Requiremental Analysis

Technology Stack (Architecture & Stack)

Date	25-06-2025
Team ID	LTVIP2025TMID20838
Project Name	Plugging into the Future : An Exploration of Electricity Consumption Patterns
Maximum Marks	4 Marks

Visualization Tool for Electricity Consumption In India 2019 and 2020

Technical Architecture: -

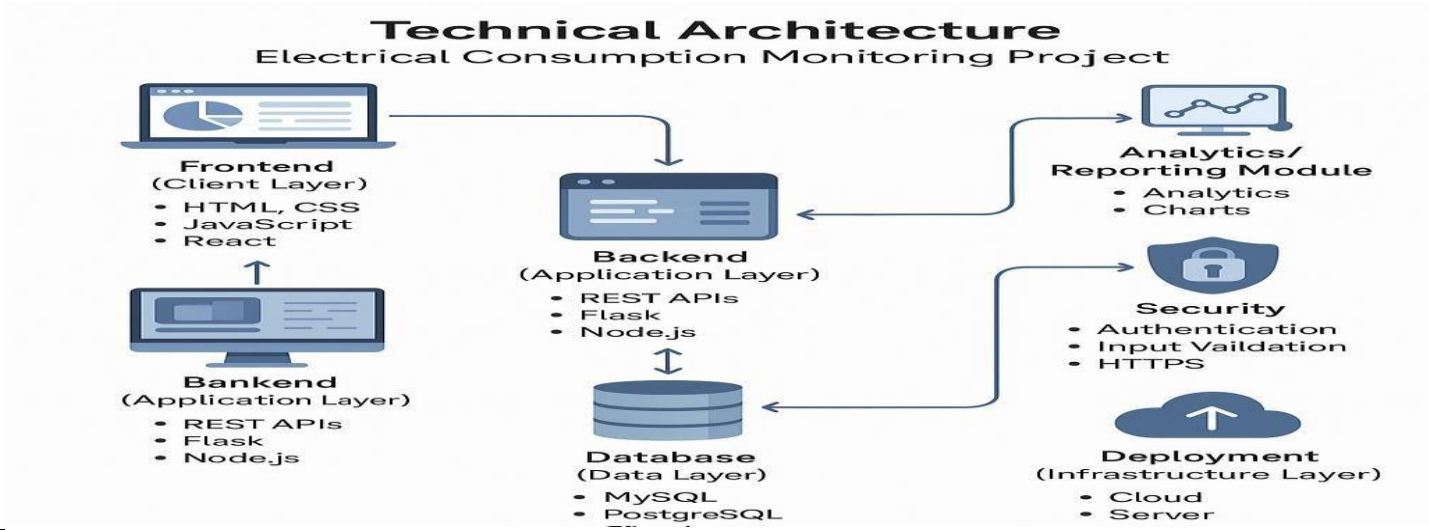

Table 1: - Components and Technologies Used

S.No	Component	Description	Technology Used
1	Data Collection Script	Reads real-time electricity usage from meter or sensor.	Python, Arduino C++, Serial Communication
2	Data Transmission Module	Sends usage data to the backend or cloud.	HTTP, MQTT, Python `requests`, ESP32 firmware
3	Backend Server	Handles incoming data, user requests, and processes logic.	Flask / Node.js / PHP, REST APIs
4	Database	Stores electricity data and user info.	MySQL, MongoDB, Firebase
5	Web Dashboard (Frontend)	Visualizes electricity consumption in charts and tables.	HTML, CSS, JS, Bootstrap, Chart.js
6	Authentication Module	Manages user login, registration, and access control.	Firebase Auth, JWT, PHP Sessions
7	Notification System (Opt.)	Alerts users when consumption exceeds threshold (SMS/email/push).	SMTP, Firebase Cloud Messaging, Twilio API

Table2:- Characteristics and Technologies Used

S.No	Characteristics	Technologies Used
1.	Real-time data reading	Python, Arduino C++
2.	Wireless data transmission	MQTT, HTTP, ESP32, Python `requests`
3.	Scalable and secure server-side processing	Flask, Node.js, PHP, REST APIs
4.	Interactive and responsive user interface	HTML, CSS, JavaScript, Chart.js, Bootstrap
5.	Reliable data storage and retrieval	MySQL, MongoDB, Firebase