
Team ID: LTVIP2025TMID51504

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

Electricity Consumption Analysis Final Report

1. INTRODUCTION

1.1 Project Overview

Plugging into the Future explores electricity consumption patterns across Indian states using data visualizations built in Tableau. The project aims to uncover insights into regional usage trends, impacts of external events (like COVID-19), and forecasting future consumption using interactive dashboards.

1.2 Purpose

The purpose is to build a data-driven, user-friendly system for understanding electricity usage in India through visual storytelling and predictive insights. It promotes awareness of energy consumption behaviors and supports sustainable planning.

2. IDEATION PHASE

2.1 Problem Statement

Consumers lack detailed, interactive tools to analyze their electricity usage over time, making it difficult to understand consumption trends, optimize usage, or prepare for future bills.

2.2 Empathy Map Canvas

We empathize with residential users who are frustrated by high bills, confused by vague data, and seek control over their energy use. Our dashboard empowers them with clear visuals, trends, and comparisons.

2.3 Brainstorming

- Compare electricity usage across states and seasons
- Analyze peak load hours for residential/commercial zones
- Forecast future consumption using Tableau's predictive models
- Analyze behavior changes pre/post COVID lockdown

3. REQUIREMENT ANALYSIS

3.1 Customer Journey Map

User discovers high bills, seeks solutions online, tries our dashboard, explores filters and forecasts, and feels informed and empowered after using the system.

3.2 Solution Requirement

- Dataset with regional/state-wise consumption
- Filters for date, region, and state
- Calculation fields for YoY change and forecasting
- Exportable dashboards and embedded story

3.3 Data Flow Diagram

DFD Level 1 covers: user input, filter selection, data querying from DB, data prep layer, visualization output.

3.4 Technology Stack

- Tableau Public
- Python (for preprocessing if needed)
- HTML/CSS/Bootstrap (UI)
- Flask (optional web integration)

4. PROJECT DESIGN

4.1 Problem Solution Fit

User needs insights into electricity usage patterns. Our dashboard solves this by delivering a visual tool with forecasting, filtering, and comparative analysis features.

4.2 Proposed Solution

A responsive, filter-enabled Tableau dashboard embedded into a Bootstrap UI to help users visualize usage, detect anomalies, and make informed decisions.

4.3 Solution Architecture

- User accesses UI (browser)
- Embedded Tableau dashboard renders based on filters
- Data stored in .csv or cloud-accessed source
- System requires no login/backend (unless Flask used)

5. PROJECT PLANNING & SCHEDULING

5.1 Project Planning

Team of 4: Mahi Kumar, Lella Vardhan, Gnana Deepika, Liyakhat. Started June 18, 2025. Used Kanban board to track daily/weekly deliverables. Sprints were aligned to guided project structure.

6. FUNCTIONAL AND PERFORMANCE TESTING

6.1 Performance Testing

- 16,587 records processed
- Filters: Region, State, Month, Year, Date Slider
- Visualizations: 6 (dashboard), 4 (story scenes)

7. RESULTS

7.1 Output Screenshots

Included: full dashboard, filters, story points, top/bottom states, forecast graph, and KPI tiles.

8. ADVANTAGES & DISADVANTAGES

Advantages

- User-friendly and interactive
- Supports trend discovery and decision-making
- Forecasting capability

Disadvantages

- Static data (real-time not supported)
- Requires internet connection (for Tableau Public)

9. CONCLUSION

The project succeeded in visualizing India's electricity usage using Tableau and presenting it through a modern web UI. It enhances user understanding, supports awareness, and can be expanded into real-time systems.

10. FUTURE SCOPE

- Real-time smart meter data integration
- Mobile app version
- NLP chatbot for data questions
- Statewise comparison ranking system

11. APPENDIX

****Source Code (if any):**** Uploaded to GitHub

****Dataset Link:**** [Google Drive or CSV attached]

****GitHub & Project Demo Link:****

- Dashboard: https://public.tableau.com/shared/PQJ7JCRW9?:display_count=n&origin=viz_share_link

- Story: https://public.tableau.com/views/project1_17509553369030/Dashboard5?:language=en-US&sid=&redirect=auth&display_count=n&origin=viz_share_link

- GitHub: <https://github.com/liyakhat04/Plugging-into-the-Future-An-Exploration-of-Electricity-Consumption-Patterns-Using-Tableau>