

# PLUGGING INTO THE FUTURE: AN EXPLORATION OF ELECTRICITY CONSUMPTION PATTERNS

## 1. INTRODUCTION

### **PROJECT REPORT**

Project Title: Plugging into the future: An exploration of Electricity Consumption Patterns

Team Size: 5

Team Leader: Kancharla Likhitha

Team Member: Gundam Sushma

Team Member: Grandhi Sri Harshitha

Team Member: Gummadi Madhavi

Team Member: Giri Varsha Sri

Faculty Mentor: SASHI KANTH BETHAs

### **OVERVIEW**

India is the world's third-largest producer and third-largest consumer of electricity.

During the financial year 2019-20, the total electricity generation in the country was 1,598TWh, of which 1,383.5 TWh generated by utilities.

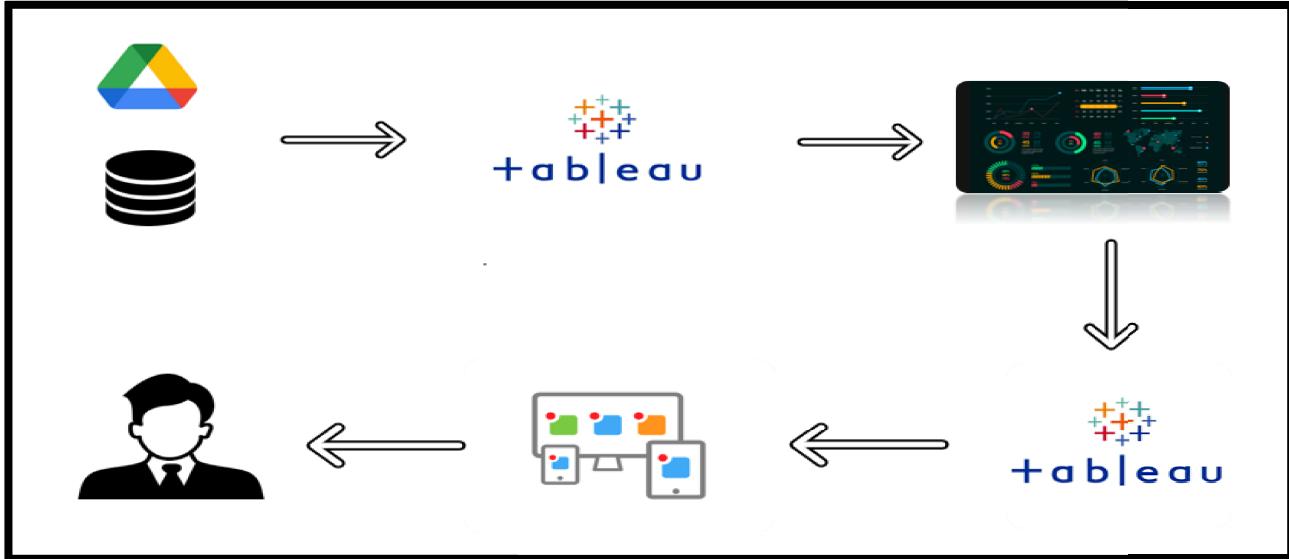
The gross electricity consumption per capita in FY2019 was 1,208kWh.

In light of the recent COVID-19 situation, when everyone has been under lockdown for the months of March to June the impacts of the lockdown on economic activities have been faced by every sector in a positive or a negative way.

Analyzing Electricity Consumption in India from Jan 2019 till 5<sup>th</sup> December 2020. This dataset contains a record of Electricity consumption in each states of India, here we are going to analyze State wise, region wise and Overall Electricity Consumption in India.

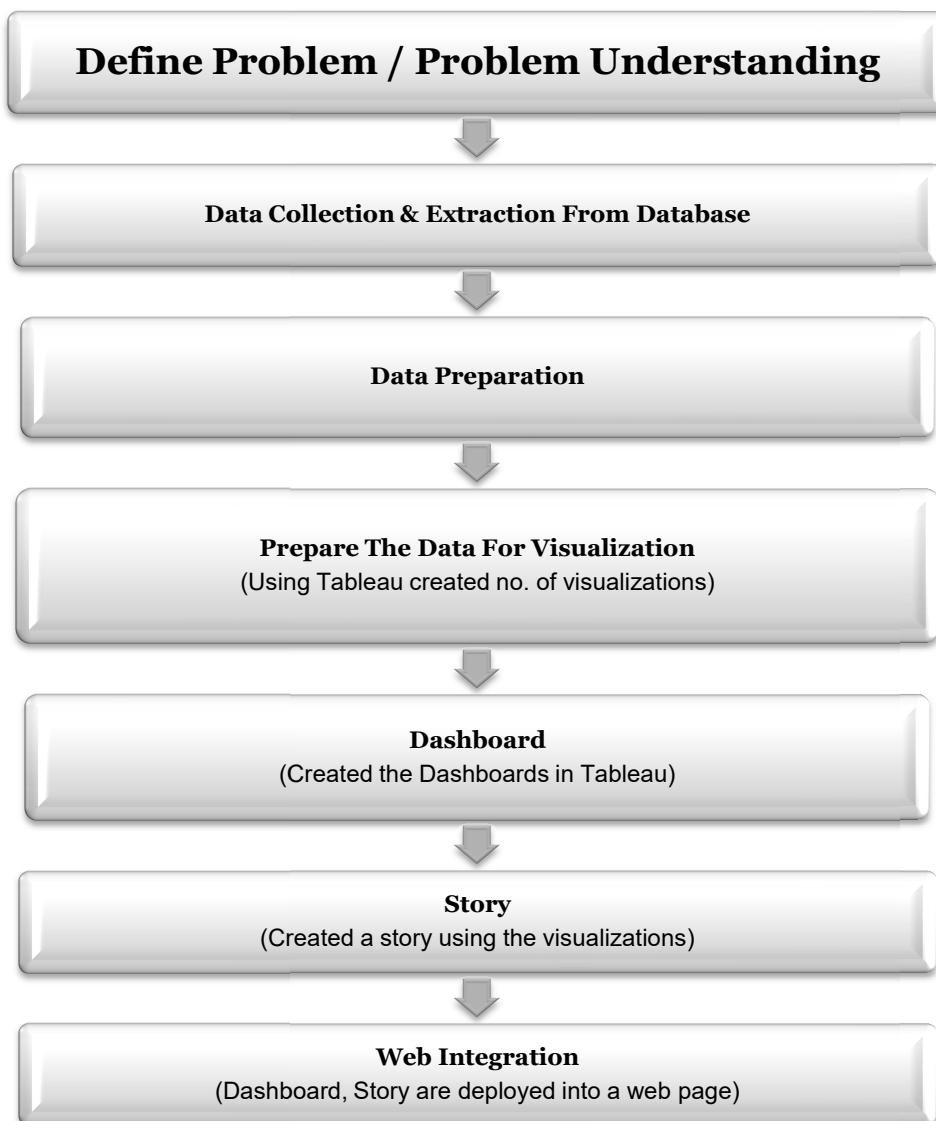
A comprehensive dataset was collected from Smart Internz platform which includes States, Regions, Latitude, Longitude, Dates and Usage.

Uploaded dataset in MYSQL Workbench 8.0 CE app Analyzed the data and done number of visualizations, created Dashboards and Story in Tableau app through the connection by SQL Server Management Studio and uploaded the data into Web page edited HTML code which is taken from Arsha web page using Visual Studio. And connected it through Flask in Spyder compiler and generated a Web page code. In that Web page inserted the total analysis part of 2019-2020 Electricity Consumption.



## 2. THEORETICAL ANALYSIS

### BLOCK DIAGRAM:



## SOFTWARE OR HARDWARE DESIGNING

### **Software Requirements:**

- MySQL Workbench 8.0 CE
- SQL Server Management Studio Management Studio 19
- Tableau
- Visual Studio Code
- Flask

### **Hardware Requirements:**

- Processor
- Memory
- Internet Connection

## 3. STEP BY STEP PROCEDURE

The screenshot shows the MySQL Workbench interface. In the top-left, the 'Schemas' tree view shows a database named 'electricity' containing a table 'consumption'. The main area displays a query editor with the following SQL code:

```
1 •  create schema electricity;
2 •  use electricity;
3 •  select * from consumption;
4 •  select States, Regions from consumption;
5 •  select * from consumption order by dates;
```

Below the query editor is a 'Result Grid' showing data from the 'consumption' table. The columns are 'States', 'Regions', 'latitude', 'longitude', 'Dates', and 'Usage'. The data includes rows for Assam, J&K, Uttarakhand, UP, Delhi, Rajasthan, Haryana, and Punjab. The 'Output' pane at the bottom shows the execution history of the queries.

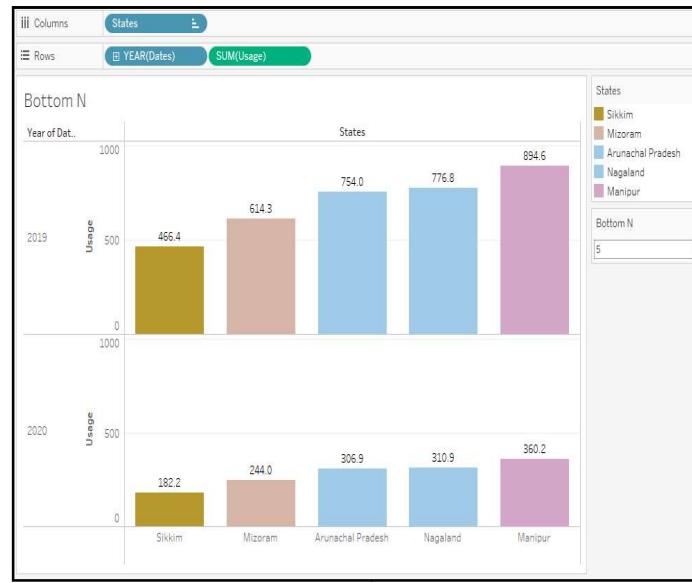
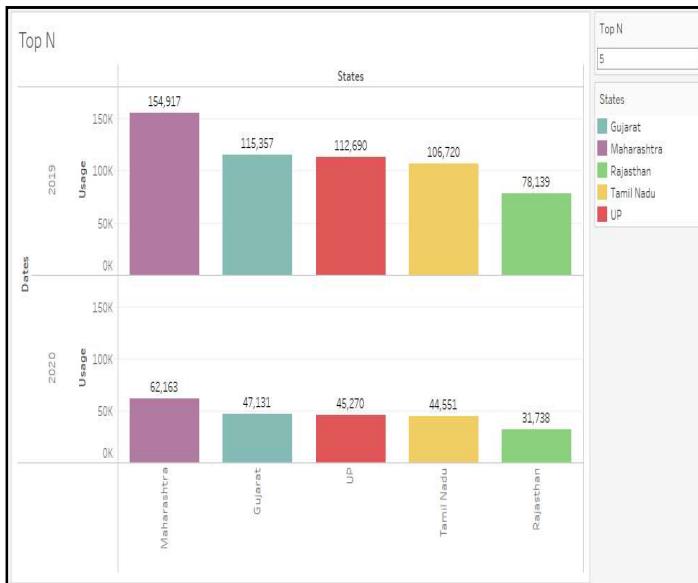
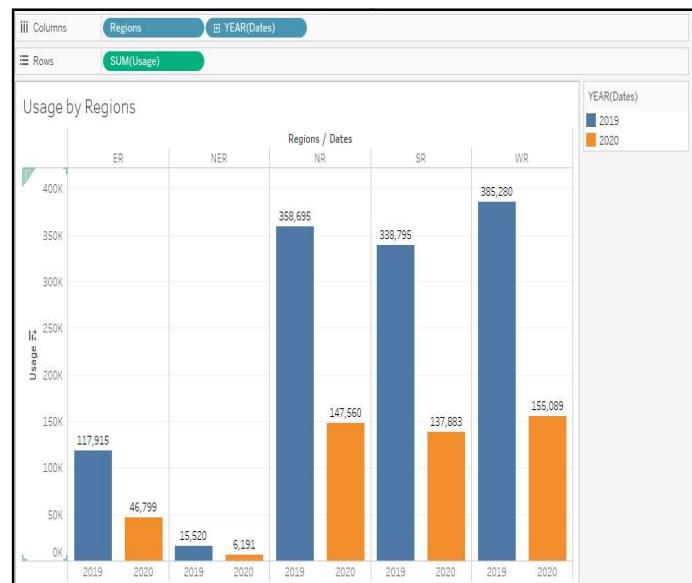
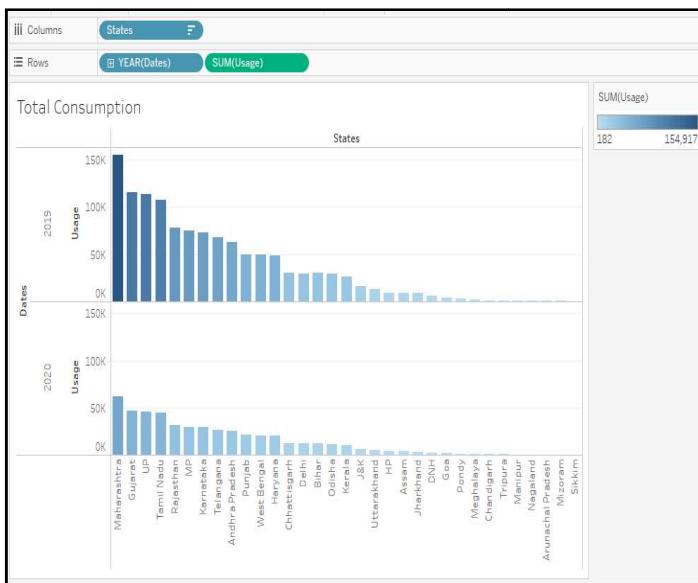
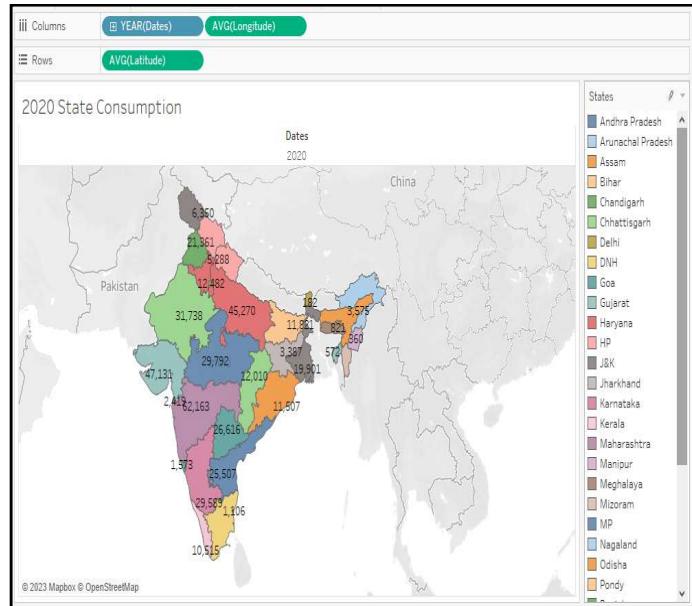
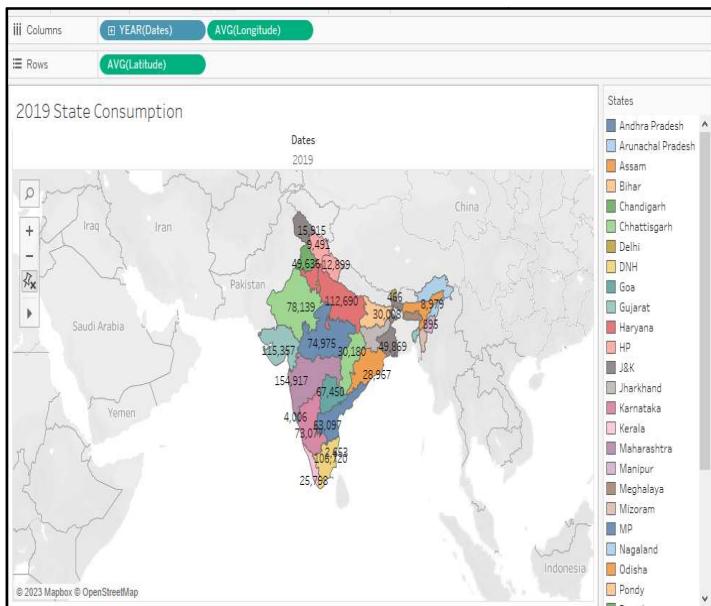
States	Regions	latitude	longitude	Dates	Usage
Assam	NR	26.7499809	94.21666744	01/01/2020	34.1
J&K	NR	33.45	76.24	01/01/2020	44.9
Uttarakhand	NR	30.32040895	78.050001565	01/01/2020	42.1
UP	NR	27.59998069	78.05000565	01/01/2020	42.1
Delhi	NR	28.6699929	77.23000403	01/01/2020	137.2
Rajasthan	NR	26.44999921	74.63998124	01/01/2020	253
Haryana	NR	28.45000633	77.01999101	01/01/2020	222.6
Punjab	NR	31.51997398	75.98000281	01/01/2020	264.6

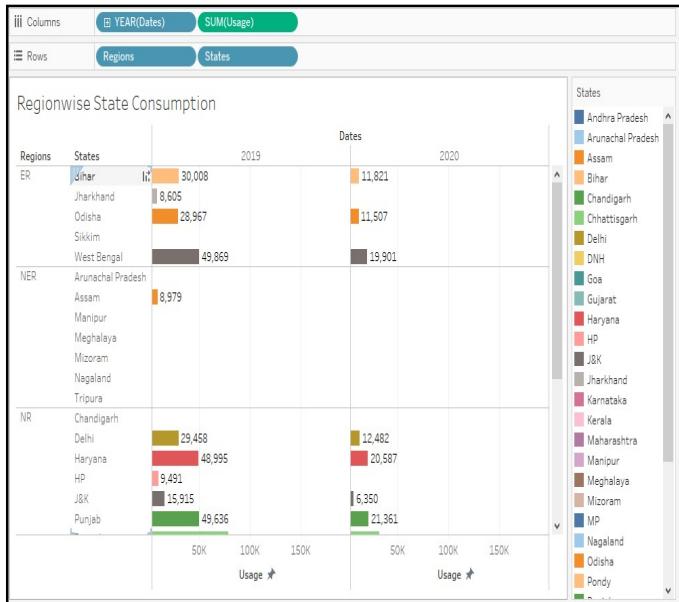
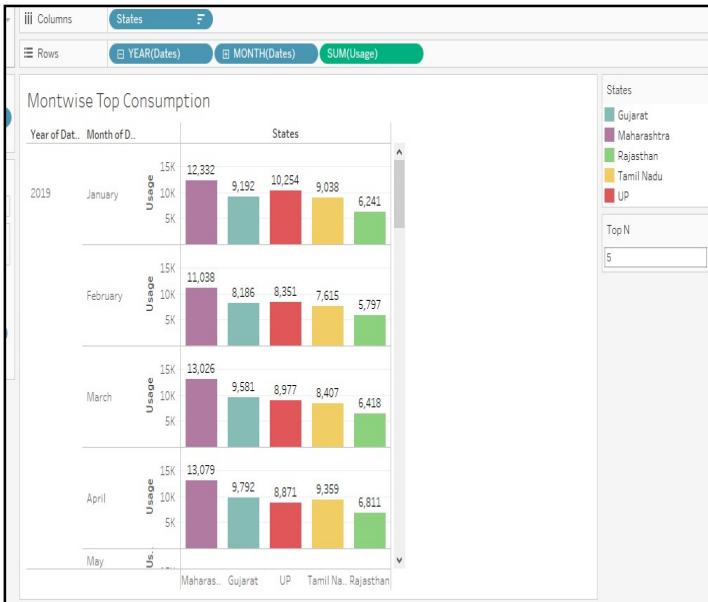
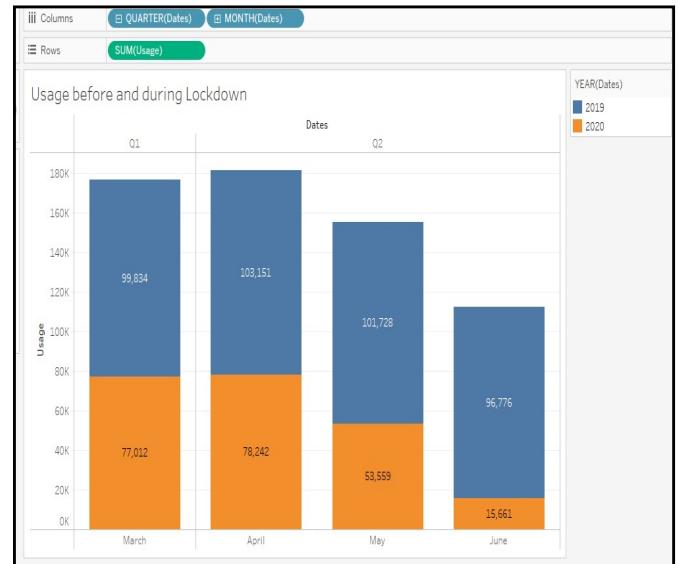
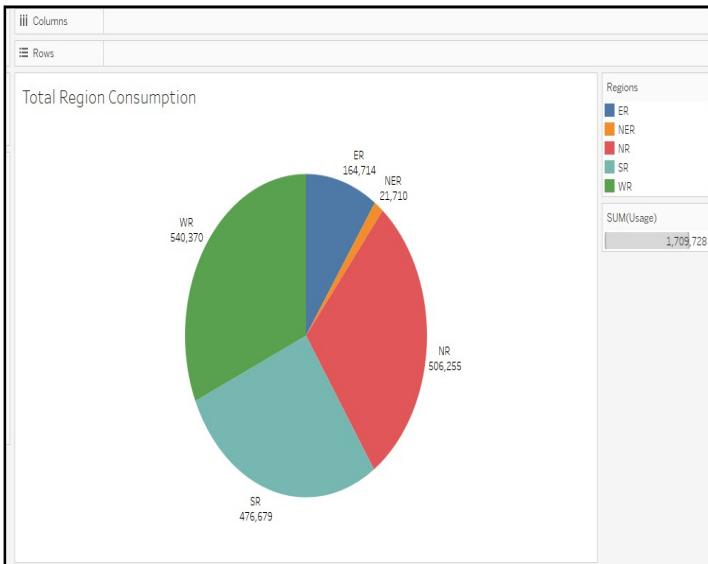
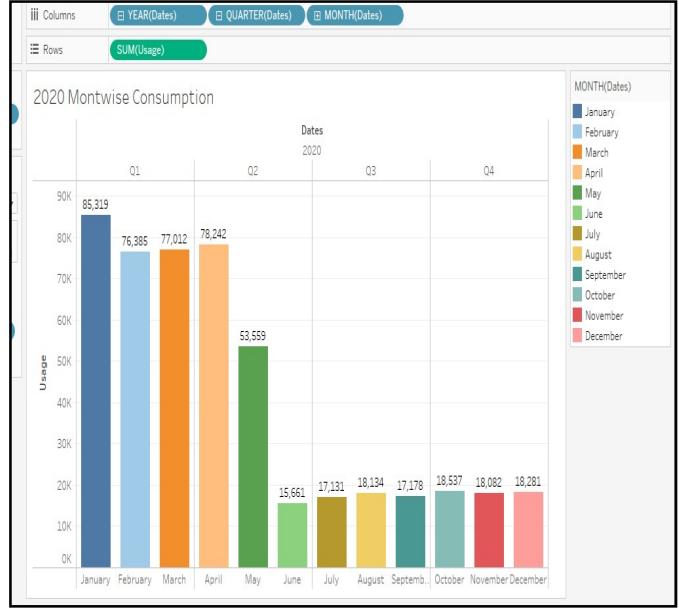
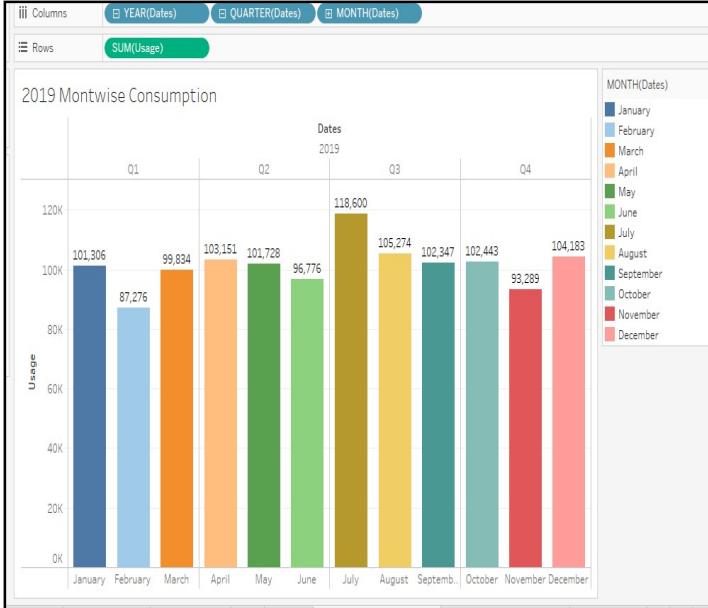
Uploaded the consumption file into MYSQL Workbench 8.0 CE to understand the data.

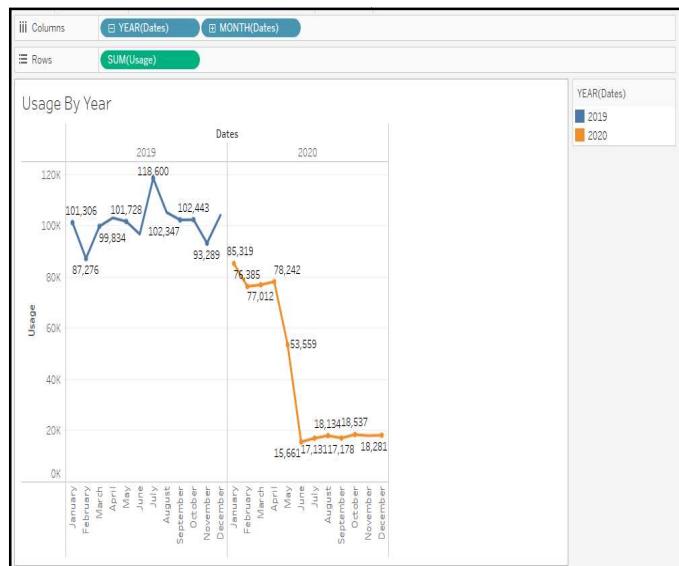
In Dataset Consumption.csv, data is in the form of a time series for a period of 24 months beginning from 2nd Jan 2019 till 5th December 2020. Columns contain States, Regions, Latitude, Longitude, Dates and Usage. The dataset has been scraped from the weekly energy reports of POSOC.

Fields include States – Indian States, Regions – States in Regions on Indian Map, Latitudes – States in Regions on Indian Map, Longitude – Geographical Coordinates of States, Dates– Dates of Usage and Usage– Power consumed in Mega Units (MU).

## NO. OF UNIQUE VISUALIZATIONS







## DASHBOARD CREATION

**Dashboard**

**2019 State Consumption**

Dates 2019

**2020 State Consumption**

Dates 2020

**Year Wise Consumption in Region**

Dates

Region	2019 SUM(Usage)	2020 SUM(Usage)
ER	493,523	46,799
NR	600,000	147,560
SR	800,000	137,883
WR	1,000,000	338,795
WR	1,216,205	385,280

**Total Region Consumption**

Region	2019 SUM(Usage)
WR	540,370
ER	164,714
NR	506,255
SR	476,679

**Total Consumption**

Dates

State	2019 Usage (K)	2020 Usage (K)
Gujarat	150K	182
Tamil N	100K	154,917
MP	100K	182
TE	50K	182
Punjab	50K	182
Haryana	50K	182
Delhi	50K	182
J&K	50K	182
Jharkh.	50K	182
Goa	50K	182
Meghal.	50K	182
Tripura	50K	182
Nagaland	50K	182
Mizoram	50K	182

**Dashboard 2**

**States**

- Andhra Pradesh
- Arunachal Pradesh
- Assam
- Bihar
- Chandigarh
- Chhattisgarh
- Delhi
- DNH
- Goa
- Gujarat
- Haryana
- HP

**Regions**

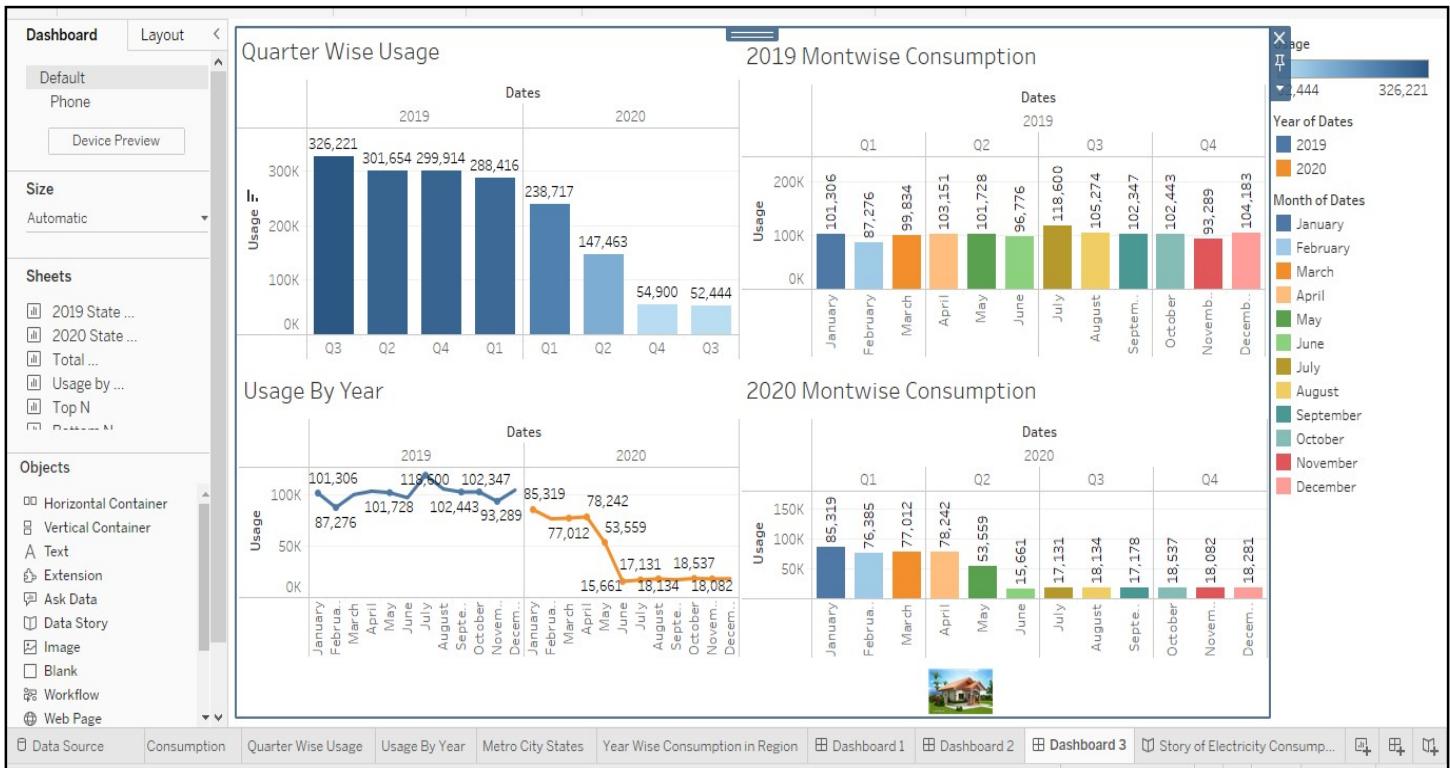
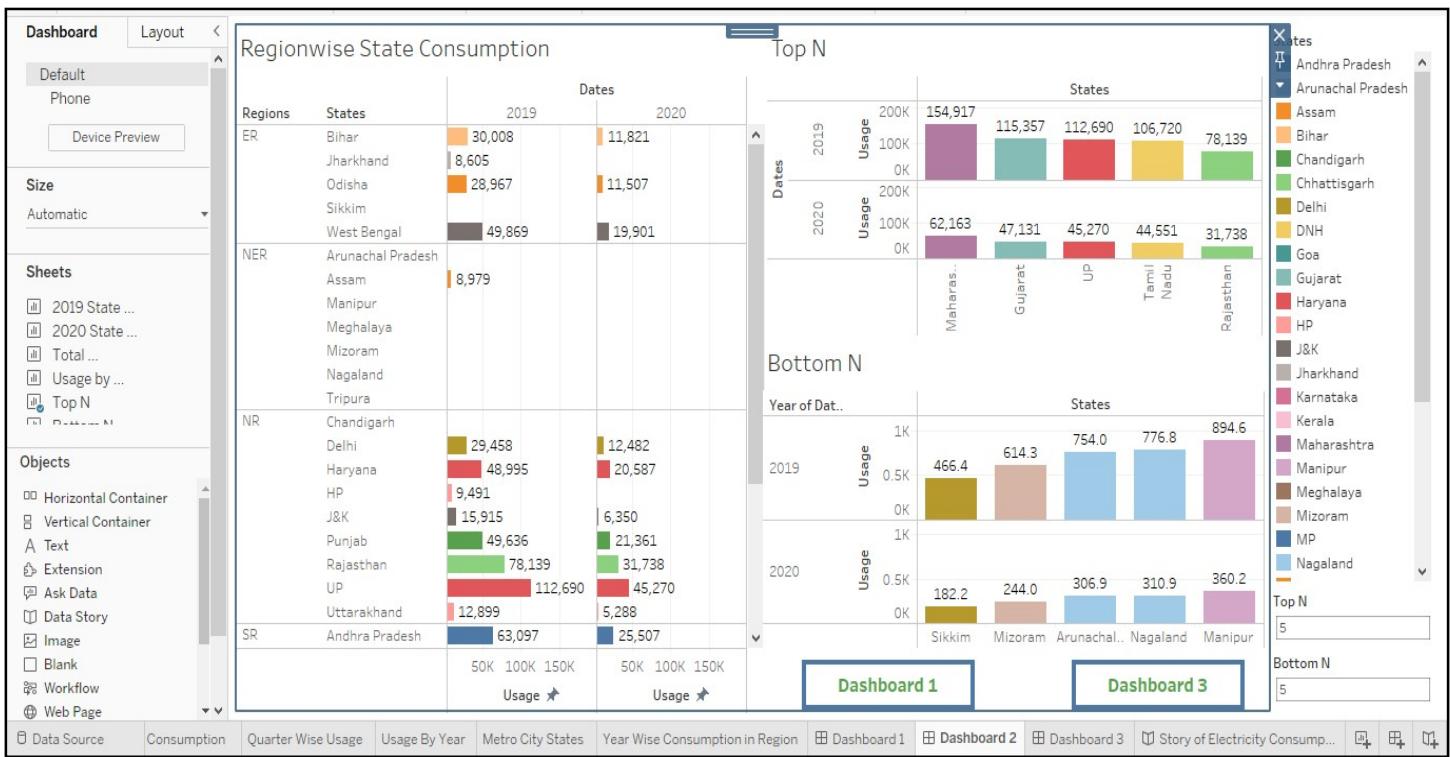
- ER
- NER
- NR
- SR
- WR

**Usage**

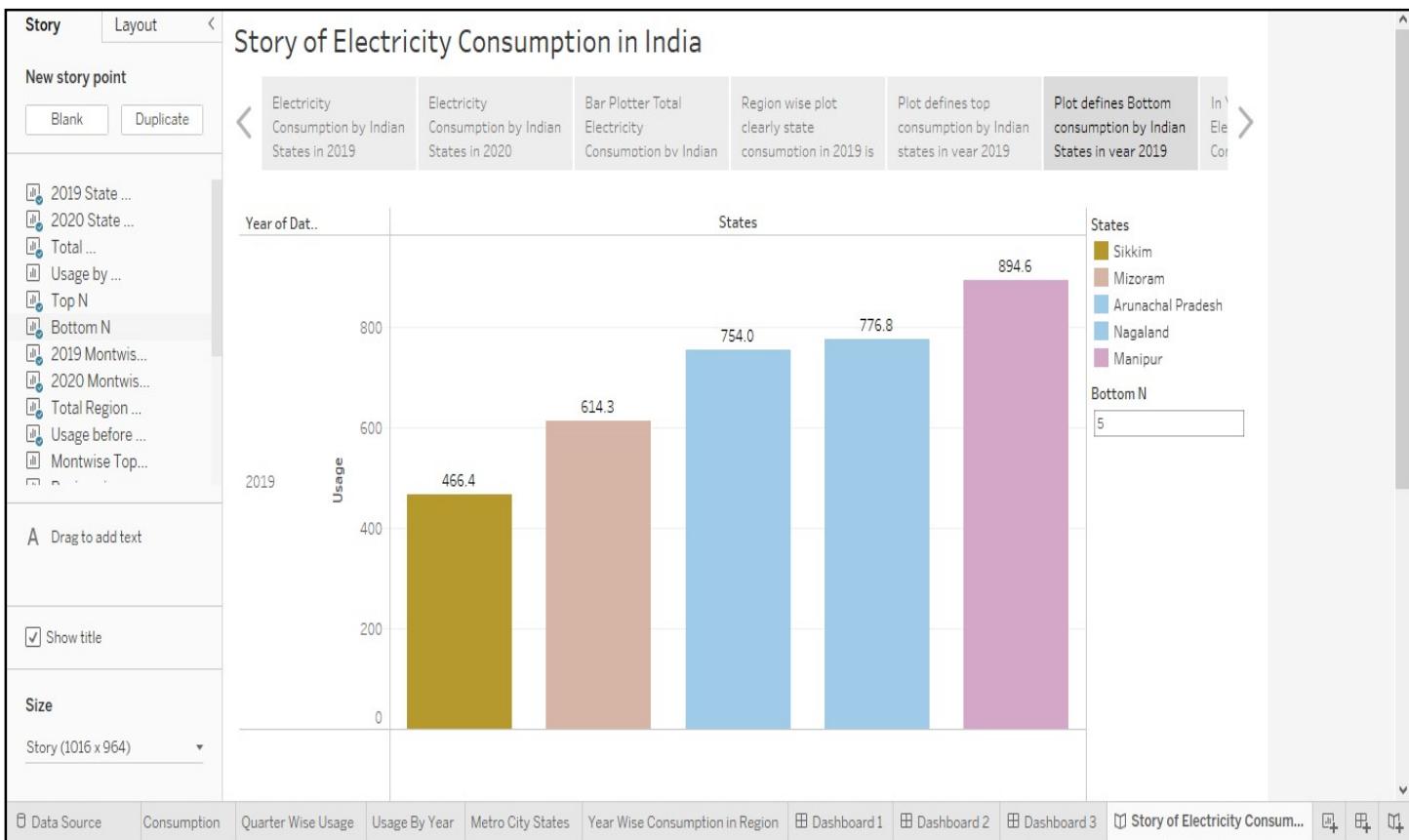
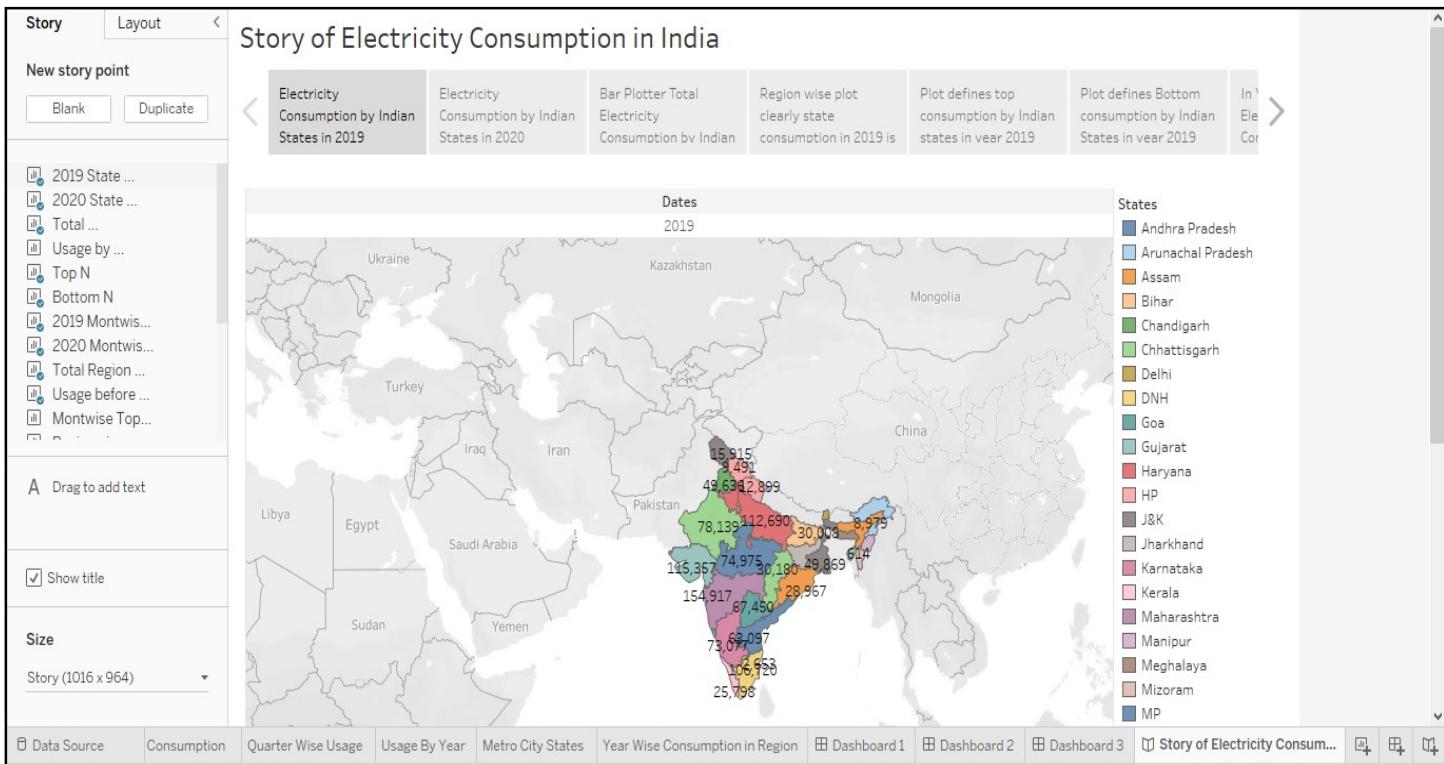
Usage
493,523
600,000
800,000
1,000,000
1,216,205

**Usage**

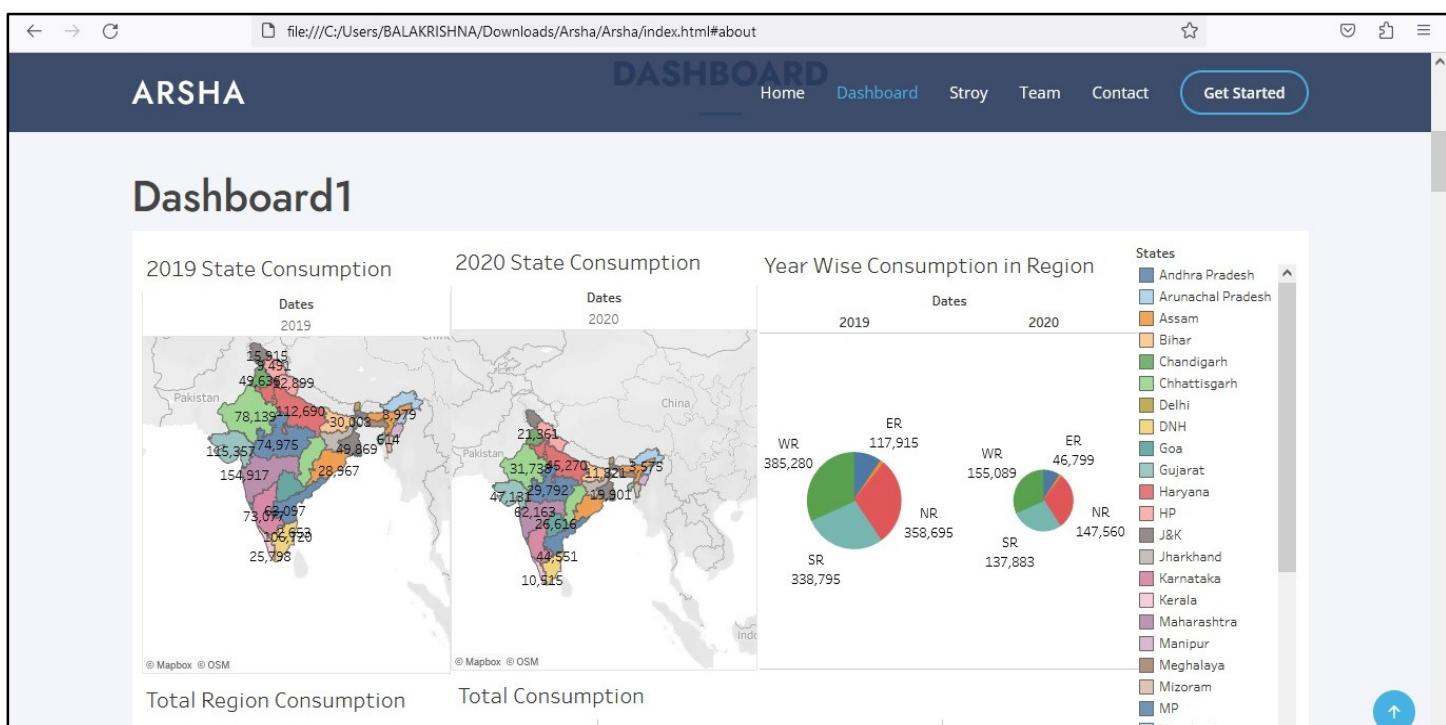
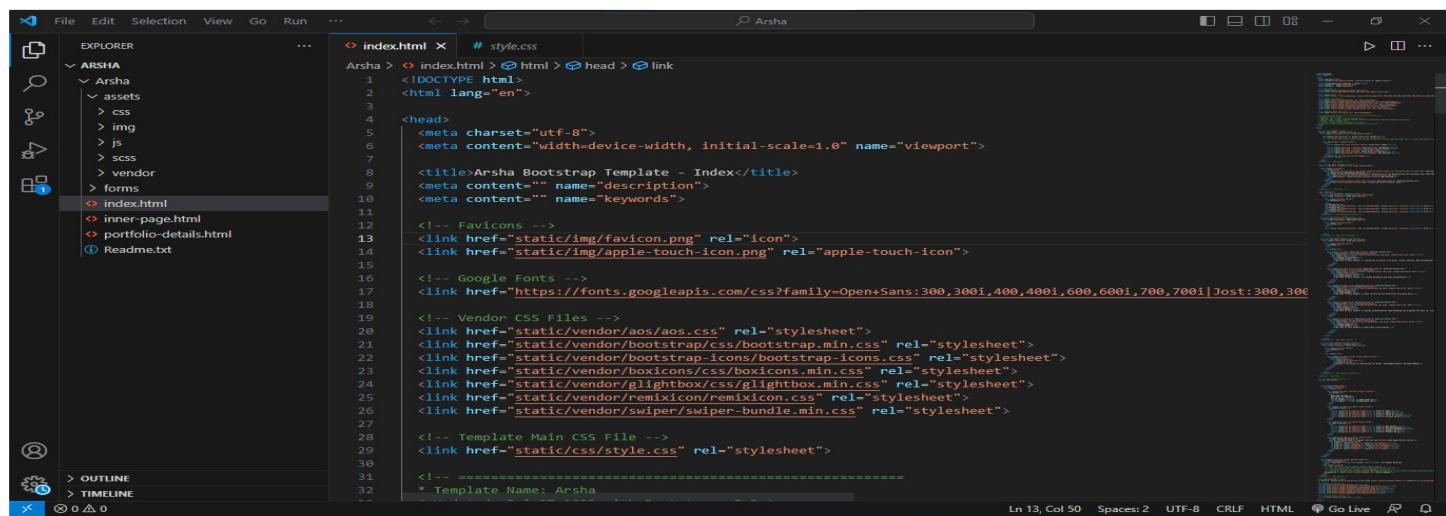
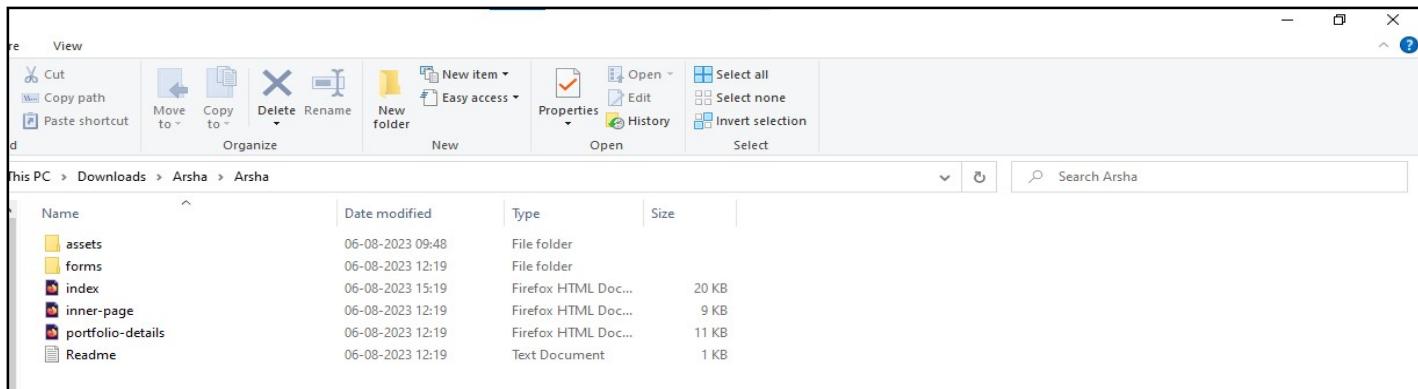
Usage
182
154,917



## STORY CREATION



## WEB INTEGRATION



## CONNECTED THE HTML FILE WITH FLASK TO GET THE WEB ADDRESS

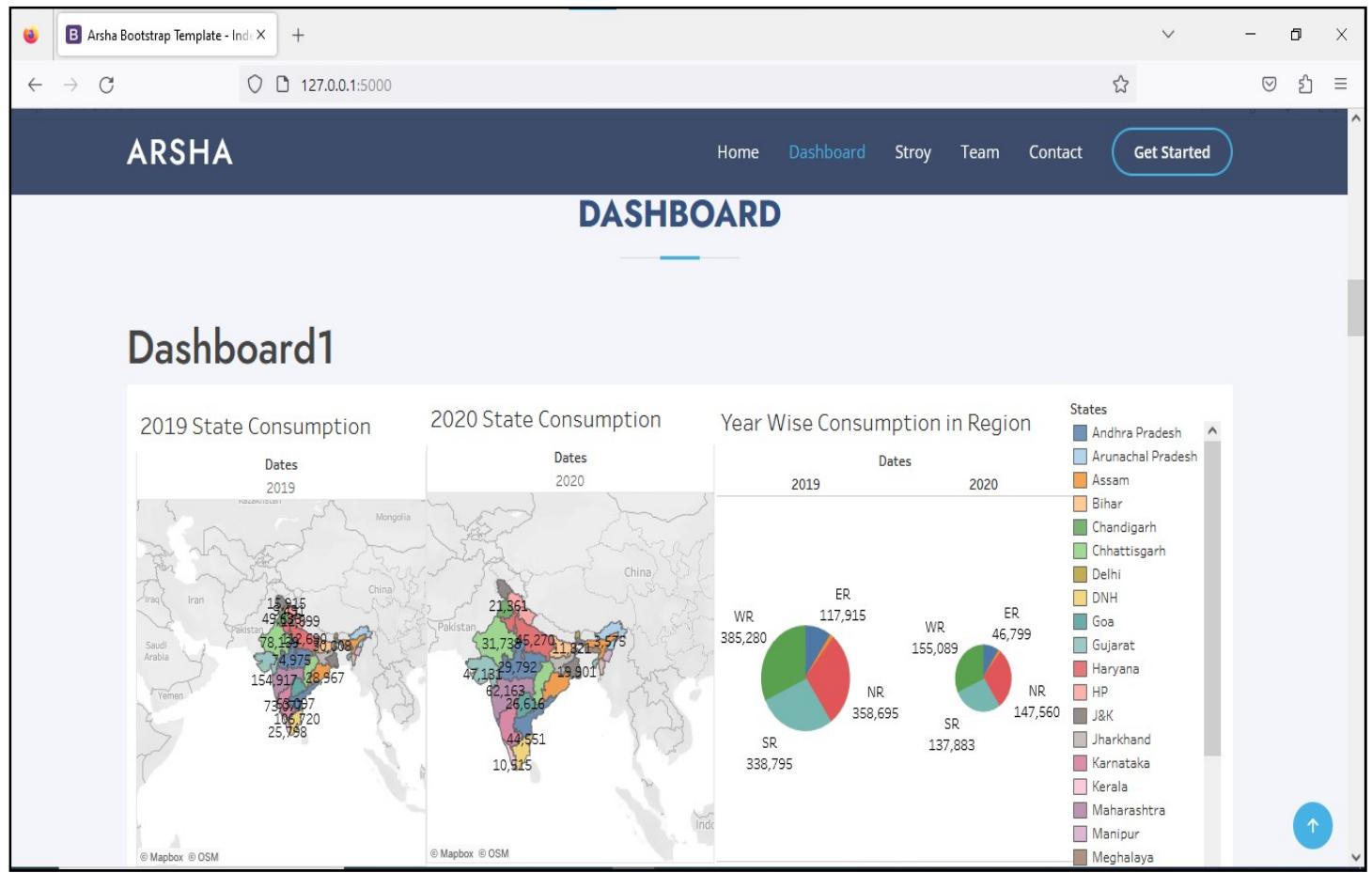
The screenshot shows the Spyder Python IDE interface. On the left, the code editor displays `index.html` and `app.py`. The `app.py` file contains the following code:

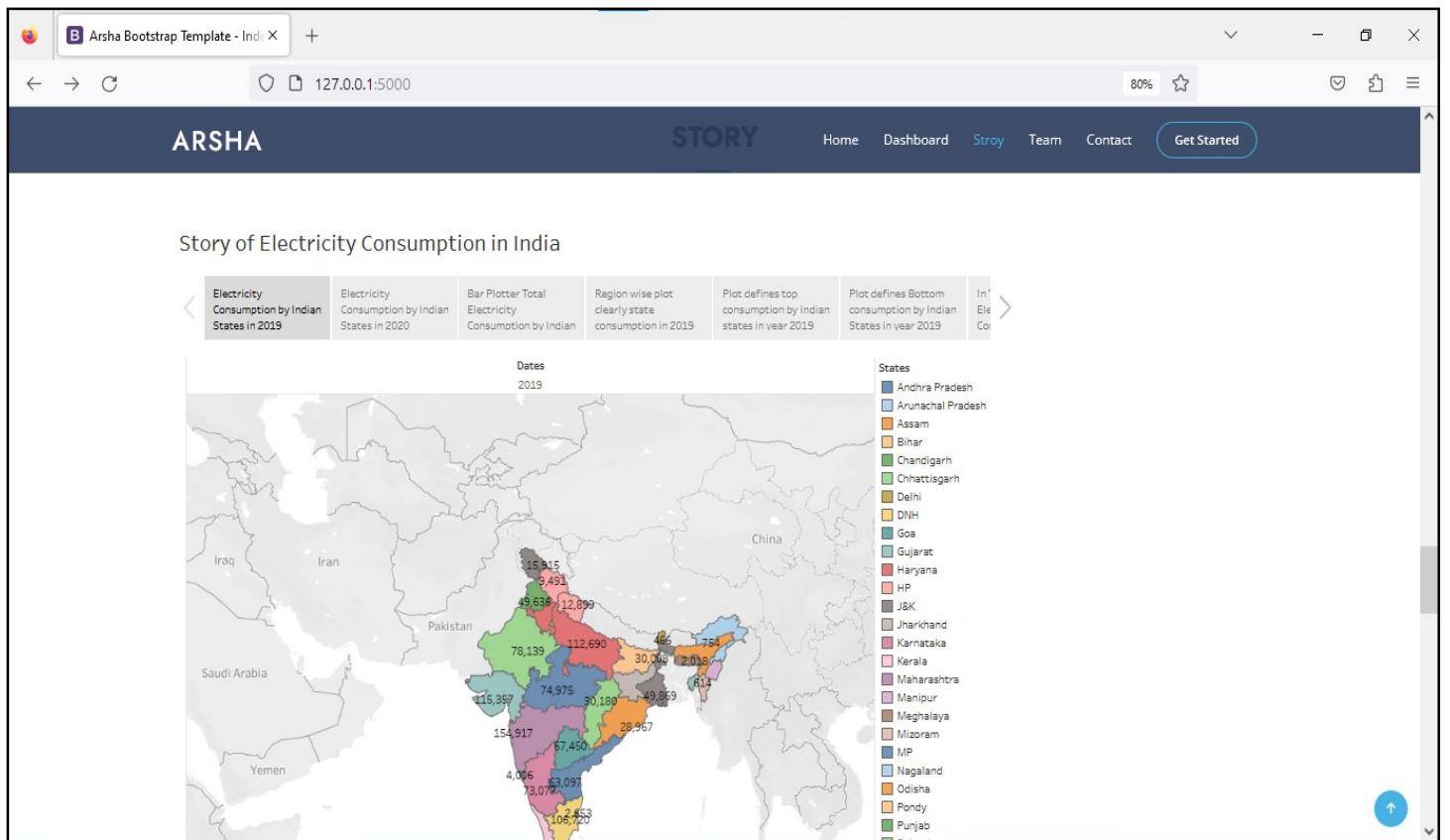
```
from flask import Flask, render_template, request
app = Flask(__name__)
@app.route("/")
def hello_world():
    return render_template('index.html')
if __name__ == '__main__':
    app.run(debug = False)
```

On the right, the terminal window shows the Flask application running on `http://127.0.0.1:5000`. The log output includes:

```
BALAKRISHNA/Desktop/Electricity/Flask
* Serving Flask app 'app'
* Debug mode: off
WARNING: This is a development server. Do not use it in a production deployment. Use a
production WSGI server instead.
* Running on http://127.0.0.1:5000
Press CTRL+C to quit
127.0.0.1 - - [13/Aug/2023 14:42:46] "GET / HTTP/1.1" 200 -
127.0.0.1 - - [13/Aug/2023 14:42:47] "GET /static/vendor/bootstrap/css/bootstrap.min.css
HTTP/1.1" 200 -
127.0.0.1 - - [13/Aug/2023 14:42:48] "GET /static/vendor/boxicons/css/boxicons.min.css HTTP/
1.1" 304 -
127.0.0.1 - - [13/Aug/2023 14:42:48] "GET /static/vendor/aos/aos.css HTTP/1.1" 200 -
127.0.0.1 - - [13/Aug/2023 14:42:48] "GET /static/css/style.css HTTP/1.1" 200 -
127.0.0.1 - - [13/Aug/2023 14:42:48] "GET /static/vendor/remixicon/remixicon.css HTTP/1.1"
...
```

The web address is **http://127.0.0.1:5000**





ARSHA TEAM Home Dashboard Story Team Contact Get Started

### TEAM

**Kancharla Likhitha**  
Team Leader  
My work in this project is connection of server from mysql, Story creation, Web Intergration

**Grandhi Sri Harshitha**  
Team Member  
My work in this project is created dashboard and done presentation.

**Gundam Sushma**  
Team Member  
My work in this project is Data collection and Extraction from data base.

**Giri Varsha Sri**  
Team Member  
My work in this project is Define problem/Define understanding and prepared the data for visualization.

**Gummadi Madhavi**  
Team Member  
My work in this project is done data visualisation.

public.tableau.com

#### **4. APPLICATIONS**

- Electrical energy has many applications across agricultural sector and it been the sector of highest consumption of electricity worldwide.
- IT has multiple consumptions in residential sector followed by the commercial and industrial sectors.
- Powering essential services in places such as hospitals and schools.

#### **5. CONCLUSION**

2019-20 Electricity Consumption has decreased. For those 2 years Sikkim has least use of electricity than all the other states. North region has the major consumption of electricity. Maharashtra has the major consumption of Electricity. There was a drastic drop of consumption of electricity from May to June of the year 2020 this might be because of the shutdown of many companies and factories due to Covid 19. This information can be validated even by the stats of consumption of electricity from March to June which depicts that the consumption of electricity has a drastic difference in these months.