

Project Design Phase-II
Technology Stack (Architecture & Stack)

Date	20 Jan 2026
Team ID	LTVIP2026TMIDS25025
Project Name	Plugging into the Future: An exploration of electricity
Maximum Marks	4 Marks

Technical Architecture: The Deliverable shall include the architectural diagram as below and the information as per the table1 & table 2

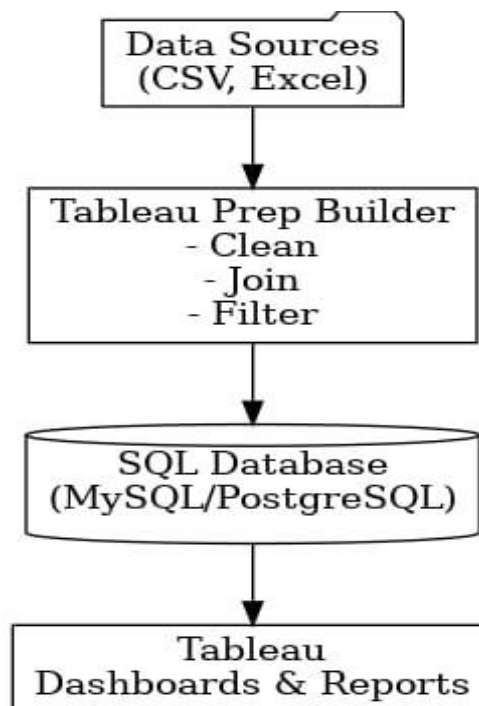


Table-1: Components & Technologies:

S.No	Component	Description	Technology
1	User Interface	Users interact with dashboard, filters, charts and comparison visuals	HTML, CSS, Bootstrap, JavaScript
2	Application Logic-1	Data cleaning, preprocessing, handling missing values	Python (Pandas)
3	Application Logic-2	Filtering, state/year selection, comparison logic	Flask (Backend Routing), Pandas
4	Application Logic-3	Data aggregation, grouping, KPI generation	Pandas (SUM, GROUPBY, Aggregations)
5	Visualization Engine	Generation of charts (state-wise, year-wise, sector-wise)	Chart.js / Plotly (or your chart library)
6	Database	Structured electricity consumption dataset	CSV Dataset (Electricity_Consumption.csv)
7	File Storage	Storage of raw and cleaned dataset files	Local File System (.csv files)
8	Export Module	Export dashboard data into downloadable format	Python (CSV Export)
9	Web Framework	Backend application handling requests and responses	Flask (Python Framework)
10	Data Processing Layer	Conversion of processed data into visualization-ready format	Python (JSON conversion via Flask)
11	Infrastructure (Server / Hosting)	Deployment and hosting of web dashboard	Localhost / Cloud Deployment (if hosted)

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1	Open-Source Frameworks	Open-source libraries used for backend processing and visualization	Python, Flask, Pandas, Chart.js / Plotly
2	Security Implementations	Basic application-level protection and controlled dataset modification (Admin-level access)	Flask Routing, Server-side Validation
3	Scalable Architecture	Separation of Presentation Layer, Application Layer, and Data Layer (3-Tier Architecture)	Flask 3-Tier Architecture
4	Availability	Web-based dashboard accessible through browser when server is running	Flask Web Server (Localhost / Cloud)
5	Performance	Optimized data filtering and aggregation for faster dashboard updates	Pandas Aggregations, Efficient CSV Handling
6	Maintainability	Modular structure separating routes, templates, and data processing logic	Flask MVC Structure
7	Reliability	Accurate data display using validated and cleaned dataset	Pandas Data Cleaning & Validation