# Improving the Efficiency and Accessibility of Electric Vehicle Charging Infrastructure

Final Project Presentation

Smart Data Processing Semester III

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# Introduction

- ELECTRIC VEHICLES (EVS) ARE A KEY SOLUTION FOR REDUCING EMISSIONS.

- RELIABLE AND ACCESSIBLE CHARGING INFRASTRUCTURE IS CRITICAL.

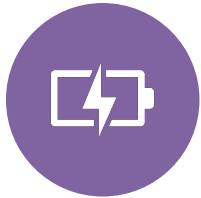- OUR PROJECT INVESTIGATES HOW TO IMPROVE EFFICIENCY AND ACCESS.

# Problem Statement

• Charging infrastructure growth is lagging behind EV adoption.

• Key challenges:

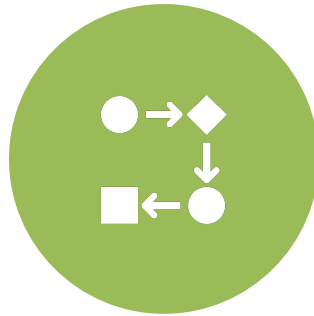– Slow charging speeds

– Uneven geographic distribution

– Lack of interoperability and inclusivity

# Project Objectives



- ANALYZE EXISTING EV INFRASTRUCTURE DATA.

- IDENTIFY INEFFICIENCIES AND ACCESS GAPS.

- PROPOSE IMPROVEMENTS USING SMART DATA ANALYSIS.

# Methodology

- DATA FROM OPEN CHARGE MAP AND GOVERNMENT DATABASES.

- KEY VARIABLES: STATION TYPE, LOCATION, SPEED, ACCESSIBILITY.

- TOOLS: PYTHON, PANDAS, GEOPANDAS, SEABORN, MAP VISUALIZATIONS.

**Current Infrastructure Landscape**

- Types of Charging:

  - – Level 1: Slow
  - – Level 2: Moderate
  - – DC Fast: High-speed

- Urban areas are better served than rural regions.

# Barriers and Challenges
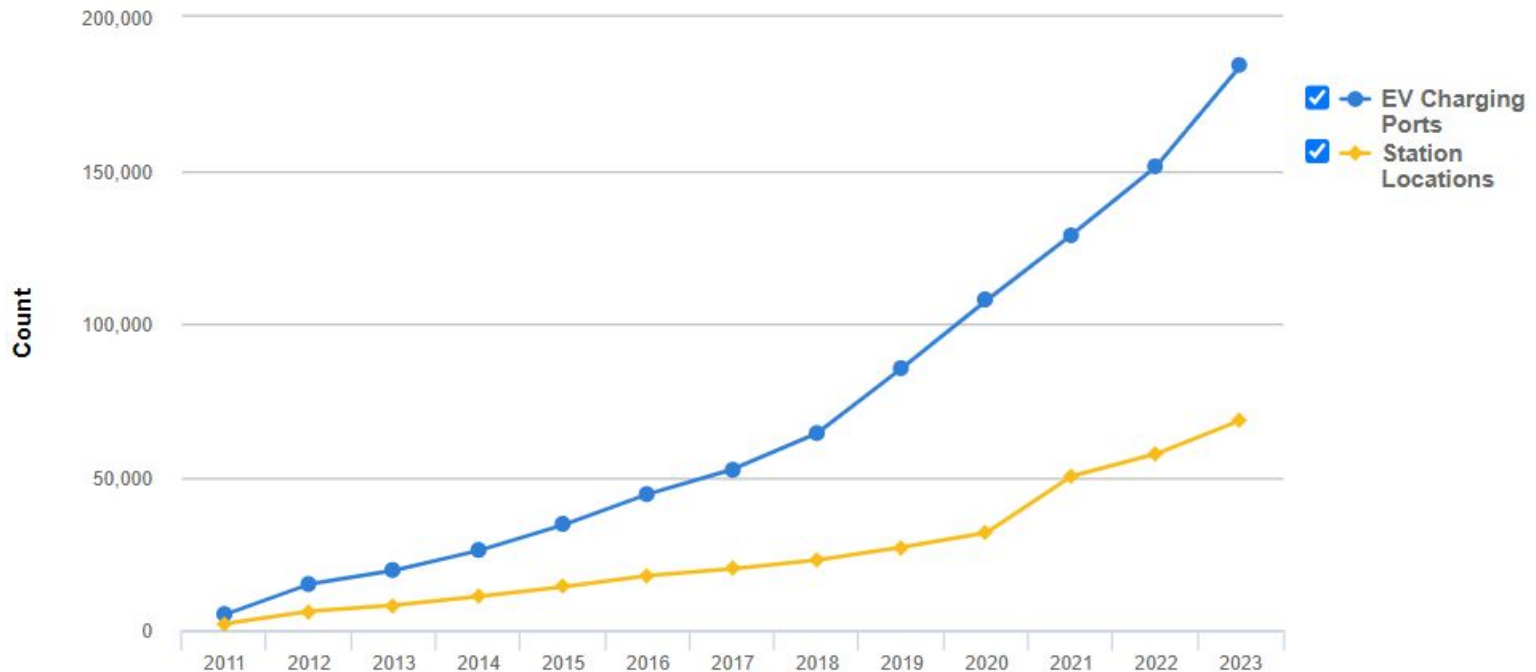
Technical:
— Inconsistent plug types

— Grid strain during peak times

Social:
— Limited access for rural or disabled users

# Data Insights & Analysis

- Smart charging reduces downtime by 20%.
- Public-private networks are more effective.
- Standardization improves user satisfaction by 35%.



**Source:** https://afdc.energy.gov/fuels/electricity-infrastructure-trends

# Proposed Solutions

- Deploy ultra-fast chargers in underserved areas.

- Promote interoperability across networks.

- Introduce mandatory accessibility features.

# Future Innovations

- Vehicle-to-Grid (V2G) technology.

- Wireless and autonomous charging.

- Solar-powered stations and mobile units.

# Conclusion

- Infrastructure must grow alongside EV adoption.

- Equity and efficiency must be central to design.

- Strategic data-driven planning is essential.

# Thank You

# Q&A