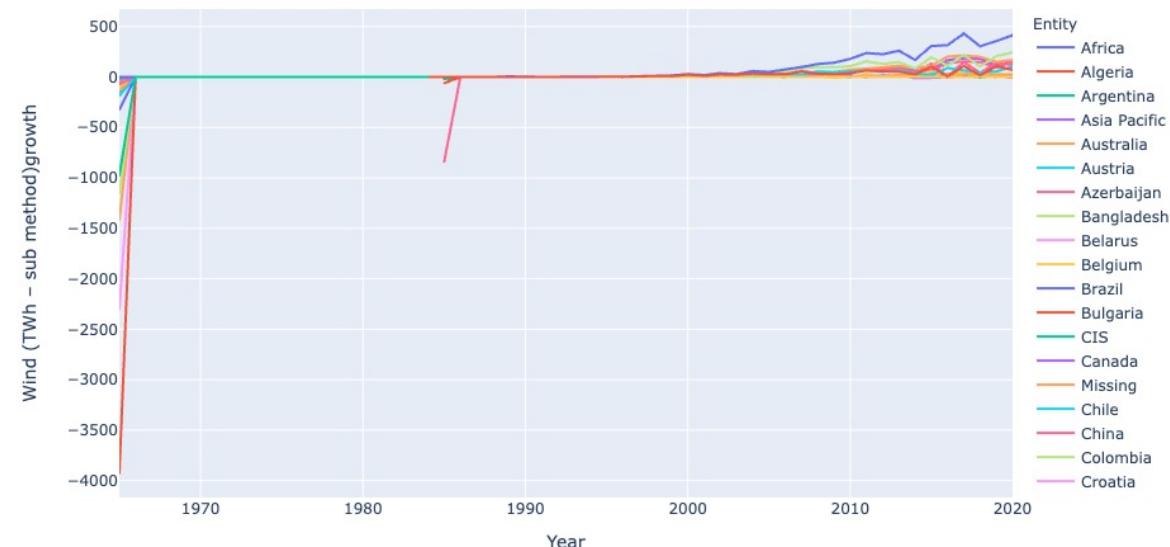
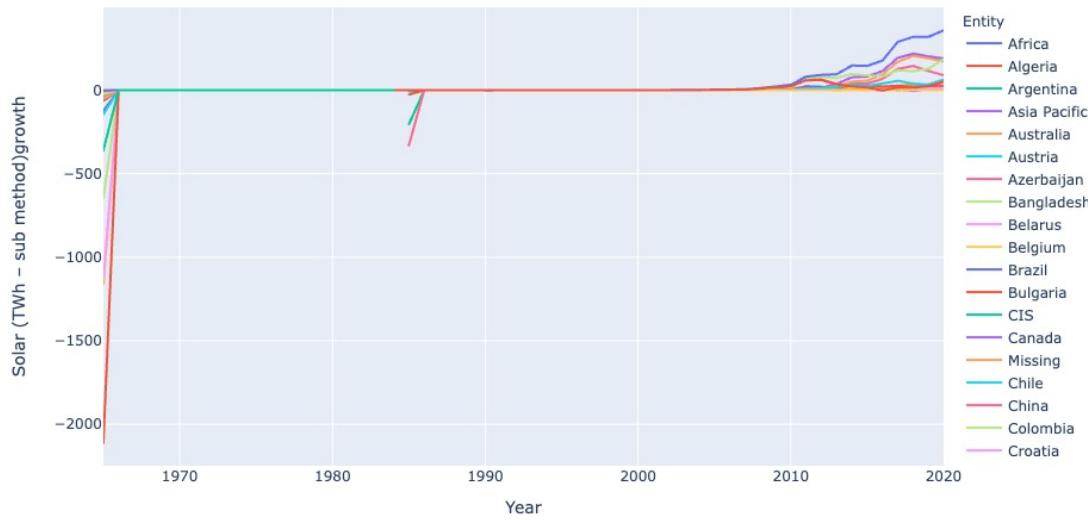


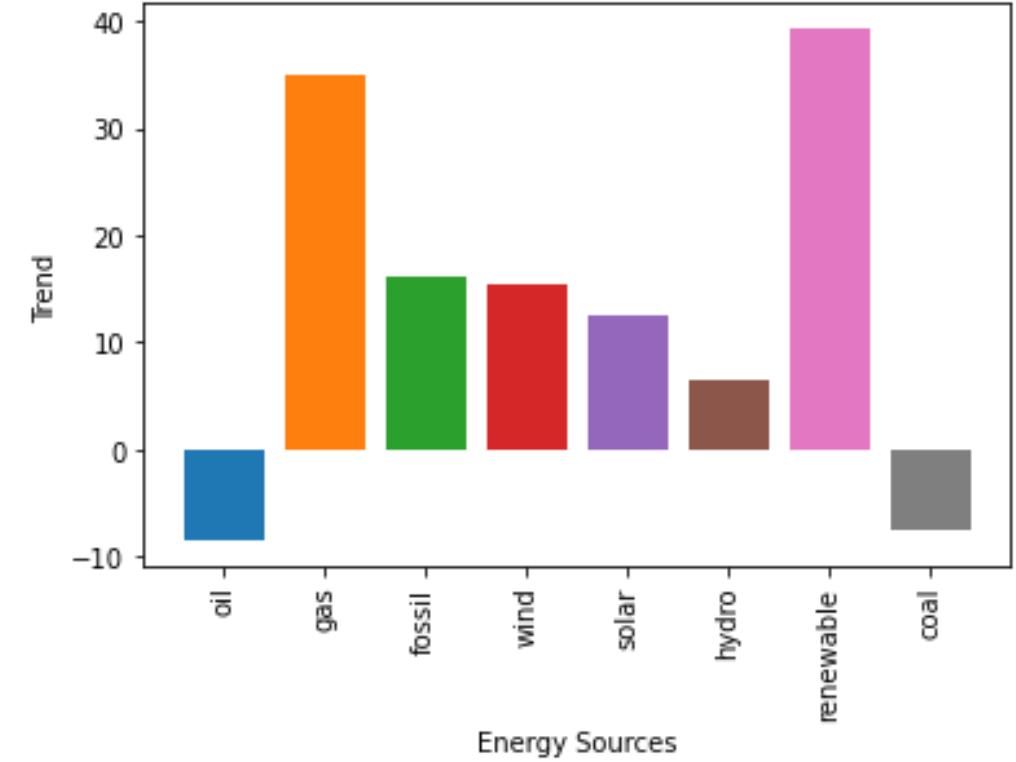
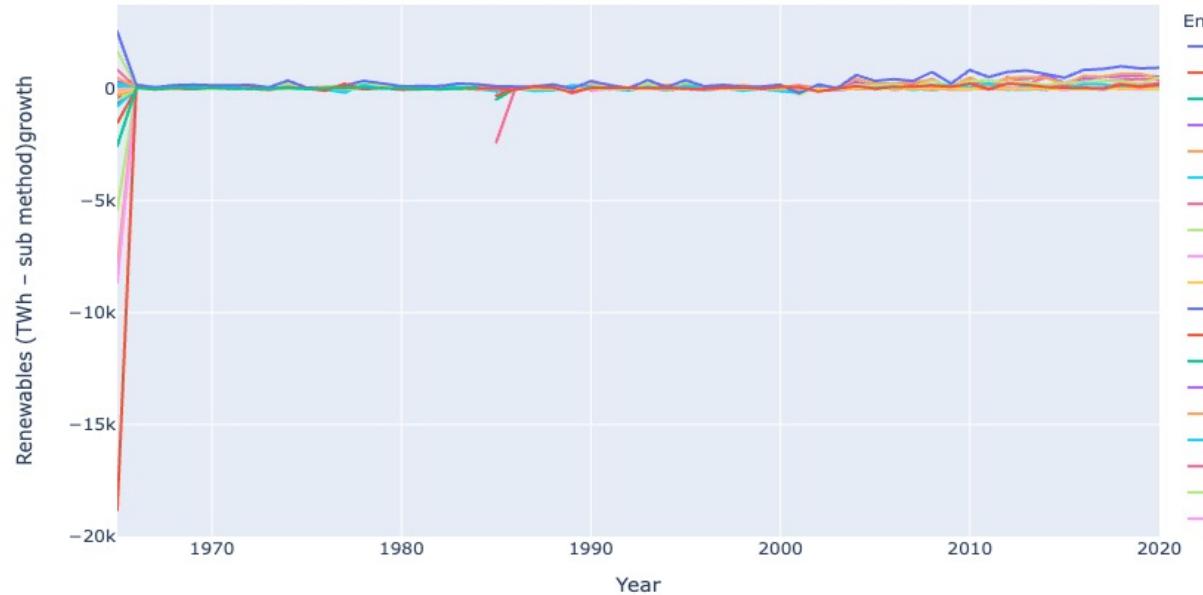
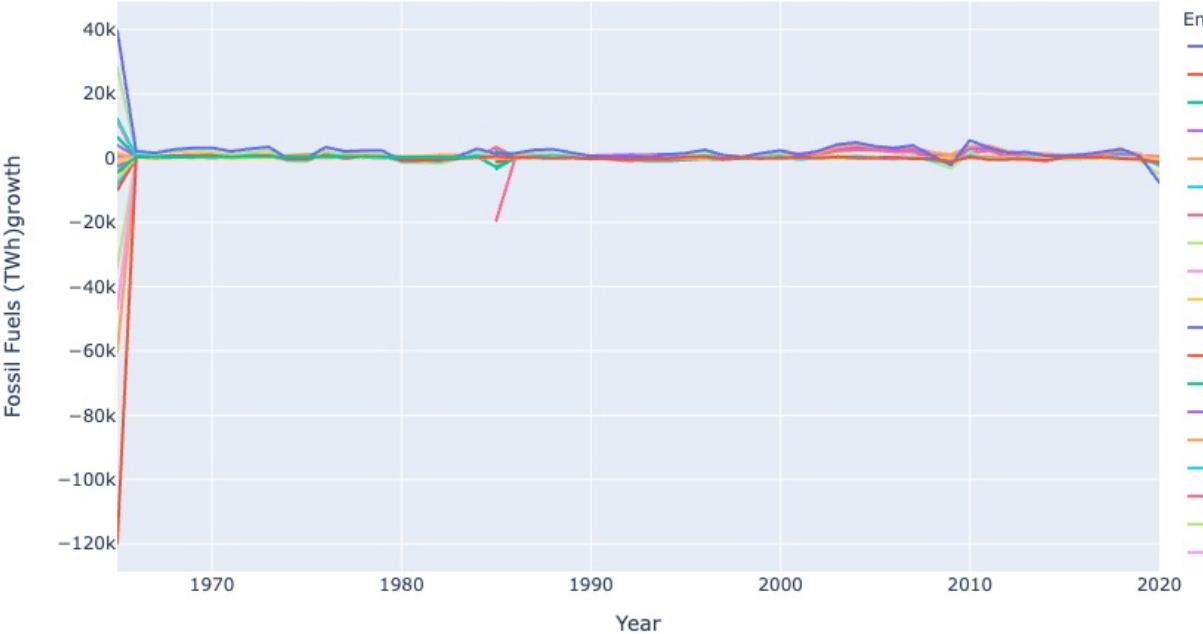
Non-Renewable Energy Growth





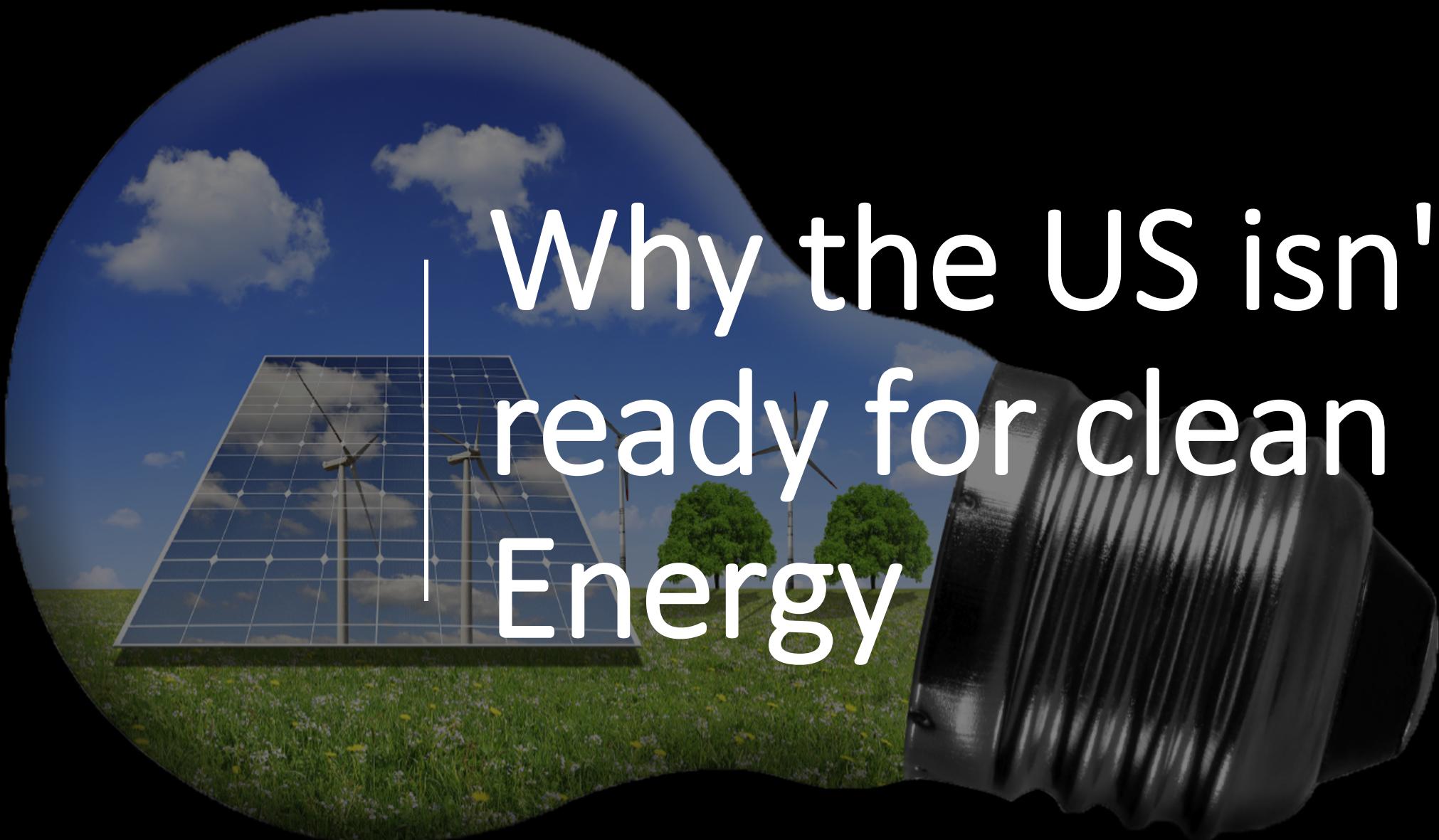
Renewable Energy Growth





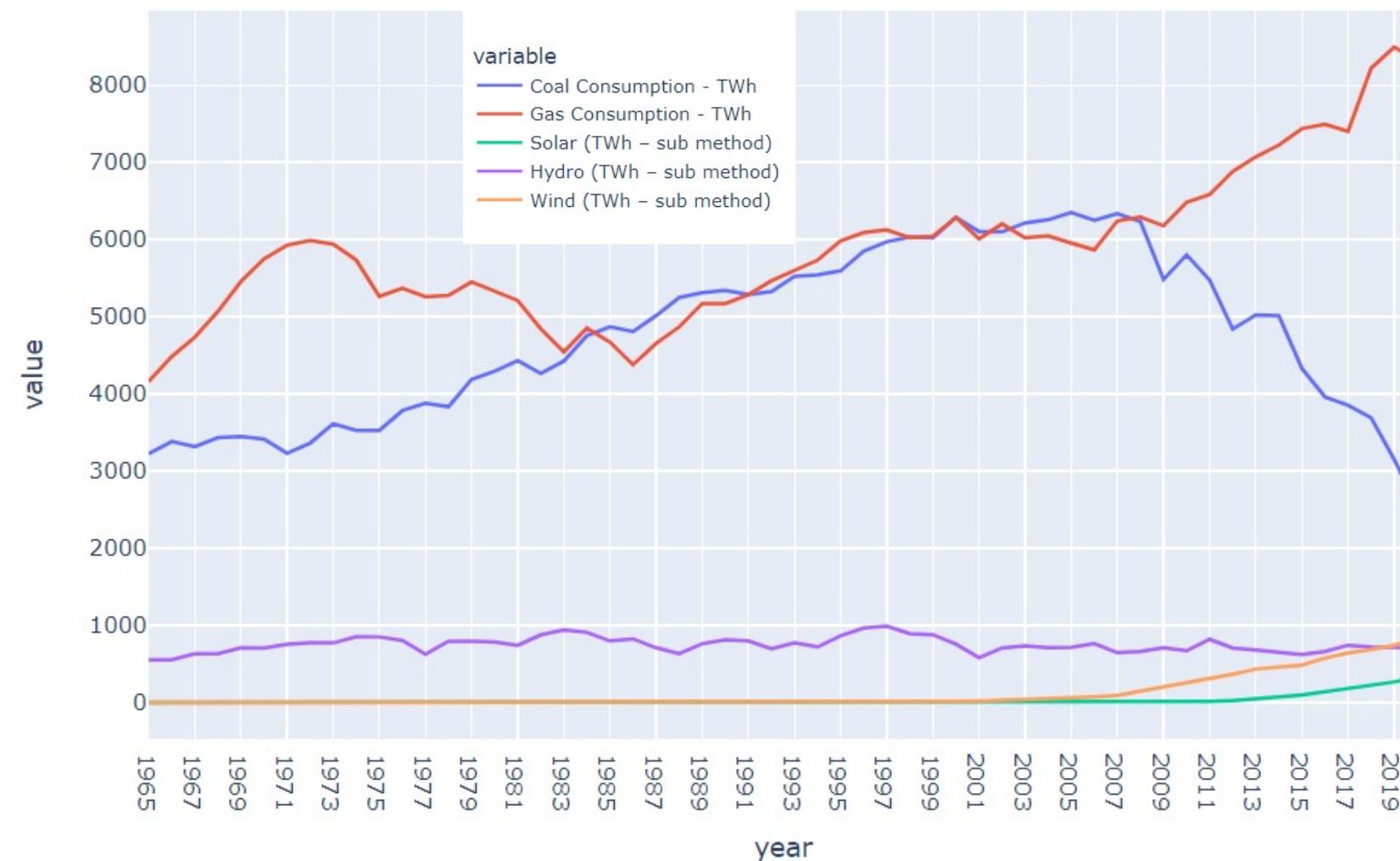
Trends

- Out of all, Oil and Coal have negative trends based on recent data.
- Surprisingly, Gas has a positive trend which makes fossil fuels collectively have a positive trend.
- All the renewable resources have a positive trend which was anticipated.

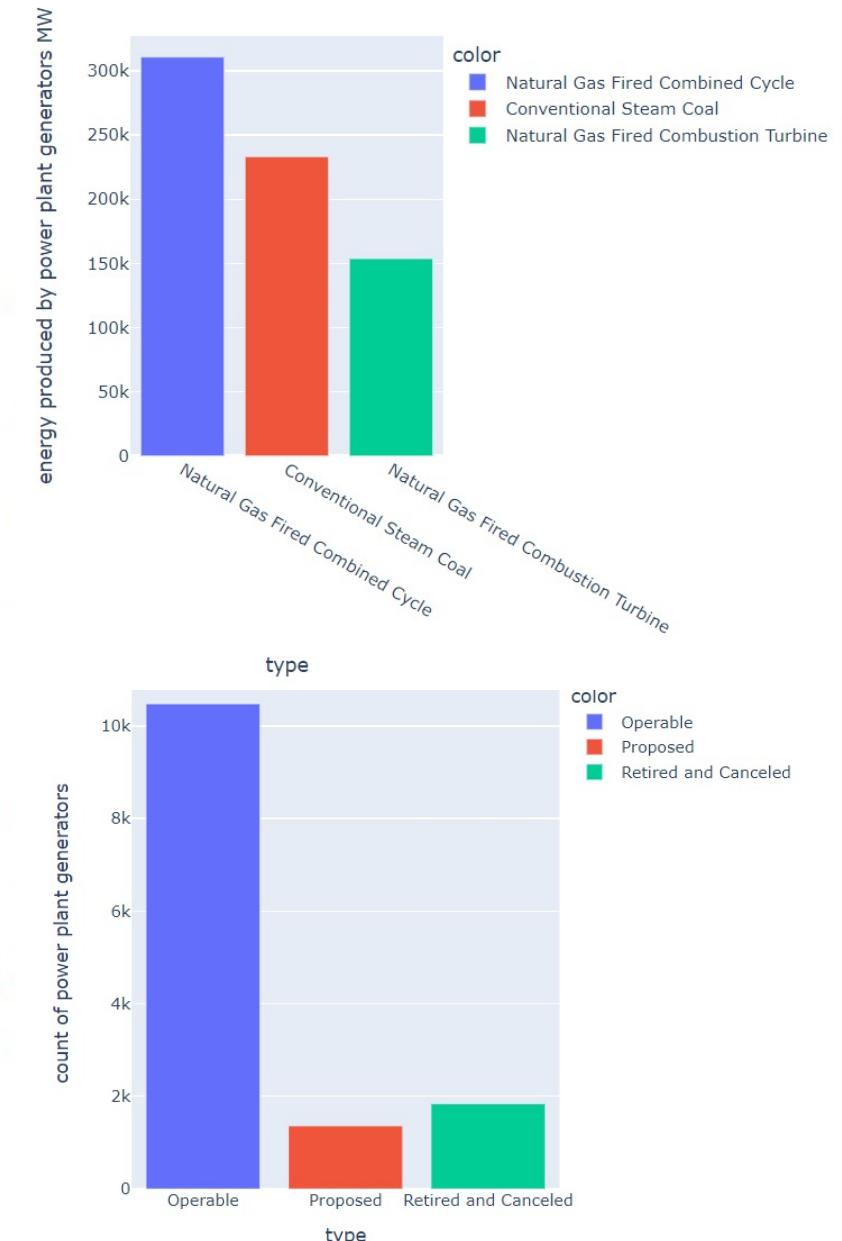


Why the US isn't
ready for clean
Energy

United States Energy Analysis

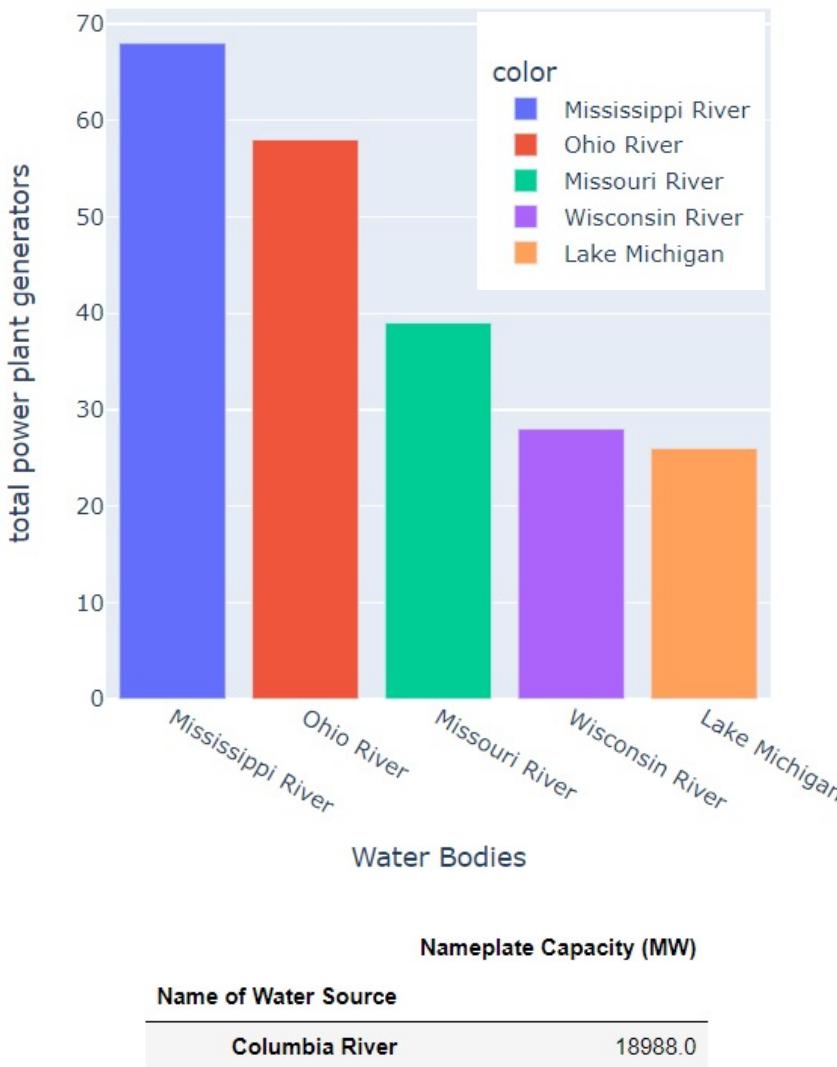


Total Energy produced in US: 1212239 MW

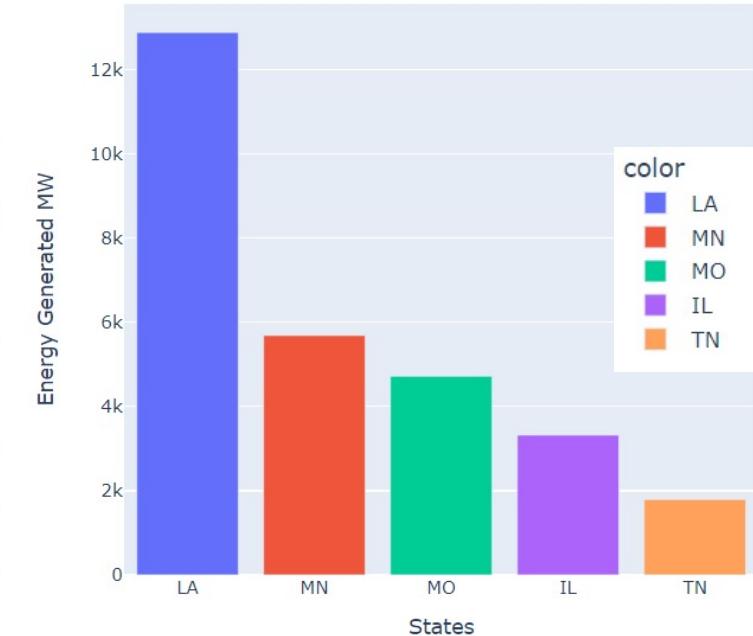
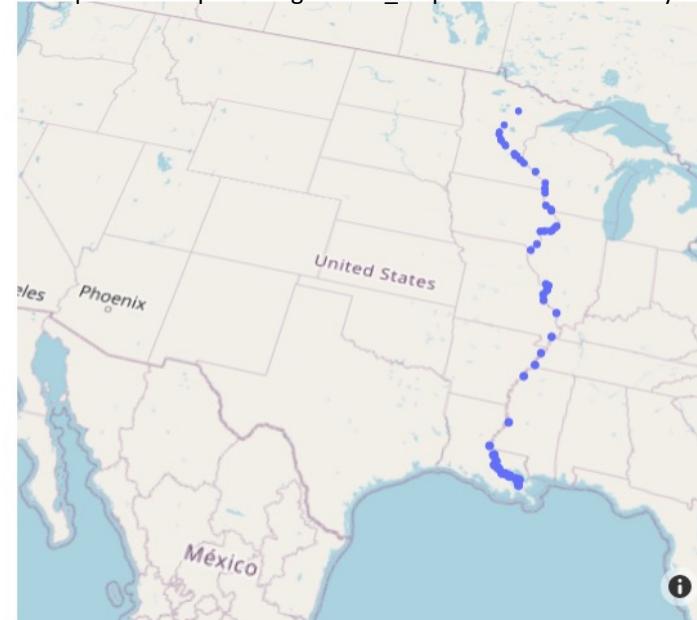


Data viz using US Energy Information Administration 2020 data

Importance of Water Bodies

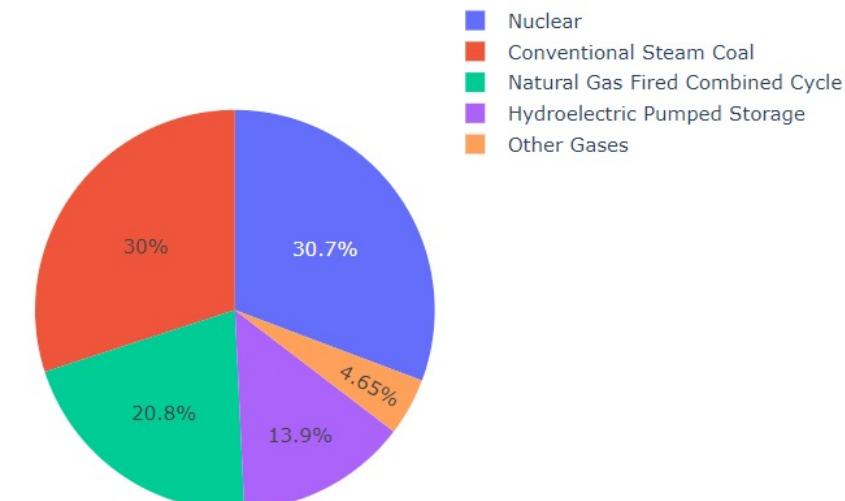


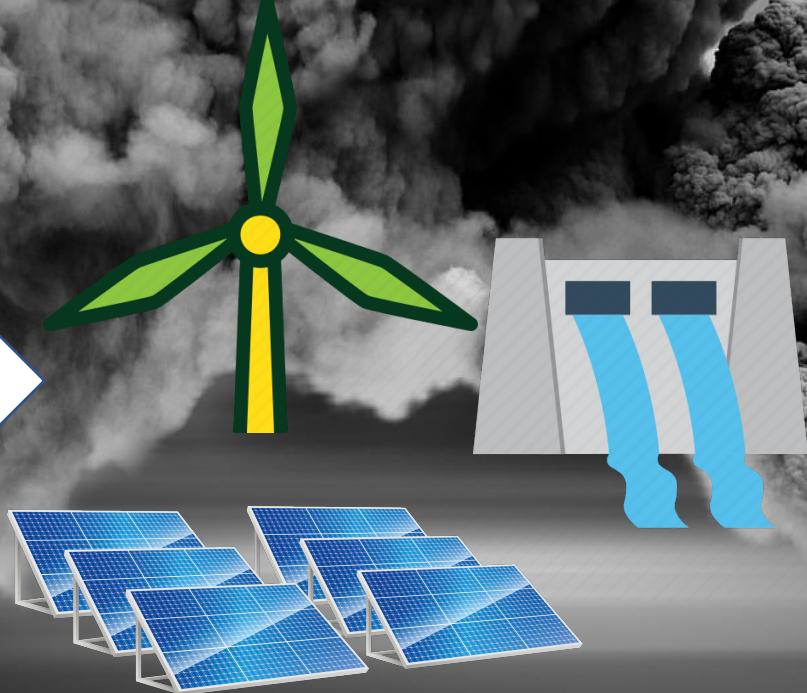
Spatial Data plot using scatter_mapbox function in Plotly



Grand Coulee Dame

Source image: [City Girl Goes West: Grand Coulee Dam](#)





Biden commits to cutting U.S. emissions in half by 2030 as part of Paris climate pact

The president announced the pledge during remarks at the White House's virtual climate summit Thursday.



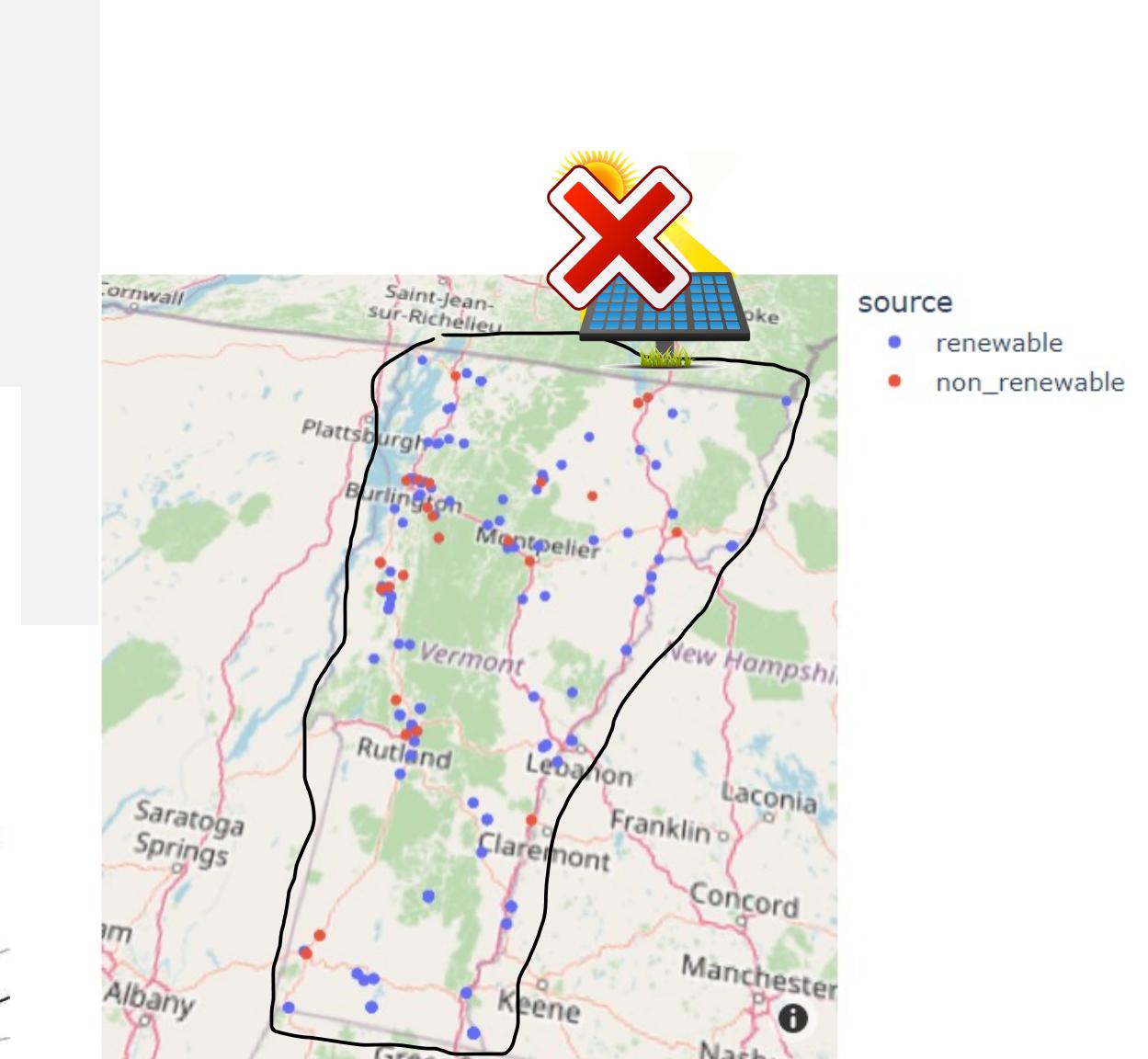
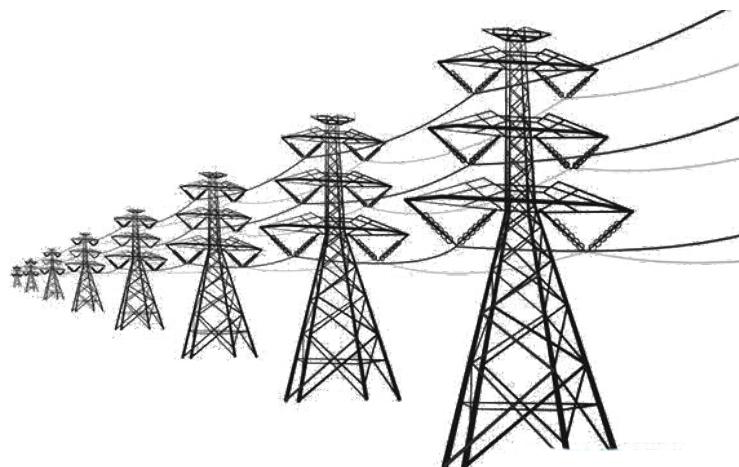


State of Vermont

Grid operators: Vermont electric grid reaching saturation point in the north

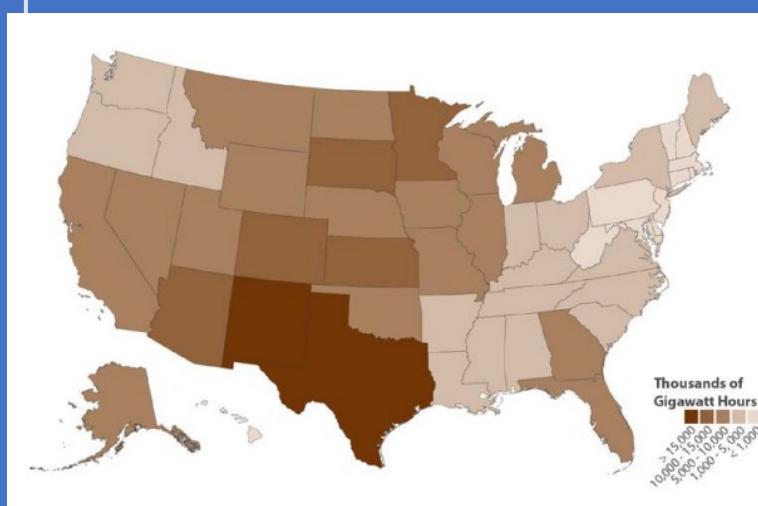
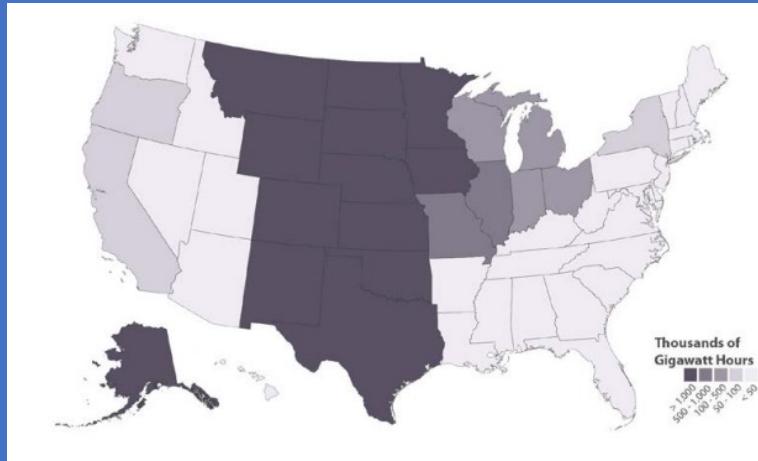
Michael Bielawski / August 3, 2017

Regional electric utility and grid operators say they are being forced to curtail power sources and that new development may not be possible due to energy grid saturation in northern Vermont.

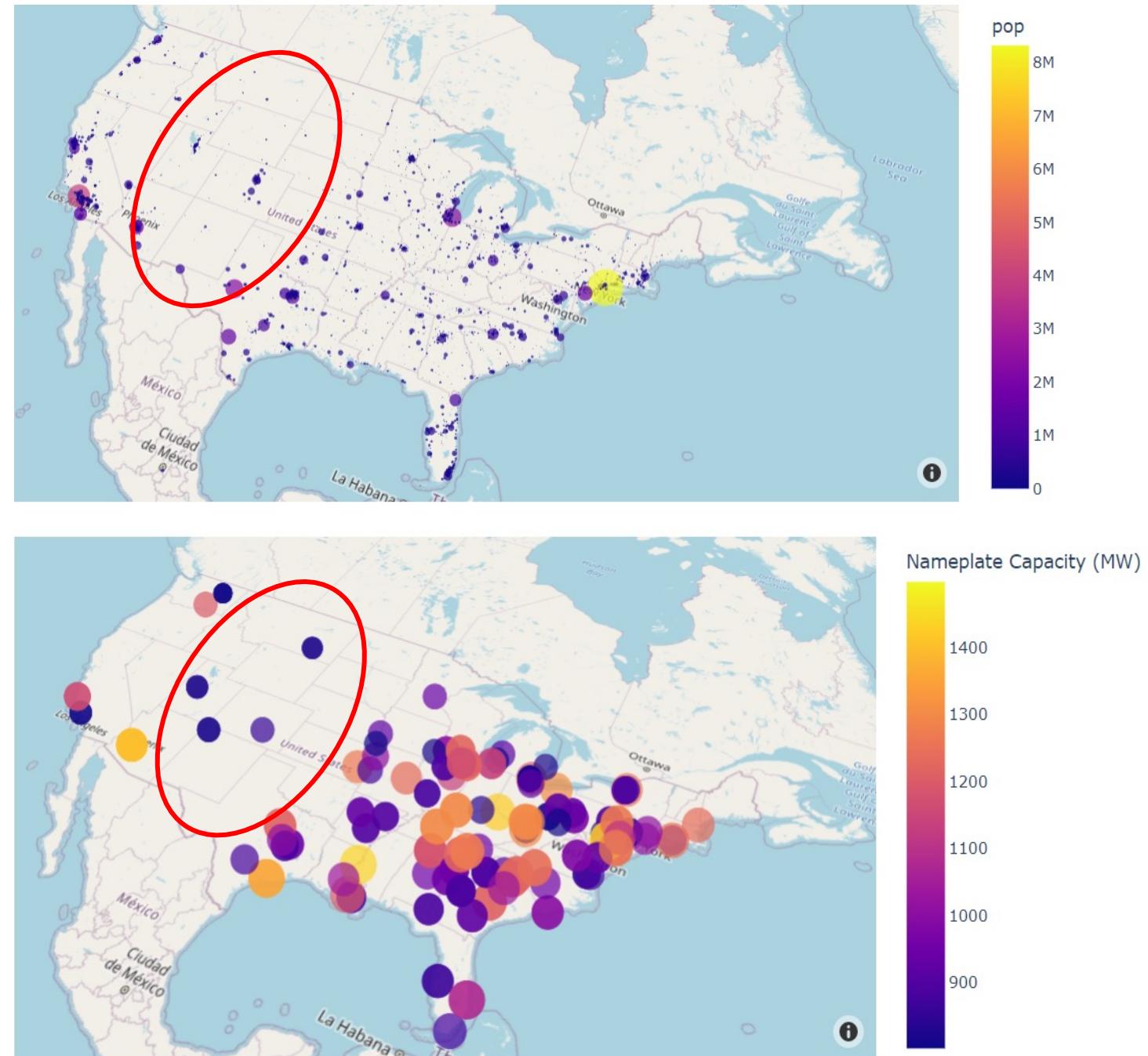


Data Viz done using PLOTLY on EIA data

Population vs Major Power Plants in US



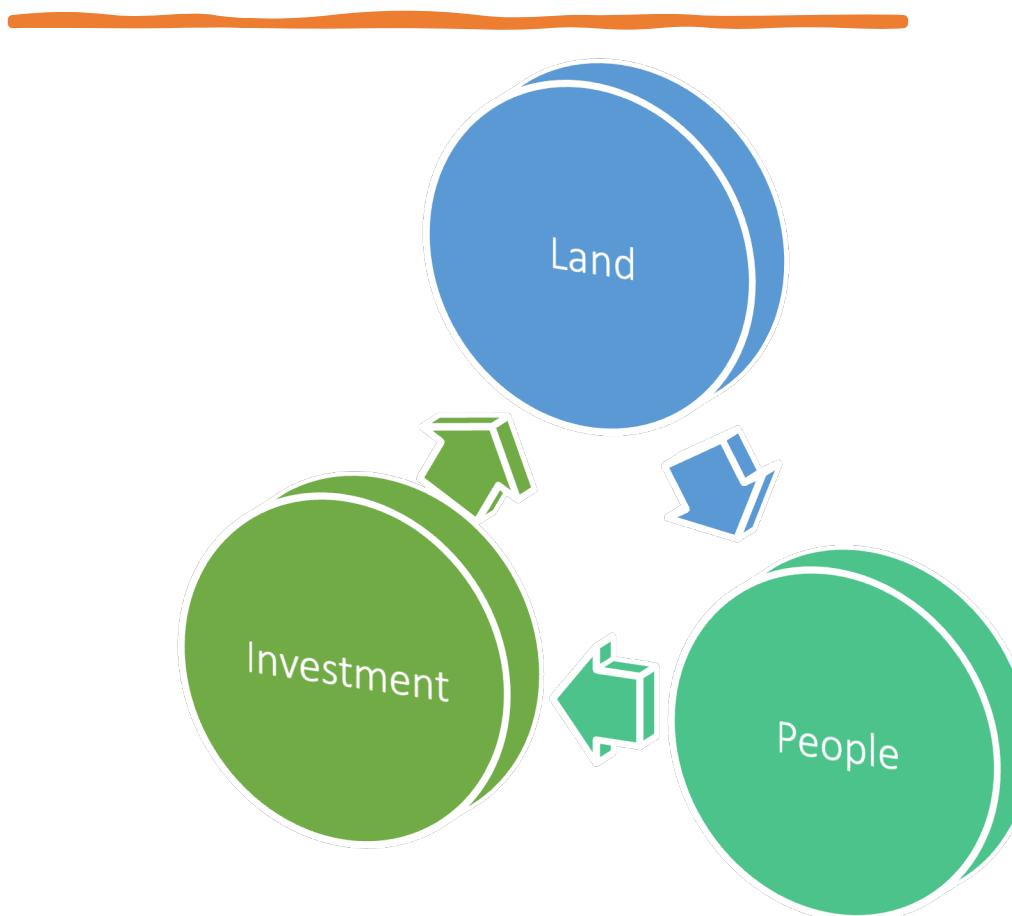
Potential Areas for Renewable Energy:
Source (The National Renewable Energy Laboratory (NREL))



Data Viz done using PLOTLY on population census and EIA data



What will be needed to build
more clean energy sources in
the US?



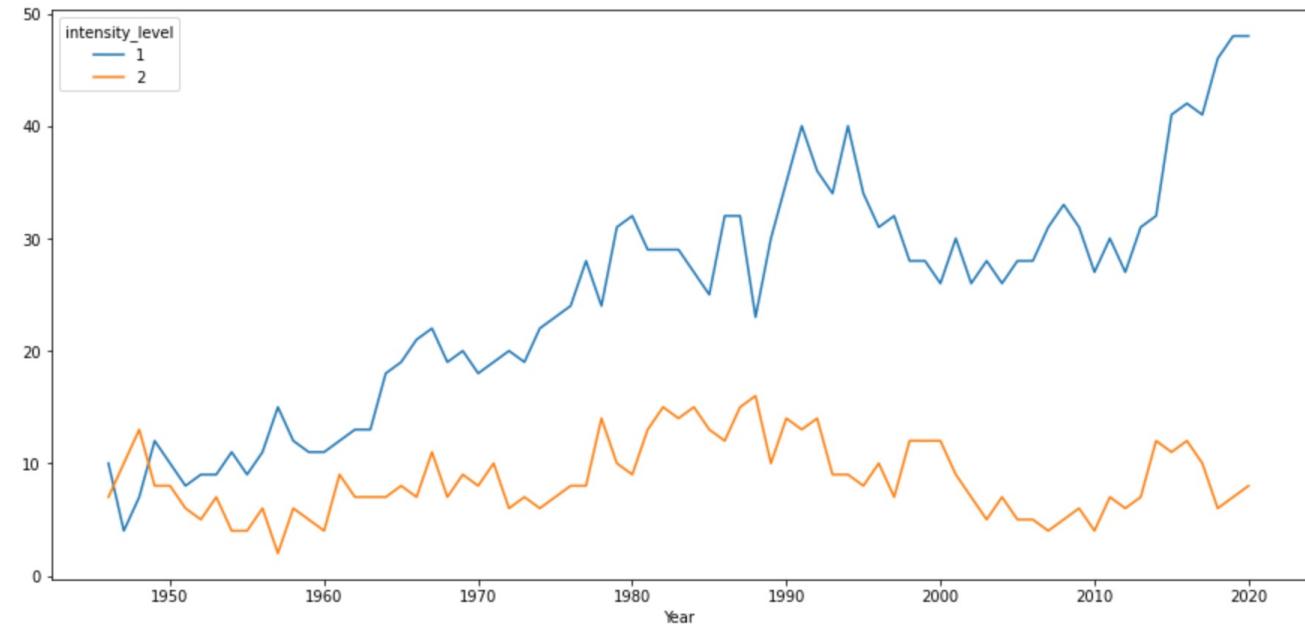


Hypothesis - 2

As the state conflicts increase, we expect the prices of energy resources to increase.

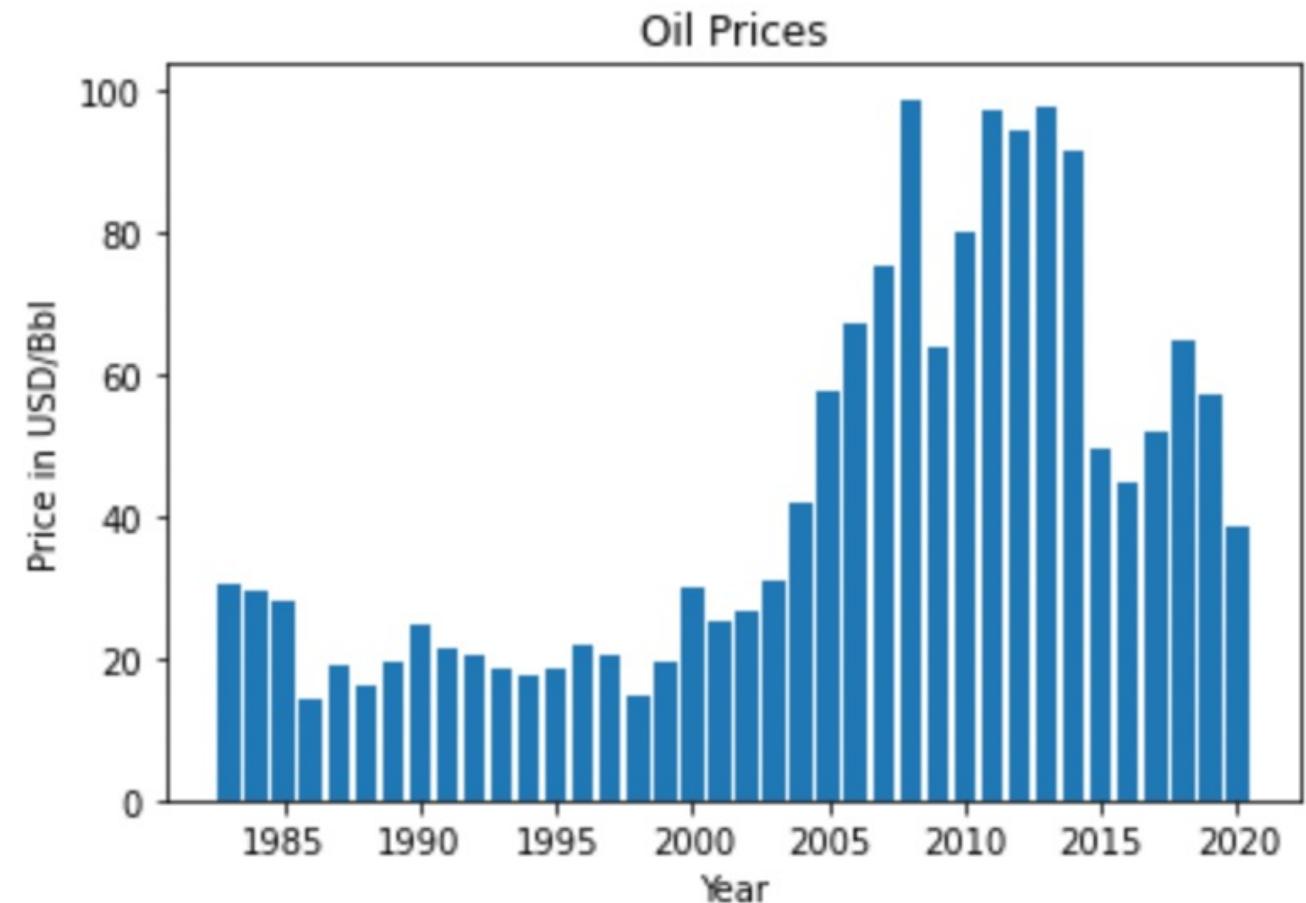
Armed Conflicts dataset over the years

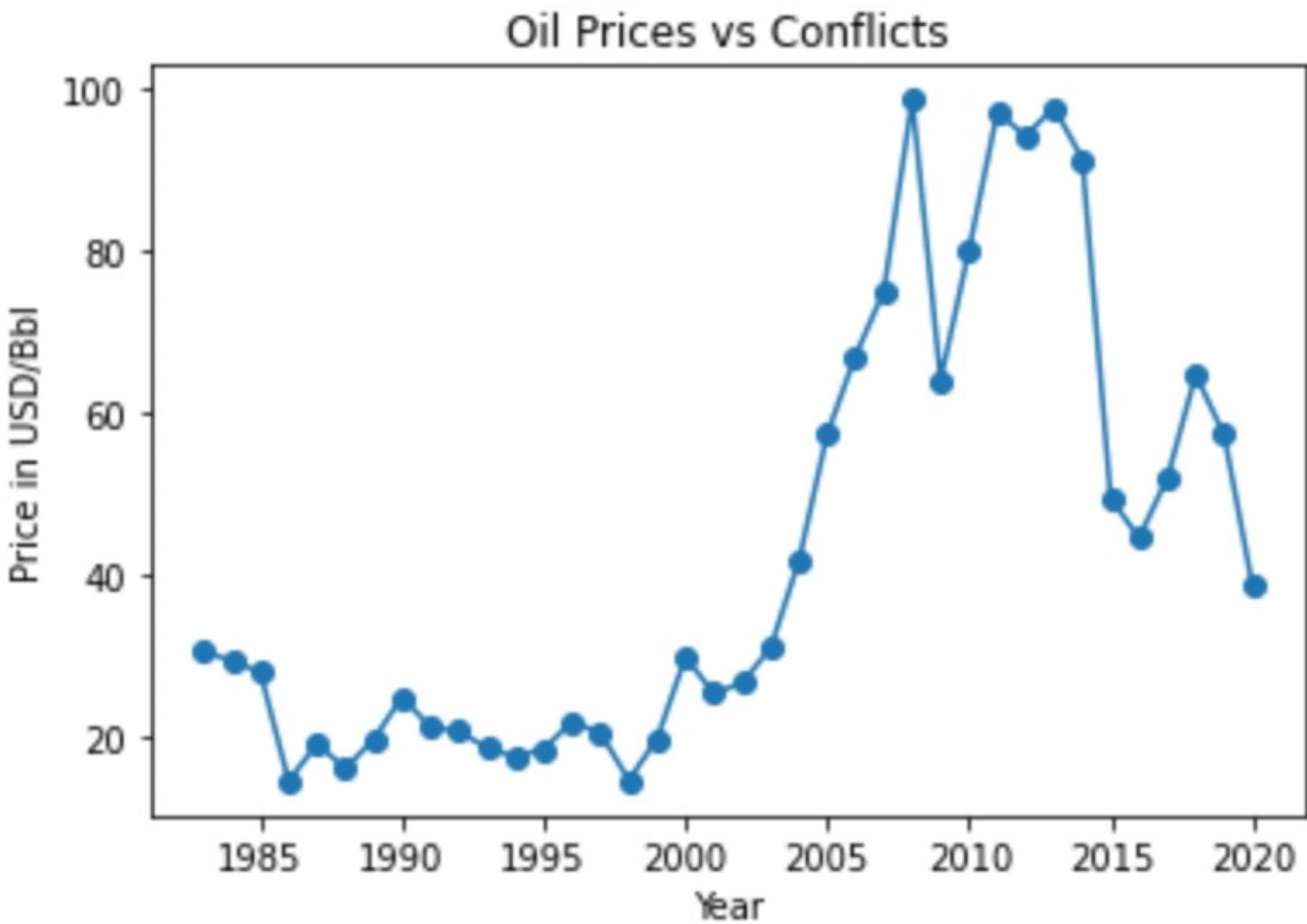
- The dataset spans over 1946-2020
- The graph shows the intensity level w.r.t cumulative count of the countries in each year



Oil Price dataset

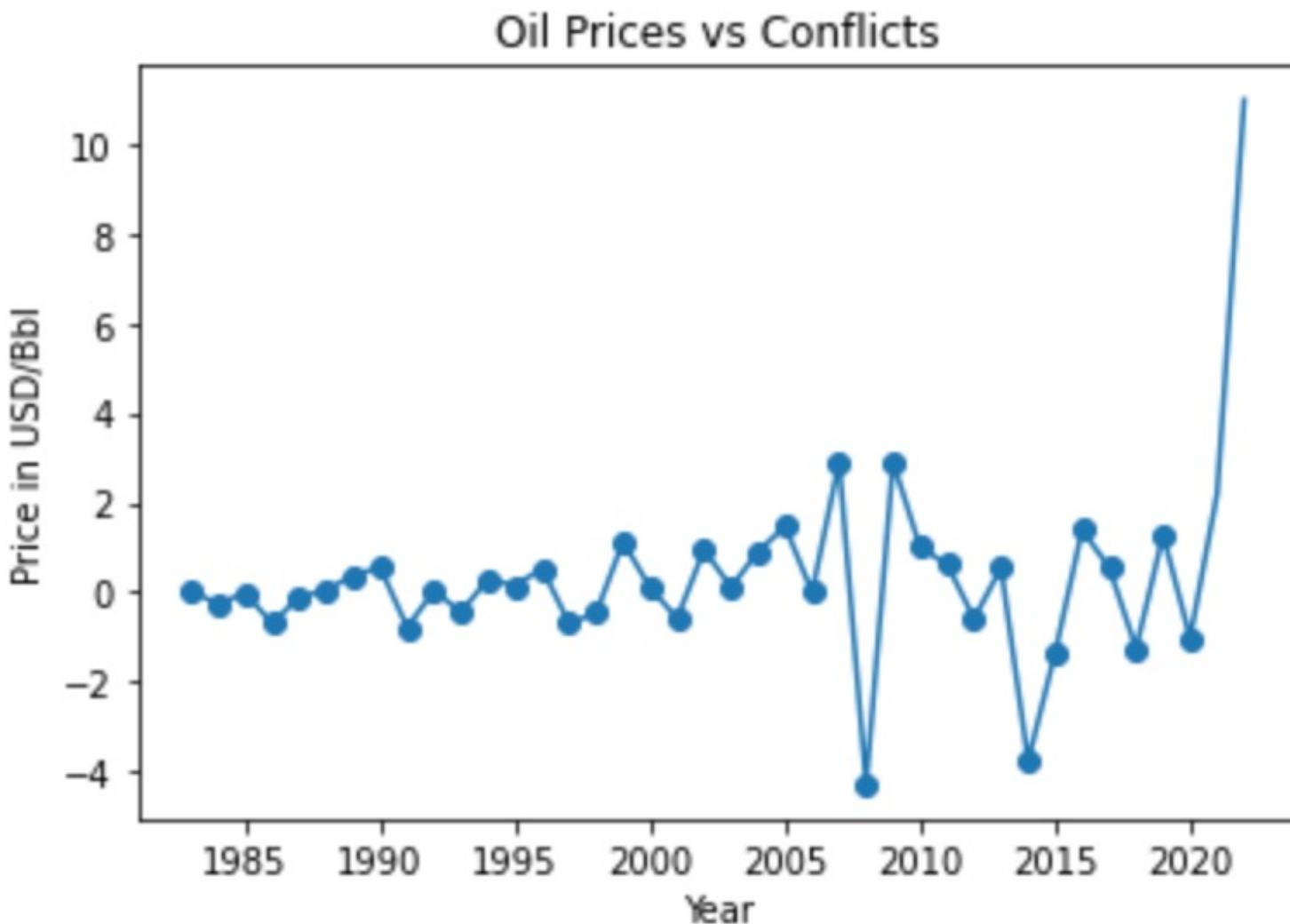
- The duration of the dataset is 1983-2021
- Crude oil price in USD/Bbl



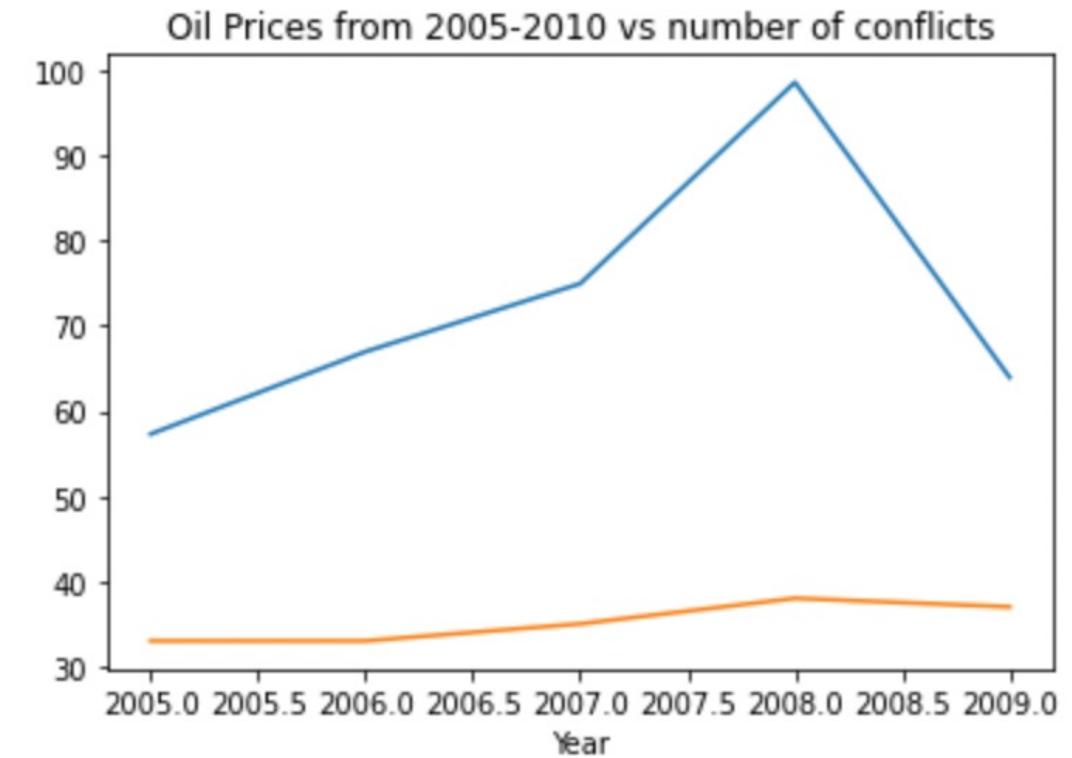
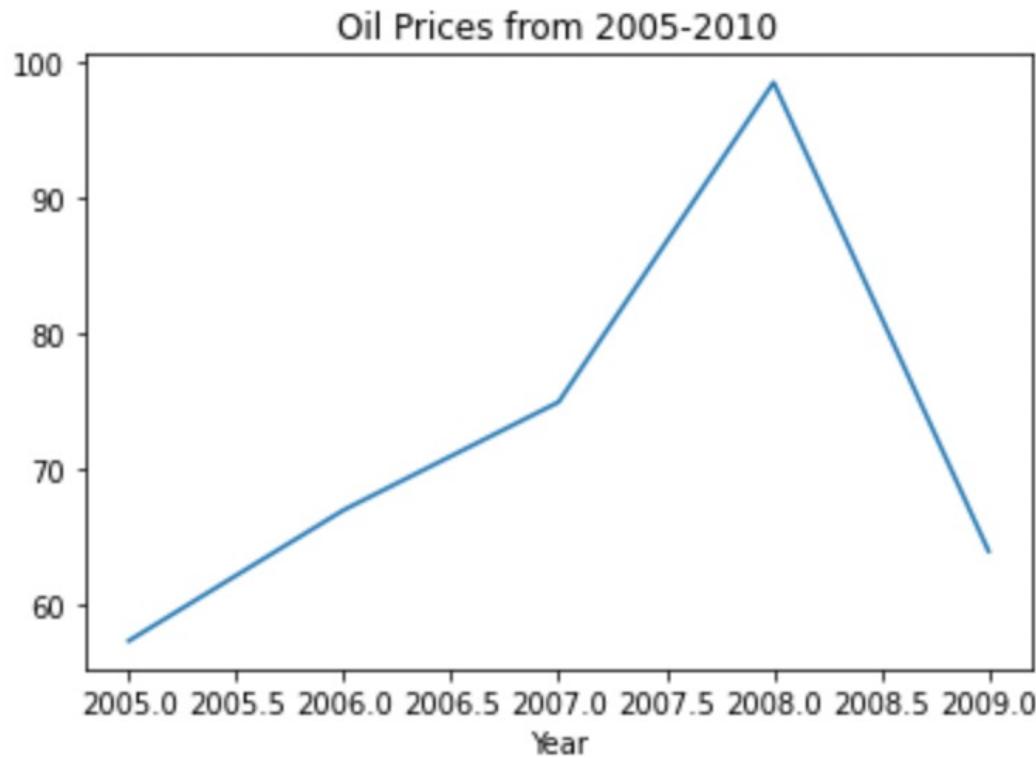


Oil price vs
armed
conflicts

Oil Price
change v/s
Armed
Conflicts



Does armed conflicts affect oil price?





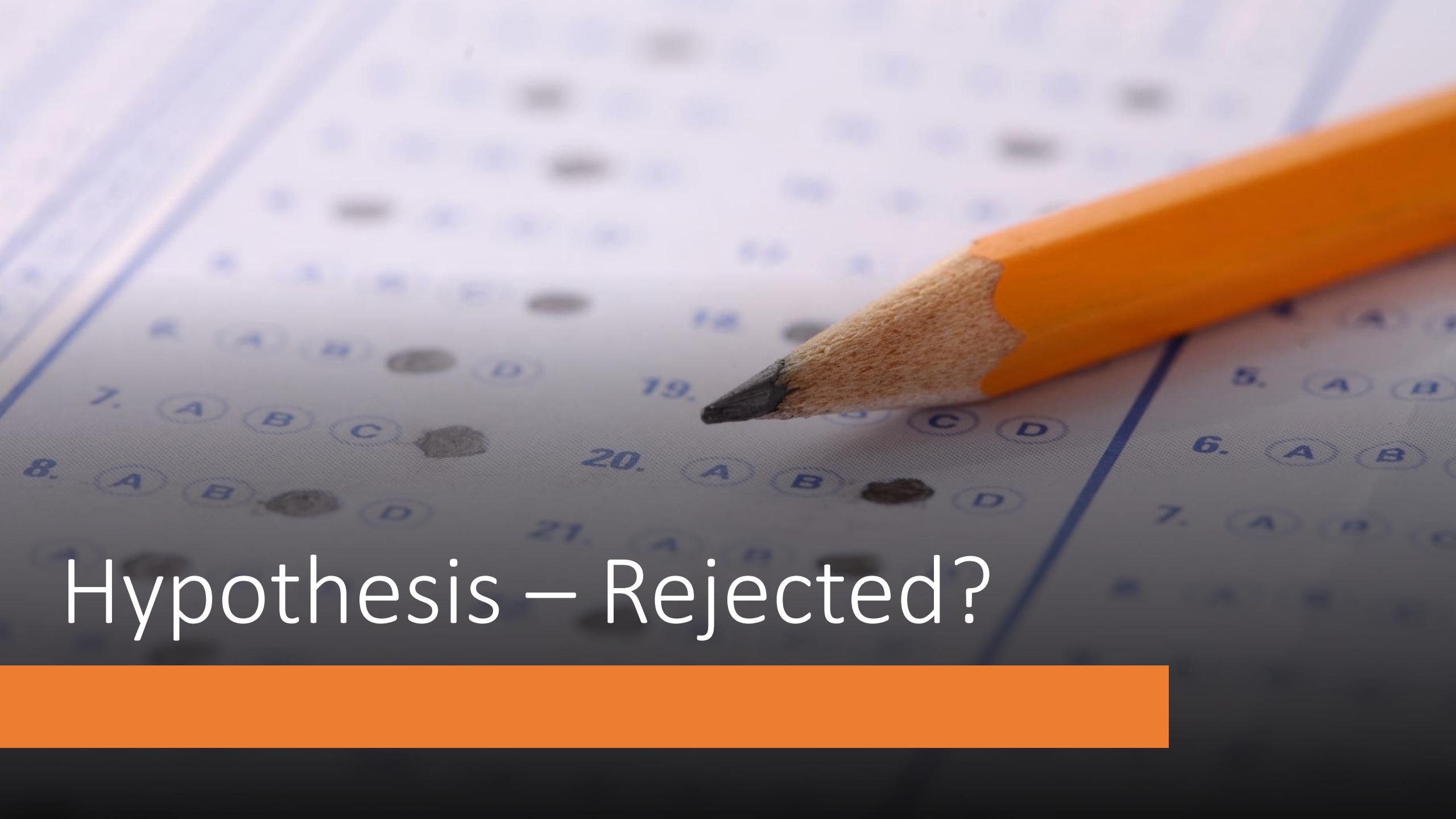
Correlation

- Finding the correlation between the oil price and conflicts through linear regression models

Specific time-periods

- Finding other factors along with the oil price during time period of a specific war/conflict

Hypothesis – Rejected?





Thank You!



References

- [U.S. Renewable Energy Technical Potentials: A GIS-Based Analysis \(nrel.gov\)](#)
- <https://www.iea.org/reports/global-energy-review-2019/natural-gas>
- [Grid operators: Vermont electric grid reaching saturation point in the north | True North Reports](#)
- [Biden commits to cutting U.S. emissions in half by 2030 as part of Paris climate pact \(nbcnews.com\)](#)