

Understanding Power Consumption in Indian States

Questions:

- Before and after covid analysis, what difference did it make in terms of consumption — on a state and regional level?
- Predicting the amount of power a state consumes each day.
- To see how each state's monthly power consumption compares to the national average.
- How much of overall energy consumption is derived from renewable and non-renewable sources?
- How much power does a state use on a daily basis?
- Region and State wise maximum and minimum consumption on a monthly basis
- Analyzing the patterns of consumption in states that give free power for agricultural use.

Stakeholder Map

State government

Central government

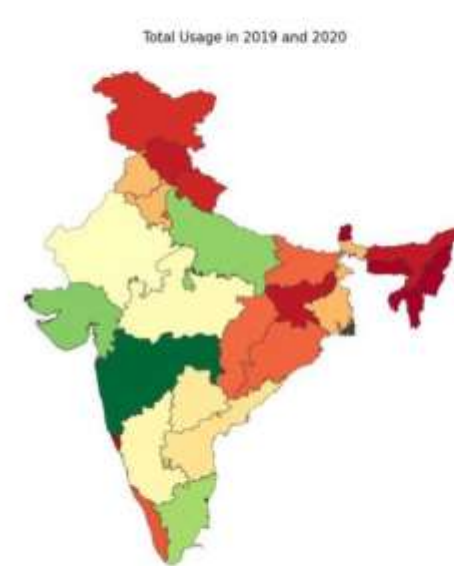
Industrialists

Business analytics firms

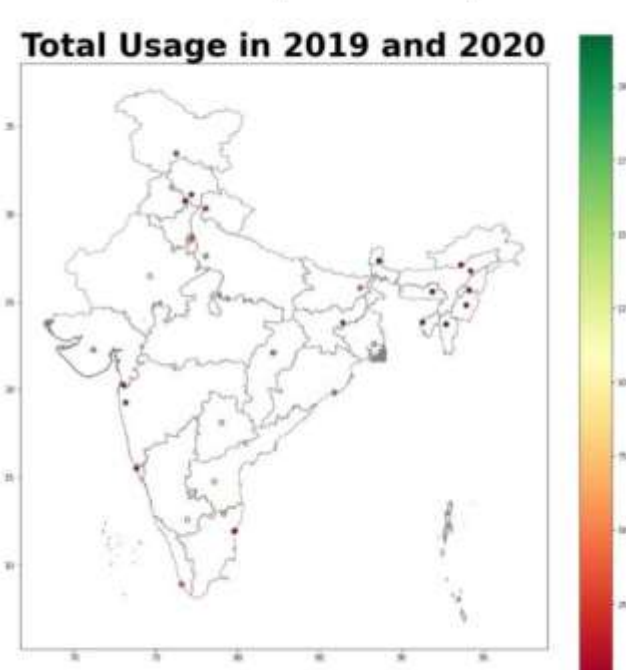
Startups & investors of energy power plants

Regulatory bodies and suppliers

Heat Plot on India map

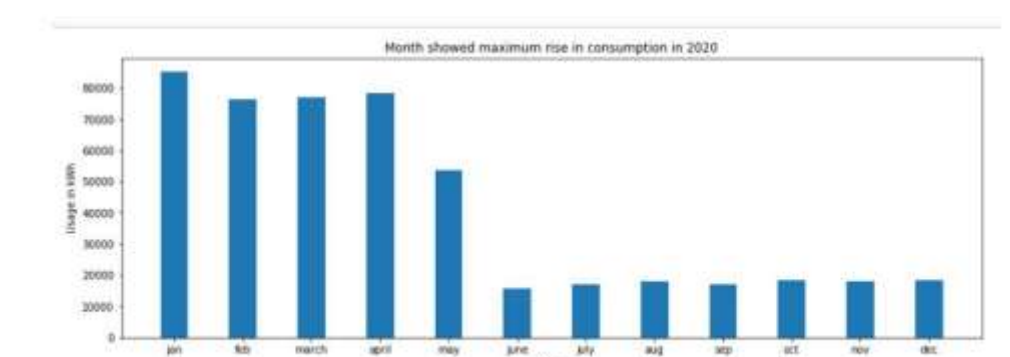
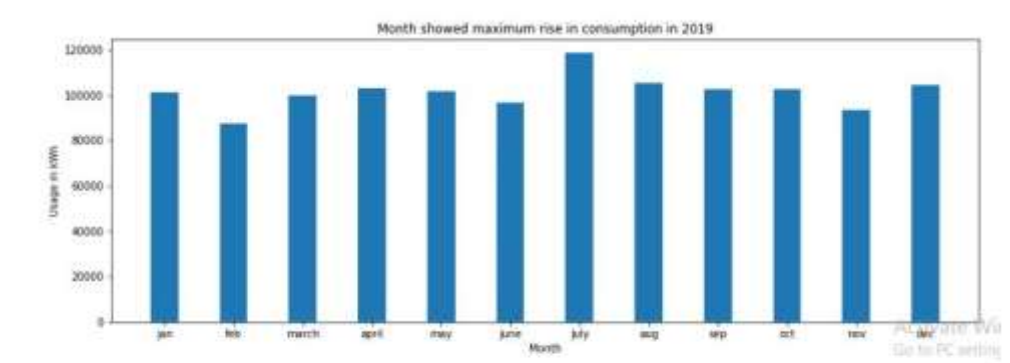
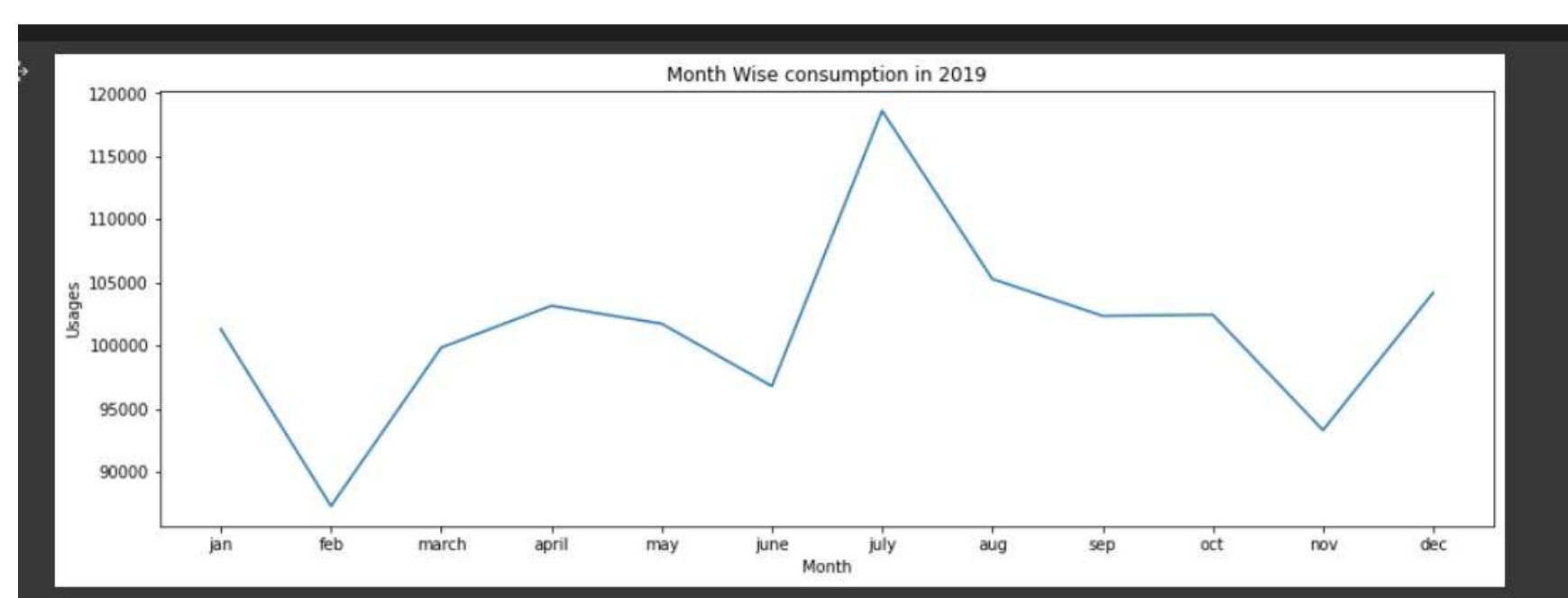
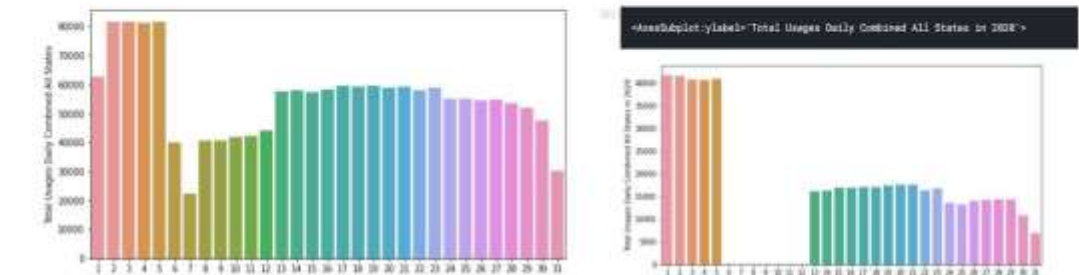


Bubble Plot usage on India map

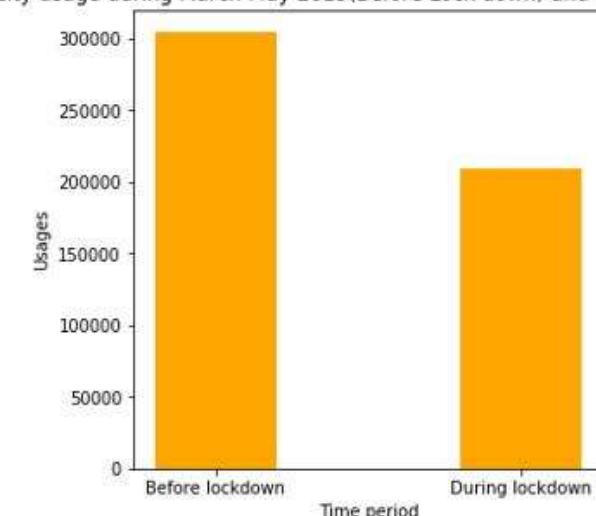


- On which day, did we see the highest & lowest consumption in India - 2019 & 2020

Analysis based on:
 Event
 Industries
 Elections
 Population
 State size- geographical areas



Comparing the electricity usage during March-May 2019(Before Lock down) and March-May 2020 (During Lockdown)

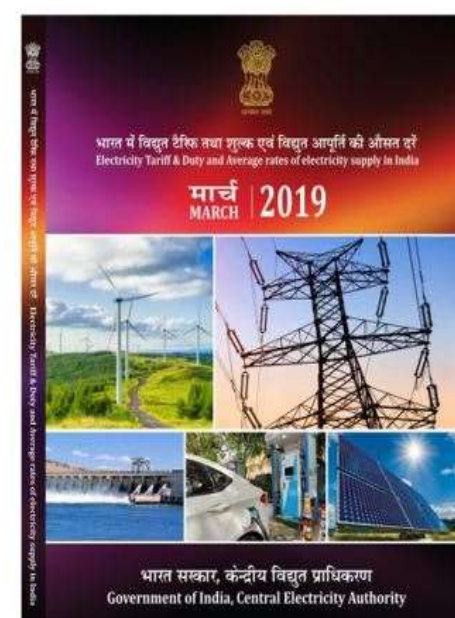


Solution overview on the problem statement:

- From our covid analysis, the power consumption across states during lockdown declined by 31.47%.
- Using previous data points from any state, our algorithm can predict power consumption on a daily basis.
- Top 15% most power consuming states are above the national average of 102.74 MUJ.
- From total consumption of 1700.73 MU, about 613.11 MU was consumed from Renewable Energy Sources.
- Western states consumers most power on a daily basis, followed by Northern, Southern, Eastern and then NE states.
- The maximum peak of power consumption happened in July 2019, and lowest in Feb 2019.
- In terms of agricultural power consumption, the southern states outperform the northern states.
- A heat map was created to depict the behavior of power consumption patterns across Indian states.
- Visual analysis of power consumption utilization based on each state's latitude and longitude data



SECONDARY RESEARCH



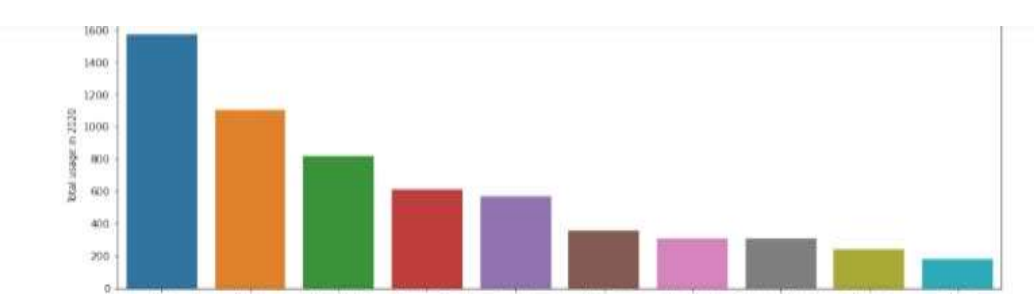
Domestic electricity LT Tariff slabs and rates for all states in India 2019- 2020

Electricity Tariff & duty and average rates of electricity supply in India

PRESS NOTE PUNJAB STATE ELECTRICITY REGULATORY COMMISSION

Uniqueness of Solution extracted:

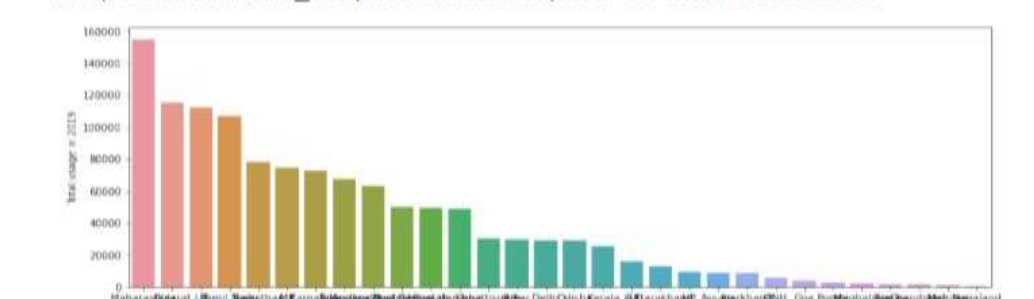
- Calculated overall energy consumption derived from renewable and non-renewable sources?
- Analyzed patterns of consumption in states that provide free power for agricultural use.
- Analyzed power consumption patterns before and during covid lockdown
- Predicting daily power consumption using historical data points from any state.
- Calculated consumption according to geographical landscape data extraction



Overview of consumption in year 2019

```
table5=table2.head(30)
plt.figure(figsize=(15, 5))
sns.barplot(y="Total usage in 2019",x=table5.index,data=table5)
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f5f2d003310>
```



Overview of consumption in year 2020

```
table6=table1.head(30)
plt.figure(figsize=(15, 5))
sns.barplot(y="Total usage in 2020",x=table6.index,data=table6)
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f5f2c1e0790>
```

```
import pandas as pd
import matplotlib.pyplot as plt
import numpy as np
import seaborn as sns
from datetime import datetime

df=pd.read_csv("../content/dataset-ek.csv")
df_long=pd.read_csv("../content/long_data_.csv")

df.isnull().sum()
df_long.isnull().sum()

States      0
Regions     0
Latitude    0
Longitude   0
Dates       0
Usage       0
dtype: int64

df.rename(columns={'Unnamed: 0': 'Date'}, inplace=True)
df['Date']=pd.to_datetime(df['Date'])
df['year']=df['Date'].dt.year
df['month']=df['Date'].dt.month
df['day']=df['Date'].dt.day
df.drop(['Date'],axis=1,inplace=True)
df_long.head()

df_long=pd.read_csv("../content/long_data_.csv")
df_long['Dates']=pd.to_datetime(df_long['Dates'],dayfirst=True)
df_long['year']=df_long['Dates'].dt.year
```

Track Name: B

Team Name: Bazigar

Team Group members

