#### ****Purpose****

**Key Points**:

* The primary goal of the project is to **collect data** on electric vehicles and analyze it thoroughly.
* The analysis is designed to provide **actionable insights** that can inform stakeholders and drive decisions.

**Explanation**:

* This slide introduces the overarching aim of the project. The focus is on deriving insights that help understand electric vehicle adoption trends, usage patterns, and market evolution.

#### ****Scope****

**Key Points**:

* The analysis focuses on providing detailed insights into:
  + **Electric Vehicle Details**: Information about registration data, range, and other vehicle-specific metrics.
  + **Statistical Trends**: Patterns and trends in electric vehicle adoption over time.

**Explanation**:

* The scope defines the boundaries of the analysis, emphasizing the inclusion of key vehicle metrics and trend analysis to understand the market dynamics better.

#### ****EV Registrations****

**Key Points**:

The dataset includes the following fields:

* **VIN (1-10)**: Vehicle Identification Number for tracking.
* **Make and Model**: Identifying the vehicle’s manufacturer and version.
* **Vehicle Type**: Classifying vehicles (e.g., BEVs, PHEVs).
* **Electric Range**: The distance a vehicle can travel on a full charge.
* **Base MSRP**: Manufacturer’s Suggested Retail Price.
* **County and State**: Geographical information for location-based analysis.

**Explanation**:

* This slide highlights the attributes captured in the dataset, which serve as the foundation for understanding electric vehicle registrations and related statistics.

#### ****Adoption Trends****

**Key Points**:  
The dataset includes metrics that track:

* **Date of Registration**: Chronological insights into EV adoption.
* **Counts of BEVs and PHEVs**: Number of vehicles registered by type.
* **Percentage of EVs (%EVs)**: Proportion of electric vehicles compared to all vehicle registrations.

**Explanation**:

* This slide introduces adoption metrics, offering insights into how EVs are being embraced over time and across regions.

#### ****Data Cleaning and Preprocessing****

##### **Approach**

1. **Impute Missing Data**: Fill missing values for key fields like electric range and MSRP.
2. **Drop Columns/Rows**: Remove irrelevant or highly incomplete data.
3. **Investigate Zero Values**: Analyze fields with zero values to determine if they need replacement or removal.

##### **Explanation of Missing Data**

* **Columns with Missing Data**:
  + County: 5 rows
  + City: 5 rows
  + Electric Range: 19 rows
  + Base MSRP: 19 rows
  + Legislative District: 451 rows
* **Columns with Zero Values**:
  + Base MSRP
  + Electric Range

**Explanation**:

* This slide explains the steps taken to clean the data, ensuring its quality and reliability for further analysis. Addressing missing and zero values is a critical part of preprocessing.

#### ****Key Findings****

**Key Points**:

1. **Manufacturing Insights**:
   * Identified key manufacturers and competitors.
2. **Production Analysis**:
   * Comparison of BEVs and PHEVs production rates.
3. **Geographic Trends**:
   * Top 15 counties leading EV usage.
4. **Adoption Patterns**:
   * Yearly trends for BEVs and PHEVs.

**Explanation**:

* This slide provides the initial results from the analysis, showcasing insights into manufacturing, production, and usage trends.

#### ****Range Analysis****

**Key Points**:

* Does electric range affect sales?
* Range distribution among vehicles.
* Newer models show improved ranges, indicating technological advancements.

**Explanation**:

* This slide examines the impact of electric range on vehicle adoption and highlights advancements in EV technology over time.

#### ****EV Usage and Trends****

**Key Points**:

* **County-level Distribution**: How EVs are used geographically.
* **Usage by Vehicle Type**: Segmentation of BEVs, PHEVs, and other EVs.
* **Trends Over Time**: Historical and emerging trends in EV adoption.

**Explanation**:

* Focused on geographic and temporal trends, this slide connects regional adoption with broader market trends.

#### ****Key Insights****

1. **EV Distribution by County**:
   * Counties with higher EV adoption are typically urban or suburban areas with robust charging infrastructure and environmentally conscious populations.
   * Adoption gaps exist in rural areas, likely due to limited infrastructure and longer commute distances requiring better range capabilities.
2. **EV Usage by Vehicle Type**:
   * BEVs dominate the market due to their simplicity and alignment with sustainability goals, but PHEVs remain significant due to range flexibility and hybrid options.
   * Passenger vehicles lead EV usage, with growing interest in commercial EVs for logistics and public transportation.
3. **Trends Over Time**:
   * EV adoption has steadily grown, driven by government incentives, falling battery costs, and advancements in EV technology.
   * A clear shift is observed from early adopters to mainstream consumers, with a marked rise in yearly adoption rates.
4. **Environmental and Economic Factors**:
   * EVs contribute significantly to environmental sustainability, reducing greenhouse gas emissions and dependence on fossil fuels.
   * Economically, EVs provide long-term savings in fuel and maintenance, though upfront costs can still be a barrier for some consumers.

#### ****Future Improvements****

**Key Points**:

1. **Market Trends**: Understanding consumer preferences and demand drivers.
2. **Collaboration and Partnerships**: Encouraging industry cooperation to boost adoption.
3. **Consumer Behavior and Education**: Raising awareness about EVs.
4. **Sustainability Impact**: Highlighting environmental and economic benefits.

**Explanation**:

* This slide ties the insights to actionable recommendations for stakeholders, emphasizing market dynamics and sustainability.