PLUGGING INTO THE FUTURE: An exploration of electricity consumption patterns using tableau

Team size:3

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Team member : Somu Jyothi Sravanthi

Team member : Kurakula Naga Prasannambika

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INTRODUCTION

PROJECT OVERVIEW :

Plugging into the Future: An Exploration of Electricity Consumption Patterns Using Tableau

This project focuses on analyzing electricity consumption patterns using Tableau. The main objective is to understand how electricity usage varies across different time periods, seasons, regions, and sectors.

The project studies time-of-day usage to identify peak and off-peak demand periods. It also examines seasonal variations to understand how electricity consumption changes throughout the year. In addition, the analysis compares electricity usage among residential, commercial, and industrial sectors to identify major consumers and their usage behavior.

By using Tableau's data visualization tools, the project converts raw data into interactive dashboards and meaningful insights. These insights can help utility companies, policymakers, and consumers improve energy management, optimize electricity usage, and support sustainable energy practices.

PURPOSE:

The purpose of this project is to analyze and understand electricity consumption patterns using Tableau. It aims to identify how electricity usage changes based on time of day, seasonal variations, regions, and different sectors such as residential, commercial, and industrial.

By visualizing the data through interactive dashboards, the project helps in identifying peak demand periods, usage trends, and sector-wise consumption differences. These insights can support better decision-making for electricity management, improve energy efficiency, and promote sustainable energy practices.

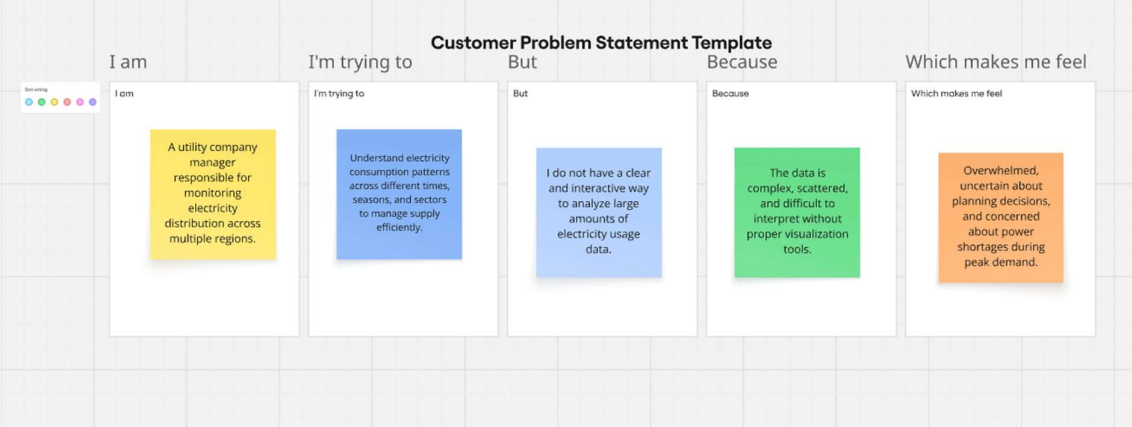
The project also demonstrates how Tableau can be used as an effective tool for transforming raw data into clear and meaningful visual insights.

IDEATION PHASE

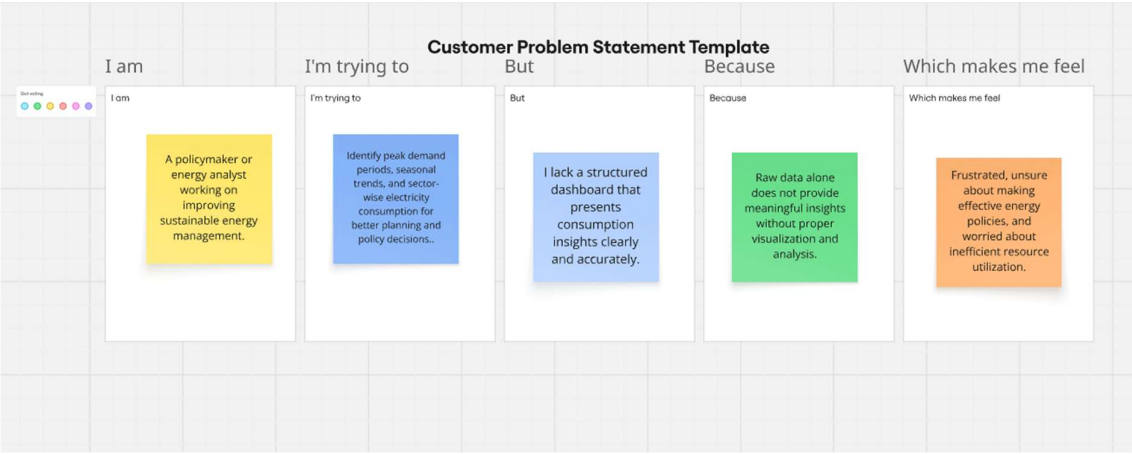
Date	20 feburary2026
Team id	LTVIP2026TMIDS39250
Project title	Plugging
Minimum marks	2 marks

2.1 PROBLEM STATEMENT :

Customer Problem Statement-1:



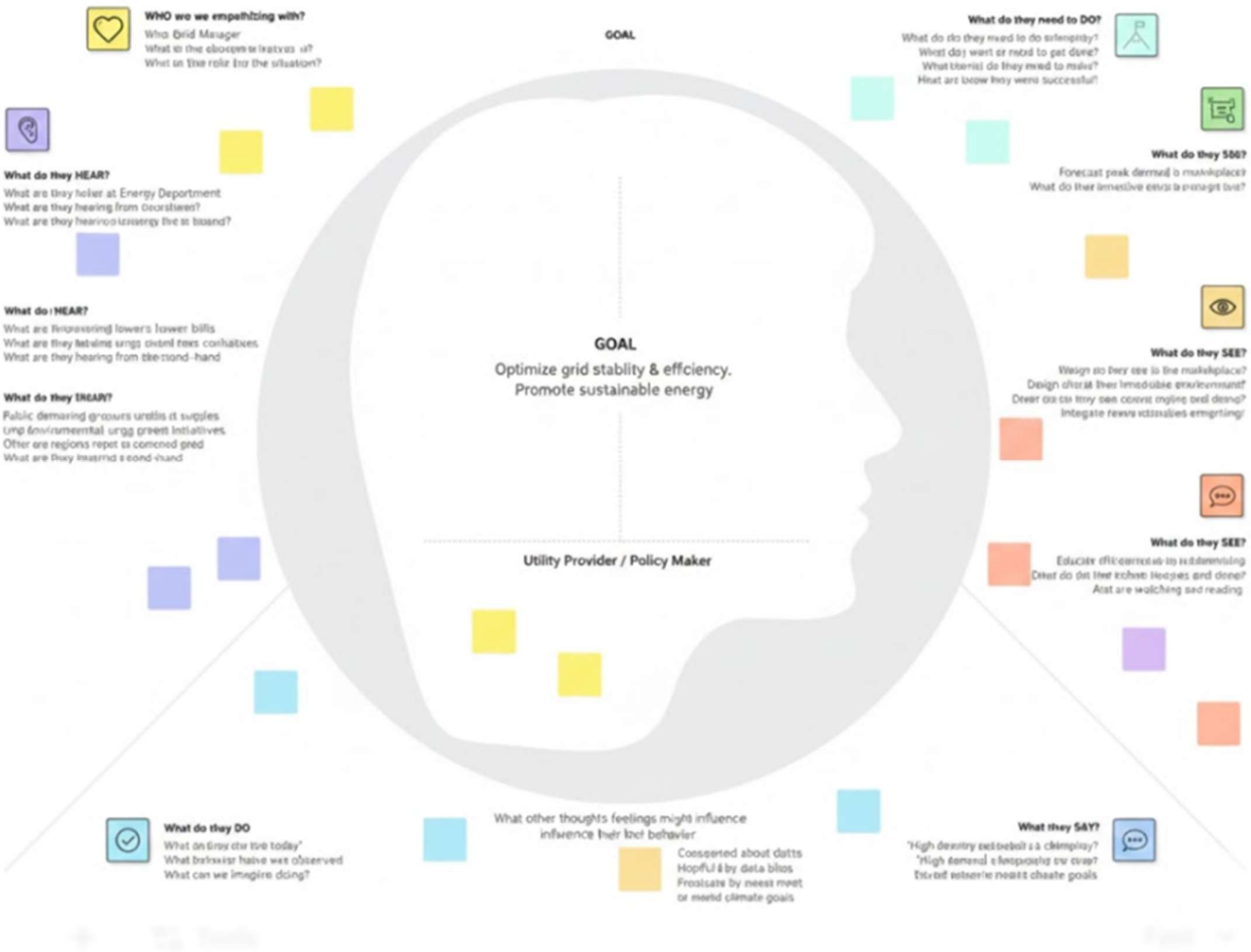
Customer Problem statement-2:



Problem Statement (PS)	I am (Customer)	I'm trying to	But	Because	Which makes me feel
PS-1	A utility company manager responsible for monitoring electricity distribution across multiple regions.	Understand electricity consumption patterns across different times, seasons, and sectors to manage supply efficiently...	I do not have a clear and interactive way to analyze large amounts of electricity usage data.	The data is complex, scattered, and difficult to interpret without proper visualization tools	Overwhelmed, uncertain about planning decisions, and concerned about power shortages during peak demand.
PS-2	A policymaker or energy analyst working on improving sustainable energy management .	Identify peak demand periods, seasonal trends, and sector-wise electricity consumption for better planning and policy decisions	I lack a structured dashboard that presents consumption insights clearly and accurately.	Raw data alone does not provide meaningful insights without proper visualization and analysis.	Frustrated, unsure about making effective energy policies, and worried about inefficient resource utilization.

2.2 EMPATHY MAP CANVAS

Date	20 feburary2026
Team id	LTVIP2026TMIDS39250
Project title	Plugging
Minimum marks	4marks



2.3 BRAINSTORMING

Date	20 feburary2026
Team id	LTVIP2026TMIDS39250
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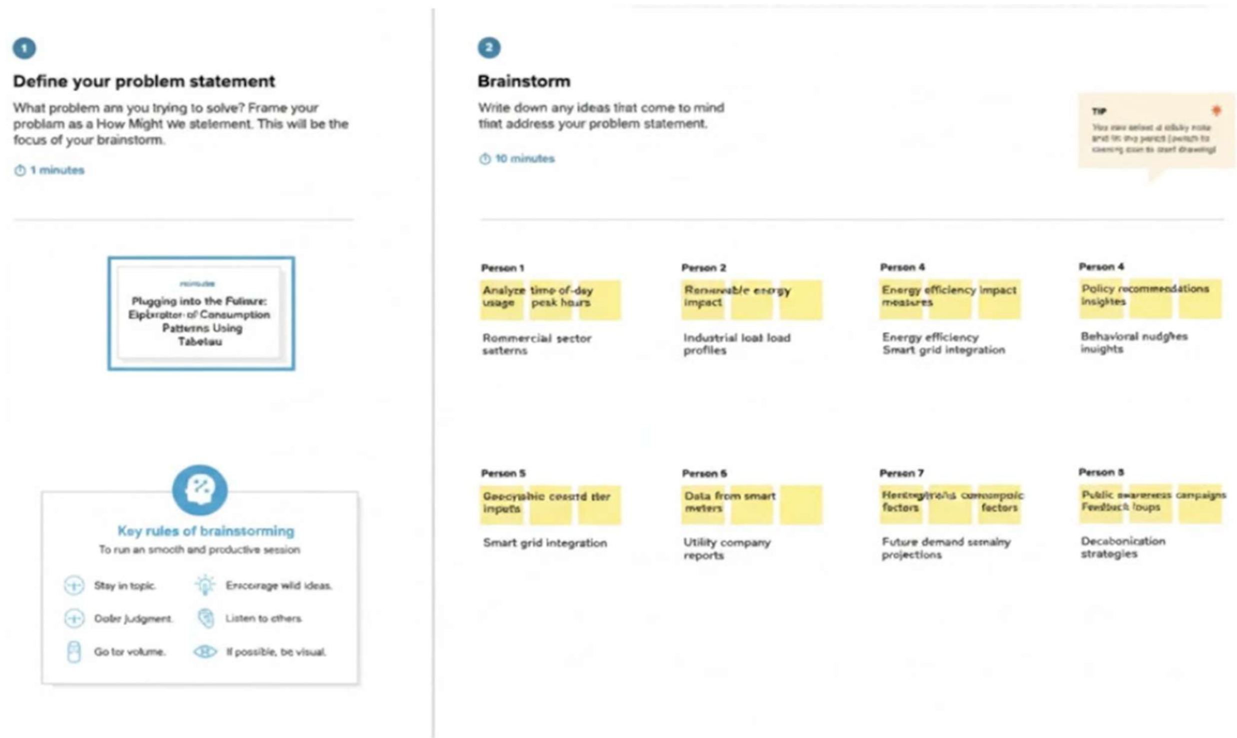
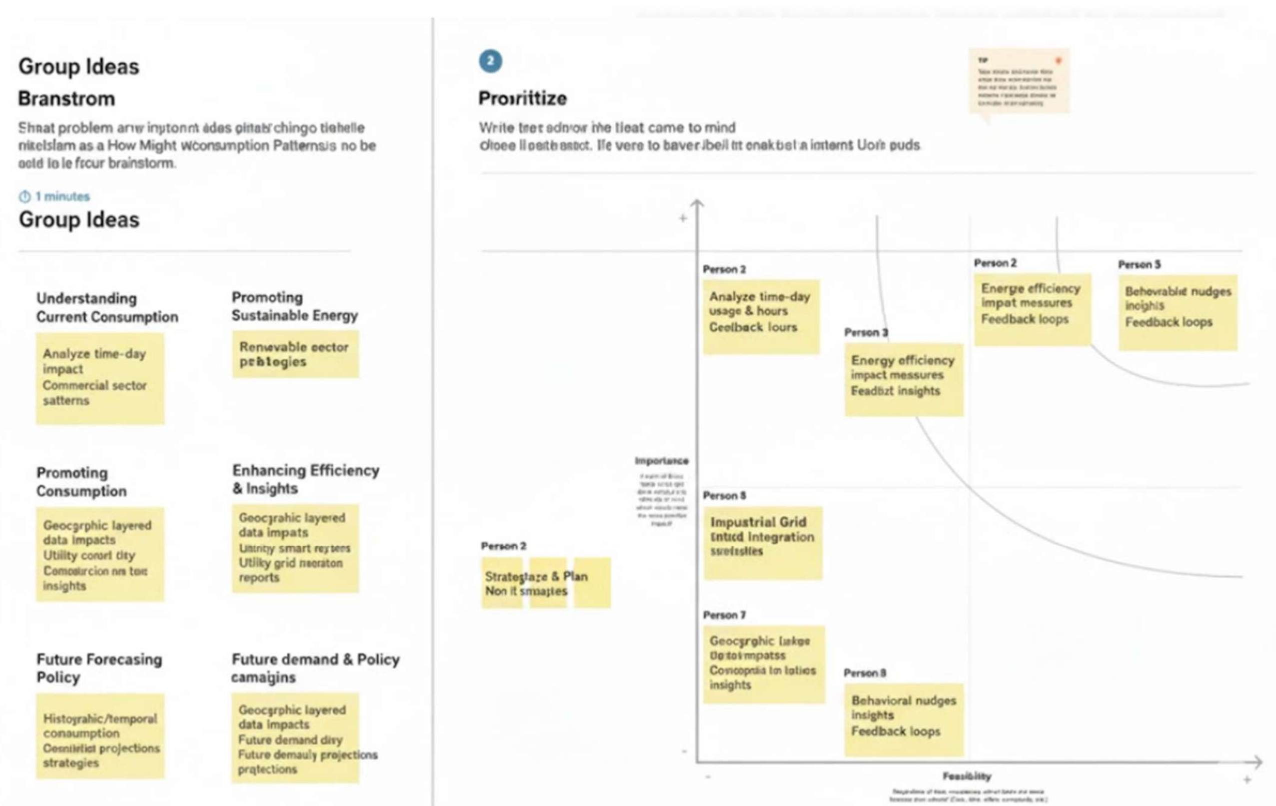
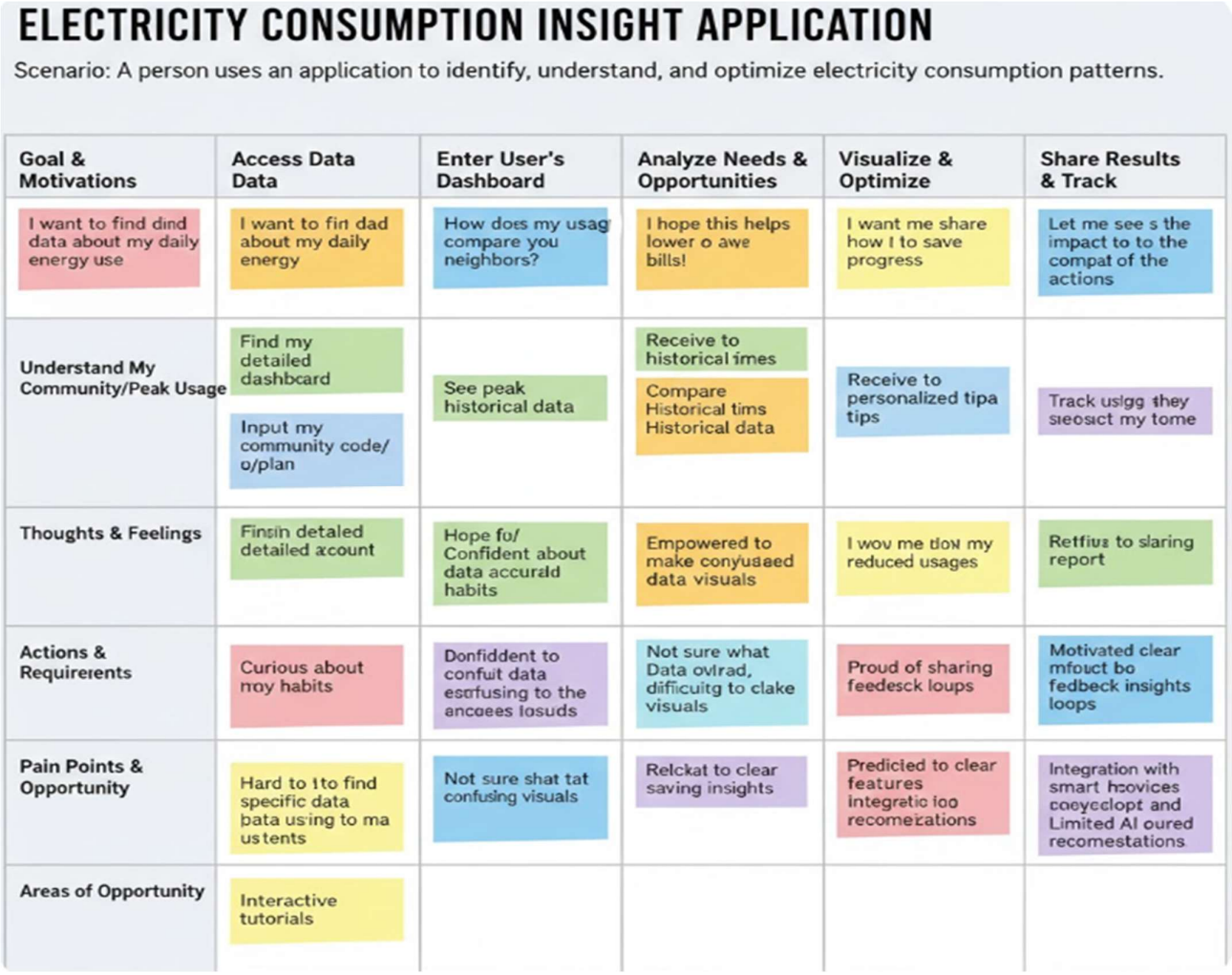
Minimum marks	4marks


1
Define your problem statement
What problem are you trying to solve? Frame your problem as a How Might We statement. This will be the focus of your brainstorm.
1 minutes
Plugging into the Future:
Patterns Using
Tableau
Key rules of brainstorming
To run an smooth and productive session
Stay in topic.
Encourage wild ideas.
Listen to others.
Go for volume.
If possible, be visual.
2
Brainstorm
Write down any ideas that come to mind that address your problem statement.
10 minutes
TIP
Person 1
Analyze time-of-day usage peak hours
Rommercial sector satterns
Person 2
Renewable energy impact
Industrial load load profiles
Person 4
Energy efficiency impact measures
Energy efficiency Smart grid integration
Person 4
Policy recommendations insightes
Behavioral nudghes insights
Person 5
Smart grid integration
Person 6
Data from smart meters
Utility company reports
Person 7
Future demand projections
Person 8
Feedback loops
Decabonication strategies


Group Ideas
Branstrom
1 minutes
Group Ideas
Understanding Current Consumption
Analyze time-day impact
Commercial sector satterns
Promoting Sustainable Energy
Renewable eector peblegies
Promoting Consumption
Geocgrphic layered data impacts
Enhancing Efficiency & Insights
Geocgrahic layered data impats
reports
Future Forecasing Policy
Histograhic/temporal consumption
strategies
Future demand & Policy camagins
Geocgrphic layered data impacts
Future demand diry
projections
2
Proritize
Write tret sdnow the tleat came to mind
Person 2
Analyze time-day usage & hours
Person 3
Energy efficiency impact messures
Person 2
Energe efficiency impat messures Feedback loops
Person 5
Behovrabid nudges
Feedback loops
Importance
Person 8
Person 2
Strategtaze & Plan
Person 7
Geocgrphic lakge
insights
Person 8
Behavioral nudges insights Feedback loops
Feasibility

3.REQUIREMENT ANALYSIS

3.1 CUSTOMER JOURNAL MAP



3.2 SOLUTION REQUIREMENT

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Project title	Plugging
Minimum marks	4marks

FUNCTIONAL REQUIREMENTS :

Following are the functional requirements of the proposed solution

FR No.	Functional Requirement (Epic)	Sub-Requirement (Story / Sub-Task)

FR-1	Data Preparation & Model Loading	Import electricity consumption dataset into Tableau. Clean and preprocess data (remove null values, correct formats). Create calculated fields (Total Consumption, YoY Growth, Peak Usage).
FR-2	Time-of-Day Analysis	Create visualizations to analyze hourly electricity usage. Identify peak and off-peak demand periods. Enable filters for region and sector./).
FR-3	Seasonal Trend Analysis	Create monthly and yearly trend line charts. Analyze seasonal variations in electricity usage. Enable comparison across different years.
FR-4	Sector-wise Consumption Analysis	Develop visualizations comparing residential, commercial, and industrial usage. Create stacked bar charts or pie charts for sector contribution. Allow sector filtering options
FR-5	Regional Analysis	Build region/state-wise electricity consumption dashboards. Create map visualization (if location data available). Enable region-based drill-down analysis..
FR-6	Interactive Dashboard Development	Design an interactive dashboard combining KPIs and visualizations. Add filters (Year, Region, Sector, Month). Display key metrics such as Total Consumption, Peak Month, Growth %.

Non-functional Requirements:

Following are the non-functional requirements of the proposed solution.

NFR No.	Non-Functional Requirement	Description
NFR-1	Usability	The Tableau dashboard should provide a clean, intuitive, and user-friendly interface that allows utility managers, analysts,

		and policymakers to easily navigate, filter, and interpret electricity consumption data.
NFR-2	Performance	The dashboard should load data and visualizations quickly (within a few seconds) under normal dataset size and usage conditions to ensure smooth interaction.
NFR-3	Reliability	The system should display accurate calculations and maintain stable performance without errors during filtering, drill-down, or dashboard interactions..
NFR-4	Data accuracy	The dataset must be validated for completeness and correctness. All calculated fields (Total Consumption, Growth %, Average Usage) should produce consistent and accurate results.
NFR-5	Availability	The Tableau dashboard should be accessible whenever required (locally or via Tableau Server/Public), except during maintenance or updates.
NFR-6	Scalability	The dashboard design should support additional datasets (future years, new regions, or sectors) without requiring complete redesign.

3.3 DATA FLOW DIAGRAM

Date	20 feburary2026
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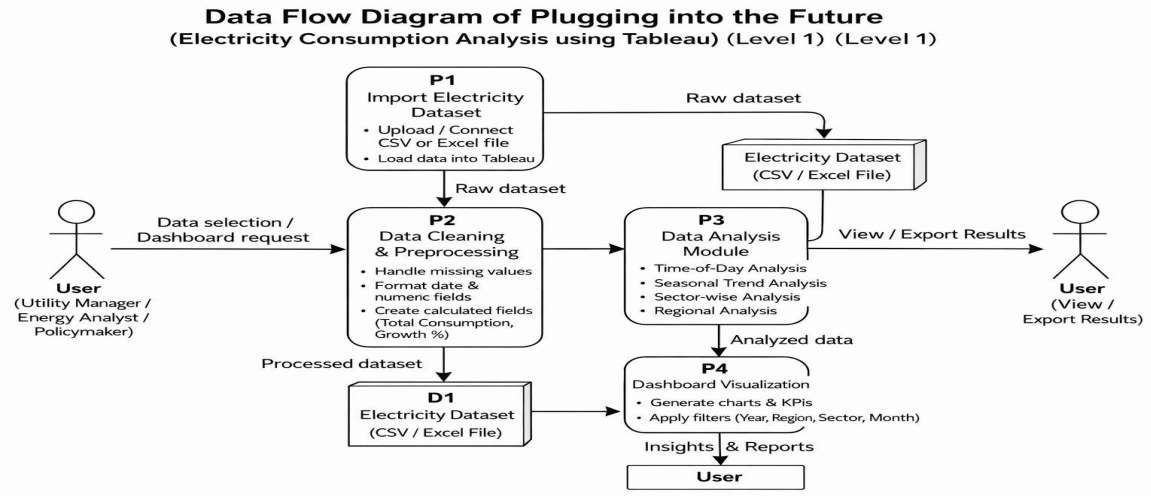
Minimum marks	4marks



User Stories – Electricity Consumption Analysis Dashboard

1. User Stories Table

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance Criteria	Priority	Release
Utility Manager / Analyst	Data Upload & Connection	USN-1	As a user, I can upload or connect an electricity dataset (CSV/Excel) to analyze consumption data.	Dataset loads successfully and is available for visualization.	High	Sprint-1
Utility Manager / Analyst	Dashboard Viewing	USN-2	As a user, I can view electricity consumption trends in interactive dashboards.	Dashboard displays charts, KPIs, and filters correctly.	High	Sprint-1
Utility Manager / Analyst	Filtering & Interaction	USN-3	As a user, I can filter data by year, region, sector, or month.	Filters update all charts dynamically without errors.	High	Sprint-1
Utility Manager / Analyst	Data Cleaning & Validation	USN-4	As a user, I can view cleaned and formatted data for accurate analysis.	Missing values handled and calculated fields generated correctly.	Medium	Sprint-1
Utility Manager / Analyst	Report Export	USN-5	As a user, I can export dashboard reports as PDF or image files.	Exported file downloads successfully with correct visuals.	Medium	Sprint-2
Utility Manager / Analyst	Trend Analysis	USN-6	As a user, I can analyze seasonal and time-based electricity consumption patterns.	Time-based charts display correct monthly/yearly trends.	High	Sprint-1
Administrator	System Monitoring	USN-7	As an admin, I want the system to log dataset upload errors.	System logs errors with timestamps when dataset loading fails.	Medium	Sprint-2
Administrator	Data Source Management	USN-8	As an admin, I want data sources to load correctly during dashboard initialization.	Data connections load without errors when opening Tableau file.	High	Sprint-1
Administrator	Deployment	USN-9	As an admin, I can deploy the dashboard on Tableau Public / Server.	Dashboard is publicly accessible via shared link.	High	Sprint-1

3.4 TECHNOLOGY STACK:

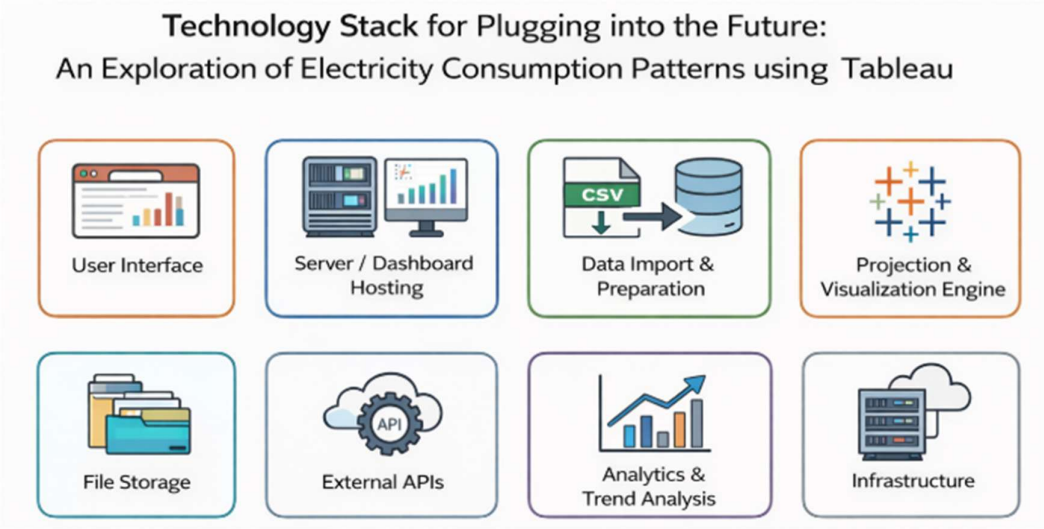
System Components Table

S.No	Component	Description	Technology Used
1	User Interface	Interactive dashboard where users view and filter electricity consumption data.	Tableau (Dashboard UI)
2	Application Logic-1	Data import and preprocessing logic (cleaning, formatting, calculated fields).	Tableau Data Preparation
3	Application Logic-2	Data visualization and analytical processing (trend, sector, seasonal analysis).	Tableau Visualization Engine
4	Application Logic-3	Filtering, parameter control, and dynamic dashboard interaction.	Tableau Filters & Parameters
5	Database	Stores electricity consumption dataset for analysis.	CSV / Excel File
6	Cloud Database	Optional future storage for large-scale datasets.	Tableau Server / Cloud (Future Scope)
7	File Storage	Stores raw dataset files before visualization.	Local System Storage
8	External API-1	Optional API integration for live electricity consumption data (future extension).	Government Open Data API (Future)
9	External API-2	Optional weather data integration for correlation analysis (future work).	Weather API (Future)
10	Data Analytics Model	Trend and seasonal pattern analysis logic within dashboard.	Tableau Analytics Features
11	Infrastructure (Server / Cloud)	Dashboard hosting and public access.	Tableau Public / Tableau Server

APPLICATION CHARACTERSTICS :

S.No	Characteristic	Description	Technology Used
1	Open-Source / Analytical Platform	The system is developed using widely used data visualization and analytics tools for dashboard creation and reporting.	Tableau Public, CSV/Excel
2	Data Security & Integrity	Dataset is locally stored and securely handled within Tableau environment. No unauthorized data modification allowed.	Tableau Data Handling, Local File Storage
3	Scalable Architecture	Dashboard can be extended with larger datasets, additional KPIs, and cloud-based data sources in the future.	Tableau Server / Tableau Cloud (Future Scope)
4	Availability	Dashboard can be published online and accessed anytime via public or shared links.	Tableau Public / Tableau Server
5	Interactive Visualization	Users can apply filters, parameters, and drill-down features for dynamic data exploration.	Tableau Filters, Parameters, Calculated Fields

S.No	Characteristic	Description	Technology Used
6	Data Processing Capability	Supports data cleaning, calculated fields, aggregation, and trend analysis within the platform.	Tableau Data Preparation & Analytics Engine
7	Cross-Platform Access	Dashboard can be accessed through web browsers on desktop and mobile devices.	Web Browser (Chrome, Edge, etc.)



4.PROJECT DESIGN

4.1 Problem Solution Fit

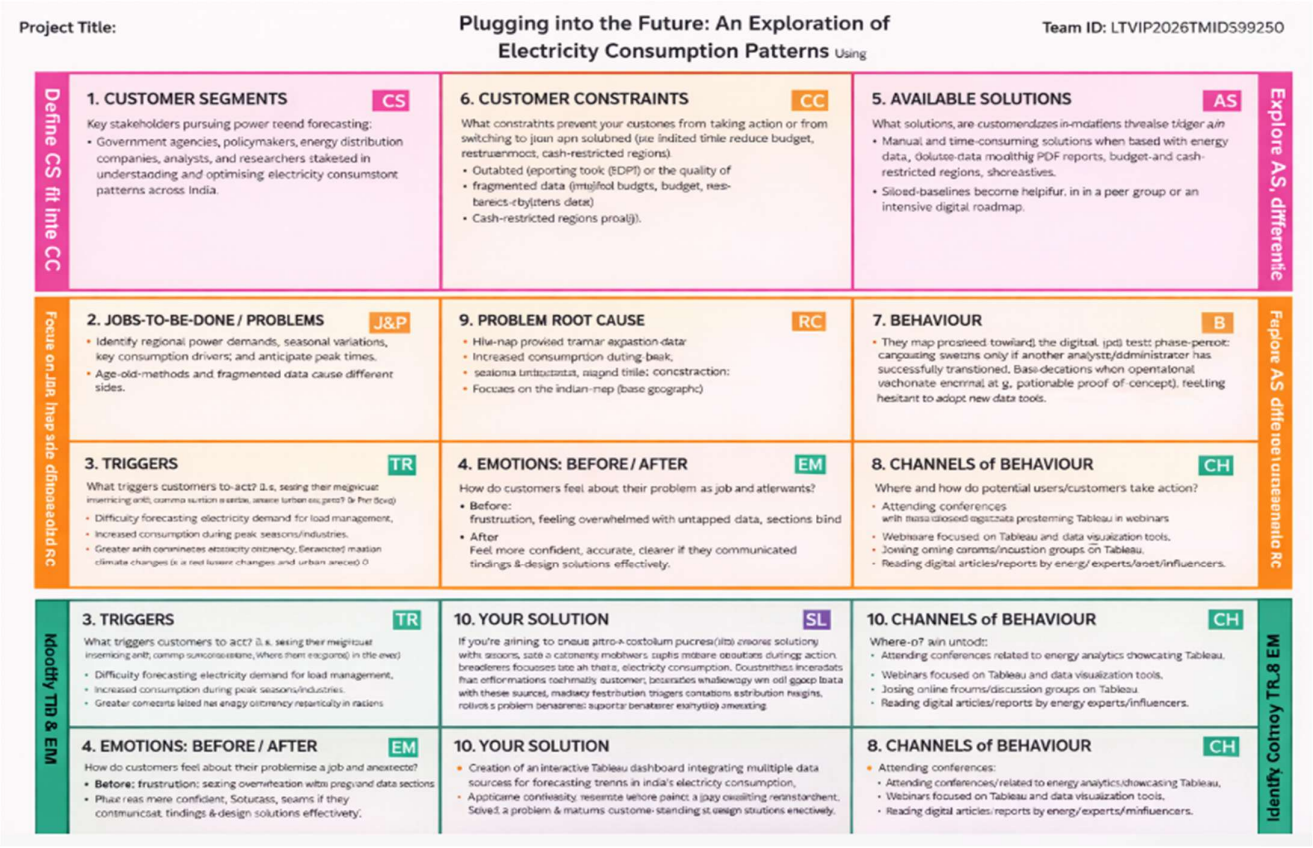
Date	20 feburary2026
Team id	LTVIP2026TMIDS39250
Project title	Plugging
Minimum marks	2marks

The Problem

In today's rapidly growing world, electricity consumption is increasing across residential, commercial, and industrial sectors. However, understanding and managing electricity usage effectively remains a major challenge. Energy providers, policymakers, and analysts often:

- Rely on raw data sheets that are difficult to interpret
- Lack clear visualization of consumption trends over time
- Struggle to identify seasonal and peak demand patterns
- Face difficulty in comparing regional or sector-wise electricity usage
- Have limited tools to support data-driven energy planning and decision-making

Therefore, there is a need for an interactive and analytical system that explores electricity consumption patterns effectively and transforms raw data into meaningful insights for better decision-making.



4.2 PROPOSED SOLUTION :

Date	20 feburary2026
Team id	LTVIP2026TMIDS39250
Project title	Plugging
Minimum marks	2marks

"**Plugging into the Future"** is an interactive data visualization and analytics dashboard developed using Tableau that enables users to explore electricity consumption patterns effectively. The system transforms raw electricity usage data into meaningful visual insights to support informed decision-making.

How It Solves the Problem:

- **Interactive Data Visualization**
  Converts complex electricity datasets into clear charts, graphs, and dashboards.
- **Trend & Seasonal Analysis**
  Identifies monthly, yearly, and seasonal electricity consumption patterns.
- **Sector & Region-wise Comparison**
  Allows comparison of electricity usage across residential, commercial, and industrial sectors, as well as different regions.
- **Dynamic Filtering & Drill-down**
  Users can filter data by year, region, or sector to analyze specific consumption trends.
- **Data-Driven Decision Support**
  Provides insights that help in forecasting demand, improving energy distribution, and planning sustainable energy strategies.

Why It Fits

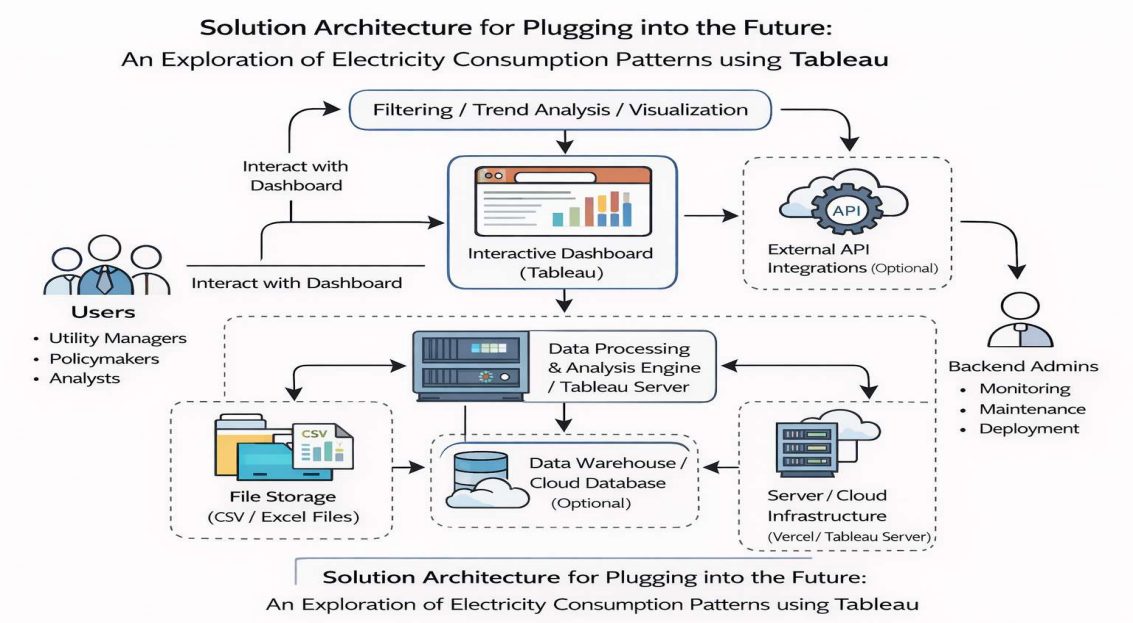
- Eliminates dependence on manual spreadsheet analysis
- Enhances clarity in understanding large electricity datasets
- Supports energy planning and policy decisions
- Improves efficiency in demand monitoring and peak load management
- Scalable for integration with live datasets and future forecasting

S. No.	Parameter	Description
1	Problem Statement	Energy providers and policymakers lack a simple and interactive system to analyze electricity consumption patterns effectively. Raw datasets are complex, difficult to interpret, and do not clearly highlight trends, peak demand, or sector-wise usage.

S. No.	Parameter	Description
2	Idea / Solution Description	A Tableau-based interactive dashboard that analyzes electricity consumption data and converts it into meaningful visual insights. The system enables users to explore trends, seasonal patterns, regional variations, and sector-wise comparisons through dynamic charts and filters.
3	Novelty / Uniqueness	Combines data analytics and interactive visualization in one unified dashboard. Provides real-time filtering, drill-down analysis, and comparative insights across time, region, and sector. Makes complex electricity datasets easy to understand for non-technical users.
4	Social Impact / Customer Satisfaction	Supports efficient energy planning, improves demand forecasting, and helps reduce power shortages. Assists policymakers and utility providers in making data-driven decisions for sustainable energy management.
5	Business Model (Revenue Model)	Can be deployed on Tableau Public for free access or integrated into enterprise systems via Tableau Server/Cloud. Revenue potential through enterprise analytics services, government collaborations, and energy consultancy solutions.
6	Scalability of the Solution	Can be extended to include real-time data integration, predictive forecasting models, renewable energy analysis, and smart grid monitoring. Scalable across multiple regions, sectors, and large datasets.

4.3 SOLUTION ARCHIETURE:

Date	20 feburary2026
Team id	LTVIP2026TMIDS39250
Project title	Plugging
Minimum marks	4marks



5. PROJECT PLANNING &SCHEDULING

Date	20 feburary2026
Team id	LTVIP2026TMIDS39250
Project title	Plugging
Minimum marks	5marks

1.PRODUCT BACKLOG TABLE

Sprint 1 – Data Collection & Integration

Sprint	Epic	User Story No	User Story / Task	Story Points	Priority	Team Member
Sprint-1	Data Collection & Integration	USN-1	Collect historical electricity datasets	5	High	Member 1
Sprint-1	Data Collection & Integration	USN-2	Clean and preprocess dataset	5	High	Member 2
Sprint-1	Data Collection & Integration	USN-3	Structure dataset fields	4	High	Member 3
Sprint-1	Data Collection & Integration	USN-4	Upload dataset to Tableau	3	High	Member 1
Sprint-1	Data Collection & Integration	USN-5	Validate data accuracy	3	Medium	All

Total: 20 Story Points

Sprint 2 – Dashboard Design

Sprint	Epic	User Story No	User Story / Task	Story Points	Priority	Team Member
Sprint-2	Dashboard Design	USN-6	Create trend line visualizations	5	High	Member 1
Sprint-2	Dashboard Design	USN-7	Regional comparison charts	5	High	Member 2
Sprint-2	Dashboard Design	USN-8	Peak consumption analysis	4	High	Member 3
Sprint-2	Dashboard Design	USN-9	Add filters (year, region)	3	Medium	Member 1
Sprint-2	Dashboard Design	USN-10	Export insights as PDF	3	Medium	Member 2

Total: 20 Story Points

Sprint 3 – Advanced Analysis

Sprint	Epic	User Story No	User Story / Task	Story Points	Priority	Team Member
Sprint-3	Advanced Analysis	USN-11	Seasonal usage analysis	5	High	Member 2
Sprint-3	Advanced Analysis	USN-12	Urban vs Rural comparison	5	High	Member 3
Sprint-3	Advanced Analysis	USN-13	Detect abnormal spikes	4	Medium	Member 1
Sprint-3	Advanced Analysis	USN-14	Renewable vs Non-renewable trends	3	Medium	Member 2
Sprint-3	Advanced Analysis	USN-15	Dashboard optimization	3	Medium	All

Total: 20 Story Points

Sprint 4 – Testing & Deployment

Sprint	Epic	User Story No	User Story / Task	Story Points	Priority	Team Member
Sprint-4	Testing & Deployment	USN-16	Validate dashboard accuracy	5	High	Member 3
Sprint-4	Testing & Deployment	USN-17	Fix visualization issues	5	High	Member 1
Sprint-4	Testing & Deployment	USN-18	Prepare documentation	4	High	All
Sprint-4	Testing & Deployment	USN-19	Deploy on Tableau Public	3	Medium	Member 2
Sprint-4	Testing & Deployment	USN-20	Final presentation	3	Medium	All

Total: 20 Story Points

2. PROJECT TRACKER TABLE

Sprint	Total Story Points	Duration	Sprint Start Date	Planned End Date	Story Points Completed	Release Date
Sprint-1	20	14 Days	01 Dec 2025	14 Dec 2025	20	14 Dec 2025

Sprint	Total Story Points	Duration	Sprint Start Date	Planned End Date	Story Points Completed	Release Date
Sprint-2	20	14 Days	15 Dec 2025	28 Dec 2025	20	28 Dec 2025
Sprint-3	20	14 Days	29 Dec 2025	11 Jan 2026	18	12 Jan 2026
Sprint-4	20	14 Days	13 Jan 2026	26 Jan 2026	20	26 Jan 2026

Buffer & Final Review Period: 27 Jan 2026 – 10 Feb 2026

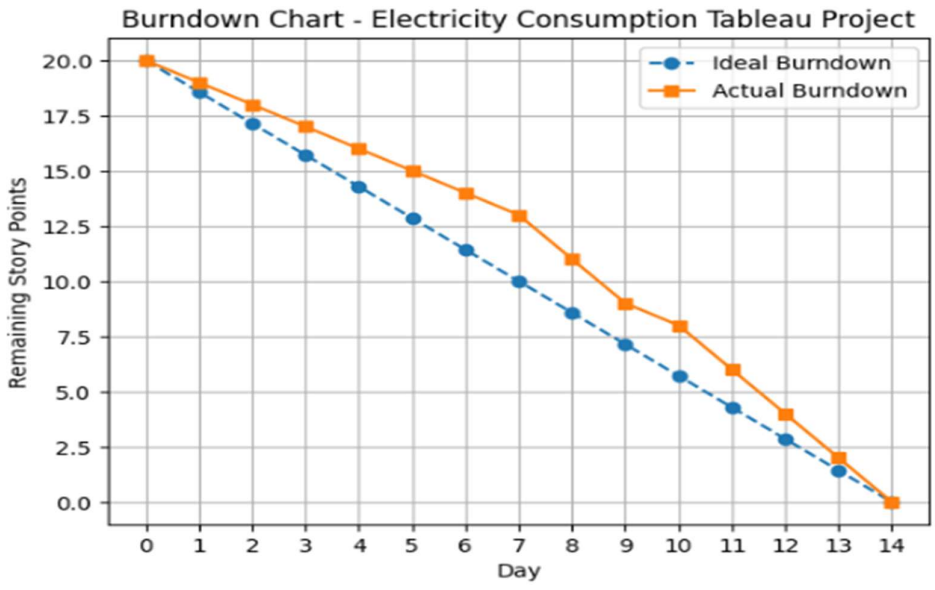
3. VELOCITY TABLE

Parameter	Value
Story Points per Sprint	20
Sprint Duration	14 Days
Team Size	3
Velocity per Sprint	20
Average Velocity per Day	1.43
Avg Contribution per Member per Day	0.48

Calculation:

Velocity per Day = 20 / 14 = 1.43
Individual Contribution = 1.43 / 3 = 0.48

Burndown Chart:



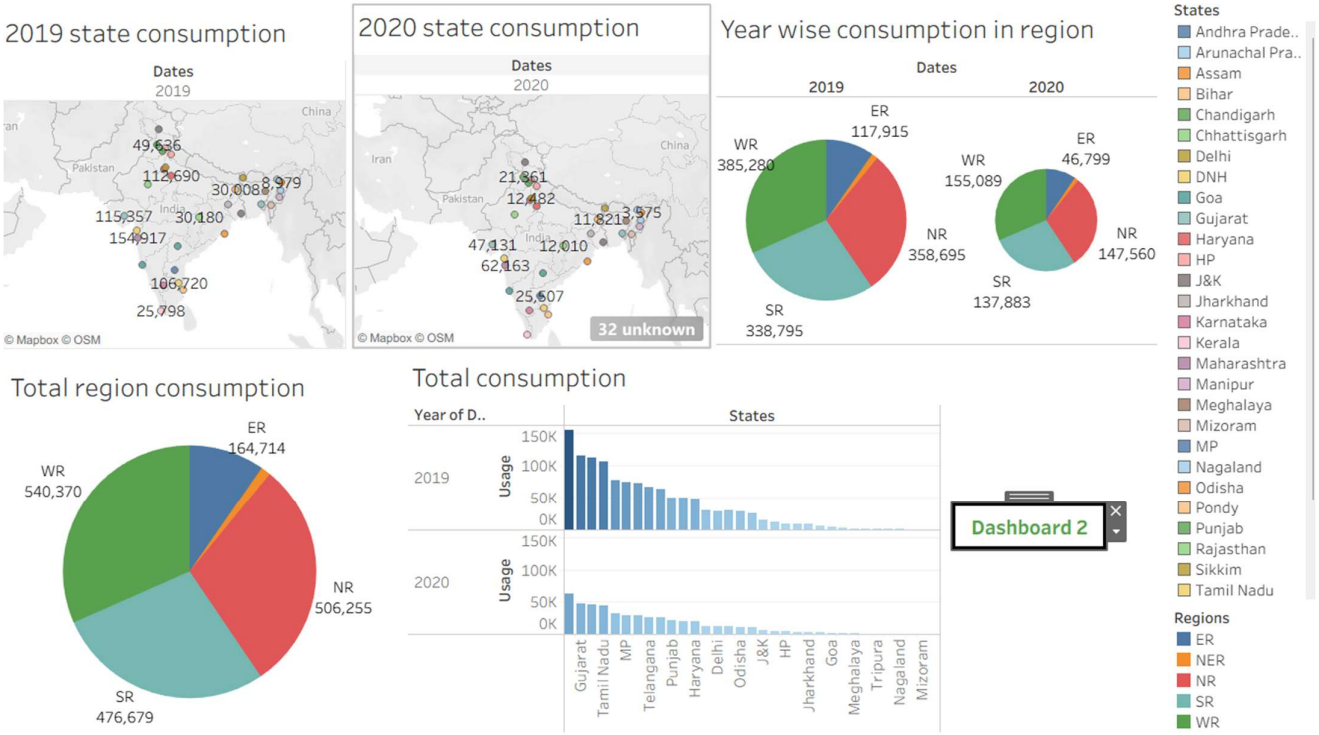
6. FUNCTIONAL AND PERFORMANCE TESTING

Date	20 feburary2026
Team id	LTVIP2026TMIDS39250
Project title	Plugging
Minimum marks	10marks

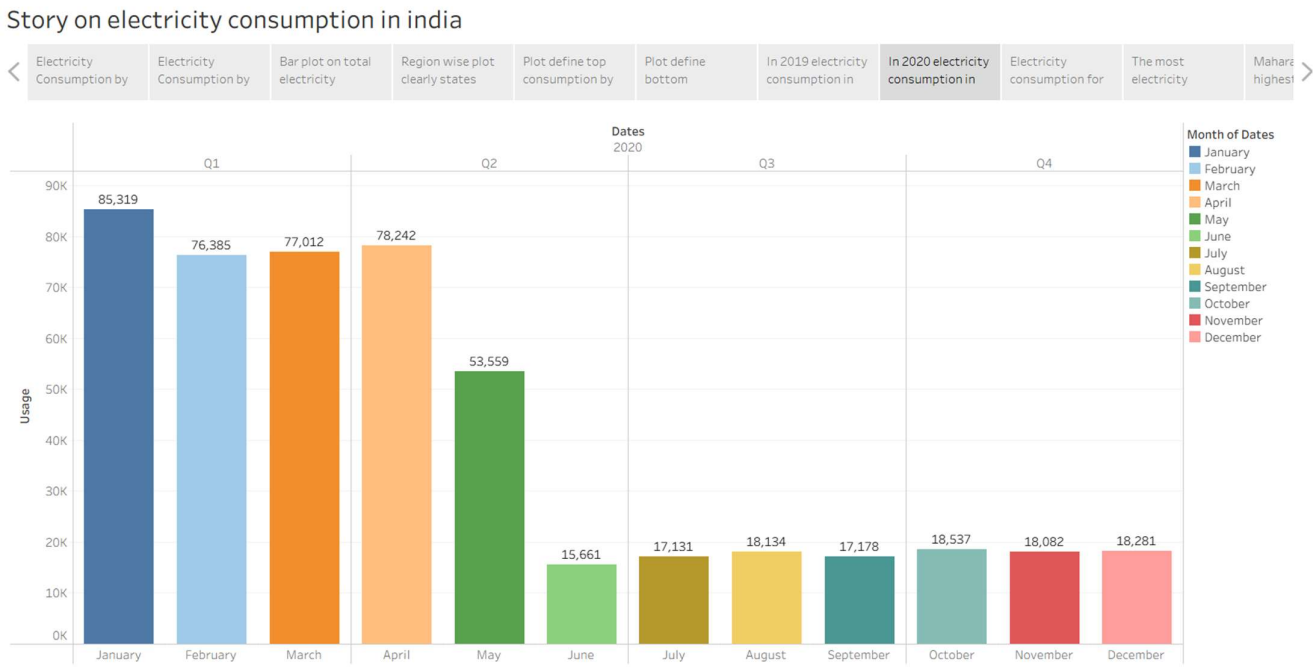
Model Performance Testing

S.No	Parameter	Screenshot / Values
1	Data Rendered	Dataset successfully loaded in Tableau. Time series data covering 24 months (02 Jan 2019 – 05 Dec 2020). Total Fields: States, Regions, Latitude, Longitude, Dates, Usage (MU). Total Records: Weekly data entries for all Indian States across 24 months. Data rendered correctly in maps, line charts, and dashboards.
2	Data Preprocessing	Converted Dates column into Date data type (continuous time format). Standardized state names for consistency. Verified Latitude and Longitude for geographic mapping. Checked and removed missing Usage values. Aggregated weekly data into monthly totals where required for trend analysis.
3	Utilization of Filters	Implemented interactive filters: Date Range Filter (2019–2020), State Filter (Dropdown list of Indian States), Region Filter (North, South, East, West, Central, North-East. All filters dynamically update charts and maps.
4	Calculation Fields Used	Created calculated fields: 1) Monthly Total Usage = SUM(Usage). 2) Average Weekly Usage per State. 3) Year-over-Year Growth Rate. 4) Regional Usage Share Percentage = (Region Usage / Total Usage) × 100. 5) Maximum and Minimum Consumption Identification.
5	Dashboard Design	No of Visualizations / Graphs – 16 Visualizations: Time Series Line Chart (Usage Trend), State-wise Bar Chart, Regional Comparison Chart, Geographic Map (using Latitude & Longitude, Area Chart (Regional Trend), Top N States Consumption Chart, Filter Panel.
6	Story Design	No of Visualizations / Graphs – 1 Story Sheets in Tableau: 1) National Electricity Usage Overview (Trend + KPIs). 2) Regional & State-Level Analysis (Map + Bar Charts). 3) Time Series & Growth Insights (Seasonality + Peak Consumption Patterns). Each story contains visualizations with descriptive captions.

Dashboard Design:-

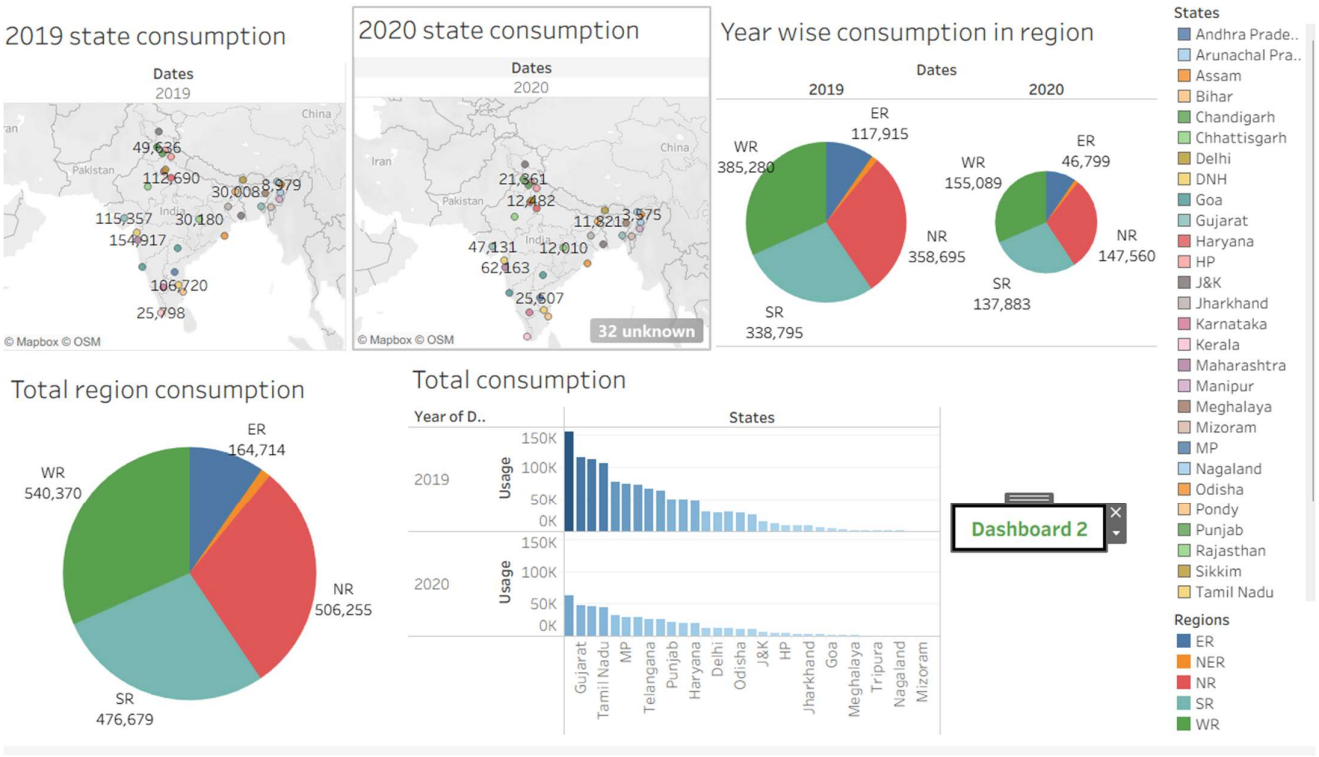


Story Design:-

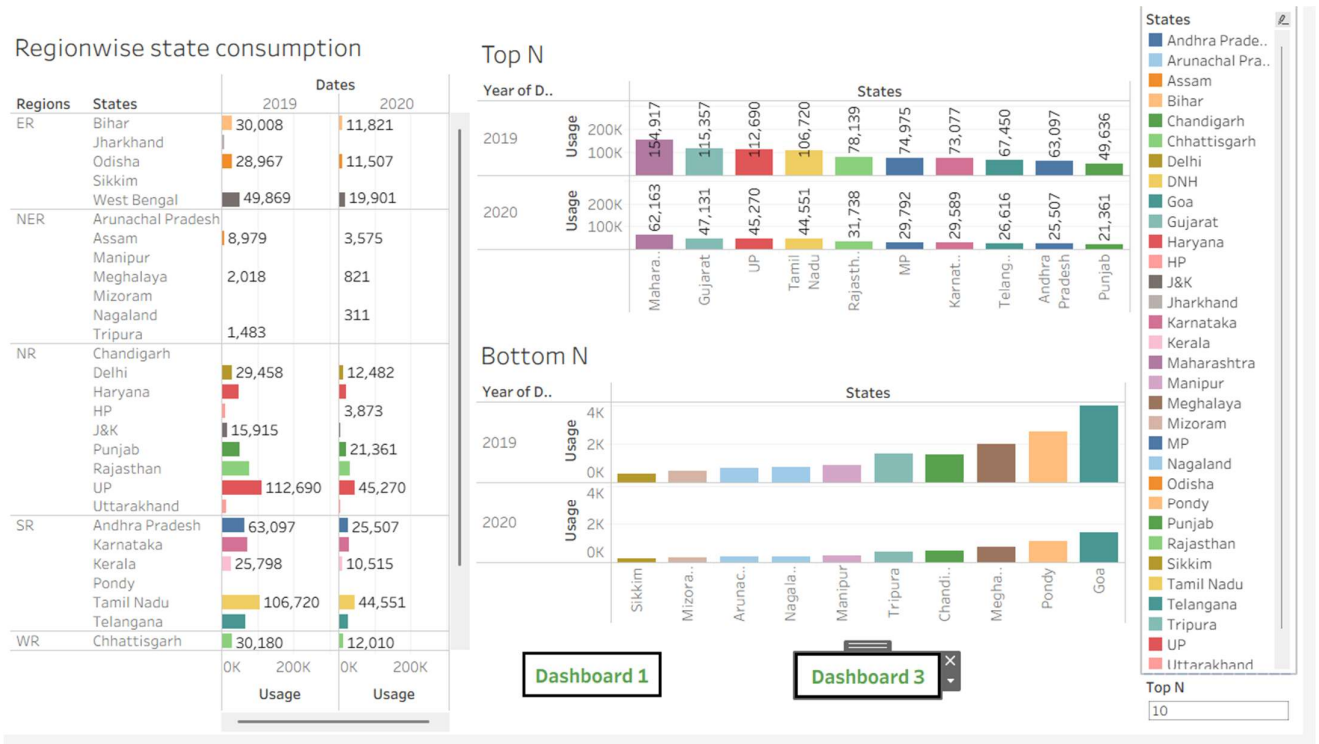


7.RESULTS

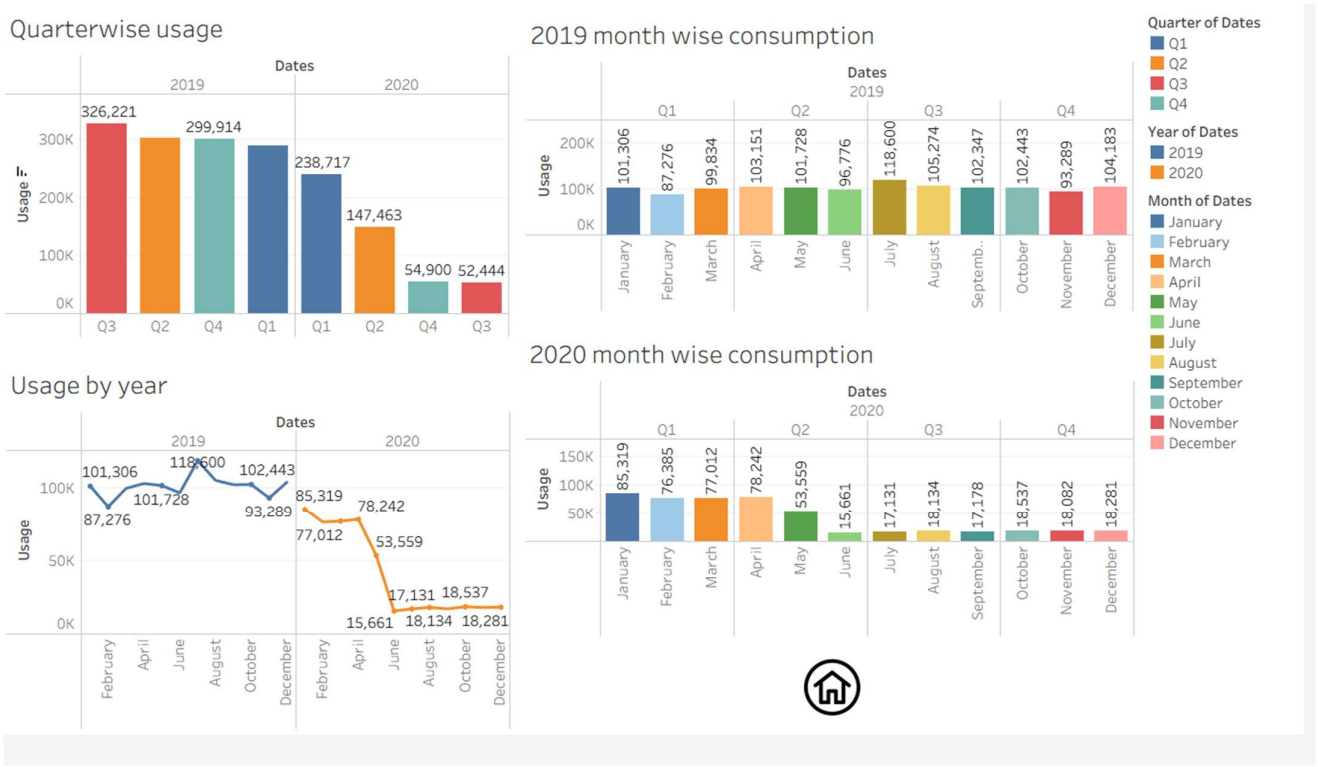
Dashboard 1:-



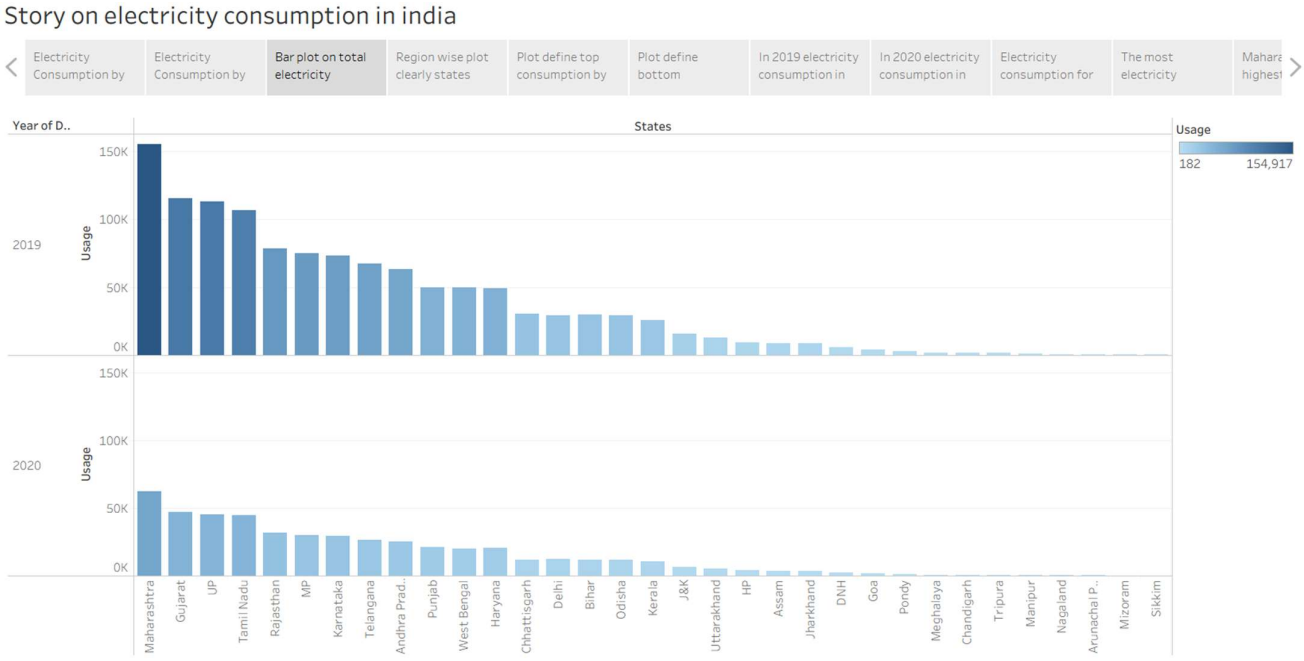
Dashboard 2:-



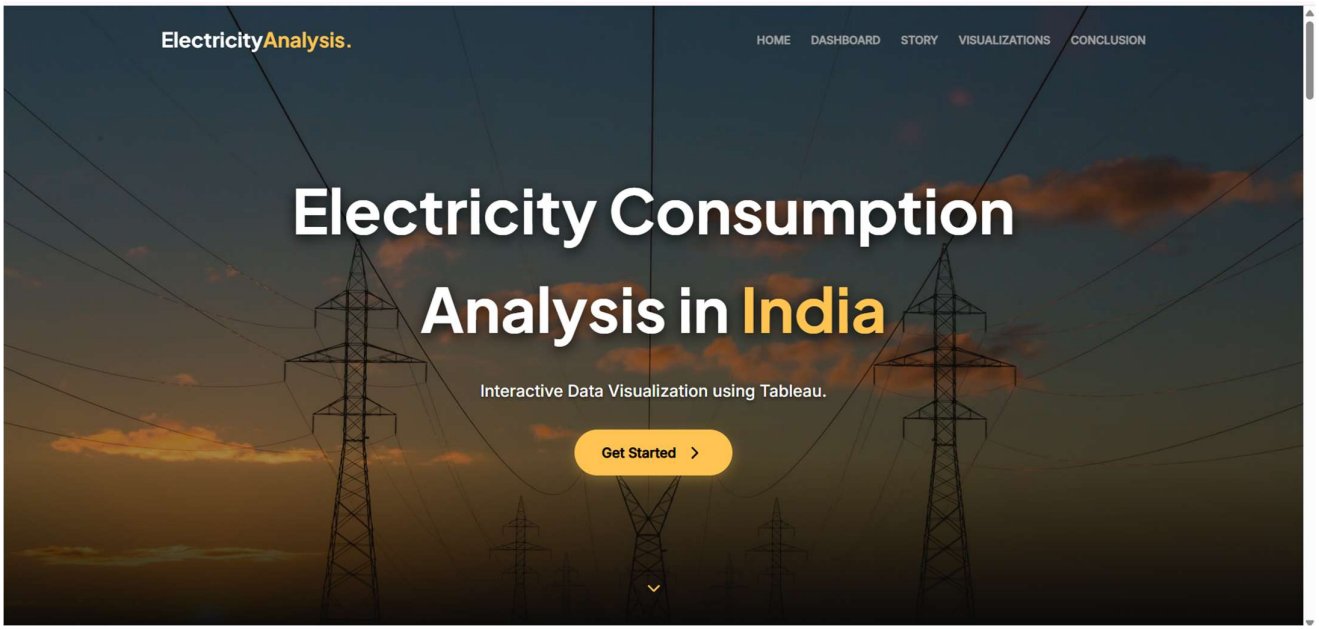
Dashboard 3:-

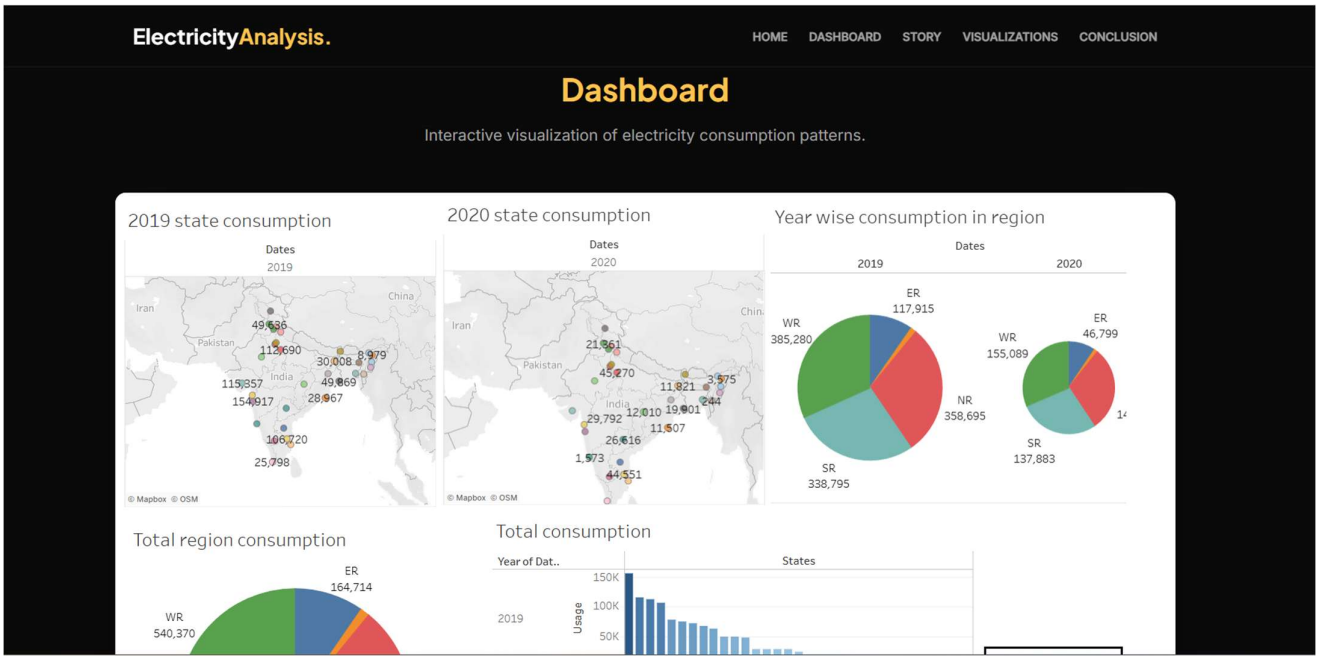


Story:-



Website:-


ElectricityAnalysis.
HOME
DASHBOARD
STORY
VISUALIZATIONS
CONCLUSION
Electricity Consumption Analysis in India
Interactive Data Visualization using Tableau.
Get Started


ElectricityAnalysis.
HOME
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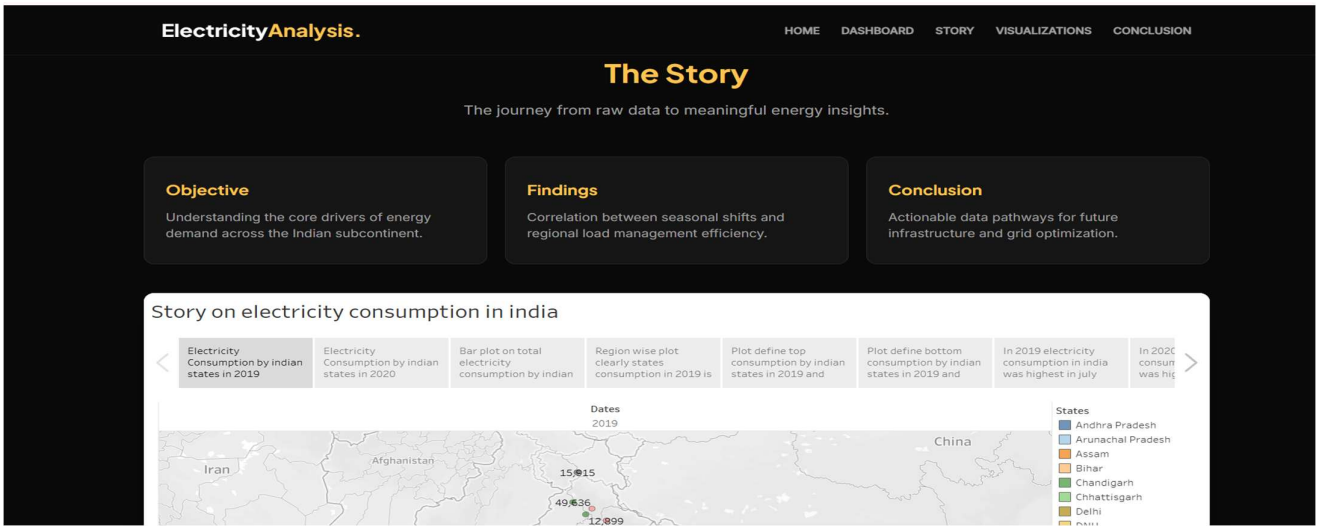
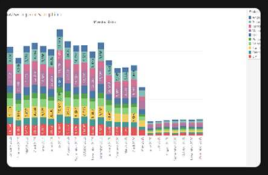
CONCLUSION
Dashboard
Interactive visualization of electricity consumption patterns.
2019 state consumption
2020 state consumption
Year wise consumption in region
Total region consumption
Total consumption


ElectricityAnalysis.
HOME
DASHBOARD
STORY
VISUALIZATIONS
CONCLUSION
The Story
The journey from raw data to meaningful energy insights.
Objective
Understanding the core drivers of energy demand across the Indian subcontinent.
Findings
Correlation between seasonal shifts and regional load management efficiency.
Conclusion
Actionable data pathways for future infrastructure and grid optimization.
Story on electricity consumption in india

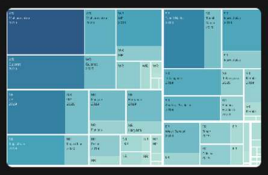
Visualizations

Individual analysis sheets exploring specific metrics.



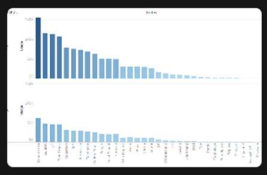
Monthly Trends

Analysis of consumption spikes during peak summer months.



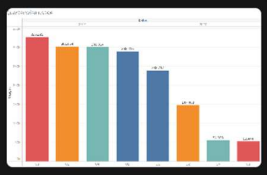
Regional Share

Proportional breakdown of total national demand.



State-wise Usage

Comparative study of energy requirements.

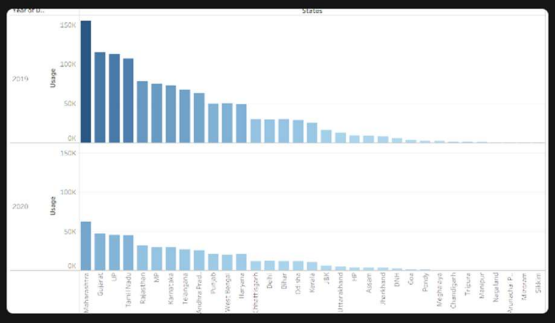


Quarterly Comparison

Year-over-year performance metrics.

Conclusions

Key insights derived from the multi-year analysis.



Consumption Statistics

Electricity Consumption Stats

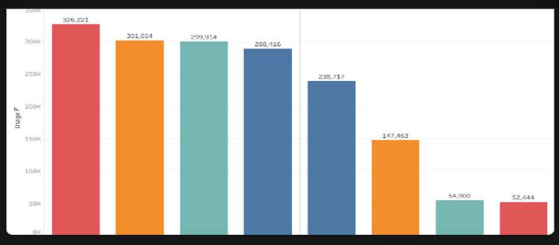
- **Maharashtra** is the highest electricity consumer in India.
- **Gujarat** is the second highest electricity consumer in India.
- **Sikkim** is the lowest electricity consumer in India.

ElectricityAnalysis.

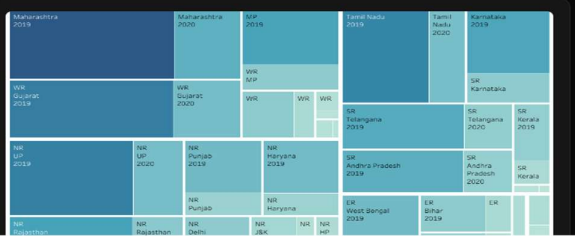
HOME DASHBOARD STORY VISUALIZATIONS CONCLUSION

Electricity Consumption in Quarters

- Electricity consumption in 2019 for **Quarter 3** was Highest.
- Electricity consumption in 2020 for **Quarter 1** was Highest.



Quarterly Analysis



Electricity Consumption in Regions

- Total consumption in **Western Region** is Highest.
- Total consumption in **North Eastern Region** is Lowest.

8.ADVANTAGES AND DISADVANTAGES

ADVANTAGES:

1. Better Data Visualization

The project converts complex electricity consumption data into clear visual formats such as line charts, bar graphs, heat maps, and KPI indicators. This makes large datasets easier to understand for policymakers, analysts, and stakeholders.

2. Identification of Consumption Trends

It helps in identifying monthly, yearly, and seasonal electricity usage patterns. This supports understanding of peak demand periods and low consumption phases.

3. Data-Driven Decision Making

The dashboard enables authorities and energy planners to make informed decisions based on actual consumption data rather than assumptions.

4. Sector-wise Analysis

The system allows comparison of electricity usage across sectors such as residential, industrial, and commercial, improving resource allocation strategies.

5. Interactive and User-Friendly Interface

Tableau provides filter options (year, region, sector), drill-down capabilities, and dynamic dashboards, making analysis simple even for non-technical users.

6. Performance Monitoring

The dashboard can be used to monitor electricity growth rates and consumption changes over time, helping in forecasting and planning.

7. Scalable Solution

The project can be extended to include real-time data integration, predictive analytics, and AI-based forecasting in the future.

DISADVANTAGES :

1. Dependency on Data Quality

If the dataset contains errors, missing values, or outdated information, the insights generated may be inaccurate or misleading.

2. Time-Consuming Data Preparation

Cleaning, formatting, and transforming raw electricity data requires significant effort before visualization.

3. Limited Real-Time Analysis

If the project uses static datasets, it may not reflect real-time electricity consumption changes.

4. Tableau Licensing Limitations

Advanced Tableau features may require paid licenses, which can increase project cost.

5. Performance Issues with Large Data

Very large datasets may slow down dashboard performance if not optimized properly.

6. Technical Knowledge Requirement

Basic knowledge of Tableau and data analysis concepts is necessary to fully utilize the dashboard features.

9.CONCLUSION

The project *"Plugging into the Future"* successfully analyzes electricity consumption patterns using Tableau's powerful data visualization capabilities. By collecting, cleaning, and transforming electricity consumption data, the project provides meaningful insights through interactive dashboards and graphical representations.

The analysis helps in identifying seasonal trends, sector-wise consumption patterns, peak demand periods, and growth rates over time. These insights support data-driven decision-making for energy planners, policymakers, and utility providers. The use of Tableau enhances clarity by converting complex datasets into simple, understandable visual formats.

Overall, the project demonstrates how data analytics and visualization tools can improve energy management, planning efficiency, and transparency in electricity consumption monitoring.

10.FUTURE SCOPE

1. Real-Time Data Integration

The project can be enhanced by integrating live electricity consumption data using APIs to provide real-time dashboards.

2. Predictive Analytics

Machine learning models can be incorporated to forecast future electricity demand based on historical trends.

3. Smart Grid Integration

The system can be connected with smart grid technologies to monitor and analyze energy usage dynamically.

4. Mobile Application Development

A mobile-friendly version of the dashboard can be developed to provide accessibility on smartphones.

5. Renewable Energy Analysis

The dashboard can be expanded to compare renewable and non-renewable energy consumption trends.

6. AI-Based Alerts

Automated alerts can be added to notify authorities about unusual consumption spikes or energy shortages.

7. Government & Utility Collaboration

The solution can be scaled for use by electricity boards and government agencies for national-level energy planning.

11. APPENDIX

Source Code :

app.py <!DOCTYPE html> Untitled-1

C: > Users > ADMIN > Documents > APSCHE > website > app.py

```python
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=True)
```

File Edit Selection View Go ... Search

index.html app.py <!DOCTYPE html> Untitled-1

MIN > Documents > APSCHE > website > templates > index.html > html > body > div.page-container > section#conclusion > div.conclusion-row > div.conclusion-text > h3

```
<html lang="en">
<body>
<div class="page-container">
    <!-- DASHBOARD SECTION -->
    <section id="dashboard">
        <div class="section-header">
            <h2>Dashboard</h2>
            <p>Interactive visualization of electricity consumption patterns.</p>
        </div>

        <div class="viz-outer-wrapper">
            <div class='tableauPlaceholder' id='viz1770746349027' style='position: relative'>
                <noscript>
                    <a href='#'><img alt='Dashboard 1 ' src='https:&#47;&#47;public.tableau.com&#47;static&#47;images&#47;pr&#
                </noscript>
                <object class='tableauViz' style='display:none;'>
                    <param name='host_url' value='https%3A%2F%2Fpublic.tableau.com%2F' />
                    <param name='embed_code_version' value='3' />
                    <param name='site_root' value='' />
                    <param name='name' value='pro1_17707289109290&#47;Dashboard1' />
                    <param name='tabs' value='no' />
                    <param name='toolbar' value='yes' />
                    <param name='static_image' value='https:&#47;&#47;public.tableau.com&#47;static&#47;images&#47;pr&#47;pro1_
                    <param name='animate_transition' value='yes' />
                    <param name='display_static_image' value='yes' />
                    <param name='display_spinner' value='yes' />
                    <param name='display_overlay' value='yes' />
                    <param name='display_count' value='yes' />
                    <param name='language' value='en-US' />
                </object>
            </div>
        </div>

        <script type='text/javascript'>
            var divElement = document.getElementById('viz1770746349027');
            var vizElement = divElement.getElementsByTagName('object')[0];
```

Dataset Link :

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

GitHub Link :

https://github.com/sravanthi224/Exploration-of-Electricity-Consumption-Patterns-Using-Tableau.git

Project Demo :

https://drive.google.com/file/d/1cNG8MBG3mtvVzaa14MKJpE6I73dnWsqP/view?usp=drivesdk

Deployed Website Link:

https://tableau-electricity-consumption.onrender.com/

Tableau Public Links:-

Dashboard:-

https://public.tableau.com/app/profile/jyothi.sravanthi.somu/viz/pro1_17707289109290/Dashboard1

Story:-

https://public.tableau.com/app/profile/jyothi.sravanthi.somu/viz/pro2_17707303091690/Storyonelectricityconsumptioninindia