📄 INTERNSHIP PROJECT REPORT

Electric Vehicle Sales in India

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1. Introduction

9The adoption of Electric Vehicles (EVs) in India has significantly increased over the past decade due to environmental awareness, government incentives, and the rising popularity of sustainable mobility. This project, "Electric Vehicle Sales in India", focuses on analyzing EV sales data across various states, years, vehicle categories, and types.

The objective of this project is to apply Data Analytics techniques using Python, SQL, and Excel to extract meaningful insights from real-world EV sales data.

2. Project Objectives

This project aims to:

Clean and preprocess raw EV sales data

Analyze EV sales trends from 2014–2023

Identify top-performing states

Understand sales distribution by vehicle type (2W, 3W, 4W, Bus, Others)

Visualize the data through interactive charts and dashboards

Use SQL to query EV sales patterns

Create a professional dashboard in Excel

Summarize findings in a clear insight report

3. Tools & Technologies Used

Python (Pandas, Matplotlib)

Google Colab

SQL

Google Sheets / Excel

GitHub

Data Visualization Techniques

4. Dataset Description

The dataset contains EV sales from 2014 to 2023, across all states of India.
Columns include:

Year

Month_Name

Date

State

Vehicle_Class

Vehicle_Category

Vehicle_Type

EV_Sales_Quantity

Total rows: 96,845
Total columns: 8

5. Python Data Cleaning & Analysis

✔ Steps performed in Python:

1. Imported dataset using Pandas

2. Checked dataset shape, columns, null values

3. Converted Date field to proper datetime format

4. Cleaned EV_Sales_Quantity column

5. Removed duplicates

6. Performed grouped analysis:

State-wise sales

Year-wise sales

Month-wise sales

Vehicle-type-wise sales

✔ Sample Important Code:

```
df = pd.read_csv('/content/EV_Sales_Data.csv')
df['Date'] = pd.to_datetime(df['Date'])
df = df.drop_duplicates()
df.info()
```

✔ Key Python Insights:

EV sales increased rapidly after 2020, peaking around 2022–2023.

Maharashtra, Karnataka, Tamil Nadu, Delhi are top EV-selling states.

2-Wheelers dominate EV sales in India (>60% contribution).

Some states like Goa, Sikkim, Arunachal Pradesh have very low sales.

6. SQL Analysis

SQL queries were executed to extract insights such as:

✔ 1. Total EV sales by state

✔ 2. Top 5 states with highest sales

✔ 3. Year-wise total EV sales

✔ 4. Vehicle-type-wise sales

✔ 5. Month-wise sales trend

SQL helped verify patterns discovered in Python.

SQL Queries Used

Query 1: Total EV sales by state

```
SELECT State, SUM(EV_Sales_Quantity) AS Total_Sales
FROM ev_sales
GROUP BY State
ORDER BY Total_Sales DESC;
```

Query 2: Top 5 states with highest sales

```
SELECT State, SUM(EV_Sales_Quantity) AS Total_Sales
FROM ev_sales
GROUP BY State
ORDER BY Total_Sales DESC
LIMIT 5;
```

Query 3: Year-wise EV sales

```
SELECT Year, SUM(EV_Sales_Quantity) AS Yearly_Sales
```

```
FROM ev_sales
GROUP BY Year
ORDER BY Year;
```

Query 4: Vehicle-type-wise sales

```
SELECT Vehicle_Type, SUM(EV_Sales_Quantity) AS Total_Sales
FROM ev_sales
GROUP BY Vehicle_Type
ORDER BY Total_Sales DESC;
```

Query 5: Month-wise trend

```
SELECT Month_Name, SUM(EV_Sales_Quantity) AS Monthly_Sales
FROM ev_sales
GROUP BY Month_Name
ORDER BY FIELD(Month_Name,'jan','feb','mar','apr','may','jun','jul','aug','sep','oct','nov','dec');
```

7. Excel / Google Sheets Dashboard

A complete interactive Dashboard was created with:

📊 Charts Included:

1. Year-wise EV Sales Trend (Line Chart)

2. EV Sales by State (Bar Chart)

3. EV Sales by Vehicle Type (Pie Chart)

4. Month-wise EV Sales Trend (Area/Line Chart)
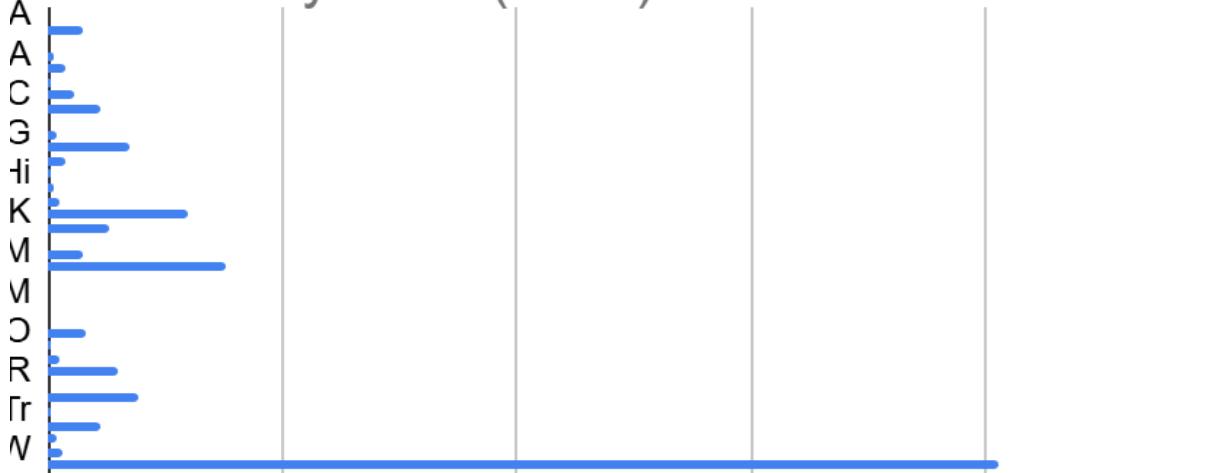
📌 **Dashboard Title:**

Electric Vehicle Sales Analysis Dashboard (India)
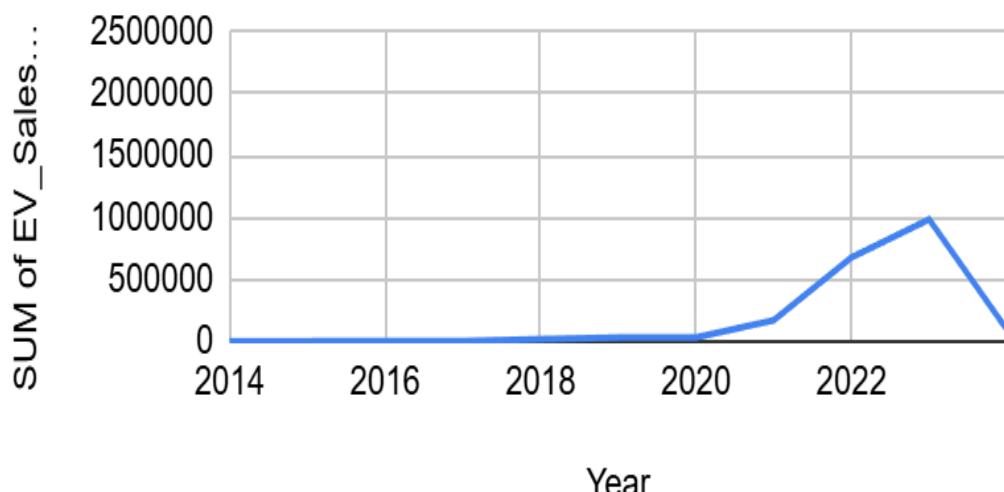
Your dashboard visually shows clear growth, comparisons, and category-wise distribution of EV adoption in India.

# EV Sales by state (India)
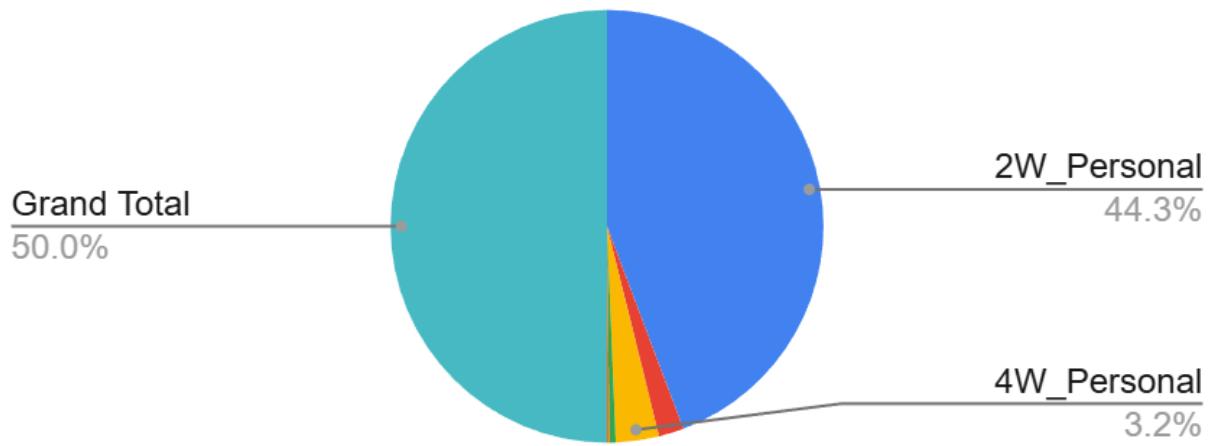
This chart shows the total EV sales for each state in India. States like Maharashtra, Karnataka, and Tamil Nadu recorded the highest adoption.

Year-wise EV Sales Trend(India)
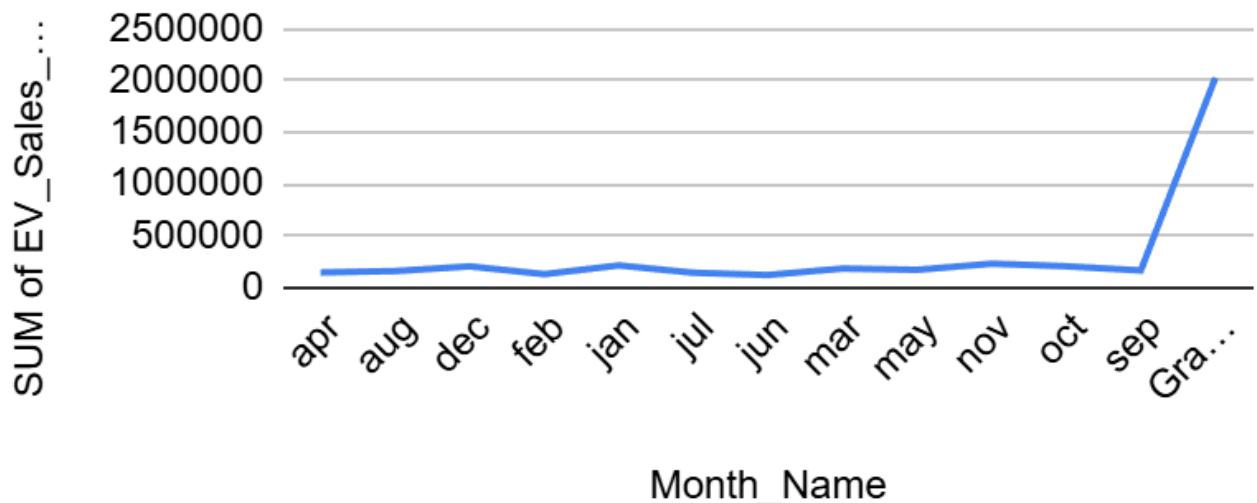
This line chart shows EV sales growth from 2014 to 2024. Sales increased sharply after 2021 due to government incentives and rising EV adoption.

EV Sales by Vehicle Type

Grand Total
50.0%

2W_Personal
44.3%

4W_Personal
3.2%

This pie chart shows category-wise EV sales. 2W (two-wheelers) contribute the highest share, followed by 3W and 4W vehicles.

Monthly EV Sales Trend(India)

This chart shows monthly EV sales patterns. Some months show higher sales activity due to seasonal and policy-related factors.

8. Final Insights

Based on all analyses:

⭐ **1. Top EV Selling States**

Maharashtra
Karnataka
Tamil Nadu
Delhi

⭐ **2. Vehicle Type Contribution**

2-Wheelers contribute the highest to EV sales

3-Wheelers and 4-Wheelers follow

EV Buses are lowest

⭐ **3. Best Performing Years**

2022 and 2023 show massive EV adoption

After 2020, EV sales show exponential rise

⭐ **4. Low-Selling States**

Sikkim
Arunachal Pradesh
Goa

9. Conclusion

EV adoption in India is rapidly growing, mainly driven by 2-wheelers and strong states like Maharashtra and Karnataka. Government initiatives, subsidies, and rising fuel costs are accelerating EV growth.

This project helped understand the complete workflow of data analytics:

Data Cleaning

Python Analysis

SQL Querying

Excel Dashboarding

Insight Generation

The insights from the analysis can assist policymakers, EV manufacturers, and consumers in understanding the trends and growth opportunities in India's EV sector.