



Is ENERGY in SYNERGY with LIFE!!

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Github Link -
<https://github.com/karan1dhir/CU-Boulder-DataScienceAsField.git>

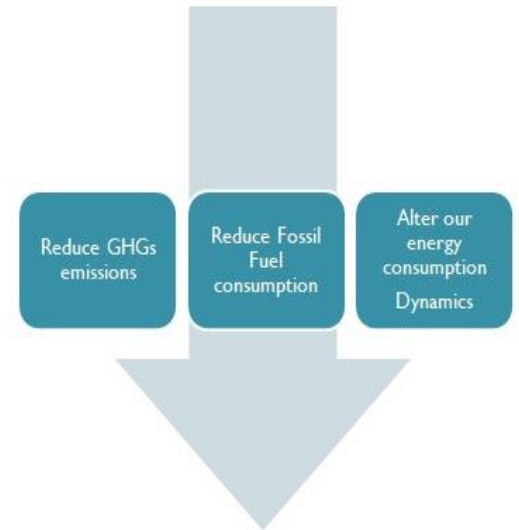


Introduction

We are witnessing :

- Life being claimed by extreme climate events : droughts, flood , hurricanes
- Heatwaves in greenland or heavy snow in Madrid
- Financial + social + psychological cost
- Ecosystem loss
- Migration

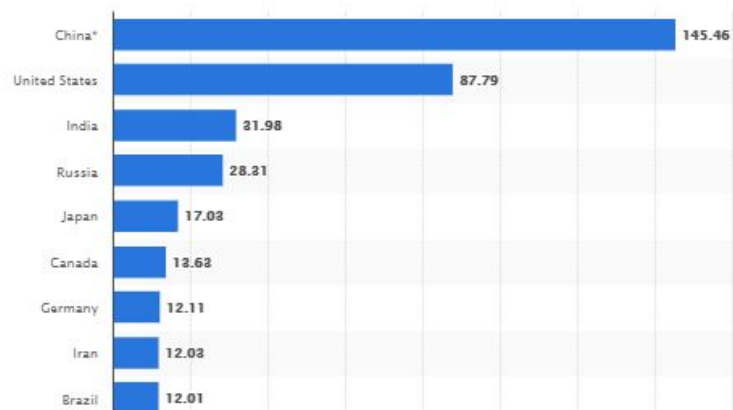
IPCC : “Special Report on Global Warming of 1.5°C”



United States is 2nd largest Energy Consumer in the world.

Energy & Environment > Energy

Primary energy consumption worldwide in 2020, by country
(in exajoules)

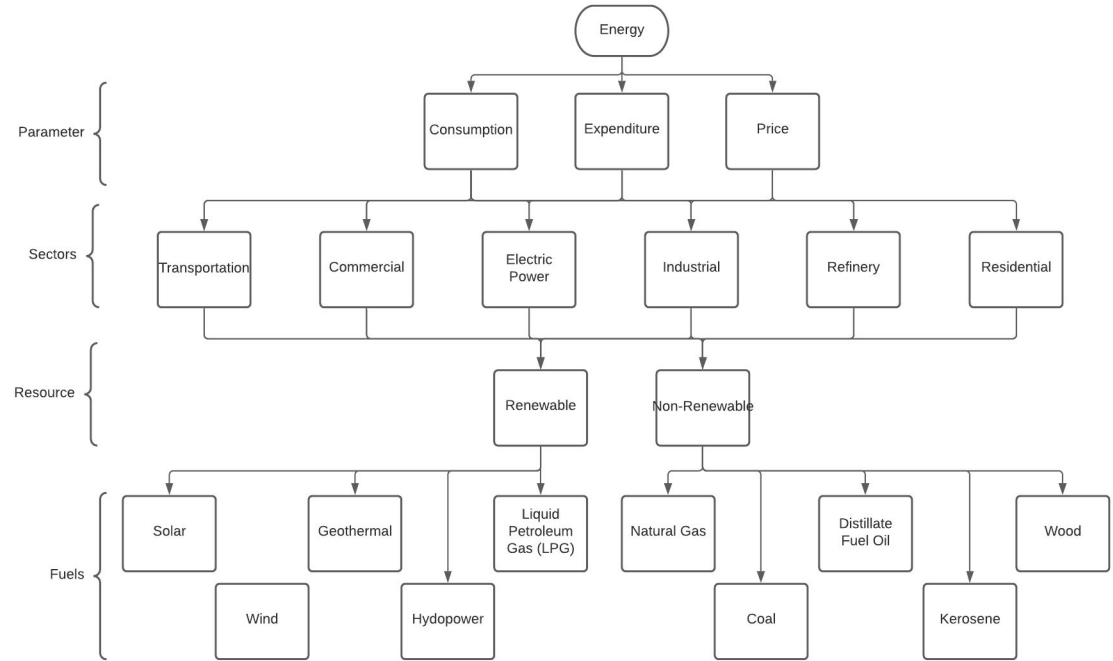




Overview

- Data Source : The US Energy Information Administration
- Duration : 1960 - 2014
- Data Description : United States Government reports on consumption, production, expenditures, and prices of various fuel sources.

Energy Resources Dataset



Before Starting Data Science as Field.



R



Python

WHEN R AND PYTHON



JOIN FORCES

Total Consumption of Renewable Energy

Top 3 States for Renewable Energy.

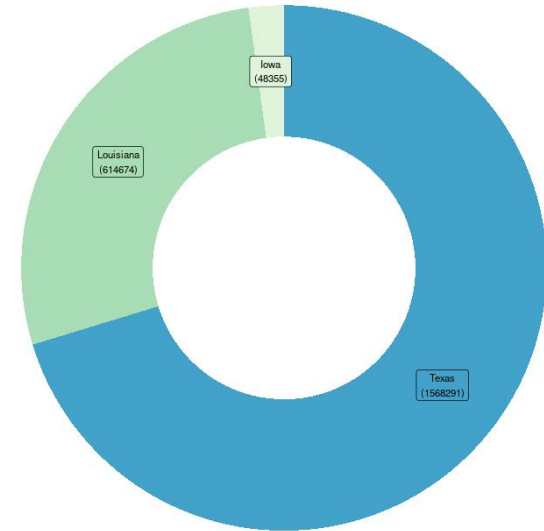
Filter(Year == 2014)

Runner ups of the game :

1. Texas
2. Louisiana
3. Iowa

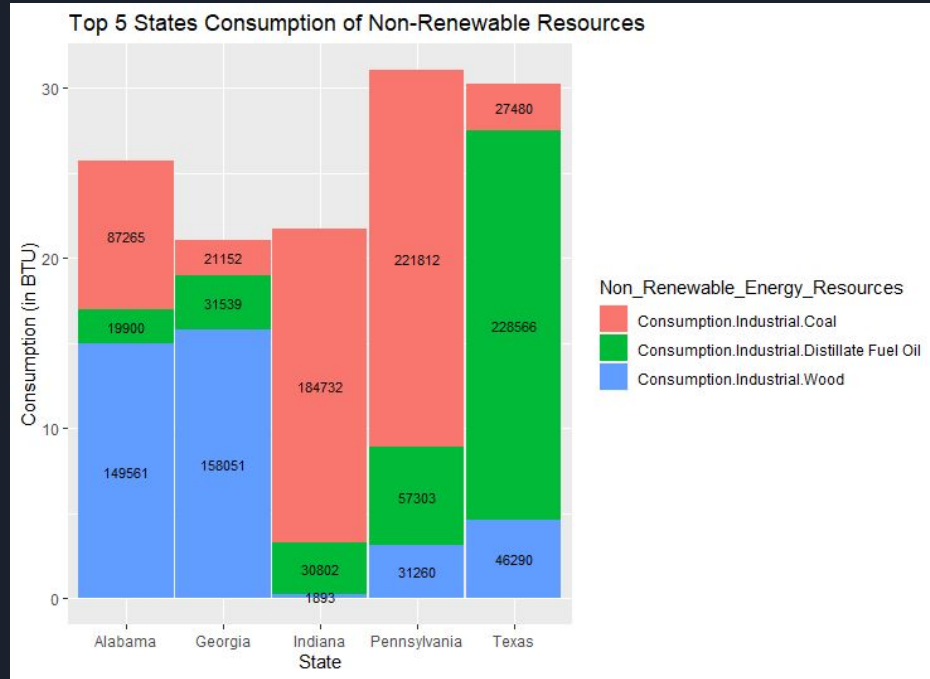


Top 3 States Consumption of Renewable resources(in BTU)



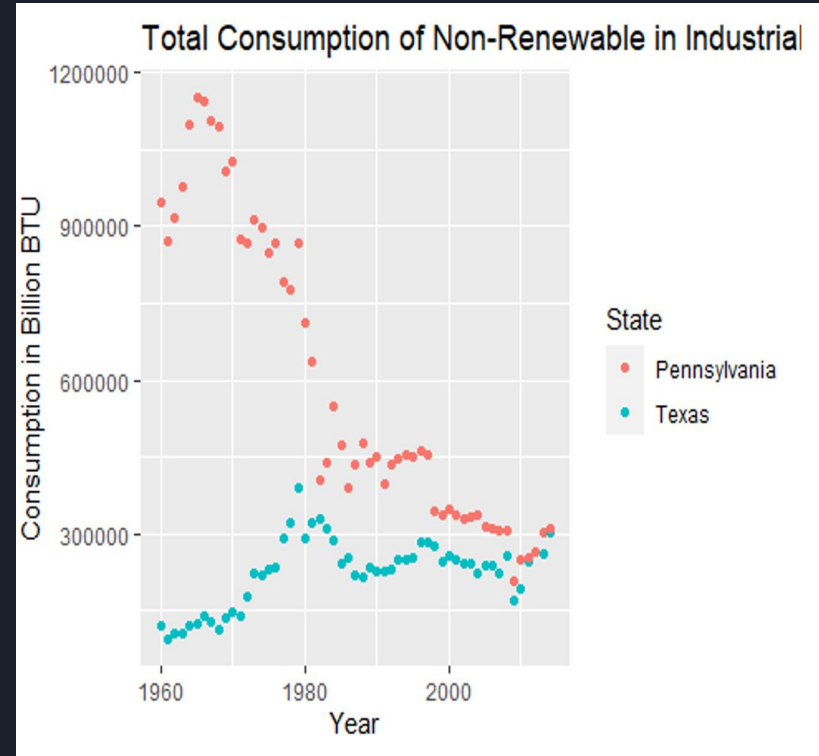
States with highest consumption of Non-Renewable Resources(in 2014)

- Pennsylvania - Worst State - Largely consumes Coal resource.
- Texas - Highly dependent on Distillate Fuel Oil.
- Indiana - Utilize less Wood resource.



Analysis : Ideal vs Worst States?

- Texas - Consistently utilizing renewable resources.
- Pennsylvania - Reducing its consumption from the last 20 years.

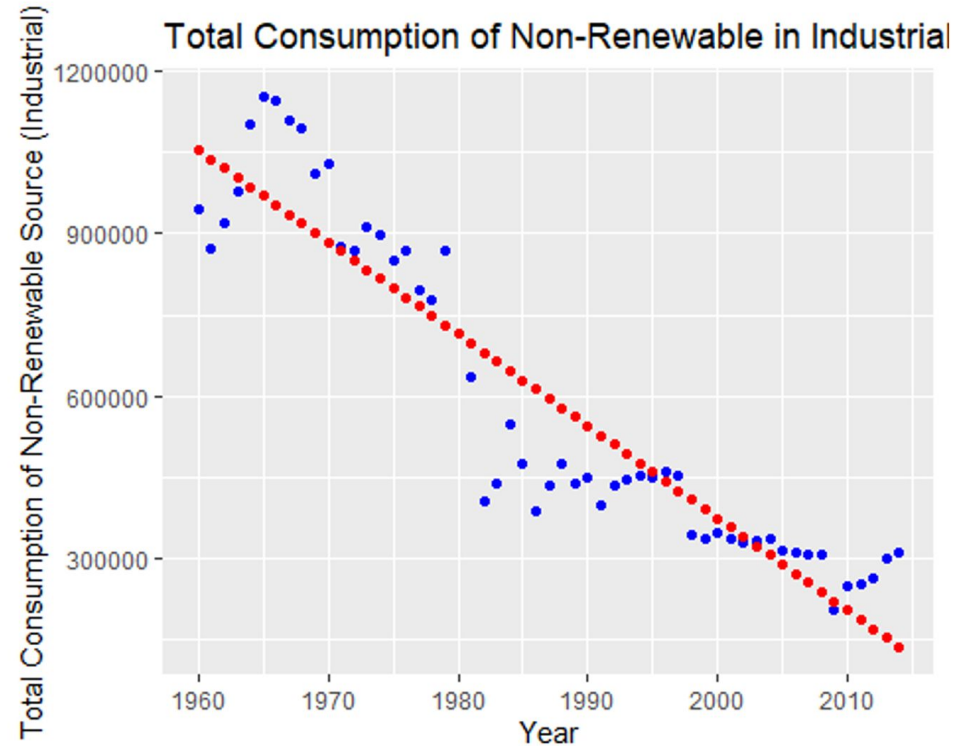


Its All About Texas!!



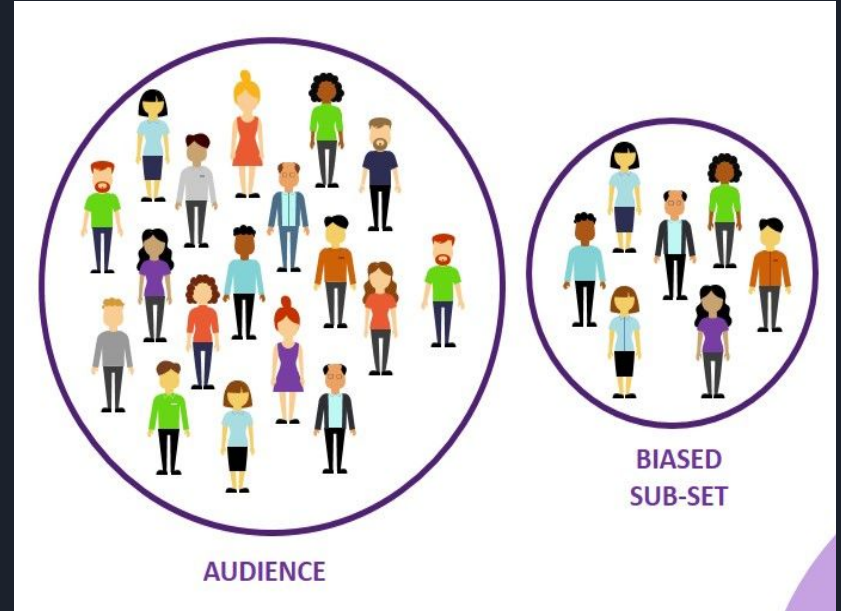
Model and Analysis for Pennsylvania state, over the period from 1960-2020 :

```
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept) 34339265.6 1876308.4   18.30  <2e-16 ***
## Year        -16982.3    944.3   -17.98  <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 111200 on 53 degrees of freedom
## Multiple R-squared:  0.8592, Adjusted R-squared:  0.8566
## F-statistic: 323.4 on 1 and 53 DF,  p-value: < 2.2e-16
```



Bias

- Selection Bias
 - Ignored Columns
 - Missing Values Replaced
- Data Collection Bias



What can we conclude ?

- Most of the US states depends primarily on three different sources of energy: coal, hydro, and distillate fuel oil.
- Massive amounts of energy are consumed from petroleum sources as well, especially in transportation sector.
- Need more data to assimilate each state's production and expenditure on resources.
- States like Pennsylvania, if continue to use more renewable resources, will have positive impact on economic progress , population, energy prices and weather.



THANK
YOU