Electric Vehicle Charging Dashboard

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Welcome to our Dashboard!

The Electric Vehicle Charging Dashboard provides users with the locations of available charging stations in the District of Columbia, Maryland, and Virginia area. The dashboard shows:

- GPS Location
- Street Address
- Charging Connector Type
- Vendor
- Access (Public or Private)

Technical Analysis and Procedures

- API calls and data extraction on Jupyter notebooks
- Clean data via Python Pandas on Jupyter
- Export data to CSV and Geojson
- Created PostgreSQL Database
- FlaskAPI
- Javascript / HTML creation
- Plotly and Leaflet visualizations

EV Charging - Most Popular Locations

1. Charging at home
   64 percent of EV drivers regularly charge at their house.

2. Charging at work
   34 percent of current EV drivers also charge their car at the workplace.

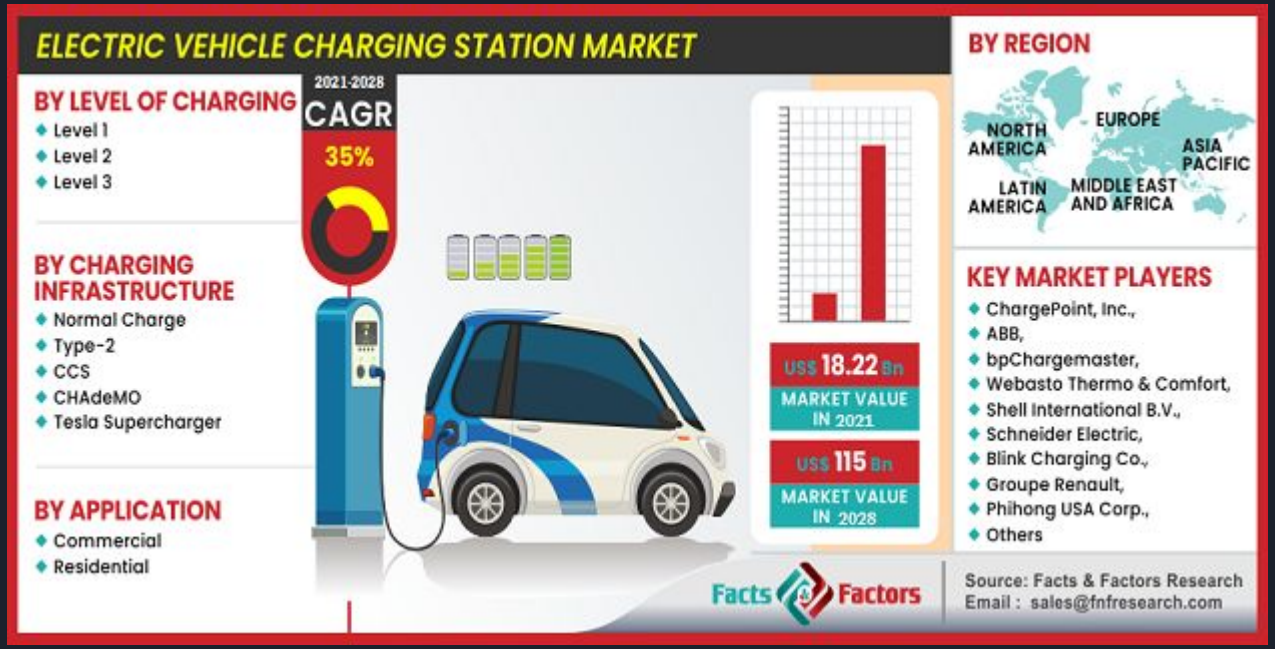
3. Public charging stations
   31 percent of EV drivers use them regularly.

4. EV charging at gas stations
   29 percent of drivers charge their car to top off their battery while on long distance drives.

5. EV charging at retail locations (i.e supermarket, department stores)
   26 percent of EV users charge their car at supermarkets, while 22 percent prefer shopping malls or department stores.

Reference: https://evbox.com/en/ev-charging-guide

EV Charging Facts



Levels of EV Charging

Level 1
- Standard power socket delivering a maximum of 2.3 kW.
- Providing approximately 4 - 5 miles of range per hour

Level 2
- Dedicated charging station delivering alternating current (AC) between 3.4 kW - 22 kW
- Most common and make up the majority of public EV chargers
- Provides 25 - 37 miles of range per hour

Level 3
- Known as DC or fast charging
- Uses direct current (DC)
- Charging for about an hour can add upwards of 200 miles to your range
- Ideal for long road trips

Reference: https://evbox.com/en/ev-charging-guide

National Renewable Energy Laboratory (NREL) Dataset Facts

At the NREL, they focus on creative answers to today's energy challenges.

NREL obtains their information about new stations from:

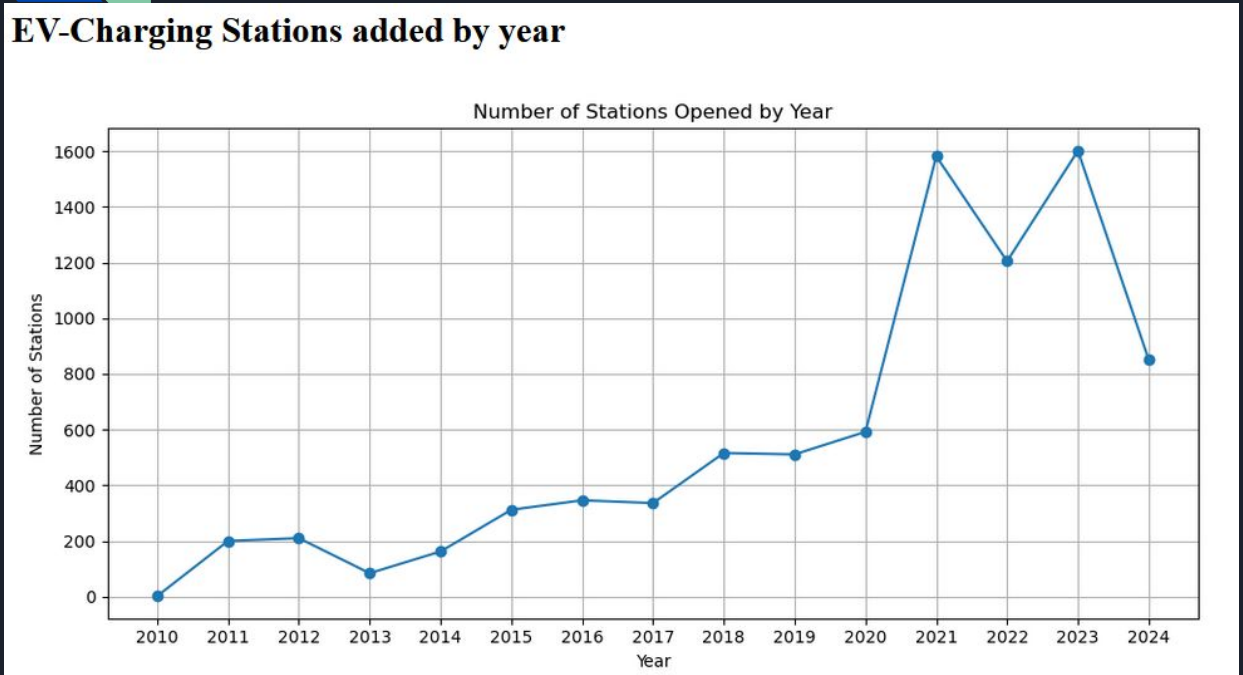
- Trade media
- Clean Cities and Communities coalitions
- Submit New Station form on the Station Locator website
- Collaborating with:
  - Infrastructure equipment
  - Fuel providers
  - Original equipment manufacturers (OEMs)
  - Industry groups

National Renewable Energy Laboratory (NREL) Station Update Schedule

Most existing stations in the database are contacted at least once a year on an established schedule to verify they are still operational and providing the fuel specified. Based on an established data collection schedule, the database is updated on an ongoing basis. Stations that are no longer operational or no longer provide alternative fuel are removed from the database as they are identified.

Public and private non-networked electric vehicle (EV) charging stations are proactively verified every other year, with half of the EV charging stations verified each year. Additionally, all private EV charging stations at multi-family housing are verified every other year. This difference in the update schedule for non-networked EV charging stations accommodates the growing number of EV charging stations in the Station Locator. NREL will continue to make updates to any station record if changes are reported.

Dashboard Elements - EV Charging Station Growth



- Shows the Growth of Charging Stations Over Time

Early Adoption and Initial Growth (Before 2015)

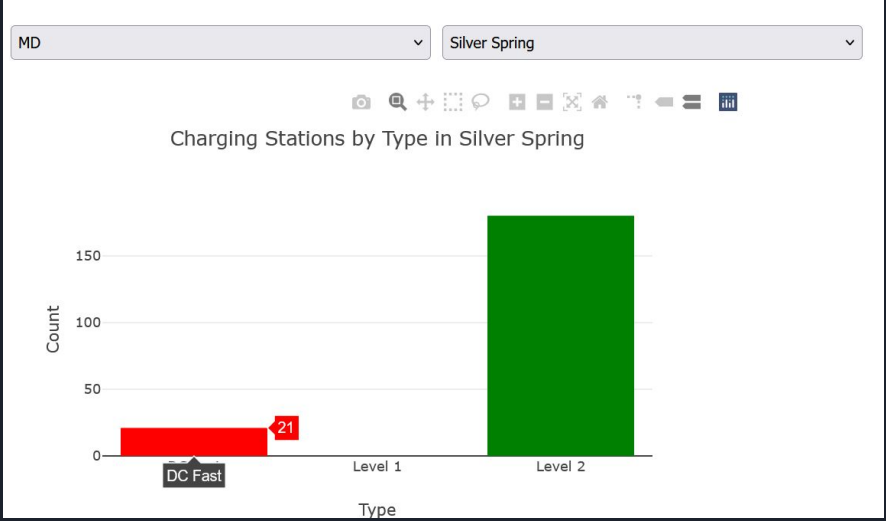
Increase In Public Awareness and Adoption (2015 - 2020)

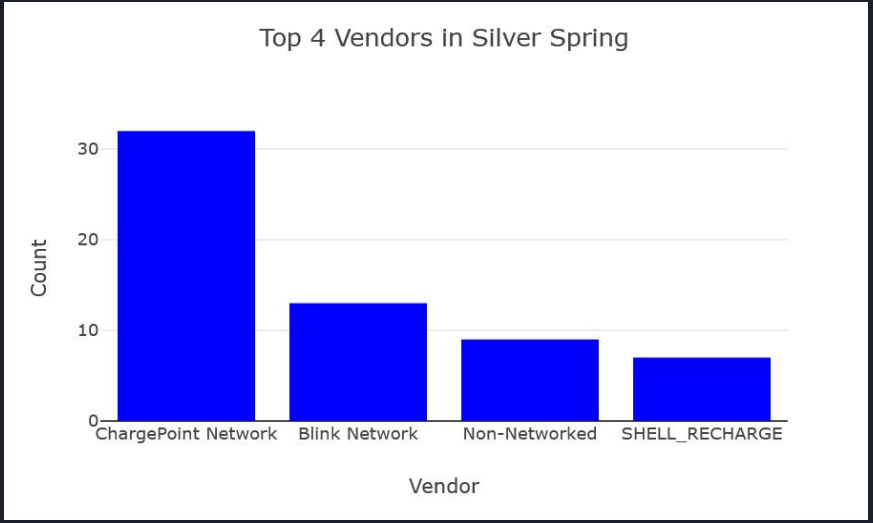
Surge in Charging Infrastructure (2020-Present)

Bar Charts illustration

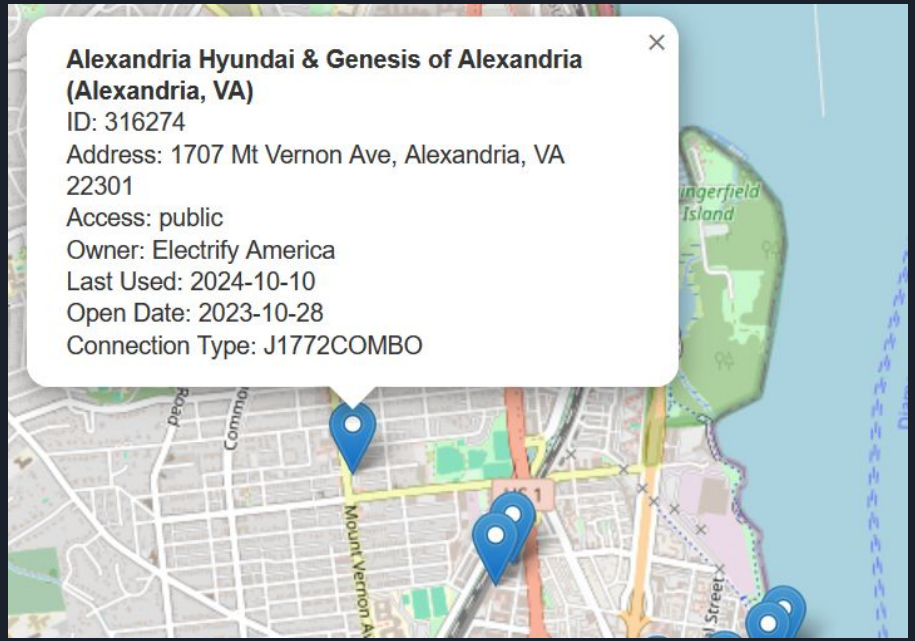
- Displays the numbers of **Level 1, Level 2, and DC Fast Chargers** across the DMV area.
- Helps identify the most prevalent type of charger and where there may be a need for more fast-charging options.

- The bar charts provide a comparative view of the top 4 vendors in the DMV area, showcasing their reach and station count. This helps stakeholders understand which vendors are leading in infrastructure deployment and how they compare against each other.



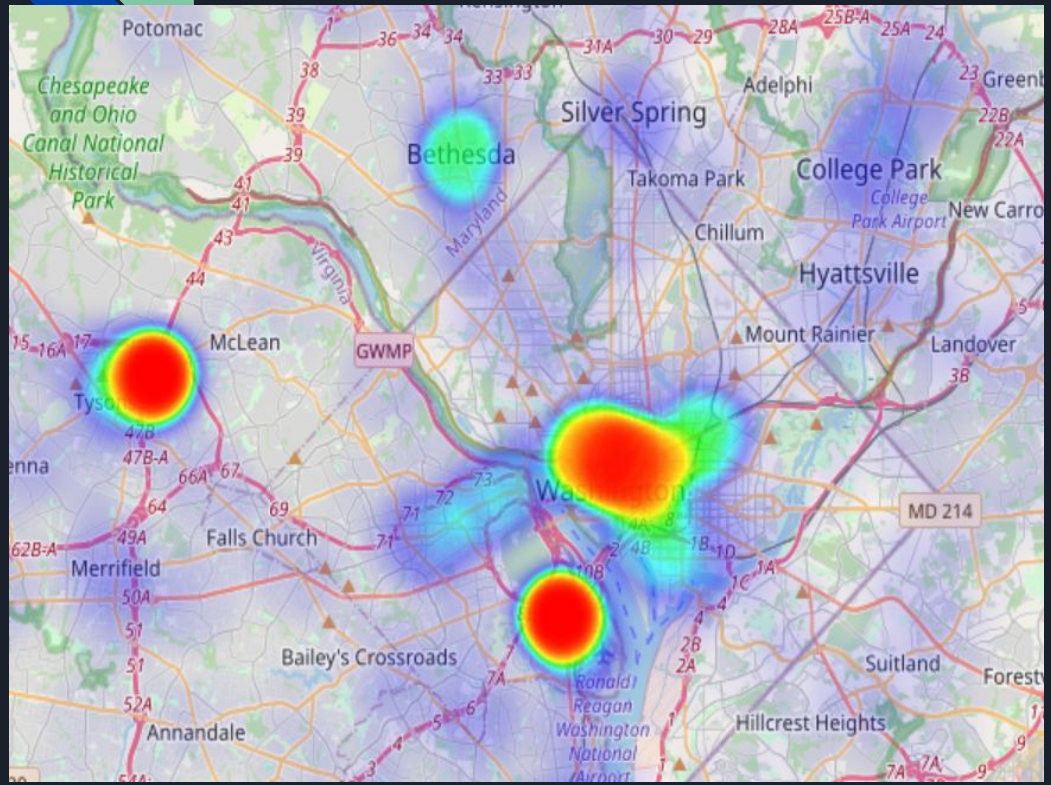


Map illustration



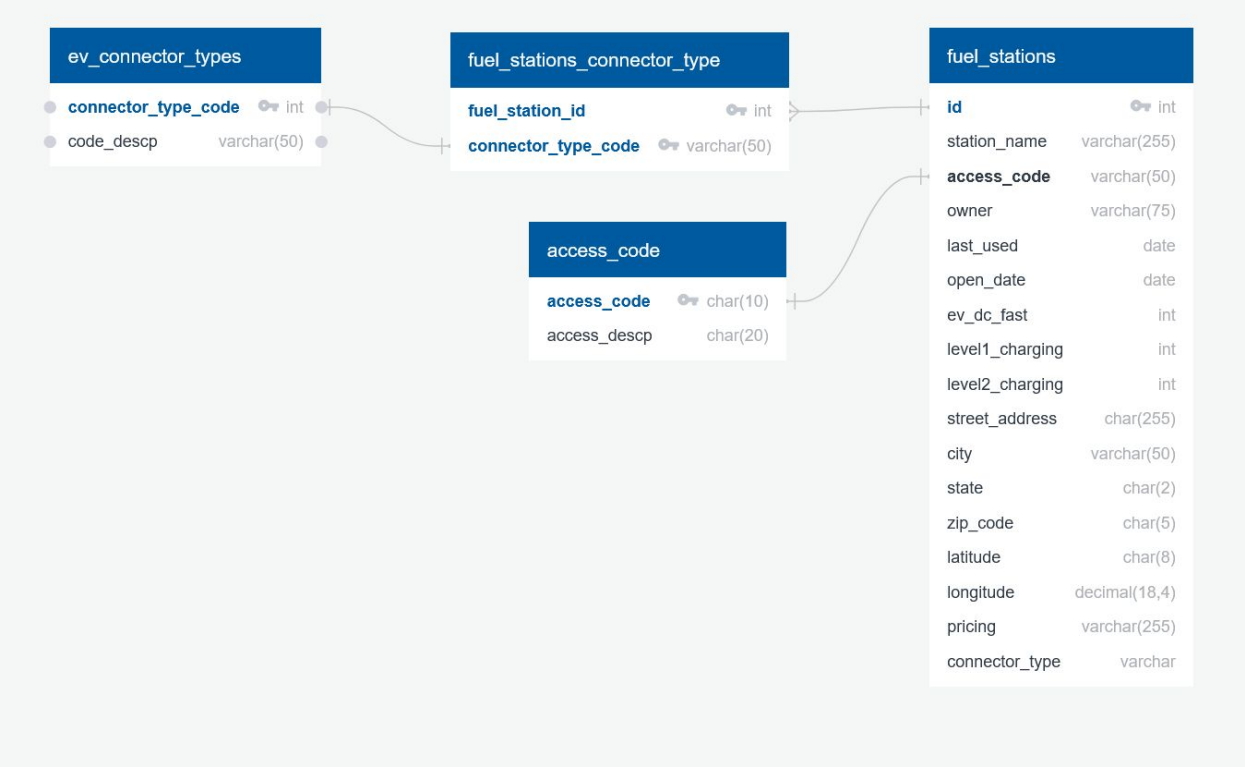
- The map displays charging station locations across the **District of Columbia, Maryland, and Virginia (DMV)** area.
- The map pulls data from a **GeoJSON file** containing up-to-date information about each charging station in the DMV area.

Heat Map illustration



- The heatmap provides a clear visual representation of where EV charging stations are concentrated within the DMV area, highlighting areas with high and low coverage.
- **Quick Identification of Gaps:** It helps stakeholders quickly identify underserved areas where more charging stations may be needed, enabling better planning and decision-making.

EV Charging PostgreSQL Database



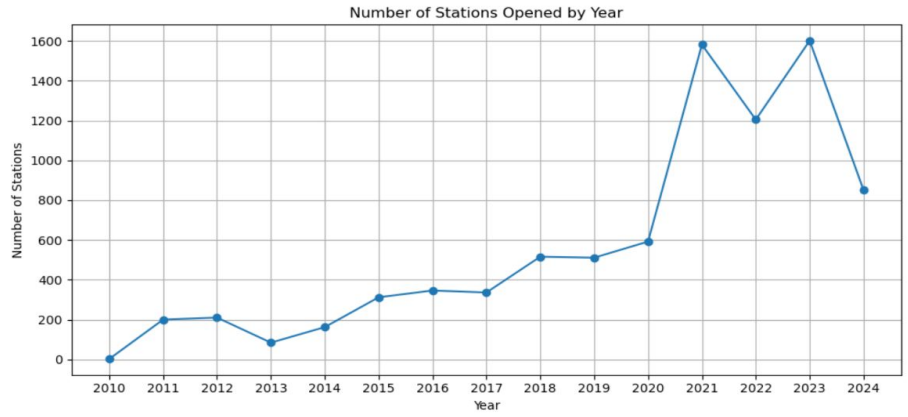
EV Charging Dashboard

EV-Charging Stations In The DMV

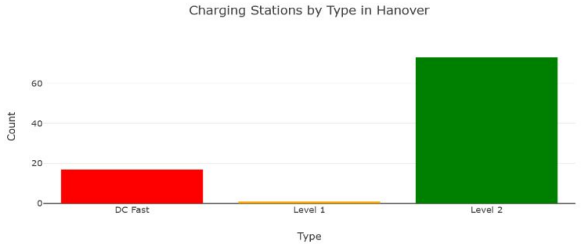
Open Map

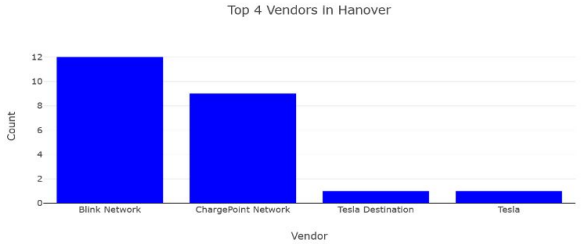
Our webpage is designed to show the different types of charging stations within the DMV and depict the trends of how many charging stations are added per year. Click the open map button above to open a new webpage showing map with all the different charging stations in the DMV area! Also, feel free to select a state and a city and these bar charts will show the totals for the different charging types and also the top four vendors within that city!

EV-Charging Stations added by year



Select a State





Benefits of EV Charging Dashboard for Stakeholders

- **Identify Gaps in Charging Coverage:** The dashboard helps planners spot areas with insufficient charging infrastructure, enabling targeted expansion.
- **Site Selection for New Charging Stations:** Businesses can use location data to identify high-traffic areas with high demand for charging, increasing foot traffic and potential sales.
- **Customized Solutions:** Businesses can decide between installing **Level 2 chargers** for prolonged parking (e.g., shopping centers) or **DC Fast Chargers** for quick stops (e.g., convenience stores, restaurants).
- **Enhanced Property Value:** Installing EV chargers can attract EV owners, adding value to commercial properties, apartment complexes, and hotels.

EV Charging Dashboard

Demonstration

Sources

- National Renewable Energy Laboratory - https://www.nrel.gov/
- Alternative Fuels Data Center - https://afdc.energy.gov/corridors