

## Chart -1 EV Sales by State:

This part of the dashboard shows how many electric vehicles (EVs) were sold in different states. It helps us understand which states are leading in EV sales and which ones are lagging behind. For example, some states like **Delhi**, **Karnataka**, and **Maharashtra** may have higher sales, while others like **Nagaland** or **Arunachal Pradesh** might have fewer sales. This tells us where EVs are becoming more popular.

### Penetration Rates:

Penetration rate refers to how much of the total vehicle sales in a state are made up of electric vehicles. So, if a state has a **high penetration rate**, it means that a larger percentage of cars being sold there are EVs. For example, if Delhi has a 3.42% penetration rate, it means that 3.42% of all vehicles sold in Delhi are electric. This helps us see how much EVs are starting to make up a part of the overall vehicle market.

### Why is it interesting?

- **Sales Trends:** We get to see the shift towards EVs in different regions. States with more EV sales might have better infrastructure like charging stations, which helps in boosting EV adoption.
- **Penetration Insights:** The higher the penetration rate, the more people are choosing EVs over traditional petrol/diesel vehicles. It shows how fast EVs are becoming mainstream in each state.

By tracking these trends, we can see which areas are adopting EVs quicker and where there's still room for growth. This kind of data is useful for manufacturers, policy makers, and even customers who want to know where the EV market is heading!

## How to plot ?

To plot **EV Sales by State and Penetration Rates** in Power BI, follow these steps:

### 1. Import Data:

- Open **Power BI Desktop**.
- Click on "Get Data" on the Home tab.
- Select your data source (e.g., Excel, CSV, or directly from a database).
- Load the dataset containing the EV sales data by state, including columns for state names, sales numbers, and penetration rates.

## 2. Clean and Prepare the Data (Optional):

- After importing the data, check if any columns need cleaning or transformation. For example, ensure that sales data and penetration rates are in numeric format.
- If needed, use the **Power Query Editor** to clean the data:
  - Click on **Transform Data** to open the editor.
  - Apply transformations like changing data types or removing unwanted rows.

## 3. Create the Visual:

### a. Sales by State (Bar Chart or Column Chart)

- From the **Visualizations pane**, choose the **Bar Chart** or **Column Chart**.
- Drag **State** to the **Axis** field.
- Drag **EV Sales** to the **Values** field.
- This will give you a chart showing EV sales for each state.

### b. Penetration Rate by State (Line Chart or Scatter Plot)

To show the **Penetration Rate** alongside the EV sales:

- Click on the **Line Chart** or **Scatter Plot** from the **Visualizations pane**.
- Drag **State** to the **Axis** field (just like in the bar chart).
- Drag **Penetration Rate** to the **Values** field.
- This will show the penetration rate for each state. If you're using a scatter plot, you can plot both **Sales** and **Penetration Rate** on the X and Y axes for an insightful comparison.

## 4. Combine the Two Charts (Optional)

You can combine both the **EV Sales** and **Penetration Rate** in a single visualization (combo chart):

- In the **Visualizations pane**, choose the **Combo Chart (Clustered Column and Line)**.
- Drag **State** to the **Axis** field.
- Drag **EV Sales** to the **Column Values** field (this will create the bar part).
- Drag **Penetration Rate** to the **Line Values** field (this will create the line part).
- This way, you can see both EV sales (bars) and the penetration rate (line) in one chart.

## 5. Format the Chart:

- Customize the **colors**, **fonts**, and **labels** to make your chart more readable.
- To change the colors, click on the **Format** pane (paint roller icon) and modify the settings like color for bars and lines.
- Add data labels to display the actual numbers on top of the bars/line for clarity.

## 6. Add Tooltips (Optional):

- If you want more detailed information when you hover over a data point, you can add **tooltips**.
- Go to the **Fields pane**, drag additional fields (e.g., Sales Numbers, Penetration Rate, etc.) to the **Tooltips** section of the chart.

## 7. Publish & Share:

- Once you're satisfied with the chart, save your Power BI report.
- Click on **Publish** to upload it to the Power BI Service and share it with stakeholders.

### Bonus Tip:

- You can use **Filters** and **Slicers** to allow users to filter data by specific states, years, or other dimensions, making your dashboard interactive.

## Chart 2 - Top 5 Makers:

This section of the dashboard highlights the **top 5 electric vehicle (EV) manufacturers** based on their sales. It helps us understand which companies are leading the electric vehicle market and how much of the overall market share they capture. For example, **Tata Motors**, **BYD India**, and **Mahindra & Mahindra** might emerge as top players with higher sales, while companies like **Volvo Auto** or **Mercedes-Benz** may have fewer sales due to limited EV models or a smaller market presence.

By identifying the **top 5 manufacturers**, we can get a clear picture of which brands are dominating the market and which ones are still growing their footprint in the electric vehicle space.

### Why is it interesting?

- **Market Leadership:** Knowing which manufacturers are at the top helps us understand which companies are **leading the EV revolution**. These companies are likely benefiting from strong brand recognition, customer trust, and popular EV models.
- **Growth and Trends:** The sales figures of these manufacturers provide valuable insights into which companies are experiencing **rapid growth** in the EV space and which ones are maintaining steady performance. If a company like **MG Motors** is rising in the rankings, it could signal that their EV models are gaining traction and attracting more buyers.

- **Competitive Landscape:** Analyzing the **Top 5 Makers** helps us assess the **competition**. If a company is not in the top ranks, it may indicate opportunities for improvement in product offerings, marketing strategies, or infrastructure development.

In summary, this section gives a clear view of which **EV manufacturers** are leading the market, helping us understand their success factors and market strategies. By keeping track of the **top makers**, we can also anticipate future trends, such as which companies might take the lead as the EV market continues to grow.

## How to plot

### 1. Prepare Your Data:

Ensure your dataset has the following fields:

- **Manufacturer (Maker):** The name of the EV manufacturers (e.g., Tata Motors, BYD India, Mahindra & Mahindra, etc.).
- **Sales:** The total number of EVs sold by each manufacturer (you could have this as monthly, quarterly, or yearly sales).

Your data should look like this:

Manufacturer	Sales
Tata Motors	10000
BYD India	8500
Mahindra & Mahindra	7000
Volvo Auto	5000
Mercedes-Benz	4000

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### 2. Import Data into Power BI:

- Open **Power BI Desktop**.

- Click on **Home** → **Get Data** → **Excel/CSV** (or the appropriate data source if it's stored elsewhere).
- Load the dataset into Power BI.

### **3. Create the Visual (Bar Chart or Column Chart):**

For the **Top 5 Makers** chart, you can use either a **Bar Chart** or **Column Chart** to compare the sales of the top 5 manufacturers.

#### **a. Bar Chart (for Horizontal Comparison):**

1. **Select the Bar Chart:**
  - In the **Visualizations pane**, select the **Clustered Bar Chart** icon.
2. **Add Fields to the Chart:**
  - **Axis:** Drag the **Manufacturer** field to the **Axis** area. This will display the names of the manufacturers on the y-axis.
  - **Values:** Drag the **Sales** field to the **Values** area. This will display the total sales for each manufacturer on the x-axis.
3. **Sort the Data:**
  - To ensure the **top 5 manufacturers** are displayed in order of sales, click on the **three dots** in the upper-right corner of the chart and select **Sort by Sales** → **Descending**. This will ensure the highest sales appear first.
4. **Filter to Top 5:**
  - To filter the chart to only show the **Top 5 manufacturers**, click on the **Sales** field in the **Values** area.
  - Choose **Top N** in the options and set it to display the **Top 5** values.

#### **b. Column Chart (for Vertical Comparison):**

If you prefer to use a **Column Chart** instead of a Bar Chart, follow the same steps but select the **Clustered Column Chart** icon in the **Visualizations pane**.

### **4. Format the Chart:**

To make your chart more visually appealing and easier to interpret, consider the following formatting options:

1. **Data Labels:**
  - In the **Format pane**, toggle on **Data Labels** to display the actual sales numbers on top of each bar/column.
2. **Customize Colors:**

- Use the **Data Colors** section to choose different colors for each manufacturer or to make the chart more visually appealing. For example, you could assign a unique color to each manufacturer for easy identification.
3. **Title:**
- Add a title to the chart (e.g., "Top 5 EV Makers by Sales") in the **Format pane** under **Title**.
4. **Adjust Axes:**
- Adjust the **x-axis** and **y-axis** labels for readability, especially if the names of the manufacturers are long. You can rotate or resize the labels if necessary.
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## 5. Add Slicers for Interactivity (Optional):

To make the visual interactive, you can add **slicers** that allow viewers to filter the data by **region**, **year**, or **vehicle category**.

1. **Add a Slicer:**
- Click on the **Slicer** icon from the **Visualizations pane**.
  - Drag a field such as **Year**, **Region**, or **Vehicle Type** into the slicer. This allows users to filter the data based on these dimensions.

## 6. Analyze and Customize Further (Optional):

- **Dynamic Titles:** You can make the title dynamic by adding a measure that changes based on the slicer/filter selections. For instance, if you filter by year, the title can change to reflect the selected year.
- **Tooltips:** Add extra fields to the **Tooltip** area to show additional information when hovering over a bar or column. For example, you could display details about the **market share**, **growth rate**, or **price range** of each manufacturer.

## 7. Publish and Share:

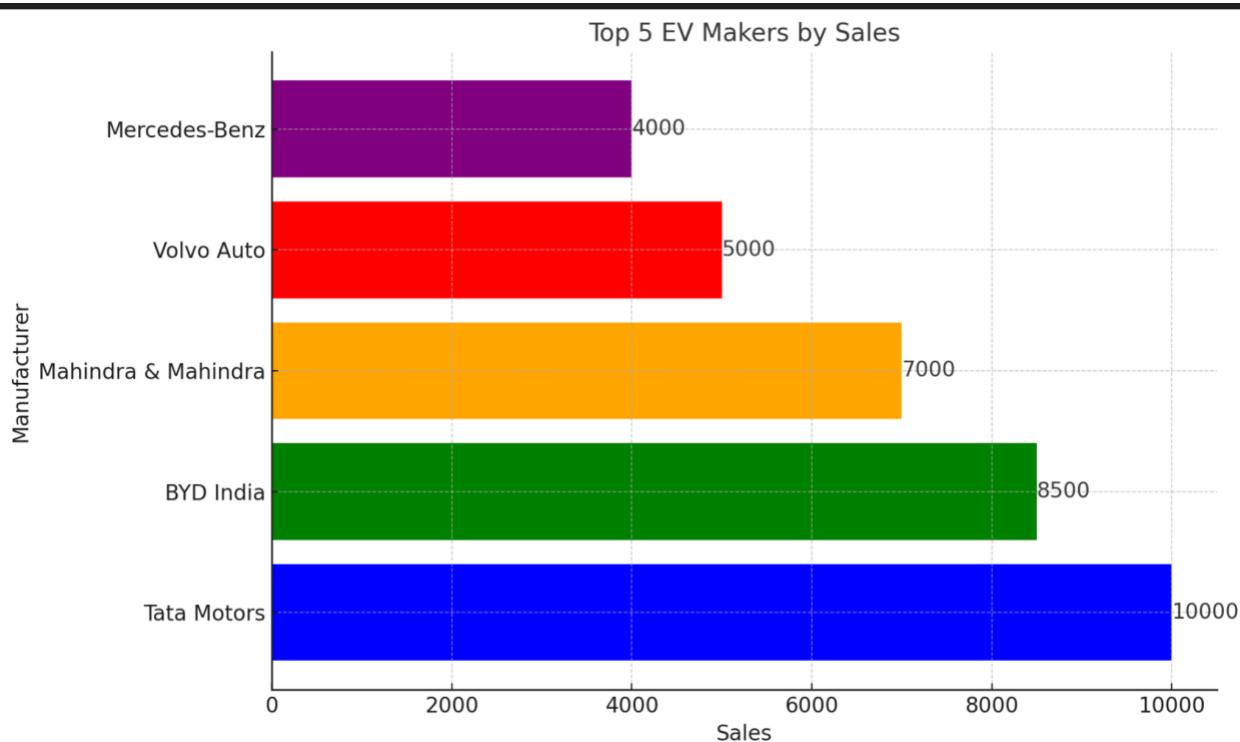
Once you are satisfied with the chart:

- Save your report.
- Click **Publish** to upload it to the **Power BI Service**.
- You can share the report with others or embed it in a dashboard.

## Summary of Steps to Plot the Top 5 Makers Chart:

1. **Prepare the data:** Ensure your data includes **manufacturer** and **sales** fields.
2. **Create the Bar or Column Chart:** Display the **Top 5 manufacturers** by sales.
3. **Format the chart:** Add **data labels**, **colors**, and **titles** for better readability.
4. **Add slicers:** Enhance interactivity by allowing users to filter the data.
5. **Publish & share:** Share the report with stakeholders.

By following these steps, you'll have a clear, interactive **Top 5 Makers** chart that provides valuable insights into the **market leaders** in the electric vehicle industry. This visual helps understand which companies are leading the market, tracking their **market share**, and identifying potential areas for growth.



Here is the **Bar Chart** visual for **Top 5 EV Makers by Sales**. It represents the sales of the top 5 electric vehicle manufacturers based on your dataset.

## Key Features of This Chart:

- The **y-axis** shows the **EV manufacturers**, such as **Tata Motors**, **BYD India**, etc.
- The **x-axis** shows the **sales numbers** for each manufacturer.

- Each bar represents the total sales for a manufacturer, and the **data labels** on the bars indicate the exact sales figure.

### **Additional Customizations:**

- **Colors:** Each manufacturer is assigned a unique color for easy identification.
- **Data Labels:** The exact sales figures are displayed on each bar for clarity

## **Chart 3 - EV Categories by Sales:**

This section of the dashboard breaks down **electric vehicle (EV) sales** into two categories: **2-wheelers** and **4-wheelers**. It helps us understand how EV sales are distributed between these two types of vehicles and highlights which category is leading in terms of adoption. For example, you might find that **2-wheelers** like electric scooters and bikes have higher sales due to their affordability and convenience in cities, while **4-wheelers** like electric cars may have fewer sales but are growing as more models become available.

By analyzing the **sales distribution** between 2-wheelers and 4-wheelers, we can see where the focus is in the EV market and which segment is experiencing faster growth.

### **Why is it interesting?**

- **Sales Comparison:** The distribution of **2-wheelers vs. 4-wheelers** reveals **consumer preferences**. In many regions, **2-wheelers** may have a higher adoption rate because they are generally more affordable and suitable for urban environments. This comparison can also reveal trends in **affordability**, **infrastructure**, and **consumer behavior**.
- **Growth Opportunities:** If sales of **4-wheelers** are growing faster than **2-wheelers**, it could indicate a shift towards the adoption of **electric cars**, which is typically seen as a more expensive segment. Conversely, if **2-wheelers** dominate, it shows the potential for **greater mass adoption** of affordable electric transport options like scooters or motorcycles.
- **Market Dynamics:** The **EV market dynamics** between these two categories are different. **2-wheelers** are often the first step for consumers entering the electric market due to lower costs, while **4-wheelers** reflect a larger commitment to a fully electric lifestyle. Tracking these trends helps manufacturers and policymakers target the right customer segments.

### **In Summary:**

By understanding the **sales split between 2-wheelers and 4-wheelers**, we get insights into how the electric vehicle market is evolving. This analysis not only reveals the **popularity** of different EV categories but also points to where **growth opportunities** lie. As more affordable 2-wheelers are introduced, they can pave the way for wider EV adoption, while the growth of 4-wheelers reflects a maturing market ready for more premium, sustainable vehicle options.

## How to plot?

### Step-by-Step Process to Plot EV Categories by Sales in Power BI:

#### 1. Prepare the Data:

Ensure your dataset contains the following fields:

- **Vehicle Type:** Indicates whether the vehicle is a **2-wheeler** or **4-wheeler**.
- **Sales:** The total number of EVs sold for each vehicle category, i.e., **2-wheelers** and **4-wheelers**.

If you have sales data in different columns (one for 2-wheelers and another for 4-wheelers), you may need to combine or reshape the data using Power BI's **Power Query Editor**. The ideal structure would be something like this:

Vehicle Type	Sale s
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2-Wheeler	1000
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4-Wheeler	1500
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If your data includes sales numbers for different time periods (like by month or year), you can aggregate them to show **total sales** by **vehicle category**.

#### 2. Import the Data into Power BI:

- Click on **Home** → **Get Data** → **Excel/CSV** (depending on your data format).
- Load the dataset into Power BI.

### 3. Create the Visual (Bar Chart or Pie Chart):

#### a. Bar Chart (for Side-by-Side Comparison)

1. **Choose a Bar Chart:** Select the **Clustered Bar Chart** (or **Clustered Column Chart**) from the **Visualizations pane**.
2. **Add Fields to the Chart:**
  - **Axis:** Drag the **Vehicle Type** field to the **Axis** area. This will display "2-Wheeler" and "4-Wheeler" categories on the x-axis.
  - **Values:** Drag the **Sales** field to the **Values** area. This will show the total sales of 2-wheelers and 4-wheelers.
3. **Sort the Data:**
  - To ensure the categories are displayed properly, you can sort by **Sales** (if needed).
4. **Customize the Chart:**
  - In the **Format pane**, enable **Data Labels** to display the exact sales numbers on top of each bar.
  - Adjust the **bar width**, **color**, and **font size** for better visibility and clarity.

#### b. Pie Chart (for Proportional Comparison)

If you prefer to show the sales split between **2-wheelers** and **4-wheelers** in **proportional terms**, you can use a **Pie Chart**.

1. **Choose a Pie Chart:** From the **Visualizations pane**, select the **Pie Chart** icon.
2. **Add Fields to the Chart:**
  - **Legend:** Drag the **Vehicle Type** field to the **Legend** area.
  - **Values:** Drag the **Sales** field to the **Values** area. This will show the proportion of sales for each category.
3. **Customize the Chart:**
  - In the **Format pane**, adjust the **data labels** to display percentages or sales values for each category.
  - You can change the **colors** of the segments to clearly distinguish between **2-wheelers** and **4-wheelers**.

### 4. Format the Chart (Optional):

- **Data Labels:** Turn on **Data Labels** in the **Format pane** to display the exact sales number or percentage on the bars or pie segments.
- **Chart Titles:** Add a clear and concise title, such as "**EV Sales by Category: 2-Wheelers vs 4-Wheelers**".

- **Customize Colors:** Adjust the **color scheme** to visually distinguish between **2-wheelers** and **4-wheelers**. For example, use **green** for **2-wheelers** and **blue** for **4-wheelers**.
  - **Legends and Tooltips:** Adjust the legend or  **tooltips** so that the viewers can easily understand the chart. You can show extra information (e.g., sales numbers, percentage) when hovering over the chart.
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## 5. Analyze the Data:

Once the chart is plotted, look at the following insights:

- **Sales Distribution:** This will help you understand which **vehicle category** (2-wheelers or 4-wheelers) is **leading in sales**.
    - For example, if **2-wheelers** dominate, it could indicate **affordability** and **urban convenience** driving the demand.
    - If **4-wheelers** show higher sales, it suggests a shift towards a more **premium EV market**.
  - **Growth Trends:** If the sales of **4-wheelers** are increasing faster than **2-wheelers**, it could signal **rising consumer interest** in electric cars as more models become available.
  - **Market Dynamics:** The comparison between **2-wheelers** and **4-wheelers** gives a deeper understanding of the market dynamics, which can guide business and marketing strategies for EV manufacturers.
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## 6. Add Slicers for Interactivity (Optional):

If you'd like to add more interactivity to the chart, you can include **slicers** that allow viewers to filter data by **year**, **region**, or **vehicle model**.

- **Add a Slicer:** Click on the **Slicer** icon from the **Visualizations pane**.
  - Drag fields such as **Region** or **Year** to the slicer to allow viewers to filter and analyze sales for specific periods or regions.
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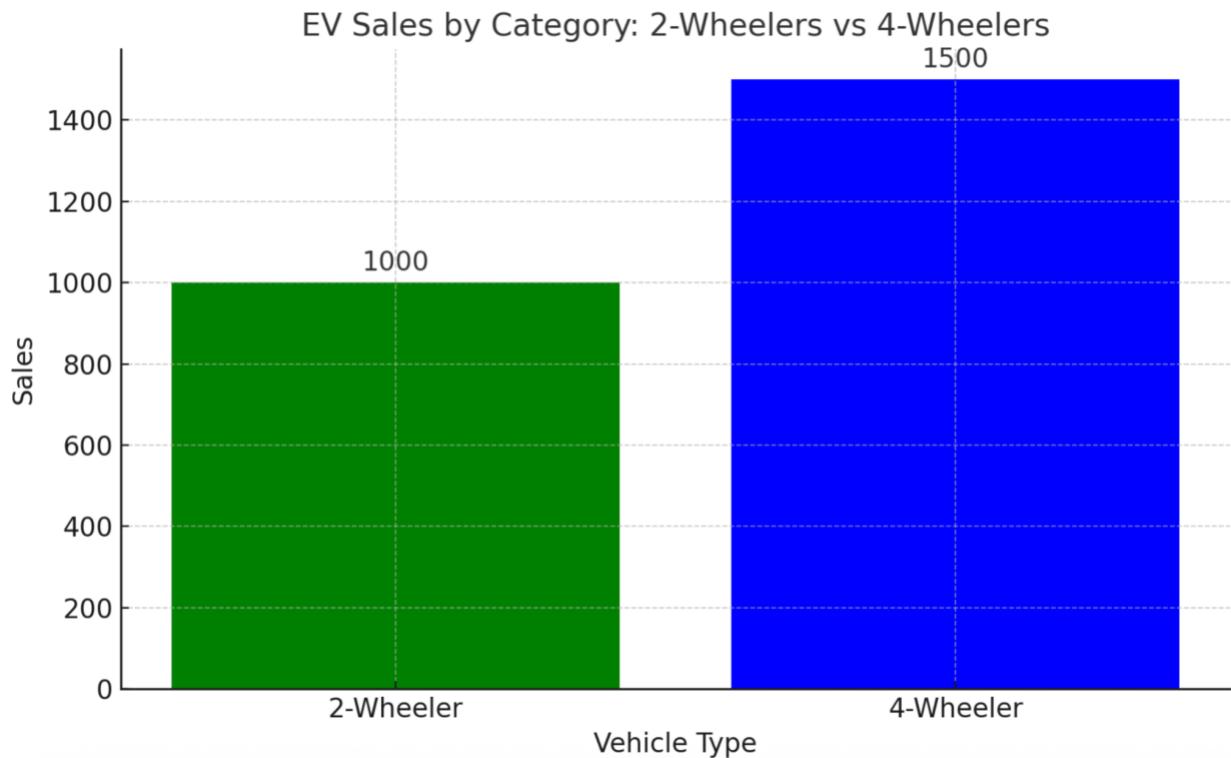
## 7. Publish & Share:

- Once you're satisfied with the visualization, **save** your Power BI report.
- Click on **Publish** to upload the report to **Power BI Service** and share it with stakeholders or embed it in a dashboard.

## Summary of Steps to Plot EV Categories by Sales:

1. **Prepare the data:** Structure the data to show total sales for **2-wheelers** and **4-wheelers**.
2. **Create a Bar or Pie Chart:** Choose the appropriate chart to compare the sales distribution.
3. **Format the chart:** Add **data labels**, customize **colors**, and adjust **titles** for clarity.
4. **Add Slicers:** Enhance interactivity by allowing users to filter by **region**, **year**, or other factors.
5. **Publish & Share:** Once complete, share the report with stakeholders for actionable insights.

By following these steps, you'll create a clear and visually engaging **comparison of 2-wheelers vs. 4-wheelers** in the EV market, providing insights into **consumer preferences** and **growth trends** in the electric vehicle space.



### Key Features of This Chart:

- The **x-axis** represents the **vehicle types**: **2-Wheeler** and **4-Wheeler**.
- The **y-axis** shows the **total sales** for each category (e.g., **1000 units** for 2-wheelers and **1500 units** for 4-wheelers).

- Each bar represents the sales for the respective category, with **data labels** on top of each bar to indicate the exact sales numbers.

### **Additional Customizations:**

- **Color:** Different colors (green for 2-wheelers and blue for 4-wheelers) distinguish the categories.
- **Data Labels:** Exact sales figures are displayed on top of the bars for clarity.

## **Chart 4 - CAGR (Compound Annual Growth Rate) by State and Maker:**

This part of the dashboard presents the **CAGR** for both **states** and **EV makers**. **CAGR** is a useful metric to measure the growth rate of sales over a specific period, assuming the growth has been steady. It helps us understand how fast EV sales are increasing, either in a particular **state** or for a specific **manufacturer**. For example, a state like **Kerala** might have a **high CAGR** (e.g., 390.96%), indicating rapid growth in EV sales, while a state like **West Bengal** might show a lower CAGR.

Similarly, for **EV makers**, the CAGR shows how much a company's EV sales have grown annually. If **Tata Motors** has a high CAGR, it means their sales are increasing quickly, indicating a strong market presence and consumer demand for their EV models.

### **Why is it interesting?**

- **Growth Trend Insights:** By analyzing **CAGR**, we can identify which **states** and **manufacturers** are growing the fastest. States with high **CAGR** are showing an increased adoption of electric vehicles, which could be due to factors like improved infrastructure, better policies, or rising consumer interest.
- **Predicting Future Growth:** The CAGR gives us a sense of **future potential**. For example, a state like **Uttarakhand**, with an **extremely high CAGR**, suggests that EV adoption is accelerating in that region, and this trend could continue, making it a key area for manufacturers to target.
- **Identifying Top Performers:** By examining **CAGR by Maker**, we can see which manufacturers are seeing the fastest growth in EV sales. A **high CAGR** for a manufacturer like **MG Motor** could indicate that their recent models or strategies have been very successful in attracting buyers, while a lower CAGR for another maker could indicate stagnation or room for improvement.
- **Strategic Decision Making:** **High CAGR** regions and makers are likely benefiting from the **right mix of policies, infrastructure, product offerings**, and customer preferences. Understanding these growth patterns helps businesses, governments, and

investors make informed decisions about where to focus efforts, whether it's building infrastructure, launching new models, or incentivizing sales.

## In Summary:

The **CAGR** by **state** and **maker** reveals which regions and companies are experiencing the **most growth** in the electric vehicle market. This metric helps us identify areas of **strong performance** and **rapid expansion** and can guide decisions on where to invest, build new infrastructure, or focus marketing efforts. It's a key indicator for understanding the **momentum** of the EV market and spotting emerging trends in the industry.

## How to plot?

### Step-by-Step Process to Plot CAGR in Power BI:

#### 1. Prepare the Data:

Ensure your dataset contains the following fields (or similar structure):

- **State/Maker:** The name of the state or EV manufacturer (e.g., Kerala, Tata Motors, etc.).
- **Sales Figures:** The total number of EVs sold for each state or maker, preferably over several years (e.g., sales data for 2020, 2021, and 2022).
- **Year:** The year for the sales data.

You may need to calculate the **CAGR** for each state or maker, using the formula:

$$\text{CAGR} = \frac{\text{Final Value} - \text{Initial Value}}{\text{Initial Value}} \times \frac{1}{\text{Number of Years}} - 1$$

Where:

- **Final Value** = Sales in the most recent year.
- **Initial Value** = Sales in the earliest year.
- **Number of Years** = The number of years over which the growth is measured.

You can either calculate this in your source data or create a measure in Power BI using DAX (Data Analysis Expressions).

#### 2. Import the Data into Power BI:

- Click on **Home** → **Get Data** → **Excel/CSV** (depending on the format of your data).
- Load the dataset into Power BI.

### **3. Create the Visual (Bar Chart or Column Chart)**

For the **CAGR visualization**, you can create a **Bar Chart** or **Column Chart** to compare the growth rates across states and makers.

**Bar Chart:**

1. **Select the Bar Chart:** Choose the **Clustered Bar Chart** from the **Visualizations pane**.
2. **Add Fields to the Chart:**
  - **Axis:** Drag the **State/Maker** field to the **Axis** area. This will display the states or manufacturers on the y-axis.
  - **Values:** Drag the **CAGR** measure or calculated field to the **Values** area. This will display the CAGR for each state or manufacturer.
3. **Sort the Data:**
  - To sort the chart by CAGR (from high to low), click on the **three dots** in the upper right corner of the chart and select **Sort by** → **CAGR** → **Descending**.

**Column Chart (Alternative):**

If you prefer a **Column Chart** to visualize CAGR, follow the same steps as above, but select **Clustered Column Chart** instead of **Clustered Bar Chart**.

### **4. Format the Chart:**

To make the chart visually appealing and clear, consider the following formatting options:

- **Data Labels:** Turn on **Data Labels** in the **Format pane** to show the exact CAGR values on the chart.
- **Customize the Colors:** Customize the colors of the bars to distinguish between different states or makers, or to highlight high-performing regions. Use the **Data Colors** section in the **Format pane** to change colors.
- **Title:** Add a clear title to the chart, such as "**CAGR by State and Maker**" to make the purpose of the chart clear.
- **Axis Formatting:** Adjust the **y-axis** (State/Maker) and **x-axis** (CAGR) for readability, such as increasing the font size and rotating the labels if necessary.
- **Legend:** If you have multiple fields, you can add a **legend** to differentiate between **states and makers**.

## 5. Add Slicers for Filtering (Optional):

To make the chart interactive and allow users to focus on specific data points, add **slicers** for **year**, **region**, or **vehicle type**. This can help viewers filter the data to look at specific periods or markets.

- **Add a Slicer:** Click on the **Slicer** icon from the **Visualizations pane**.
- **Drag the Field:** For example, drag **Year** into the slicer to allow users to filter data based on different years (e.g., 2021, 2022, 2023).

## 6. Analyze the Data:

Once the chart is ready, analyze the following insights:

- **Top Performers:** Identify which states or manufacturers are showing the highest **CAGR**. This indicates areas with the **fastest growth** in EV sales.
  - For example, **Kerala** might have a **high CAGR**, indicating that EV adoption is growing rapidly in the state, which could be due to **strong policies** or **consumer interest**.
- **Predicting Future Growth:** By looking at **high CAGR values**, you can predict which regions and companies will continue to lead in the future, allowing businesses to focus their resources accordingly.
- **Low CAGR:** If some states or makers have a **low or negative CAGR**, this could indicate areas where **improvements** are needed, whether in **marketing**, **infrastructure**, or **product offerings**.

## 7. Publish and Share:

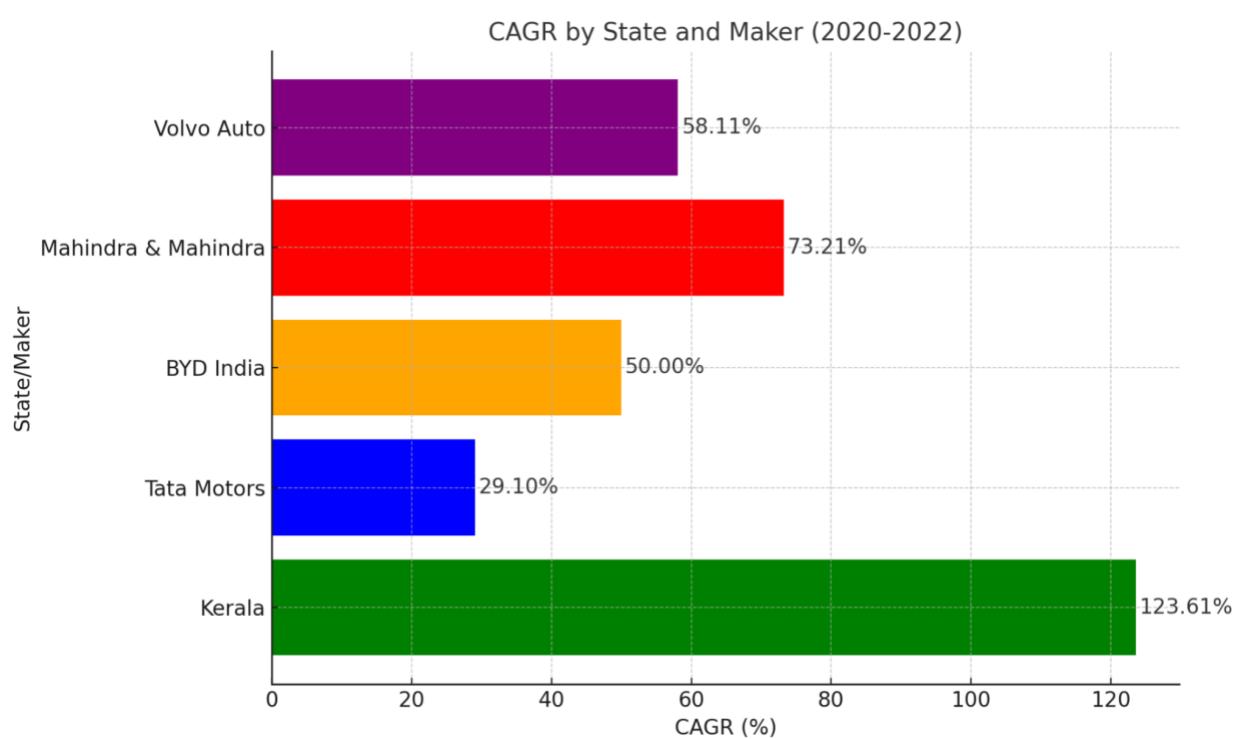
- Once you're satisfied with the visualization, **save** your report.
- Click on **Publish** to upload the report to **Power BI Service** and share it with stakeholders.

## Summary of Steps to Plot CAGR by State and Maker:

1. **Prepare the data:** Calculate the **CAGR** for each state and maker (or use an existing field if available).
2. **Create a Bar or Column Chart:** Visualize CAGR for **states** and **EV makers**.

3. **Format the chart:** Add **data labels**, customize **colors**, and adjust **titles** and **axes** for clarity.
4. **Add slicers:** Allow for filtering by **year**, **region**, or **vehicle type**.
5. **Publish & Share:** Once complete, share the report with stakeholders.

By following these steps, you'll have a clear visual of the **CAGR** for both **states** and **EV makers**, helping you understand **growth trends** and make **strategic decisions** for the future.



### Key Features of This Chart:

- The **y-axis** shows the **states** and **EV manufacturers**.
- The **x-axis** shows the **Compound Annual Growth Rate (CAGR)** for each state or manufacturer.
- Each bar represents the **CAGR** for the corresponding state or manufacturer, with **data labels** displaying the exact percentage of growth.

### Insights from the Chart:

- **Kerala** shows a significant **CAGR**, indicating a rapid increase in EV adoption in that region.

- **Tata Motors** and **BYD India** are also experiencing strong growth in the market, reflecting a strong presence in the EV space.

## Chart - 5 Seasonal Sales Peaks:

This section of the dashboard focuses on the **month-wise analysis of EV sales**, showing the **seasonal peaks** in sales. It helps us identify which months of the year see the highest and lowest EV sales, giving insight into consumer purchasing behavior throughout the year.

For example, you might notice that **sales peak in November and December**, possibly due to end-of-year discounts or festive seasons encouraging people to make big purchases. On the other hand, months like **April and May** might show lower sales, perhaps due to off-peak seasons or less favorable weather conditions for vehicle purchases.

### Why is it interesting?

- **Understanding Sales Cycles:** By analyzing **seasonal peaks**, we can understand when consumers are most likely to purchase electric vehicles. Certain times of the year, like **festivals, holidays, or year-end promotions**, may drive higher sales. Recognizing these cycles helps businesses plan **marketing campaigns** and **sales promotions** at the right times.
- **Identifying Trends:** Seasonal peaks also help us identify whether there are any **seasonal influences** affecting EV sales. For example, **weather conditions** in some regions may affect the demand for vehicles—people may be more likely to buy during warmer months or when they are looking for a car for the coming year.
- **Predicting Future Sales:** By examining the historical data for seasonal trends, companies and governments can better predict when to expect higher or lower sales, and adjust their operations accordingly. For instance, if **July** consistently shows low sales, a manufacturer may plan **targeted promotions** to boost interest during that month.
- **Planning for Production and Stock:** By knowing when the **sales peaks** are, manufacturers can plan their production schedules, ensuring they have the right inventory levels to meet demand during the busiest months. For example, if **December** typically shows high sales, manufacturers can prepare by ramping up production earlier in the year.

### In Summary:

The **Seasonal Sales Peaks** analysis helps us track **monthly fluctuations** in sales and understand how different times of the year impact consumer behavior. By recognizing **high-sales months** and **low-sales months**, businesses can optimize their marketing efforts, adjust production schedules, and better align their sales strategies with consumer patterns. It also gives insight into how **seasonal factors**—like holidays, weather, and promotions—drive EV sales.

## How to plot?

### 1. Prepare the Data:

Ensure that your dataset contains the following fields (or similar structure):

- **Date/Month:** The month or date of the sales (e.g., January, February, etc.).
- **Sales:** The total sales for the given month (could be number of units sold or sales revenue).

If your dataset is not in a "Month" format, you can create a new column that extracts the **Month** from a **Date** field.

#### Example Data:

Month	Sale s
January	2000
February	1500
March	1800
April	1200

May 1000

June 1400

July 1100

August 1600

September 1700

October 1800

November 2500

December 3000

## 2. Import the Data into Power BI:

- Click on **Home** → **Get Data** → **Excel/CSV** or manually enter data using **Enter Data**.
- Load the dataset into Power BI.

## 3. Create the Visual:

### a. Line Chart (For Monthly Sales Trends)

- **Choose a Line Chart:** In the **Visualizations pane**, select the **Line Chart** icon. This chart will show the trend of sales over the months.
- **Add Fields to the Chart:**
  - **Axis:** Drag the **Month** field to the **Axis** area. This will display each month on the x-axis.

- **Values:** Drag the **Sales** field to the **Values** area. This will show the sales for each month.
- **Sort Data:** Ensure the months are displayed in the correct order from January to December.
  - If they are not in the correct order, you can use the **Month Number** (if you created one) or manually set the order in the **Fields pane**.

### b. Column Chart (Alternative to Line Chart)

If you prefer to use a **column chart** instead of a line chart, you can follow these steps:

- **Choose a Clustered Column Chart:** Select the **Clustered Column Chart** from the **Visualizations pane**.
- **Add Fields:**
  - **Axis:** Drag the **Month** field to the **Axis** area.
  - **Values:** Drag the **Sales** field to the **Values** area.
- This will display the monthly sales as vertical bars, making it easy to compare sales visually across months.

## 4. Format the Chart (Optional):

- **Add Data Labels:**
  - In the **Format pane**, turn on **Data labels** to display the exact sales numbers on the chart for clarity.
- **Customize Colors:**
  - You can change the **line color** or **bar colors** in the **Format pane** for better distinction.
- **Adjust the Axis:**
  - Ensure that the **x-axis** is clear, and the months are evenly spaced.
  - Increase the **font size** of the month names if needed for readability.
- **Title the Chart:** Add a title to the chart, such as "**Seasonal Sales Peaks**" or "**Monthly EV Sales Trends**".

## 5. Add a Slicer (Optional):

You can add a **slicer** for interactive filtering:

- Click on the **Slicer** icon in the **Visualizations pane**.
- Drag fields like **Year** or **Region** (if applicable) to the slicer to filter sales by those dimensions. This will allow users to focus on specific years or regions.

## 6. Analyze the Data:

Once you have plotted the chart:

- **Identify the Peak Months:** Look at the chart to identify which months (e.g., **November and December**) have the highest sales. These are likely to be your **seasonal peaks**, often influenced by **festive seasons or end-of-year promotions**.
- **Identify Low Sales Months:** Months like **April and May** might show lower sales, which could be due to **seasonal factors** like weather or market conditions.

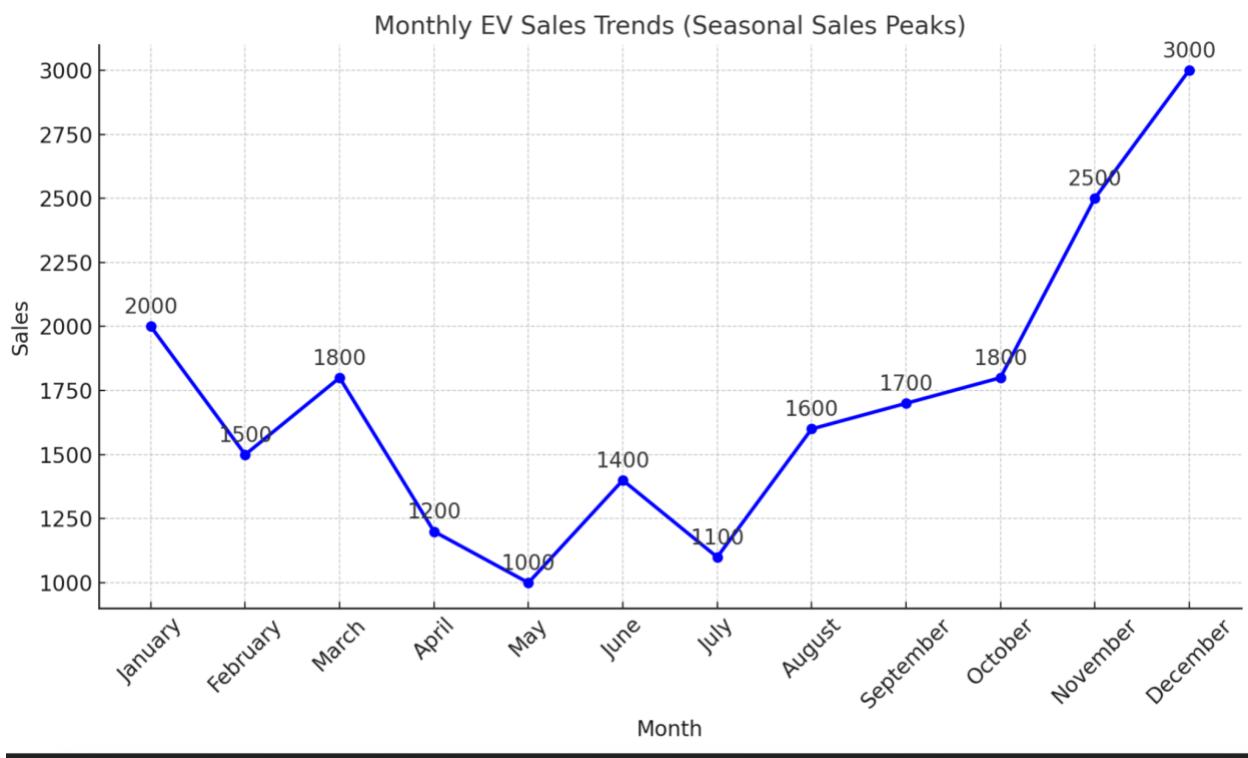
## 7. Publish & Share:

- Save the report and click **Publish** to upload the chart to **Power BI Service**.
- You can share the report with stakeholders or embed it on a website.

## Summary of Steps:

1. **Prepare the data with month-wise sales.**
2. **Create a Line Chart or Column Chart for monthly sales trends.**
3. **Format the chart** with titles, data labels, and colors for clarity.
4. **Add a slicer** if needed to filter by additional dimensions.
5. **Publish and share** the report to gain insights from the visualization.

By visualizing the **seasonal sales peaks**, you can easily track how **sales fluctuate** month by month and adjust strategies accordingly. The chart will help identify **sales patterns** and can guide marketing and production strategies based on the most and least active months for EV sales.



### Key Features of the Chart:

- **X-axis:** Represents the **months** from January to December.
- **Y-axis:** Shows the **sales figures** for each month.
- **Data Points:** Each month has a data point representing the sales, with the **exact sales numbers** shown as labels above the points.

### Insights:

- **Peak Sales:** Months like **November** and **December** show the highest sales, likely driven by **festive seasons** or **year-end promotions**.
- **Low Sales Months:** Months like **April** and **May** show lower sales, potentially influenced by **weather conditions** or being off-peak periods in the market.

## Chart 6 - Cost Comparison: EV vs. Conventional Vehicle Costs:

This section of the dashboard compares the **annual running costs** of electric vehicles (EVs) with those of **conventional vehicles** (petrol or diesel cars). The focus is on highlighting how much cheaper it is to own and operate an electric vehicle compared to traditional vehicles.

For example, the annual running cost for an **EV** might be ₹29,200, while for a **petrol vehicle**, it could be ₹120,906.25, and for a **diesel vehicle**, ₹112,953.13. This means that **EVs** are significantly cheaper to run, primarily because the cost of **electricity** is much lower than the cost of **petrol** or **diesel**, and EVs have fewer moving parts, meaning **lower maintenance costs**.

## Why is it interesting?

- **Significant Savings:** The **cost savings** of running an EV are substantial. In the example provided, the **annual running cost per kilometer** is much lower for an **EV** (₹1.60 per kilometer) compared to **petrol** (₹6.63) and **diesel** (₹6.18) vehicles. This makes EVs a more **cost-effective choice** in the long run, especially for people who drive a lot.
- **Encouraging EV Adoption:** By showing the **cost difference**, this analysis can encourage more people to consider EVs. The upfront cost of an EV might be higher, but the savings in **fuel** and **maintenance** over time make EVs a more affordable option in the long term.
- **Sustainability:** EVs are also often seen as a more **environmentally friendly** option, not just because they reduce fuel costs but because they **emit fewer pollutants**. Highlighting the savings alongside environmental benefits can help motivate more consumers to make the switch to electric.
- **Policy Impact:** Governments might use this data to promote **subsidies**, **incentives**, or **tax rebates** for EV buyers, making EVs even more affordable compared to traditional vehicles.

## In Summary:

The **Cost Comparison** analysis underscores one of the key advantages of **electric vehicles**: their **lower operating costs**. This comparison not only shows that **EVs are cheaper to maintain and fuel** but also demonstrates that over time, they can **save money**. For consumers, this makes EVs an attractive option both from a financial and environmental standpoint. As more people become aware of these savings, **EV adoption** will likely continue to grow.

## How to plot?

### 1. Prepare the Data:

Ensure you have a dataset with the following columns (or a similar structure):

- **Vehicle Type:** e.g., EV, Petrol, Diesel

- **Annual Running Cost:** The total annual running costs for each vehicle type (e.g., ₹29,200 for EV, ₹120,906.25 for Petrol, ₹112,953.13 for Diesel).
- **Cost per Kilometer:** The cost per kilometer for each vehicle type (e.g., ₹1.60 for EV, ₹6.63 for Petrol, ₹6.18 for Diesel).

If you don't have the data in this structure, you can create a simple table in Power BI.

#### **Example Data:**

Vehicle Type	Annual Running Cost	Cost per Kilometer
EV	₹29,200	₹1.60
Petrol	₹120,906.25	₹6.63
Diesel	₹112,953.13	₹6.18

## **2. Import the Data into Power BI:**

- Click on **Home** → **Get Data** → **Enter Data** (to manually input the data), or if it's in an Excel/CSV, choose the respective option.
- Enter the data or load it from your file.

## **3. Create the Visual (Bar Chart or Column Chart):**

### **a. Bar Chart or Column Chart (For Annual Running Cost Comparison):**

- Go to the **Visualizations pane** and select the **Clustered Bar Chart** or **Clustered Column Chart** icon.
- **Add Fields to the Chart:**
  - **Axis:** Drag the **Vehicle Type** field to the **Axis** area. This will display the types of vehicles (EV, Petrol, Diesel) along the x-axis.
  - **Values:** Drag the **Annual Running Cost** field to the **Values** area. This will show the cost for each vehicle type.
- **Sort the Data:**

- To make the comparison clearer, click on the **three dots** at the top-right of the chart and select **Sort by → Annual Running Cost → Descending**. This will ensure that the costs are sorted from highest to lowest.
- **Customize the Chart:**
  - In the **Format pane** (paint roller icon), turn on **Data Labels** to show the exact value on each bar.
  - Adjust the **bar width** and **colors** to make the chart visually appealing and easy to read.

#### b. Line Chart (For Cost per Kilometer Comparison):

- To compare the **Cost per Kilometer** for EVs vs. Petrol and Diesel vehicles, you can create a **Line Chart** or **Column Chart**.
- **Choose the Line Chart** from the Visualizations pane.
- **Add Fields:**
  - **Axis:** Drag the **Vehicle Type** field to the **Axis** area.
  - **Values:** Drag the **Cost per Kilometer** field to the **Values** area.
- **Format the Chart:**
  - Add **Data Labels** and adjust the **line thickness** for better visibility of the trends.

### 4. Format the Chart (Optional):

- **Change the Colors:** You can customize the color of the bars or lines to make them more distinct. For example, you can use **green for EV**, **red for Petrol**, and **blue for Diesel**.
- **Adjust Titles:** Make sure to add clear titles for the chart. For example, "Annual Running Cost Comparison" and "Cost per Kilometer Comparison" as titles for each chart.
- **Axis Labels:** Adjust the axis labels for better readability. Increase the **font size** if needed.

### 5. Add Slicers (Optional):

You can make the visual more interactive by adding **slicers** for filtering.

- Click on the **Slicer** icon in the Visualizations pane.
- Drag fields such as **Vehicle Type** or **Region** to the slicer to allow users to filter the data.

### 6. Add Tooltips (Optional):

If you want more detailed information to appear when hovering over the bars or lines, add **tooltips**:

- Drag additional fields (e.g., **Cost per Kilometer**, **Annual Maintenance Cost**, etc.) to the **Tooltips** field in the **Visualizations pane**.

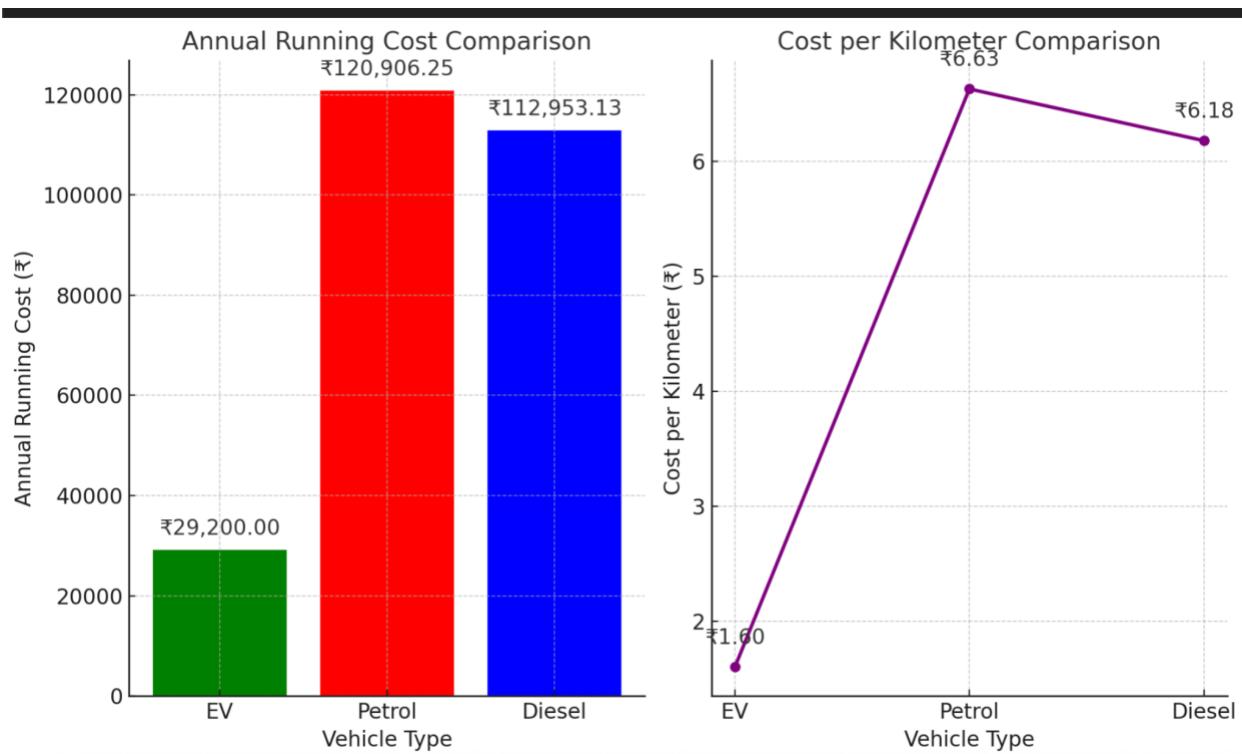
## 7. Publish & Share:

- Once you are satisfied with the visual, **save** your report.
- Click **Publish** to upload the report to the **Power BI Service** and share it with stakeholders.

## Summary of Visualization Steps:

- Import** data that includes vehicle types and costs.
- Create a bar/column chart** to compare **annual running costs** for EV, Petrol, and Diesel vehicles.
- Create a line/column chart** to compare **cost per kilometer** for each vehicle type.
- Format the chart** for clarity (e.g., adding data labels, adjusting colors).
- Optionally, add **slicers** and  **tooltips** for interactivity.

This approach will give you a clear and insightful visual comparison of **EVs vs. Conventional Vehicles** in terms of running costs, emphasizing the **significant savings** for EV owners.



### 1. Annual Running Cost Comparison (Bar Chart):

- This chart compares the **annual running costs** for **EVs**, **Petrol**, and **Diesel** vehicles.
- The **EV** category has the lowest **annual running cost**, highlighting its cost-efficiency compared to **Petrol** and **Diesel** vehicles.

## 2. Cost per Kilometer Comparison (Line Chart):

- This chart compares the **cost per kilometer** for each vehicle type.
- **EVs** have the lowest cost per kilometer (₹1.60), while **Petrol** and **Diesel** vehicles have significantly higher costs per kilometer, showing that EVs are more economical in terms of fuel usage.

### Insights:

- **EVs** not only have a lower **annual running cost** but also **lower per kilometer costs**, making them a **more cost-effective option** for consumers over time.
- **Petrol** and **Diesel** vehicles show significantly higher costs in both categories, emphasizing the potential savings for EV owners in the long run.

## Chart 7 - Government Incentives & Subsidies:

This section of the dashboard provides an overview of the **government policies** and **subsidies** available to promote the adoption of electric vehicles (EVs) across different states. Various states in India (and other countries) have introduced specific **incentive schemes** to make EVs more affordable and accessible to the general public. These incentives often include **subsidies** on the purchase price, **tax exemptions**, **reduced registration fees**, and **subsidies for charging infrastructure**.

For example, **Delhi**, **Maharashtra**, and **Tamil Nadu** may offer substantial **subsidies** for both **2-wheelers** and **4-wheelers**, while **Goa** and **Uttarakhand** might offer more targeted support, such as **tax rebates** or **free charging stations**.

### Why is it interesting?

- **Encouraging EV Adoption:** **Government incentives** are a powerful tool to **reduce the initial cost** of purchasing an EV. Since the upfront price of an EV can be higher than a conventional vehicle, these subsidies make EVs more attractive to consumers, thereby increasing their adoption.
- **Regional Focus:** Different states have different **EV policies**, reflecting their unique priorities and challenges. For example, **Delhi's Electric Vehicle Policy** might focus on providing **subsidies** for 2-wheelers to reduce pollution in the capital, while **Maharashtra** might focus on promoting both **2-wheelers and 4-wheelers**, ensuring EV growth across all segments. **Understanding these regional variations** helps manufacturers, policymakers, and consumers identify where the best deals and support systems are.

- **Boosting Infrastructure:** Some states also offer incentives for building **charging infrastructure**, which is essential to make EV ownership practical. This can include **free charging stations**, subsidies for private charging setups, or public-private partnerships to install more stations in strategic locations.
- **Long-Term Policy Support:** These **state-specific incentives** show the growing **governmental commitment** to promoting EV adoption. They play a crucial role in reducing **carbon emissions**, **improving air quality**, and driving **sustainability** in the transportation sector.
- **Boosting Local Manufacturing:** States like **Tamil Nadu** may offer incentives for **local manufacturers** of EVs and EV components, which can help reduce costs and improve the availability of EVs in the market.

## In Summary:

The **Government Incentives & Subsidies** section provides a detailed overview of how different states are **supporting EV adoption** through various policies, rebates, and incentives. By understanding these **state-wise policies**, consumers can take advantage of the financial support available in their region, while manufacturers can tailor their strategies to align with regional government priorities. These incentives are critical for accelerating the transition to electric vehicles and creating a **greener, more sustainable future**.

# How to plot?

## 1. Import Data:

First, make sure you have data that includes details about **state-wise EV policies, subsidies, incentives**, and other relevant details. Your data should include columns like:

- **State** (e.g., Delhi, Maharashtra, etc.)
- **Subsidy Amount** (e.g., ₹ amount or percentage of subsidy)
- **Incentive Type** (e.g., Tax Rebate, Charging Infrastructure Support, etc.)

If your data is in Excel or CSV format, follow these steps:

- Click on **Home** → **Get Data** → **Excel/CSV**.
- Load your data into Power BI.

## 2. Clean and Prepare Data:

- **Check Data Types:** Make sure that **state names** are in **text format**, and **subsidy amounts** or **percentages** are in **numeric format**.

- If your data includes **multiple incentive types** or **subsidy schemes**, you may need to create a separate field to categorize the types of incentives.

### 3. Create the Visual:

#### a. Bar Chart (for State-wise Subsidies)

- **Choose a Bar Chart:** On the **Visualizations pane**, select the **Bar Chart** icon (you can use **Clustered Bar Chart** for side-by-side comparisons).
- **Drag Fields into the Chart:**
  - **State:** Drag the **State** field to the **Axis** area. This will display each state on the horizontal axis.
  - **Subsidy Amount:** Drag the **Subsidy Amount** field to the **Values** area. This will display the value of the subsidy for each state.
- **Sort the Data:**
  - To see the states with the highest subsidy, click on the **three dots** at the top-right of the bar chart and choose **Sort By → Subsidy Amount → Descending**.
- **Customize the Visual:**
  - **Data Labels:** Go to the **Format pane** and turn on **Data Labels** to display the actual subsidy values on top of each bar.
  - **Color:** You can change the color of the bars to make the chart visually appealing. In the **Format pane**, under **Data colors**, select a color scheme.
  - **Title:** Add a title to your chart like “State-wise EV Subsidies” to make it clear.

#### b. Map (for Geographical Visualization of Incentives)

If you'd like to display the **state-wise incentives** on a **map** to visually show where the most incentives are available geographically:

- **Choose the Map Visual:** In the **Visualizations pane**, select the **Map** or **Filled Map** icon.
- **Drag Fields into the Map:**
  - **State:** Drag the **State** field to the **Location** area.
  - **Subsidy Amount:** Drag the **Subsidy Amount** field to the **Size** area, which will control the size of the map bubbles based on the value of the subsidy.
- **Customize the Map:**
  - **Color Saturation:** You can also use **Color Saturation** to vary the color intensity based on the subsidy amount. Higher subsidies can be represented in darker shades.
  - **Tooltips:** Add additional details (e.g., **incentive type, percentage**) to the **Tooltips** section to display when hovering over a state on the map.

### 4. Add Filters (Optional):

- You can add **slicers** for filtering the data by **incentive type**, **year**, or **subsidy category** (if applicable). This makes your visualization interactive.
  - Click on the **slicer icon** in the **Visualizations pane** and drag the field (like **Incentive Type**) to the slicer.
  - This allows users to filter and see the data for specific types of subsidies (e.g., only **tax rebates** or **charging infrastructure** incentives).

## 5. Format the Chart (Optional):

- Customize the chart for **better readability**:
  - Adjust **font size** and **axis labels** for clarity.
  - Change **bar width** for more compact or spaced-out visuals under the **Format pane**.
  - Add gridlines or **data labels** if desired for easier interpretation of the data.

## 6. Publish & Share:

Once the chart is ready:

- Save the report and click **Publish** to upload it to the **Power BI Service**.
- You can then **share the report** with stakeholders or embed it on a website.

## Summary:

- **Bar Chart:** To show **state-wise subsidies**, which makes it easy to compare the subsidy amounts across states.
- **Map:** To geographically visualize **subsidy distribution** and see where incentives are the highest.
- **Filters & Customizations:** To allow interactivity and enhance the presentation of the data.

This approach will help you create a **clear, interactive visual** of **state-wise EV policies** and **subsidies**, enabling better analysis and insights.