Plugging into the Future: An Exploration of Electricity Consumption Patterns

India is the world's third-largest producer and third-largest consumer of electricity. The national electric grid in India has an installed capacity of 370.106 GW as of 31 March 2020. Renewable power plants, which also include large hydroelectric plants, constitute 35.86% of India's total installed capacity. During the fiscal year (FY) 2019–20, the total electricity generation in the country was 1,598 TWh, of which 1,383.5 TWh generated by utilities. The gross electricity consumption per capita in FY2019 was 1,208 kWh.

In 2015-16, electric energy consumption in agriculture was recorded as being the highest (17.89%) worldwide. The per capita electricity consumption is low compared to most other countries despite India having a low electricity tariff.

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.

The dataset is exhaustive in its demonstration of energy consumption state wise.

Analysing Electricity Consumption in India from Jan 2019 till 5th December 2020. This dataset contains a record of Electricity consumption in each states of India, here we are going to analyse State wise , Region wise and Overall Electricity consumption in India.

INTRODUCTION

To accomplish this, we have to complete all the activities listed below,

- Define Problem / Problem Understanding
    - Specify the business problem
    - Business requirements
    - Literature Survey
    - Social or Business Impact.
- Data Collection & Extraction from Database
    - Collect the dataset,
    - Storing Data in DB
    - Perform SQL Operations
    - Connect DB with Tableau
- Data Preparation
    - Prepare the Data for Visualization
- Data Visualizations
    - No of Unique Visualizations
- Dashboard
    - Responsive and Design of Dashboard
- Story
    - No of Scenes of Story
- Performance Testing
    - Amount of Data Rendered to DB ‘
    - Utilization of Data Filters
    - No of Calculation Fields
    - No of Visualizations/ Graphs
- Web Integration
    - Dashboard and Story embed with UI With Flask
- Project Demonstration & Documentation
    - Record explanation Video for project end to end solution
    - Project Documentation-Step by step project development procedure

Define Problem / Problem Understanding

Specify the business problem

Refer Project Description

Business requirements

The business requirements for analyzing analysis on electricity consumption in IndiaIdentify the current patterns of electricity consumption in different regions and sectors of India. This information can be used to identify areas where consumption is high and areas where it is low. Identify opportunities for improving energy efficiency and reducing consumption in different sectors and regions. This information can be used to develop policies and programs to promote energy efficiency. This information

can be used by government agencies, electricity providers, and investors to develop policies and make investment decisions that promote sustainable energy development and consumption in India.

Literature Survey (Student Will Write)

A literature survey is a method of researching existing literature and studies related to a specific topic.The topic of electricity consumption in India is a well-researched area, with many studies having been conducted to understand consumption patterns and trends, as well as the impact of government policies and investment opportunities.A study by (Kumar et al., 2020) analyzed the electricity consumption patterns in India and identified the major contributors to the consumption. The study found that the residential sector was the largest consumer of electricity, followed by the commercial and industrial sectors.Another study by (Jain and Rathi, 2019) analyzed the impact of government policies on electricity consumption in India. The study found that policies promoting energy efficiency and renewable energy development have had a positive impact on reducing electricity consumption in India.

Social or Business Impact.

Social Impact: By providing access to electricity, the analysis can help to improve the quality of life for people living in areas without access to electricity, including providing access to lighting, heating, and cooling, and powering essential services such as hospitals and schools..

Business Model/Impact: By understanding consumption patterns and trends, the analysis can help businesses identify market opportunities and develop strategies to meet the growing demand for electricity in India.

Data Collection & Extraction from Database

Data collection is the process of gathering and measuring information on variables of interest, in an established systematic fashion that enables one to answer stated research questions, test hypotheses, and evaluate outcomes and generate insights from the data.

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 contains States, Regions, Latitude, Longitude, Dates andUsage. The dataset has been scraped from the weekly energy reports of POSOC.

Fields Include

States - Indian States

Regions- States in Regions on Indian Map

Latitude - States in Regions on Indian Map

Longitude - Geographical Coordinates of States

Dates - Dates of Usage

Usage - Power consumed in Mega Units(MU)

Data Preparation

Prepare the Data for Visualization

Preparing the data for visualization involves cleaning the data to remove irrelevant or missing data, transforming the data into a format that can be easily visualized, exploring the data to identify patterns and trends, filtering the data to focus on specific subsets of data, preparing the data for visualization software, and ensuring the data is accurate and complete. This process helps to make the data easily understandable and ready for creating visualizations to gain insights into the performance and efficiency.

This data is preprocessed initially. Lets proceed for visualization.

Data Visualization

Data visualization is the process of creating graphical representations of data in order to help people understand and explore the information. The goal of data visualization is to make complex data sets more accessible, intuitive, and easier to interpret. By using visual elements such as charts, graphs, and maps, data visualizations can help people quickly identify patterns, trends, and outliers in the data.

No of Unique Visualizations

The number of unique visualizations that can be created with a given dataset. Some common types of visualizations that can be used to analyze the performance and efficiency of Radisson Hotels include bar charts, line charts, heat maps, scatter plots, pie charts,Maps etc. These visualizations can be used to compare performance, track changes over time, show distribution, and relationships between variables, breakdown of revenue and customer demographics, workload, resource allocation and location of hotels.

Dashboard

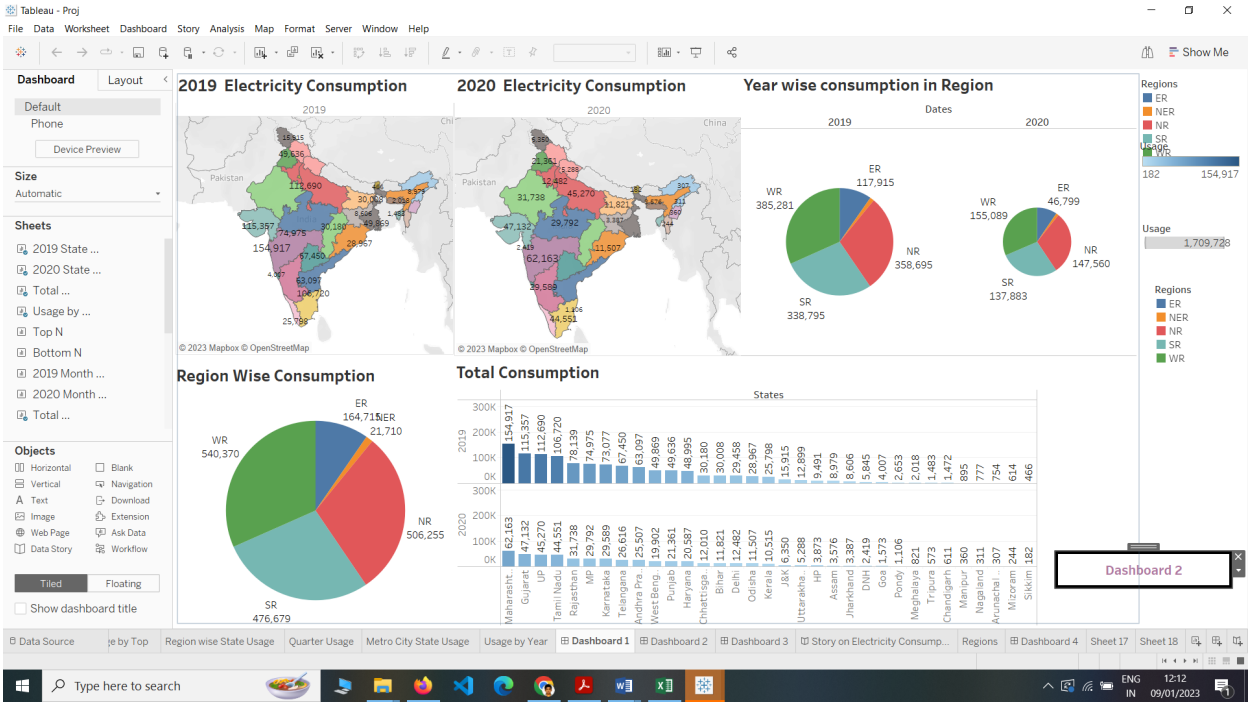
A dashboard is a graphical user interface (GUI) that displays information and data in an organized, easy-to-read format. Dashboards are often used to provide real-time monitoring and analysis of data, and are typically designed for a specific purpose or use case. Dashboards can be used in a variety of settings, such as business, finance, manufacturing, healthcare, and many other industries. They can be used to track key performance indicators (KPIs), monitor performance metrics, and display data in the form of charts, graphs, and tables.

Responsive and Design of Dashboard

The responsiveness and design of a dashboard for analyzing the performance and efficiency of Radisson Hotels is crucial to ensure that the information is easily understandable and actionable. Key considerations for designing a responsive and effective dashboard include user-centered design, clear and concise information,

interactivity, data-driven approach, accessibility, customization, and security. The goal is to create a dashboard that is user-friendly, interactive, and data-driven, providing actionable insights to improve the performance and efficiency of Radisson Hotels.

Once you have created views on different sheets in Tableau, you can pull them into a dashboard.

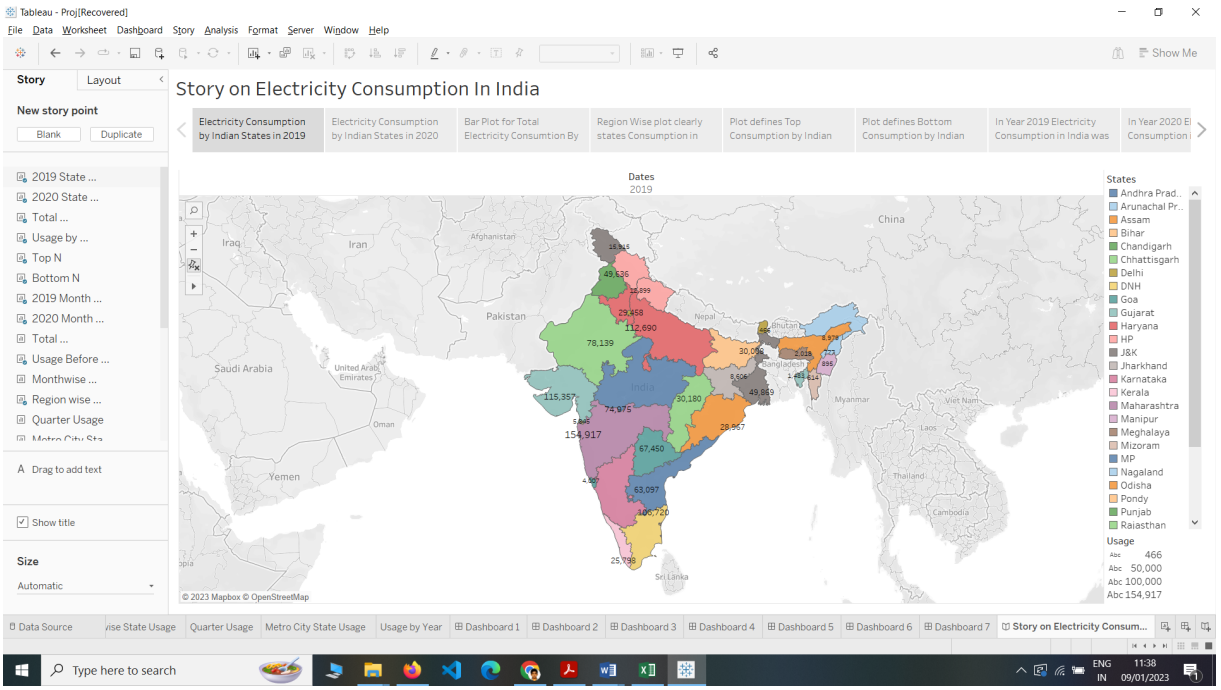


Story

A data story is a way of presenting data and analysis in a narrative format, with the goal of making the information more engaging and easier to understand. A data story typically includes a clear introduction that sets the stage and explains the context for the data, a body that presents the data and analysis in a logical and systematic way, and a conclusion that summarizes the key findings and highlights their implications. Data stories can be told using a variety of mediums, such as reports, presentations, interactive visualizations, and videos.

1- No of Scenes of Story

The number of scenes in a storyboard for a data visualization analysis of the electricity consumption in india will depend on the complexity of the analysis and the specific insights that are trying to be conveyed. A storyboard is a visual

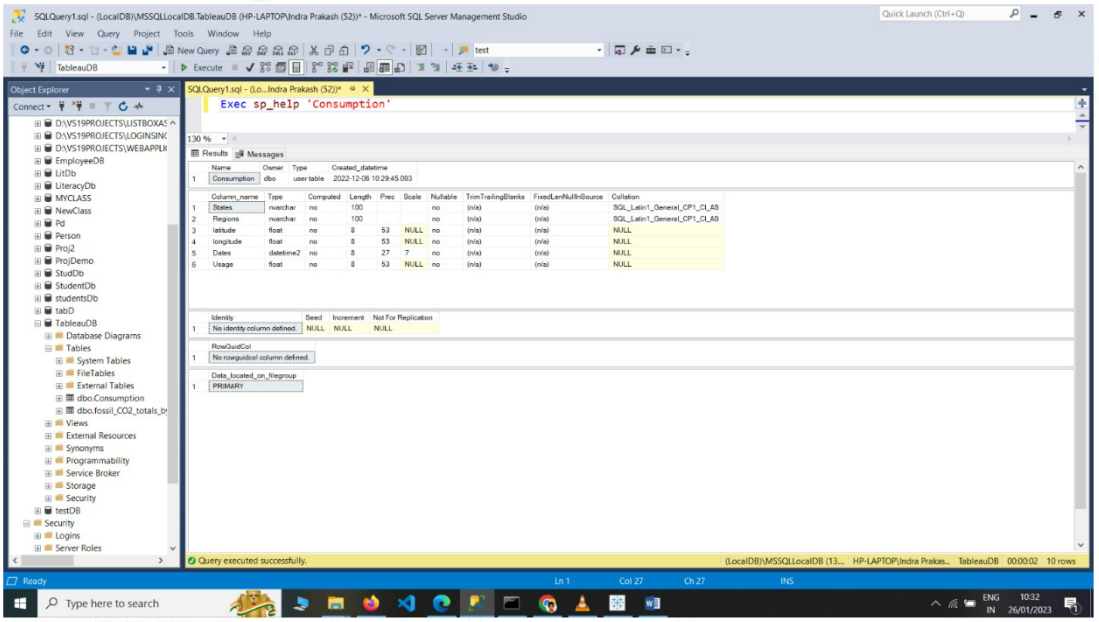


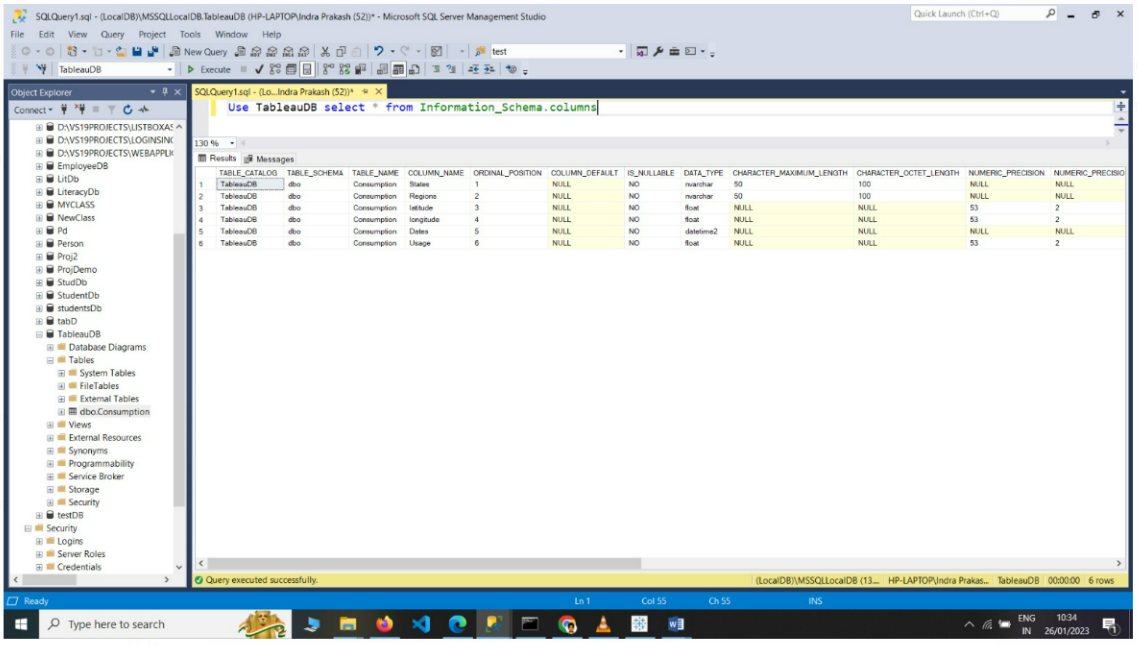
Performance Testing

Amount of Data Rendered to DB

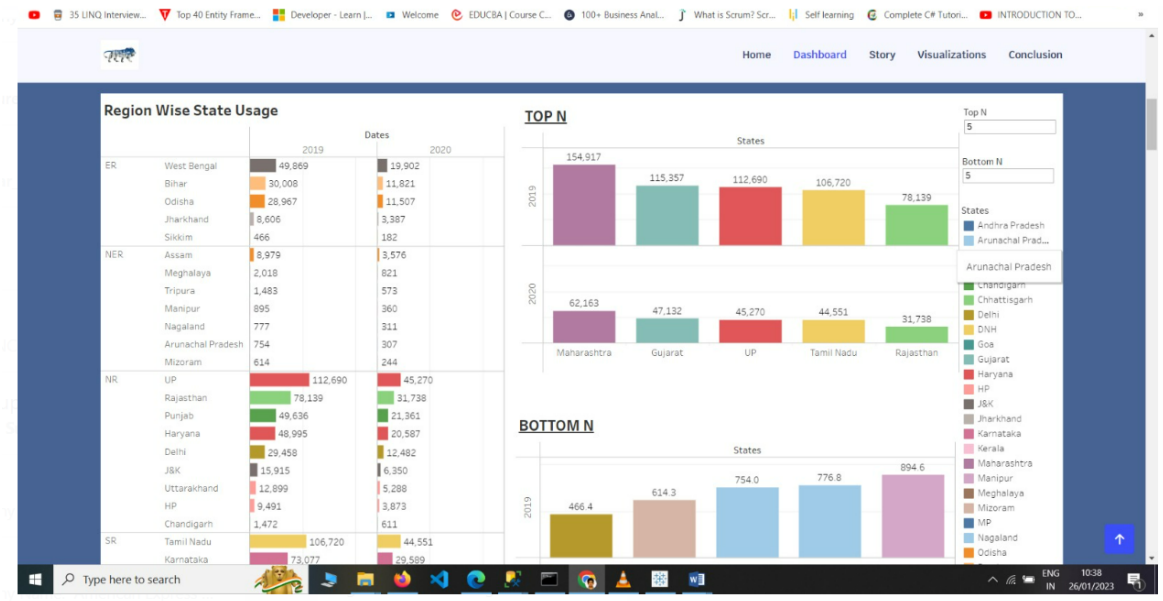
- The amount of data that is rendered to a database depends on the size of the dataset and the capacity of the database to store and retrieve data.

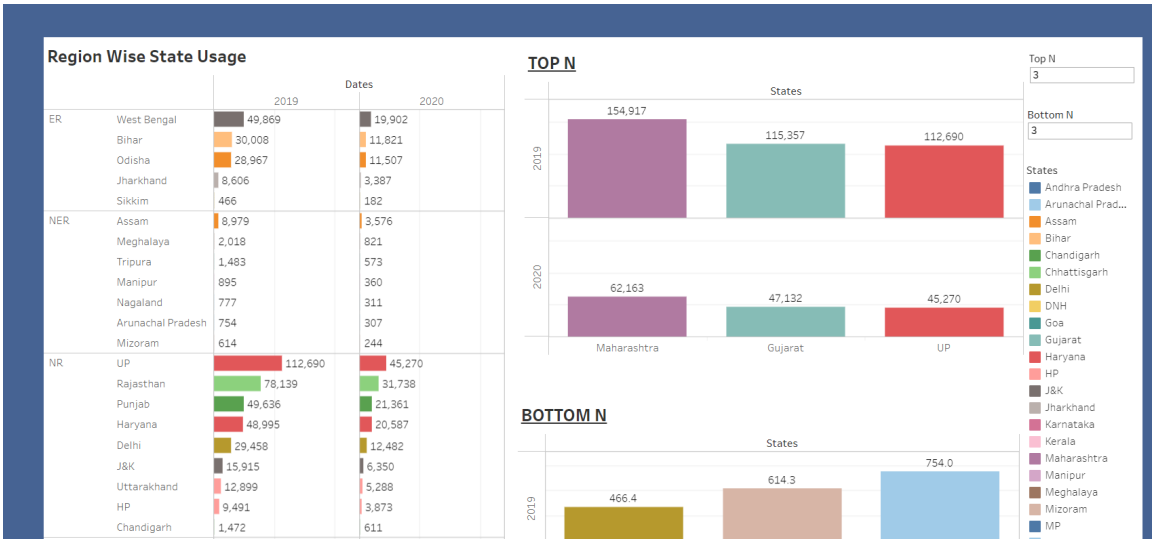
- Open the MySQL Workbench, go to the database then click to expand the tables,select the table and click on (i) button to get the information related to table such as column count,table rows etc.

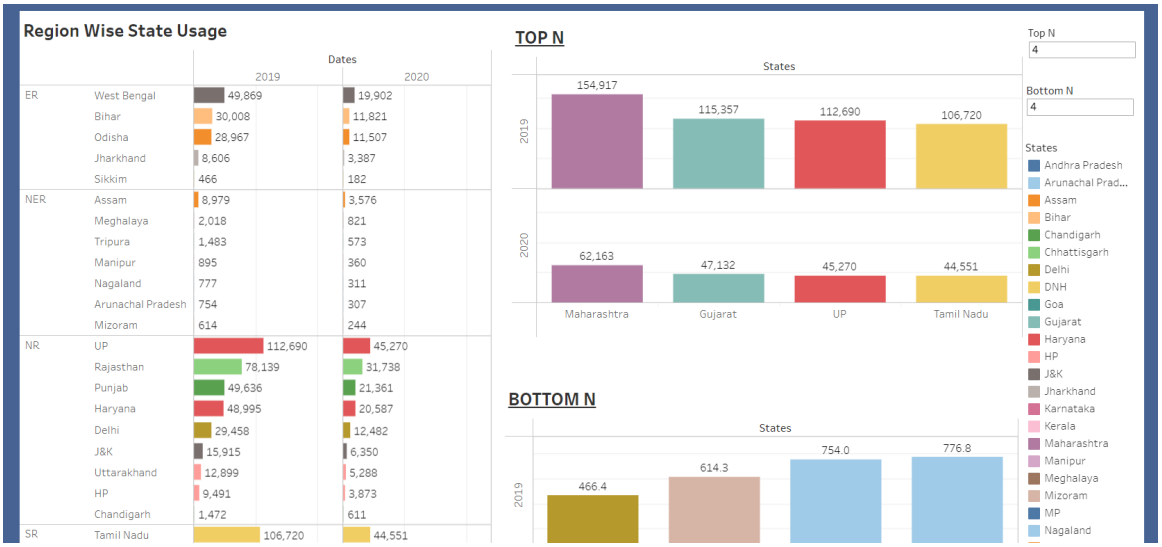




Utilization of Data Filters


Home
Dashboard
Story
Visualizations
Conclusion
Region Wise State Usage
Dates
2019
2020
ER
West Bengal 49,869 19,902
Bihar 30,008 11,821
Odisha 28,967 11,507
Jharkhand 8,606 3,387
Sikkim 466 182
NER
Assam 8,979 3,576
Meghalaya 2,018 821
Tripura 1,483 573
Manipur 895 360
Nagaland 777 311
Arunachal Pradesh 754 307
Mizoram 614 244
NR
UP 112,690 45,270
Rajasthan 78,139 31,738
Punjab 49,636 21,361
Haryana 48,995 20,587
Delhi 29,458 12,482
J&K 15,915 6,350
Uttarakhand 12,899 5,288
HP 9,491 3,873
Chandigarh 1,472 611
SR
Tamil Nadu 106,720 44,551
Karnataka 73,077 29,589
TOP N
States
154,917
115,357
112,690
106,720
78,139
62,163
47,132
45,270
44,551
31,738
Maharashtra
Gujarat
UP
Tamil Nadu
Rajasthan
Top N
5
Bottom N
5
States
Andhra Pradesh
Arunachal Prad...
Arunachal Pradesh
Chandigarh
Chhattisgarh
Delhi
DNH
Goa
Gujarat
Haryana
HP
J&K
Jharkhand
Karnataka
Kerala
Maharashtra
Manipur
Meghalaya
Mizoram
MP
Nagaland
Odisha
BOTTOM N
States
466.4
614.3
754.0
776.8
894.6
Type here to search
ENG
IN
10:38
26/01/2023

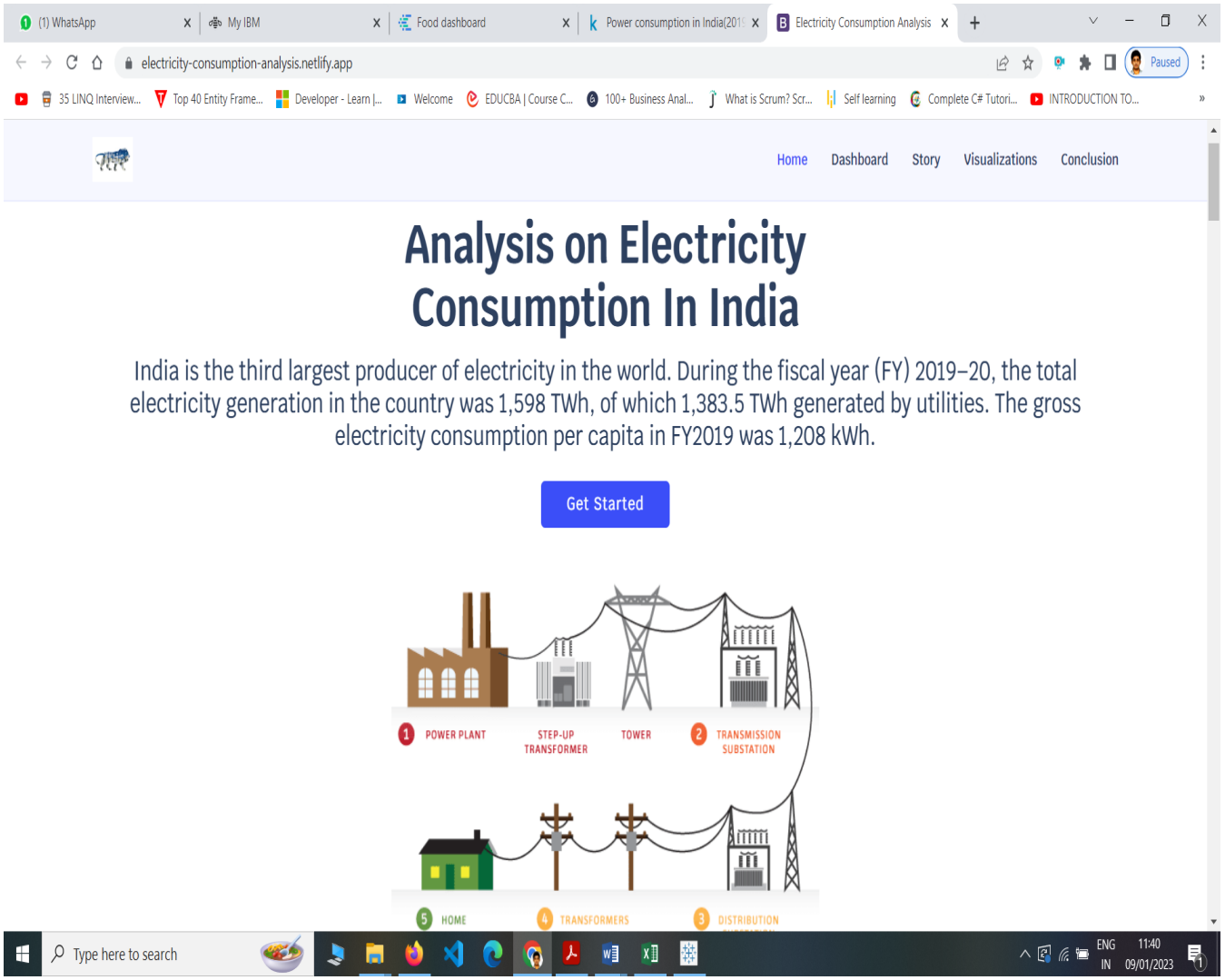

Region Wise State Usage
Dates
2019
2020
ER
West Bengal 49,869 19,902
Bihar 30,008 11,821
Odisha 28,967 11,507
Jharkhand 8,606 3,387
Sikkim 466 182
NER
Assam 8,979 3,576
Meghalaya 2,018 821
Tripura 1,483 573
Manipur 895 360
Nagaland 777 311
Arunachal Pradesh 754 307
Mizoram 614 244
NR
UP 112,690 45,270
Rajasthan 78,139 31,738
Punjab 49,636 21,361
Haryana 48,995 20,587
Delhi 29,458 12,482
J&K 15,915 6,350
Uttarakhand 12,899 5,288
HP 9,491 3,873
Chandigarh 1,472 611
TOP N
States
154,917
115,357
112,690
62,163
47,132
45,270
Maharashtra
Gujarat
UP
Top N
3
Bottom N
3
States
Andhra Pradesh
Arunachal Prad...
Assam
Bihar
Chandigarh
Chhattisgarh
Delhi
DNH
Goa
Gujarat
Haryana
HP
J&K
Jharkhand
Karnataka
Kerala
Maharashtra
Manipur
Meghalaya
Mizoram
MP
BOTTOM N
States
466.4
614.3
754.0

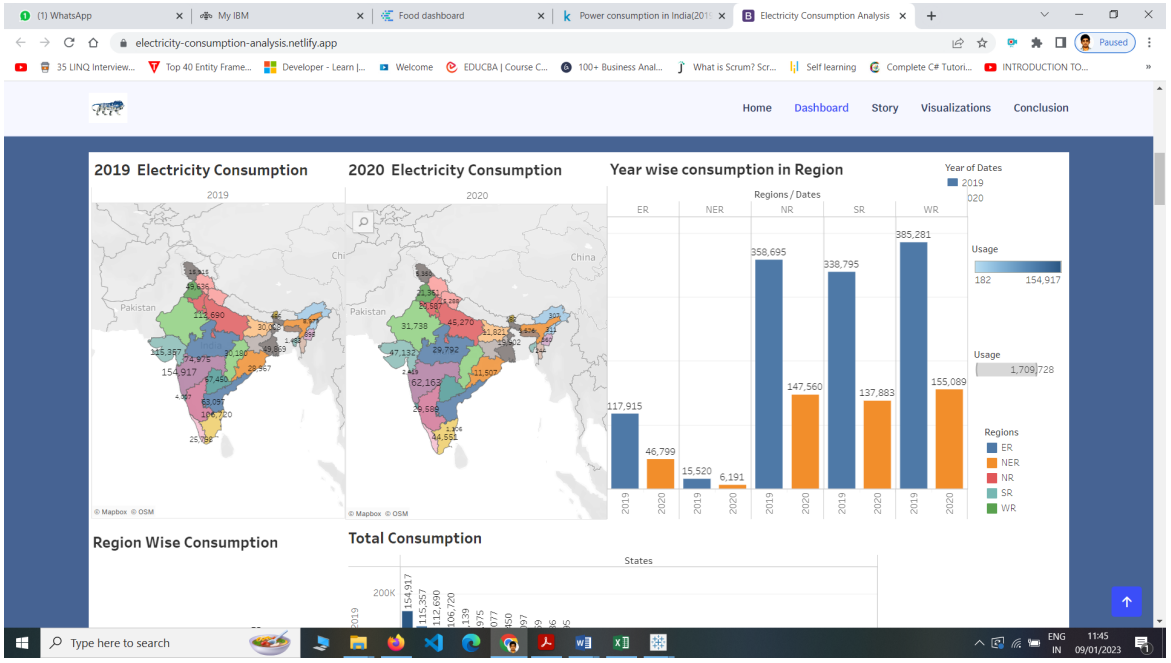

Region Wise State Usage
Dates
2019
2020
ER
West Bengal 49,869 19,902
Bihar 30,008 11,821
Odisha 28,967 11,507
Jharkhand 8,606 3,387
Sikkim 466 182
NER
Assam 8,979 3,576
Meghalaya 2,018 821
Tripura 1,483 573
Manipur 895 360
Nagaland 777 311
Arunachal Pradesh 754 307
Mizoram 614 244
NR
UP 112,690 45,270
Rajasthan 78,139 31,738
Punjab 49,636 21,361
Haryana 48,995 20,587
Delhi 29,458 12,482
J&K 15,915 6,350
Uttarakhand 12,899 5,288
HP 9,491 3,873
Chandigarh 1,472 611
SR
Tamil Nadu 106,720 44,551
TOP N
States
154,917
115,357
112,690
106,720
62,163
47,132
45,270
44,551
Maharashtra
Gujarat
UP
Tamil Nadu
Top N
4
Bottom N
4
States
Andhra Pradesh
Arunachal Prad...
Assam
Bihar
Chandigarh
Chhattisgarh
Delhi
DNH
Goa
Gujarat
Haryana
HP
J&K
Jharkhand
Karnataka
Kerala
Maharashtra
Manipur
Meghalaya
Mizoram
MP
Nagaland
BOTTOM N
States
466.4
614.3
754.0
776.8

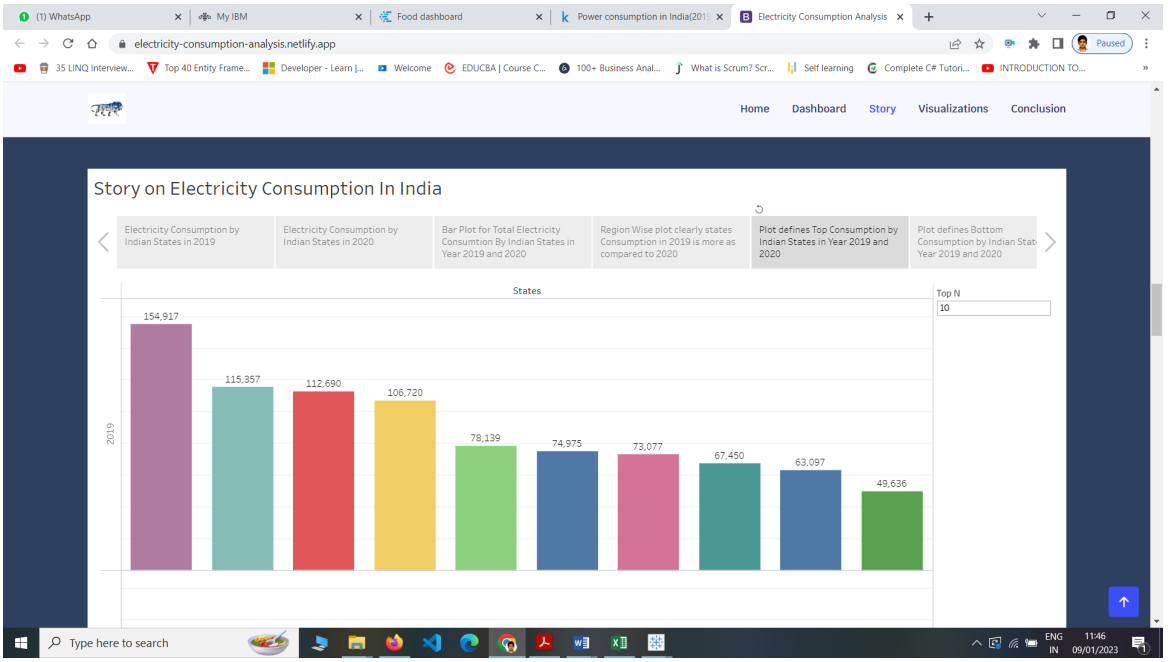
Once you login into your tableau public using the credentials, the particular visualization will be published into tableau public

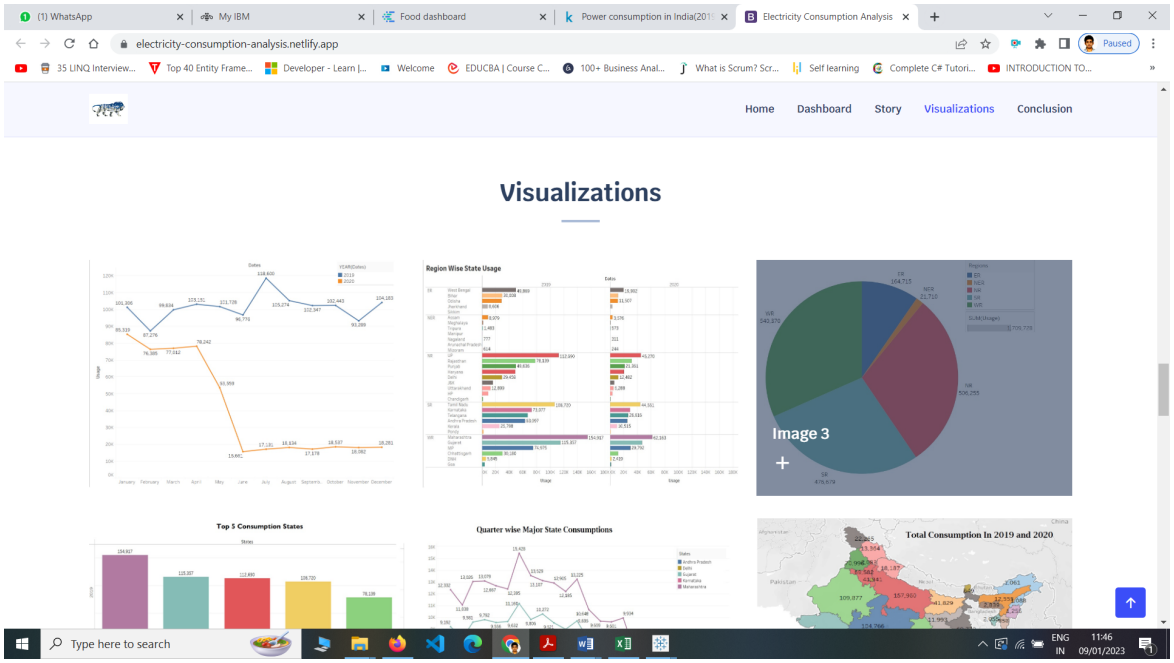
Note: While publishing the visualization to the public, the respective sheet will get published when you click on share option.

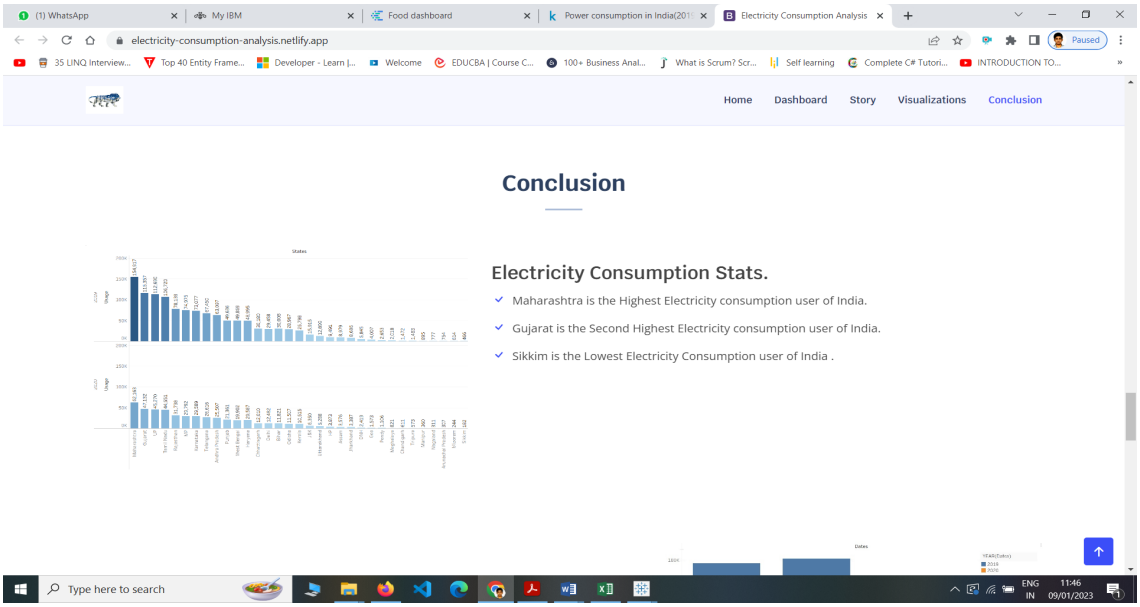
Dashboard and Story embed with UI With Flask

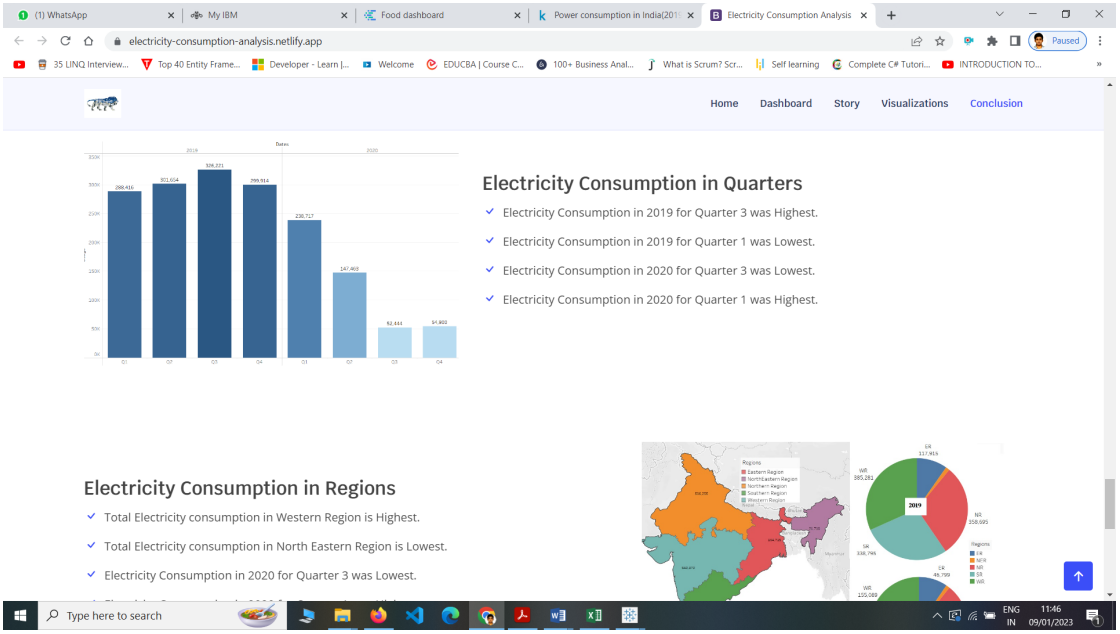



electricity-consumption-analysis.netlify.app
Home
Dashboard
Story
Visualizations
Conclusion
2019 Electricity Consumption
2020 Electricity Consumption
Year wise consumption in Region
Year of Dates
2019
2020
Regions / Dates
ER
NER
NR
SR
WR
Usage
182
154,917
1,709,728
Regions
ER
NER
NR
SR
WR
117,915
46,799
15,520
6,191
358,695
147,560
338,795
137,883
385,281
155,089
Region Wise Consumption
Total Consumption
States
200K
Type here to search
ENG
IN
11:45
09/01/2023


electricity-consumption-analysis.netlify.app
Home
Dashboard
Story
Visualizations
Conclusion
Story on Electricity Consumption In India
Electricity Consumption by Indian States in 2019
Electricity Consumption by Indian States in 2020
Bar Plot for Total Electricity Consumption By Indian States in Year 2019 and 2020
Region Wise plot clearly states Consumption in 2019 is more as compared to 2020
Plot defines Top Consumption by Indian States in Year 2019 and 2020
Plot defines Bottom Consumption by Indian Stat Year 2019 and 2020
States
Top N
10
2019
154,917
115,357
112,690
106,720
78,139
74,975
73,077
67,450
63,097
49,636
Type here to search
ENG
IN
11:46
09/01/2023


(1) WhatsApp
My IBM
Food dashboard
Power consumption in India(201
Electricity Consumption Analysis
electricity-consumption-analysis.netlify.app
Paused
Home
Dashboard
Story
Visualizations
Conclusion
Visualizations
Region Wise State Usage
Image 3
Top 5 Consumption States
Quarter wise Major State Consumptions
Total Consumption In 2019 and 2020
Type here to search
ENG
IN
11:46
09/01/2023


(1) WhatsApp
My IBM
Food dashboard
Power consumption in India(201
Electricity Consumption Analysis
electricity-consumption-analysis.netlify.app
Paused
Home
Dashboard
Story
Visualizations
Conclusion
Conclusion
Electricity Consumption Stats.
Maharashtra is the Highest Electricity consumption user of India.
Gujarat is the Second Highest Electricity consumption user of India.
Sikkim is the Lowest Electricity Consumption user of India .
Type here to search
ENG
IN
11:46
09/01/2023


(1) WhatsApp
My IBM
Food dashboard
Power consumption in India(201
Electricity Consumption Analysis
electricity-consumption-analysis.netlify.app
Paused
35 LINQ Interview...
Top 40 Entity Frame...
Developer - Learn |...
Welcome
EDUCBA | Course C...
100+ Business Anal...
What is Scrum? Scr...
Self learning
Complete C# Tutori...
INTRODUCTION TO...
Home
Dashboard
Story
Visualizations
Conclusion
Electricity Consumption in Quarters
Electricity Consumption in 2019 for Quarter 3 was Highest.
Electricity Consumption in 2019 for Quarter 1 was Lowest.
Electricity Consumption in 2020 for Quarter 3 was Lowest.
Electricity Consumption in 2020 for Quarter 1 was Highest.
Electricity Consumption in Regions
Total Electricity consumption in Western Region is Highest.
Total Electricity consumption in North Eastern Region is Lowest.
Electricity Consumption in 2020 for Quarter 3 was Lowest.
2019
Type here to search
ENG
IN
11:46
09/01/2023