

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.

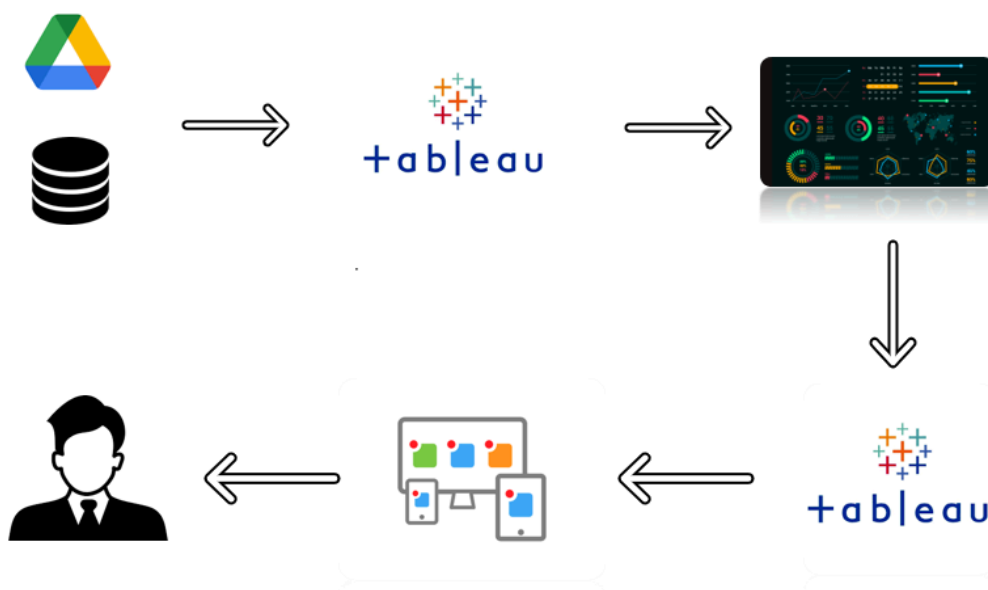
In 2015-16, electric energy consumption in agriculture was recorded as being the highest (17.89%) worldwide. The per capita electricity consumption is low compared to most other countries despite India having a low electricity tariff.

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.

Technical Architecture:



Project Flow

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

Milestone 1: Define Problem / Problem Understanding

Activity 1: Specify the business problem

Refer Project Description

Activity 2: Business requirements

The business requirements for analyzing analysis on electricity consumption in India identify 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.

Activity 3: 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.

Activity 4: 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.

Milestone 2: 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.

Activity 1: Collect the dataset

Please use the link to download the dataset:

https://drive.google.com/file/d/1JxIkHNwXxjFztKq7ad0_KtkukCqTckNy/view?usp=sharing

Activity 1.1: 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 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

Latitude - States in Regions on Indian Map

Longitude - Geographical Coordinates of States

Dates - Dates of Usage

Usage - Power consumed in Mega Units(MU)

Activity 2: Storing Data in DB & Perform SQL Operations

Explanation video

link:https://drive.google.com/file/d/1FvnGQo9cNBfAjyRSiKC_6DG9_6x5ohuG/view?usp=sharing

Activity 3: Connect DB with Tableau

Explanation video link:

<https://drive.google.com/file/d/1ssm30WD0EXOVwXPwMCWqrEbBieZlV3t6/view?usp=sharing>

Milestone 3: Data Preparation

Activity 1: 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.

Milestone 4: 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.

Activity 1: 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.

Activity 1.1: To Understand-2019 and 2020 Consumption, Total Consumption, Usage by Region, Top N and Bottom N States

Explanation video link:

https://drive.google.com/file/d/1pVHAOm5Z_5mJIeEVT32I_dXE38W0eB/view?usp=sharing

Activity 1.2: To Understand-2019 and 2020 Month wise Consumption, Total Consumption by region, Usage Before and After Lockdown

Explanation video link:

<https://drive.google.com/file/d/1MEthsJ89teEYR6k688W-7i5Bk0dEBlo2/view?usp=sharing>

Activity 1.3: To understand Region wise State Usage Quarter Usage and Usage by Year

Explanation video link:

https://drive.google.com/file/d/1utqB_Elnli2AFb4tT7Nr2RSsznRve5Ty/view?usp=sharing

Milestone 5: 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.

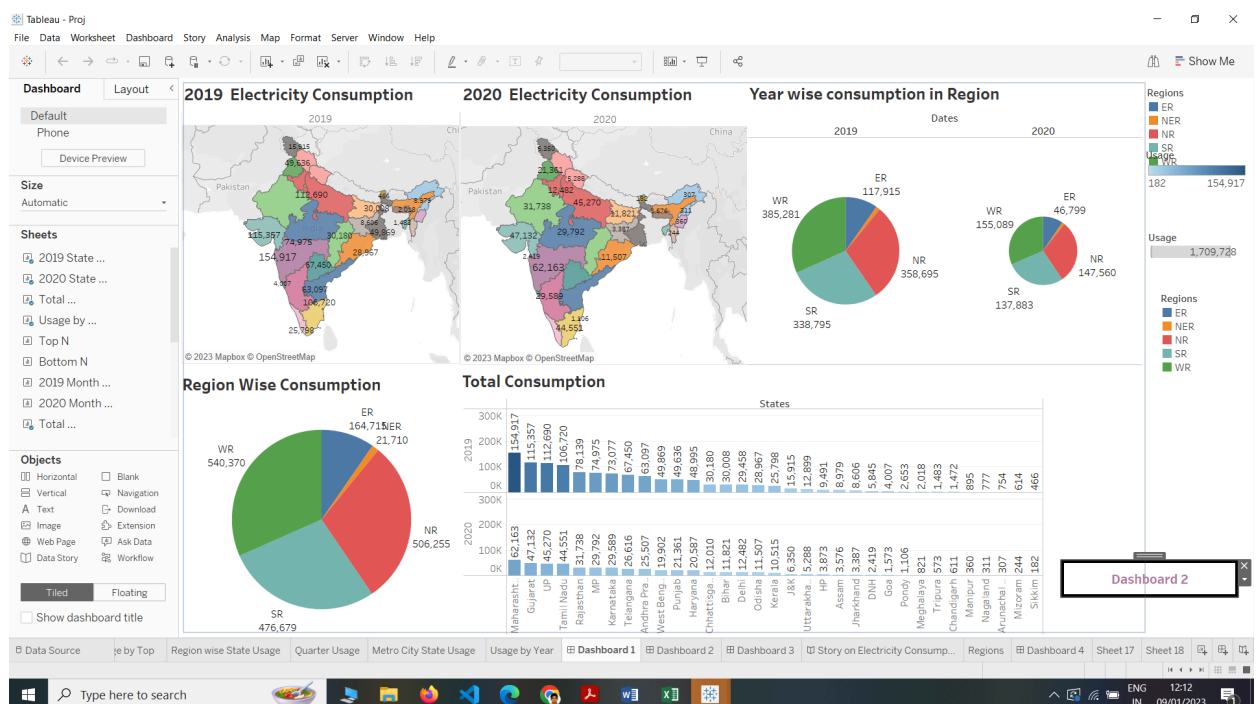
Activity :1- Responsive and Design of Dashboard

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.

Explanation video link:

<https://drive.google.com/file/d/1xBAJZD7TGEMzssDpHlrjmTS6GiaNzPHE/view?usp=sharing>



Milestone 6: Story

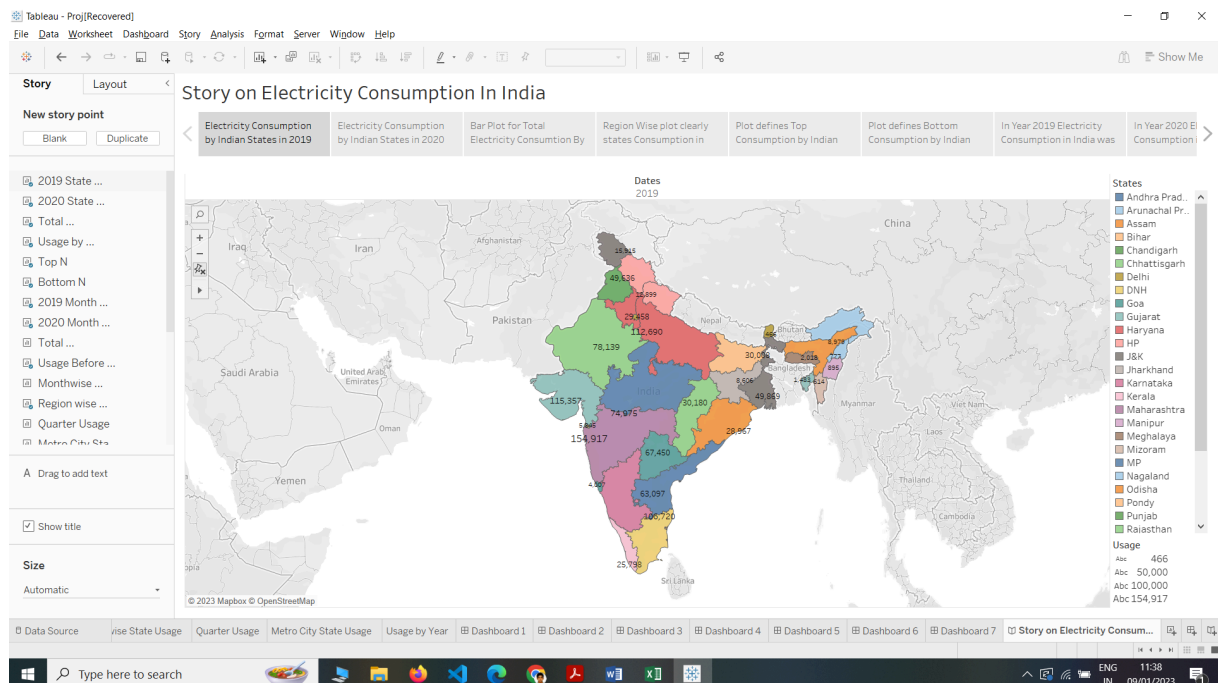
A data story is a way of presenting data and analysis in a narrative format, with the goal of making the information more engaging and easier to understand. A data story typically includes a clear introduction that sets the stage and explains the context for the data, a body that presents the data and 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.

Activity: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 representation of the data analysis process and it breaks down the analysis into a series of steps or scenes.

Explanation video link:

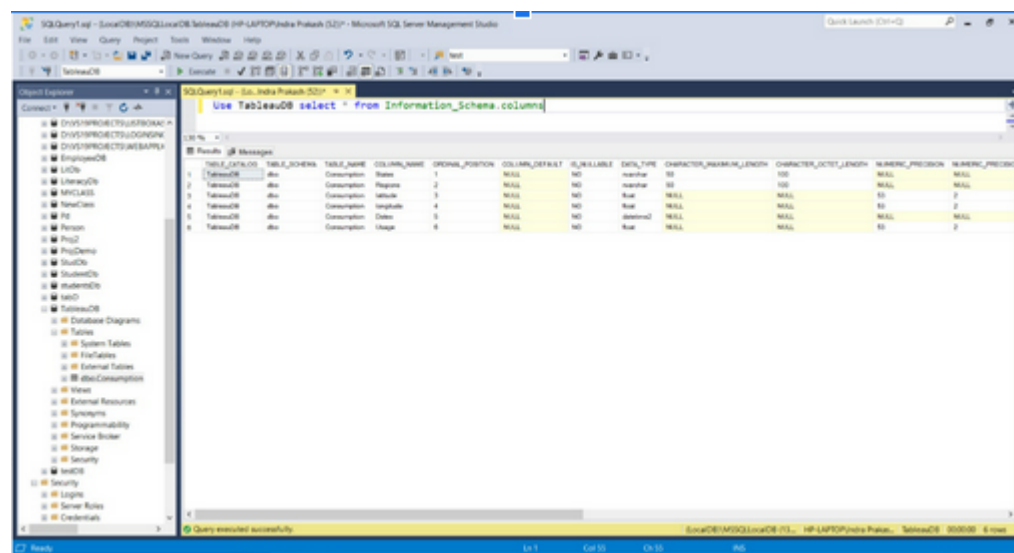
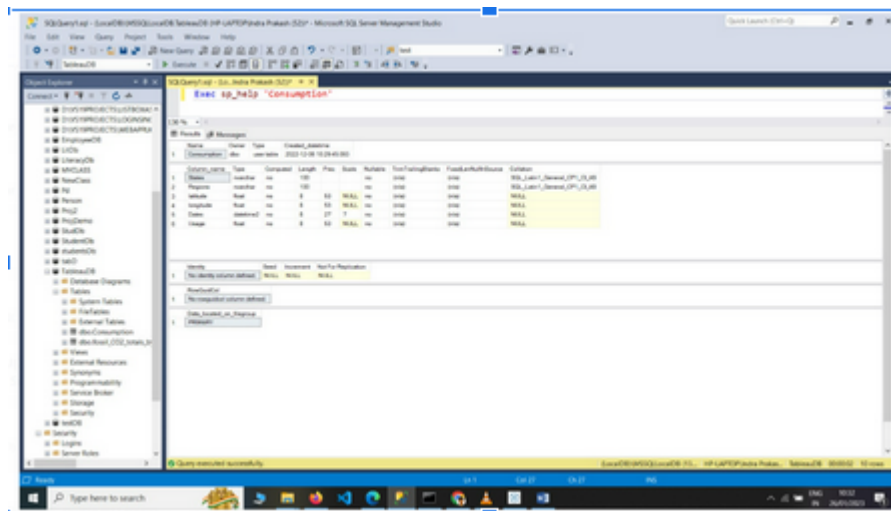
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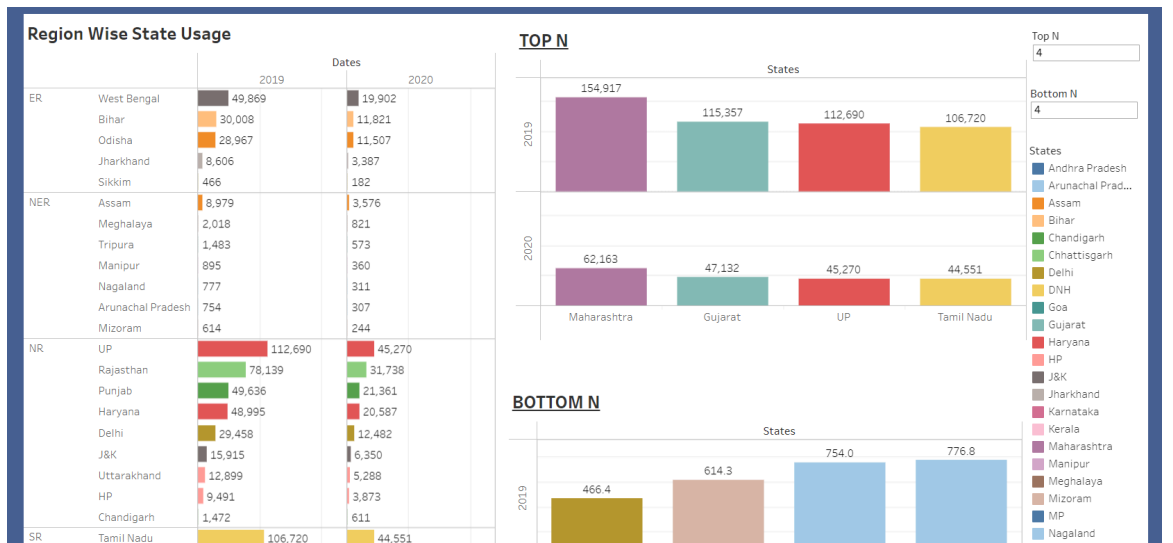
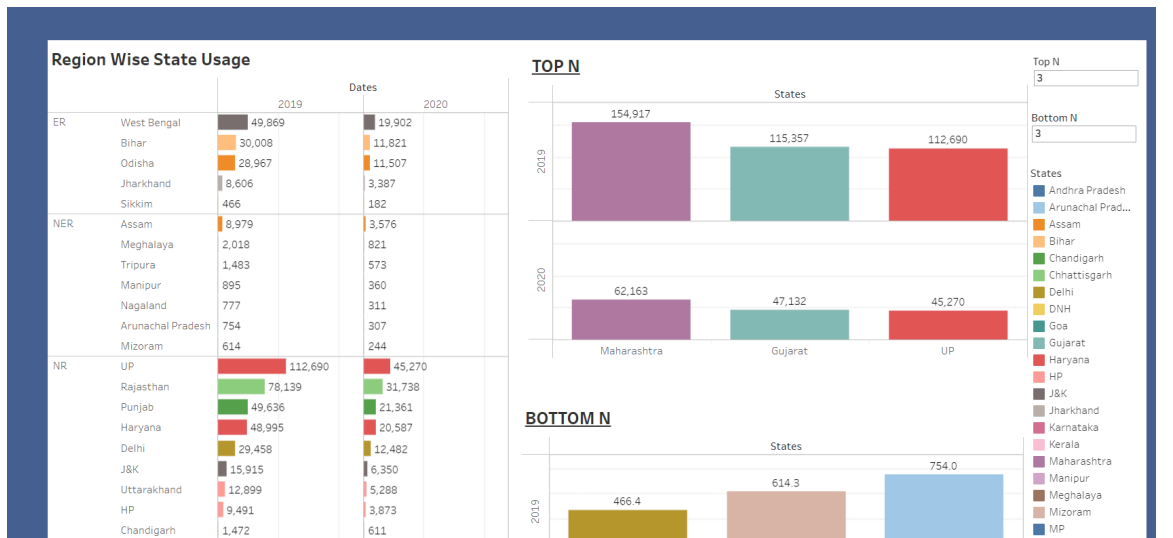
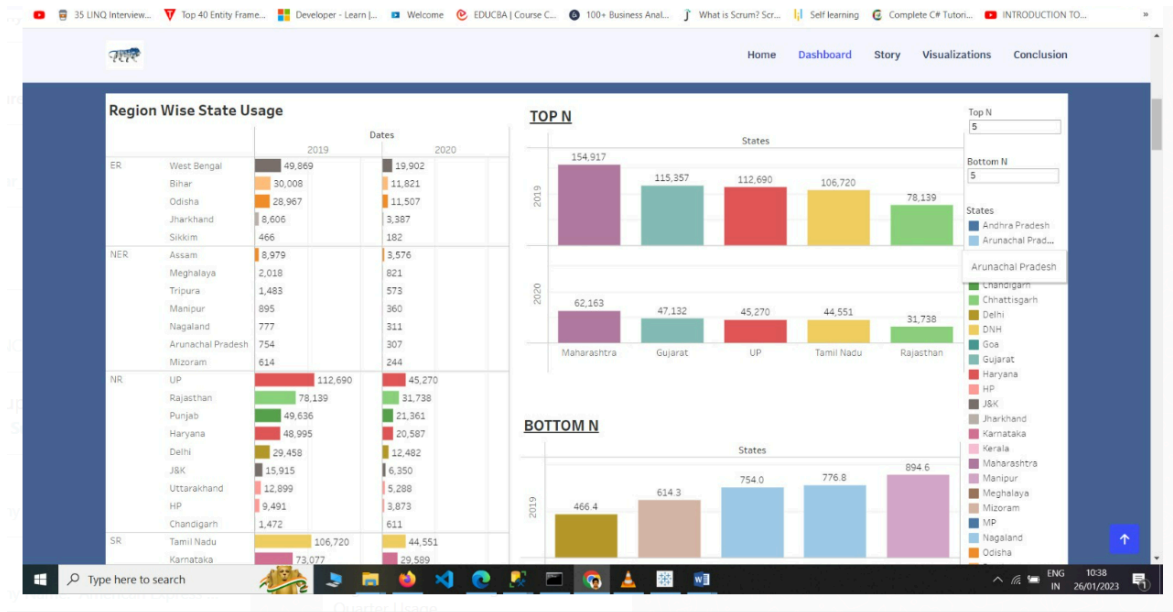
Milestone 7: Performance Testing

Activity 1: 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.



Activity 2: Utilization of Data Filters



Activity 4: No of Visualizations/ Graphs

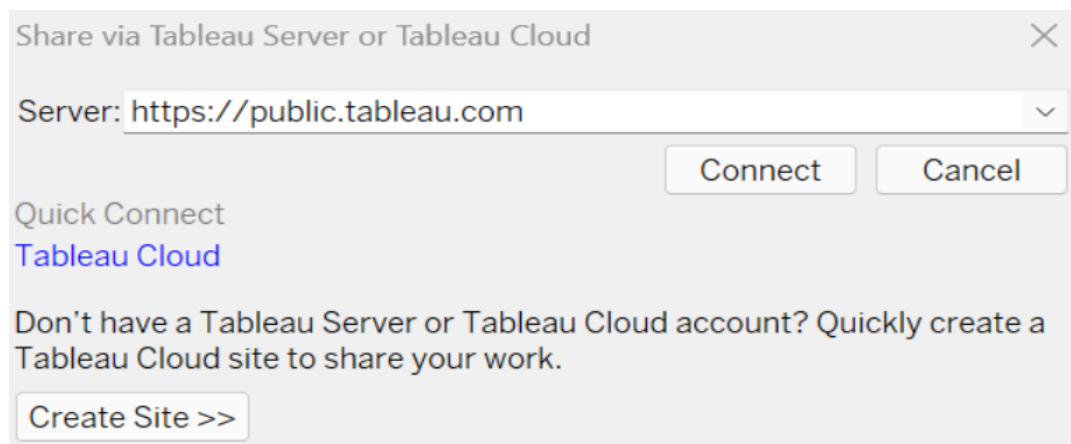
1. 2019 State Consumption
2. 2020 State Consumption
3. Total Consumption
4. Usage By Region
5. Top N and Bottom N
6. 2019 and 2020 Monthwise Consumption
7. Total Consumption Region Wise
8. Usage Before and After Lockdown
9. Region wise State Usage
10. Quarter Usage
11. Metro city State usage
12. Usage by year

Milestone 8: Web integration

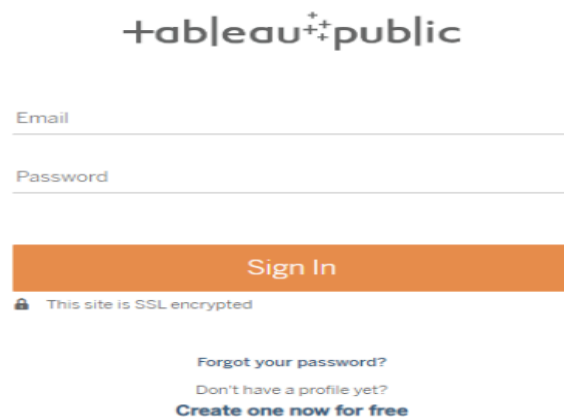
Publishing helps us to track and monitor key performance metrics, to communicate results and progress. help a publisher stay informed, make better decisions, and communicate their performance to others.

Publishing dashboard and reports to tableau public

Step 1: Go to Dashboard/story, click on share button on the top ribbon



Step 2: Once you click on connect it will ask you for tableau public user name and password



The image shows the Tableau Public sign-in interface. At the top is the 'tableau public' logo. Below it are two input fields: 'Email' and 'Password'. A large orange 'Sign In' button is centered below the fields. Under the button, a small lock icon and the text 'This site is SSL encrypted' are displayed. At the bottom, there are three links: 'Forgot your password?', 'Don't have a profile yet?', and 'Create one now for free'.

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.

Activity 1: Dashboard and Story embed with UI With Flask

Explanation video link

1: <https://drive.google.com/file/d/1hvXhX09fEFC7gqXSGdDY-yS7ghbZgp9S/view?usp=sharing>

Explanation video link 2:

<https://drive.google.com/file/d/180H5eFsCSr02qyDigEOt1yZLdmZYL0gi/view?usp=sharing>

Direct through Template Shared:

<https://drive.google.com/file/d/1lArZYEgZW2VLkhLYxJ0Rkogpq8grgB1i/view?usp=sharing>

(1) WhatsApp

My IBM

Food dashboard

Power consumption in India(201...

Electricity Consumption Analysis

electricity-consumption-analysis.netlify.app

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HomeDashboardStoryVisualizationsConclusion

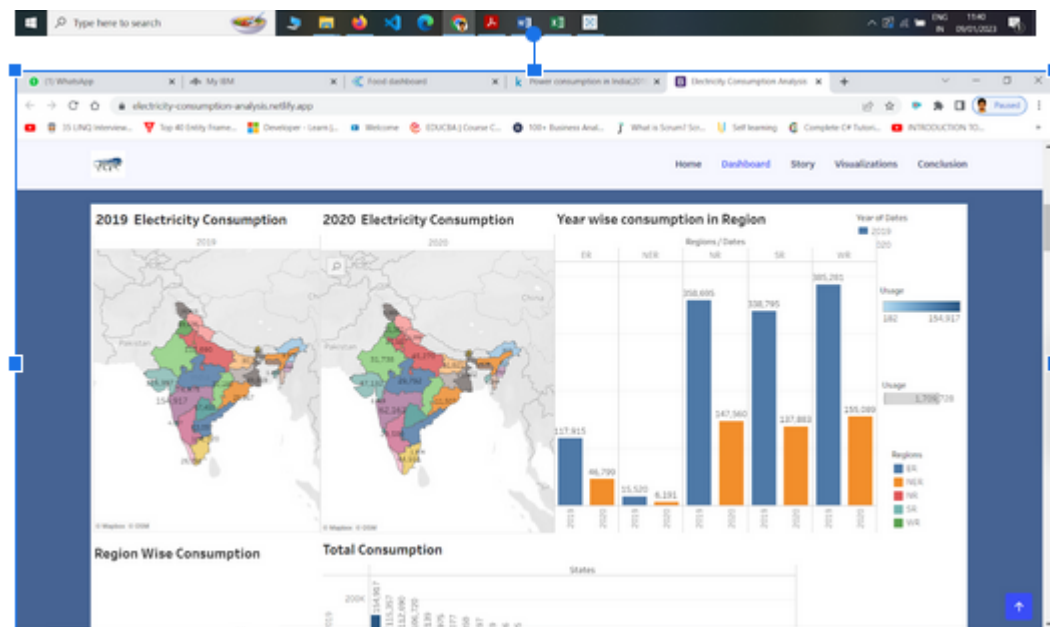
Analysis on Electricity Consumption In India

India is the third largest producer of electricity in the world. 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.

Get Started

Type here to search

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2019 Electricity Consumption

2020 Electricity Consumption

Year wise consumption in Region

Region Wise Consumption

Total Consumption

2019

2020

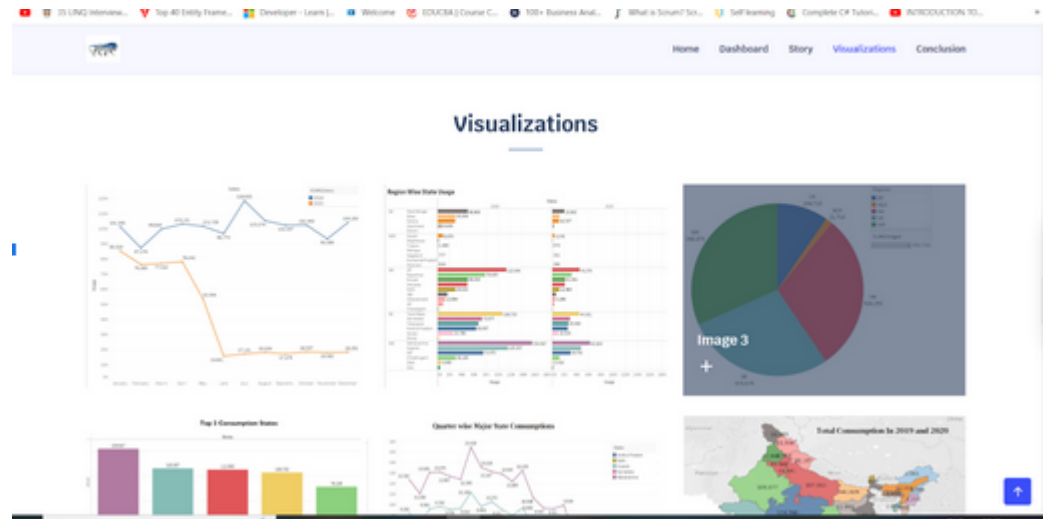
Regions / Dates

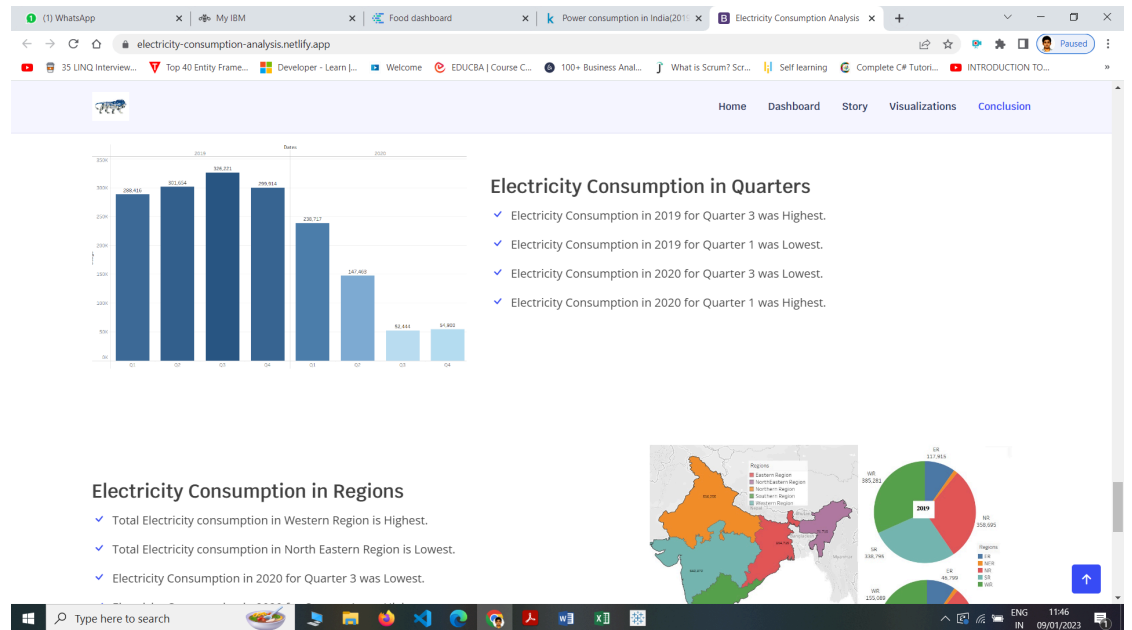
Year of Dates

States

Region	2019	2020
ER	117,915	115,520
NR	46,790	6,391
SE	315,695	338,795
SR	147,560	117,893
WR	395,282	155,089

States	2019	2020
Andhra Pradesh	115,520	117,915
Assam	11,520	11,520
Bihar	11,520	11,520
Chhattisgarh	11,520	11,520
Goa	11,520	11,520
Gujarat	11,520	11,520
Haryana	11,520	11,520
Himachal Pradesh	11,520	11,520
Jharkhand	11,520	11,520
Karnataka	11,520	11,520
Kerala	11,520	11,520
Madhya Pradesh	11,520	11,520
Maharashtra	11,520	11,520
Manipur	11,520	11,520
Mizoram	11,520	11,520
Nagaland	11,520	11,520
Nar	11,520	11,520
Nor	11,520	11,520
Odisha	11,520	11,520
Punjab	11,520	11,520
Rajasthan	11,520	11,520
Sikkim	11,520	11,520
Tamil Nadu	11,520	11,520
Telangana	11,520	11,520
Uttar Pradesh	11,520	11,520
West Bengal	11,520	11,520





Milestone 9: Project Demonstration & Documentation

Below mentioned deliverables to be submitted along with other deliverables

Activity 1:- Record explanation Video for project end to end solution

Activity 2:- Project Documentation-Step by step project development procedure

Create document as per the template provided