FORECASTING DEMAND AT EV CHARGING STATIONS

1. Introduction:- Electric Vehicles (EVs) are increasingly becoming a key solution in reducing carbon emissions and dependency on fossil fuels. Efficient planning of EV charging infrastructure is essential to meet growing demand. This project focuses on forecasting demand at EV charging stations using a visual analytics dashboard created in Tableau.

2. Abstract:- This project visualizes and analyses EV charging station usage through several dimensions such as energy consumption, number of EVs charged, charging hours, weather conditions, time patterns, weekday/weekend differences, and traffic flow. By integrating multiple influencing factors into a single Tableau dashboard, the project supports data-driven decision-making for EV infrastructure planning and management.

3. Tools Used:-

- ➢ Tableau Public Desktop Edition – For dashboard creation and interactive visualization.
- ➢ Microsoft Excel – For initial data formatting and cleaning.
- ➢ Windows 10 – Operating system for development environment.

4. Steps Involved in Building the Project

1. Data Collection
   Gathered data on EV charging sessions including energy consumption, timestamp, station IDs, weather data (temperature, humidity, precipitation), traffic patterns, and day classification (weekday/weekend).

2. Data Cleaning & Preparation
   Data was cleaned and formatted using Excel to ensure compatibility with Tableau. Null values were addressed, timestamps were converted, and data types were standardized.

3. Importing Data into Tableau
   The cleaned dataset was imported into Tableau .

4. Sheet Creation

   - ○ Pie Charts for energy consumption, number of EVs, and charging hours across stations.

- o Bar Chart showing time-wise energy consumption.

- o Bar Chart comparing weekend vs. weekday usage.

- o Bar Chart for weather parameters.

- o Traffic Flow chart indicating peak traffic hours.

5. **Dashboard Development**
   Combined all visualizations into a single dashboard titled "Forecast Demand at EV Charging Stations."
   Layout boxes were color-coded for clarity:

   - o **Magenta (Energy, EV count, Charging hours)**

   - o **Blue (Weekdays/weekends)**

   - o **Yellow (Time)**

   - o **Green (Weather)**

   - o **Red (Traffic flow)**

6. **Interactivity&Tooltips**
   Interactive tooltips and filters were added to enhance user experience and allow insights at a granular level (e.g., energy consumption by station ID).

5. Conclusion:- The dashboard successfully presents a unified view of the factors affecting EV charging demand. The project highlights:

- **Station-wise comparison of energy usage.**

- **Time-of-day and weekday patterns.**

- **Weather and traffic correlations with charging behavior.**

This visualization empowers EV infrastructure planners to make informed decisions regarding load management, station placement, and service scheduling.