## **Project Overview: Predicting Electric Vehicle Charging Demand**

This project aims to predict the daily kilowatt (kW) demand for electric vehicle (EV) charging using historical data. Accurate demand forecasting is essential for optimizing charging infrastructure, preventing grid overload, and enhancing financial planning.

## **Code Explanation**

The following Python code, utilizing the Pandas library, processes a dataset of EV charging sessions to summarize daily energy consumption:

*# Importing important libraries*  
import pandas as pd

Import Libraries: The code begins by importing the Pandas library for data manipulation.  
  
*# Load the dataset from a CSV file*  
df = pd.read\_csv('/content/sample\_data/acndata\_sessions.csv')

Load Dataset: It loads the charging session data from a CSV file into a DataFrame.  
  
*# Convert connectionTime and disconnectTime to datetime*  
df['connectionTime'] = pd.to\_datetime(df['connectionTime'])  
df['disconnectTime'] = pd.to\_datetime(df['disconnectTime'])

Datetime Conversion: The connectionTime and disconnectTime columns are converted to datetime format for accurate time-based operations.  
  
*# Calculate the date for grouping based on connection time*  
df['date'] = df['connectionTime'].dt.date

Date Extraction: A new column, date, is created to facilitate grouping by the connection date.  
  
*# Group by date of connection and aggregate data*  
daily\_summary = df.groupby('date').agg(  
 number\_of\_devices=('kWhDelivered', 'size'), *# Count of devices charged on that date*  
 total\_kWh\_delivered=('kWhDelivered', 'sum'), *# Total kWh delivered on that date*  
).reset\_index()

Data Aggregation: The data is grouped by date, aggregating:

* 1. number\_of\_devices: Count of devices charged.
  2. total\_kWh\_delivered: Total energy delivered on that date.

# Save the daily summary to a CSV file

daily\_summary.to\_csv('/content/daily\_summary.csv', index=False)

Save Summary: The daily summary is saved to a CSV file named daily\_summary.csv, without including the index.

*# Display the daily summary*  
daily\_summary

Output Summary: Finally, the daily summary DataFrame is displayed, showing daily charging statistics.

## **Conclusion**

This project utilizes historical EV charging data to predict daily kW demand effectively. By summarizing and analyzing the data, we can gain insights into usage patterns, which are crucial for planning and managing EV charging infrastructure efficiently. Accurate demand forecasting will support sustainable energy management as electric vehicle adoption continues to grow.