



# Data Analysis

# IronHack June 2025

## Electric Vehicle Analysis in Europe Growth, Infrastructure & Trends

**David Hernández** | Data Analyst  
Data PT June 2025



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# EV Market Analysis in Europe

# Growth, Infrastructure & Trends



To understand the growth of EV adoption, infrastructure development, and key trends across European countries.


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Data PT June 2025 [\\*soon to be](#)



# EV Market Analysis in Europe

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### Accelerating clean cooking investment can propel Africa

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The race between consumption and efficiency: A retrospective view of data centre server architecture

**11 Sep 2025**  
Oil Market Report – September 2025

**Sep 2025**  
Special Report on the Future of the Global Car Industry

<https://www.iea.org/data-and-statistics/data-product/global-ev-outlook-2025#global-ev-data>



# EV Market Analysis in Europe

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**Oil Market Report – August 2025**

14 Aug 2025 10:00–11:00  
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**The race between consumption and efficiency: A retrospective view of data centre server architecture**

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<https://www.iea.org/data-and-statistics/data-product/global-ev-outlook-2025#global-ev-data>



# Dataset Overview

# Libraries imported

```
# Importing modules
import pandas as pd # Data manipulation and analysis
import plotly.express as px # Allows to create interactive plots, charts, graphs, maps, and more
import plotly.graph_objects as go # More control over plots
import matplotlib.pyplot as plt # Create visualizations
import seaborn as sns # Statistical data visualization
import ipywidgets as widgets # Interactive widgets for Jupyter notebooks
from IPython.display import display # Display widgets in Jupyter notebooks
```

✓ 20.7s





# Dataset Overview

# From region\_country, year, to you\_name\_it!

```
df = pd.read_excel("C:/Users/jdhernandezd/Documents/IRONHACK/Labs/Electric_Vehicles_Project/EV_Data_Explorer_2025.xlsx")
```

```
df
```

✓ 3.2s

	region_country	category	parameter	mode	powertrain	year	unit	value	Aggregate group
0	World	Projection-STEPS	EV stock	2 and 3 wheelers	BEV	2030	Vehicles	1.700000e+08	_World
1	World	Projection-STEPS	EV stock	Cars	BEV	2030	Vehicles	1.500000e+08	_World
2	China	Projection-STEPS	EV stock	2 and 3 wheelers	BEV	2030	Vehicles	9.100000e+07	Other
3	China	Projection-STEPS	EV stock	Cars	BEV	2030	Vehicles	8.200000e+07	Other
4	World	Projection-STEPS	EV stock	Cars	PHEV	2030	Vehicles	8.200000e+07	_World
...	...	...	...	...	...	...	...	...	...
16431	Rest of the world	Historical	Oil displacement Mbd	Trucks	EV	2017	Million barrels per day	2.400000e-06	Other
16432	Rest of the world	Historical	Oil displacement Mbd	2 and 3 wheelers	EV	2011	Million barrels per day	2.200000e-06	Other
16433	Rest of the world	Historical	Oil displacement Mbd	2 and 3 wheelers	EV	2010	Million barrels per day	1.700000e-06	Other
16434	USA	Historical	Oil displacement Mbd	2 and 3 wheelers	EV	2012	Million barrels per day	1.300000e-06	Other
16435	Rest of the world	Historical	Oil displacement Mbd	Trucks	EV	2012	Million barrels per day	1.200000e-06	Other

16436 rows × 9 columns



# Dataset Overview

# Analyzing the data, filtering values

```
df = pd.read_excel('data/2025.xlsx')
df
✓ 32s
```

	region_country	category
0	World	EV
1	World	EV
2	China	EV
3	China	EV
4	China	EV
...	...	...
16431	Rest of the world	Historical
16432	Rest of the world	Historical
16433	Rest of the world	Historical
16434	USA	Historical
16435	Rest of the world	Historical

```
print(df.tail())
✓ 0.0s
```

	region_country	category
16431	Rest of the world	Historical
16432	Rest of the world	Historical
16433	Rest of the world	Historical
16434	USA	Historical
16435	Rest of the world	Historical

```
print(df.info())
✓ 0.0s
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 16436 entries, 0 to 16435
Data columns (total 9 columns):
 #   Column              Non-Null Count  Dtype
---  -
 0   region_country      16436 non-null  object
 1   category            16436 non-null  object
 2   parameter            16436 non-null  object
 3   mode                16436 non-null  object
 4   powertrain          16436 non-null  object
 5   year                16436 non-null  int64
 6   unit                16436 non-null  object
 7   value               16436 non-null  float64
 8   Aggregate_group     16436 non-null  object
```

```
# Searching for type of vehicle
(df['unit']).unique()
✓ 0.0s
```

```
array(['Vehicles', 'charging point', 'Oil displacement, millicubic
      'Million barrels per day'])
```

```
# Checking for regions and countries
(df['region_country']).unique()
✓ 0.0s
```

```
array(['World', 'China', 'Asia Pacific', 'Rest of the world', 'USA',
      'Viet Nam', 'United Kingdom', 'Netherlands', 'Central and Eastern Europe',
      'Sweden', 'Belgium', 'Denmark', 'Turkiye', 'Spain', 'Switzerland',
      'Finland', 'Portugal', 'Brazil', 'Middle East and Caspian',
      'Russia', 'Iceland', 'Greenland', 'Chile', 'Costa Rica', 'Czech Republic', 'Hungary',
      'Slovakia', 'Lithuania', 'Estonia', 'Cyprus', 'Jordan'])
```

```
# "Europe" is going to be used as a filter
df[df['region_country'] == 'Europe']
✓ 0.0s
```

```
["First year:", first_year]
["Last year:", last_year]
[7] ✓ 0.0s
... ('Last year:', 2030)
```

```
# Year 2030 will be used as a filter further in the analysis
print(sorted(df['year']).unique())
[8] ✓ 0.0s
... [2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025]
```

```
# The year 2030 comes up a total of 346 times in the dataset
df['year'] = df['year'].astype(int)
df_hist = df[df['year'] <= 2024]
df_proj = df[df['year'] > 2024]
[9] ✓ 0.0s
```

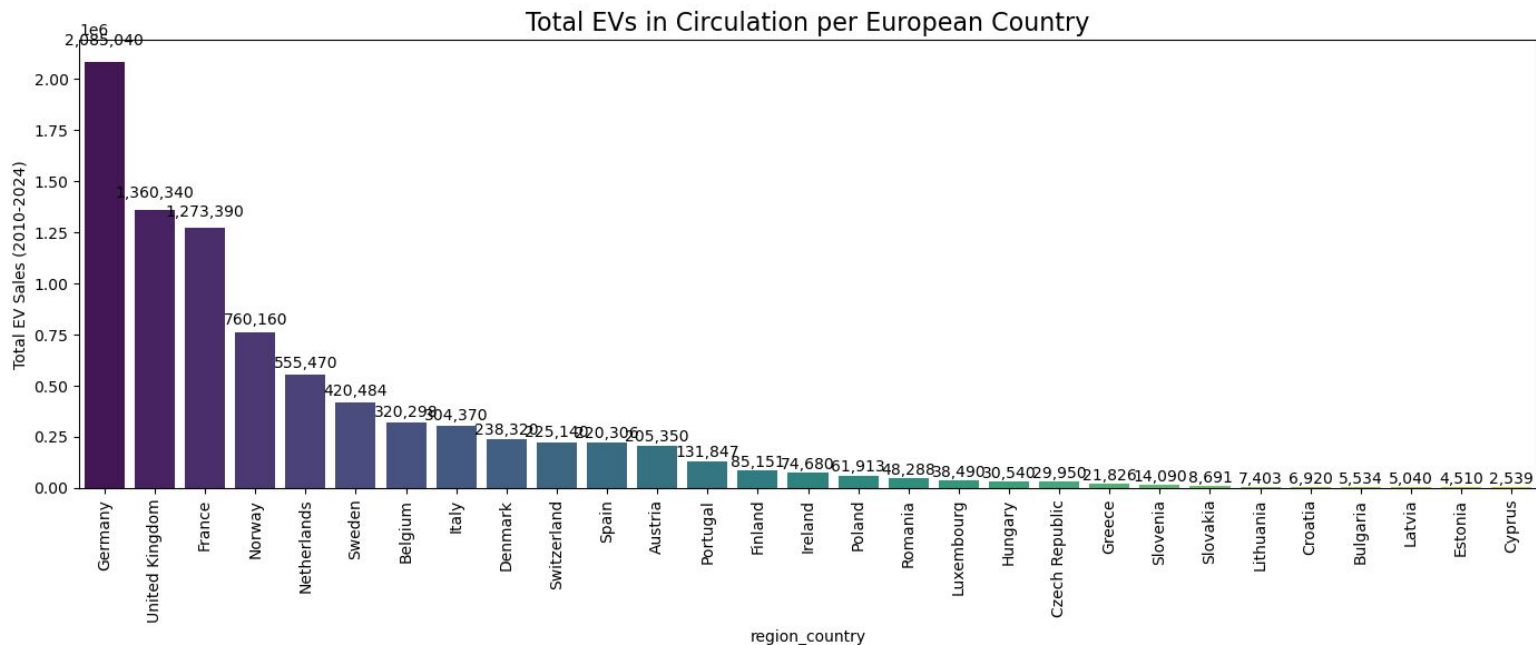
	region_country	category	parameter	value	Aggregate group
0	World	Projection-STEPS	EV stock	00000e+08	_World
1	World	Projection-STEPS	EV stock	00000e+08	_World
2	China	Projection-STEPS	EV stock	00000e+07	Other
...	...	...	...	...	...
16431	Rest of the world	Historical	EV stock	00000e+07	Other
16432	Rest of the world	Historical	EV stock	00000e+07	Other
16433	Rest of the world	Historical	EV stock	00000e+07	Other
16434	USA	Historical	EV stock	00000e+07	Other
16435	Rest of the world	Historical	EV stock	00000e+07	Other





# Total EV's in Europe

## # A look at every country

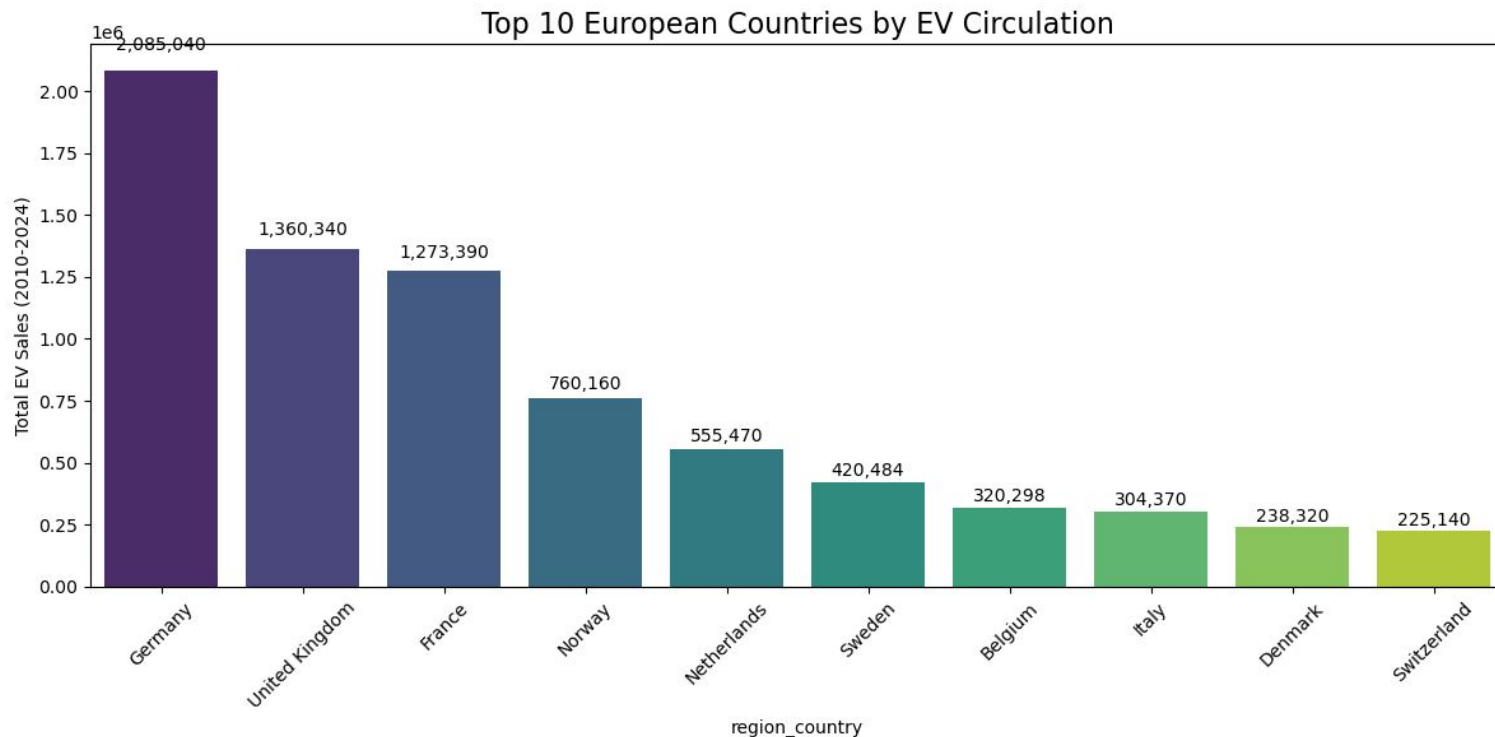


# Total EVs in circulation in Europe (2010-2024): 8,546,080



# Total EV's in Europe

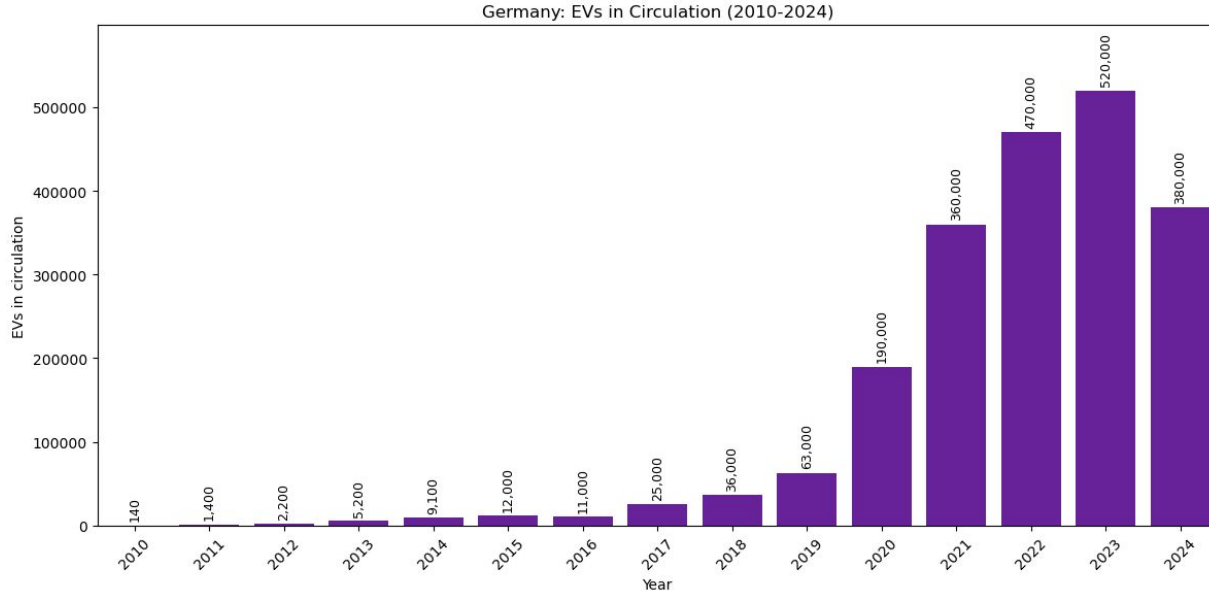
# Focusing on Top 10





# EV Growth Over Time

# Germany's trend over the years



# Total EVs in circulation in Germany (2010-2024): 2,085,040

2M

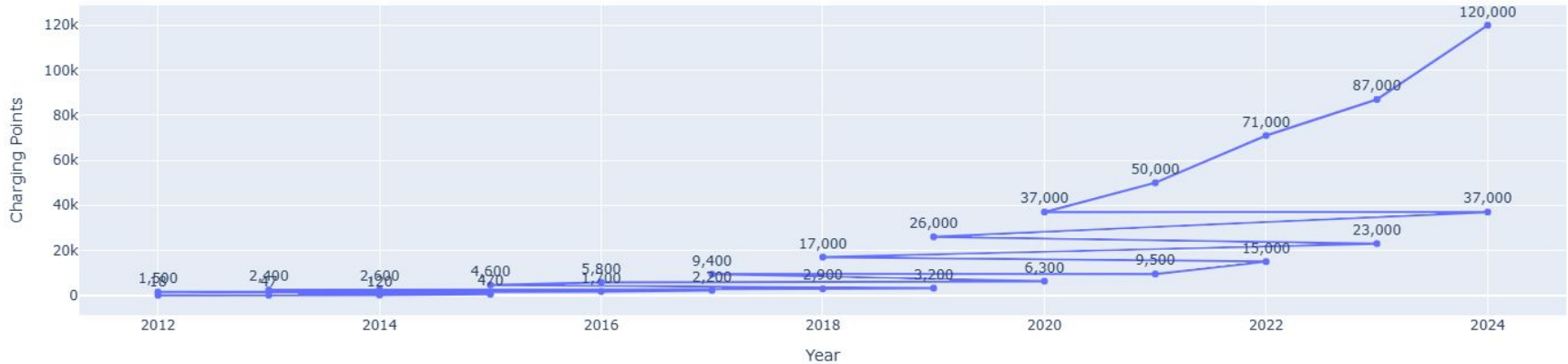




# Charging Infrastructure

## # Germany's preparation

Germany: EV Charging Points (2010-2024)



# Total EV Charging Points in Germany (2010-2024): 535,755

500K





# Charging Infrastructure

# Europe's adoption

EV Charging Points Growth in Europe (2010-2024)



# Total EV Charging Points in Europe (2010-2024): 3,495,361

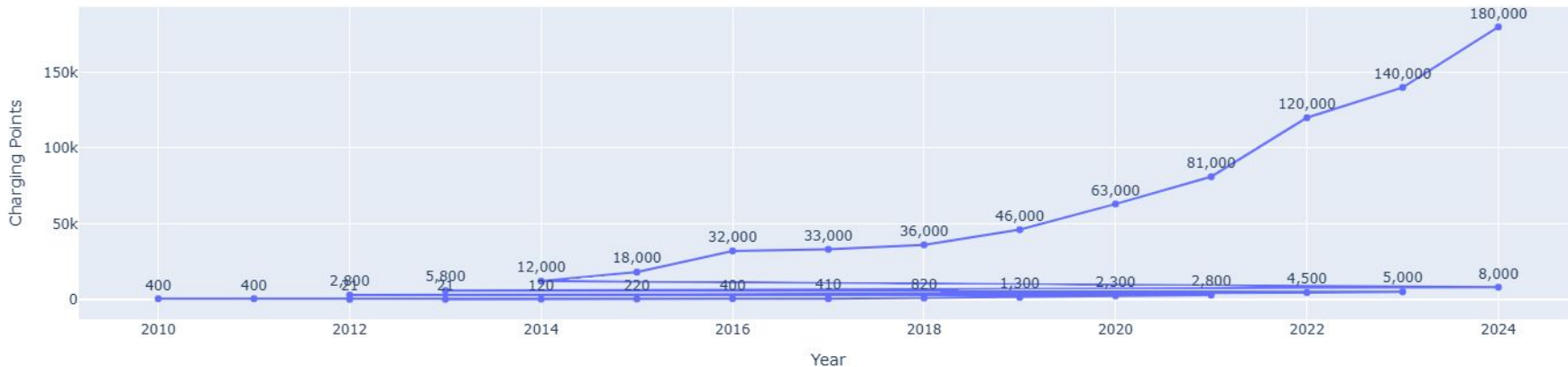
3.4M



# Charging Infrastructure

# Netherlands' trend over the years

Netherlands: EV Charging Points (2010-2024)



# Total EV Charging Points in Netherlands (2010-2024): 796,312

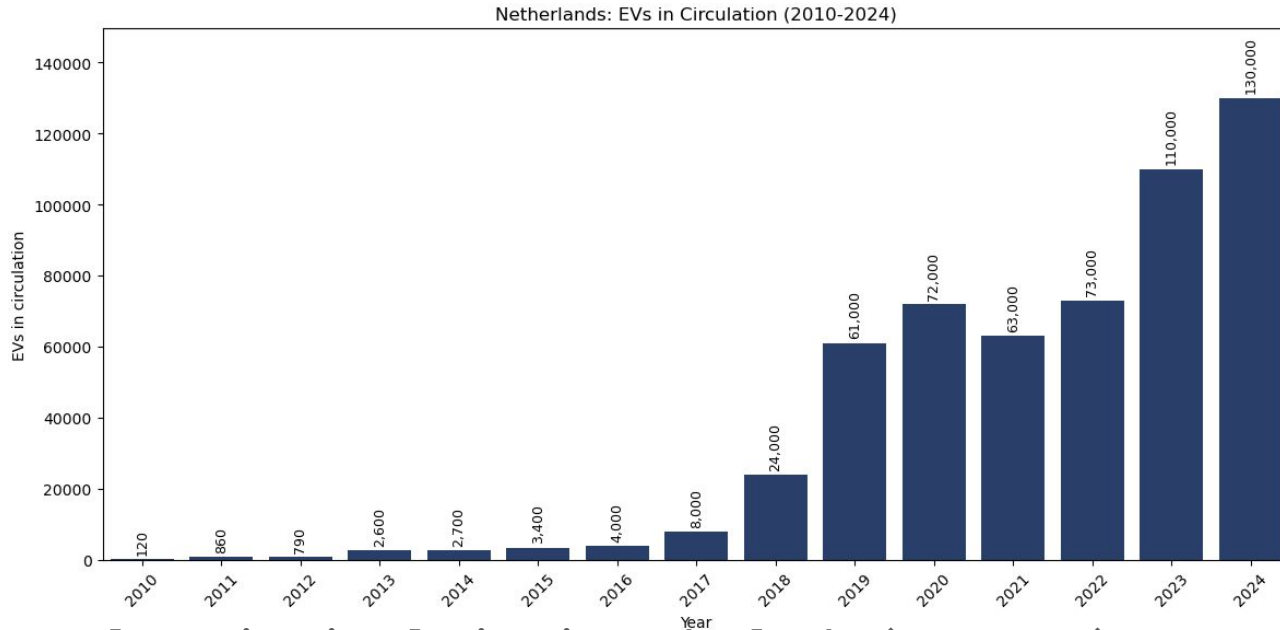
796K





# EV Growth Over Time

# Netherlands's trend over the years



# Total EVs in circulation in Netherlands (2010-2024): 555,470

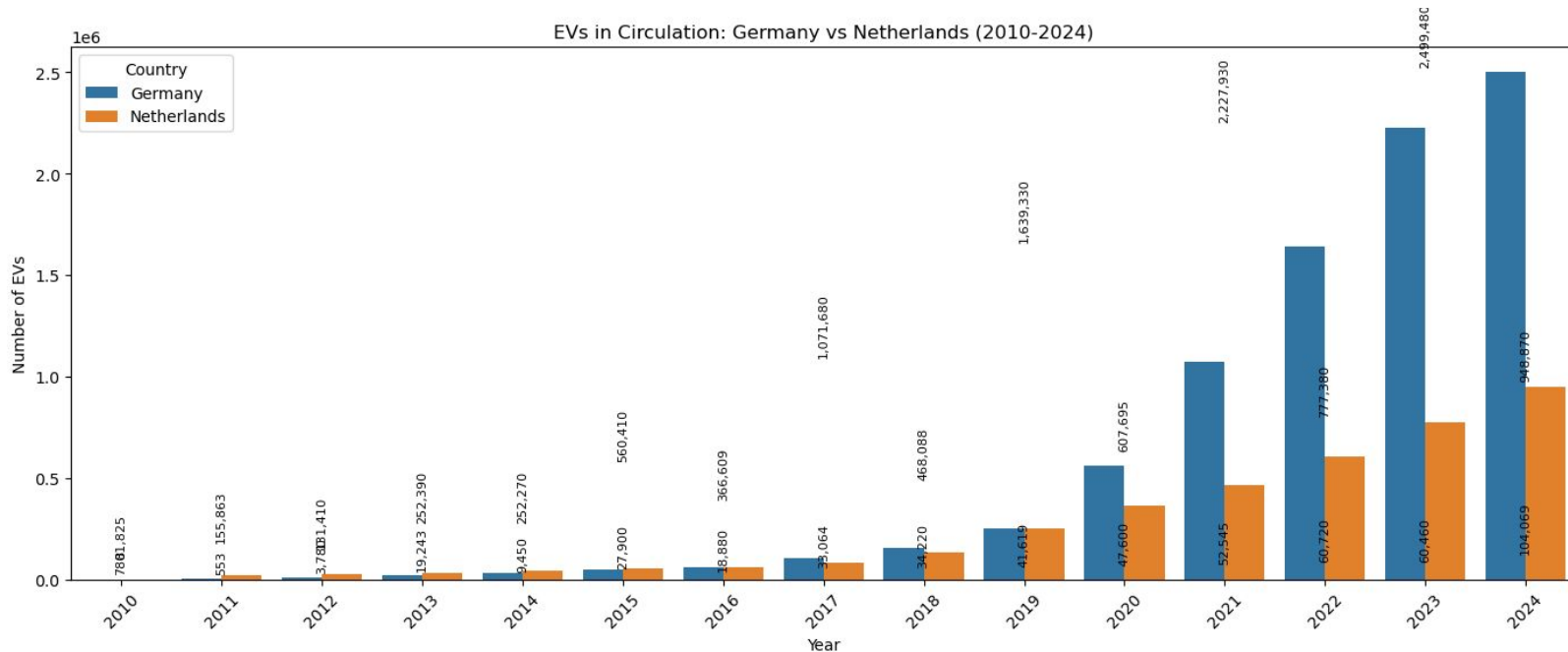
500K





# Acquisition and Preparation

## # Comparing the Front-Runners



# Total EVs in circulation in Germany (2010-2024): **2,085,040**

# Total EVs in circulation in Netherlands (2010-2024): **555,470**

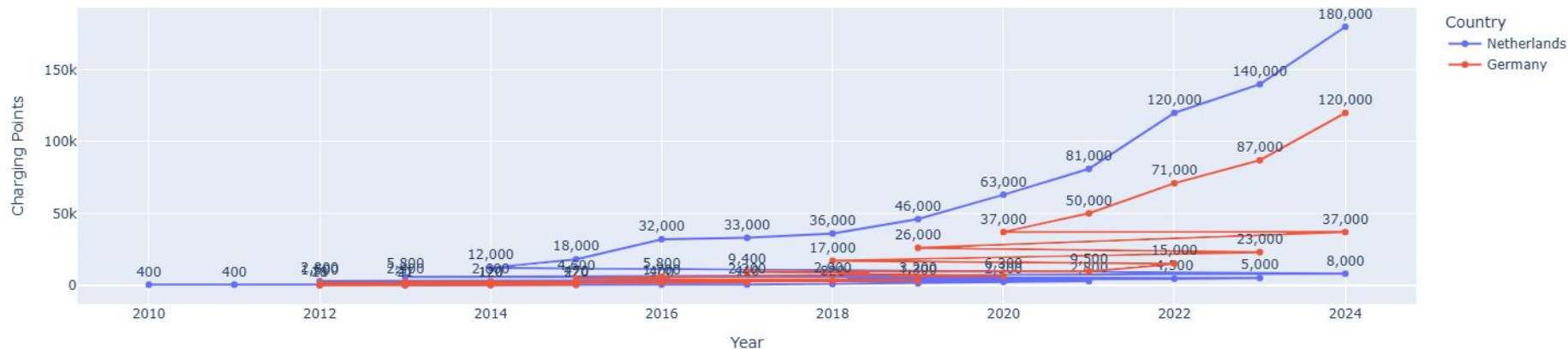




# Acquisition and Preparation

## # Charging Points installation

EV Charging Points: Germany vs Netherlands (2010-2024)



# Total EV Charging Points in Netherlands (2010-2024): 796,312

# Total EV Charging Points in Germany (2010-2024): 535,755



# Environmental Impact

# Let's put into perspective...

# Total oil displacement (2010-2024): **79,219 million lge**



Represents **79.2 million liters of gasoline** not burned



Equivalent to **annual fuel consumption** of roughly **158 million conventional cars**



# Environmental Impact

# Let's put into perspective...

# Total GWh consumed by EVs in Europe (2010-2024): **35,400 GWh**



**14 years** worth of GWh consumption



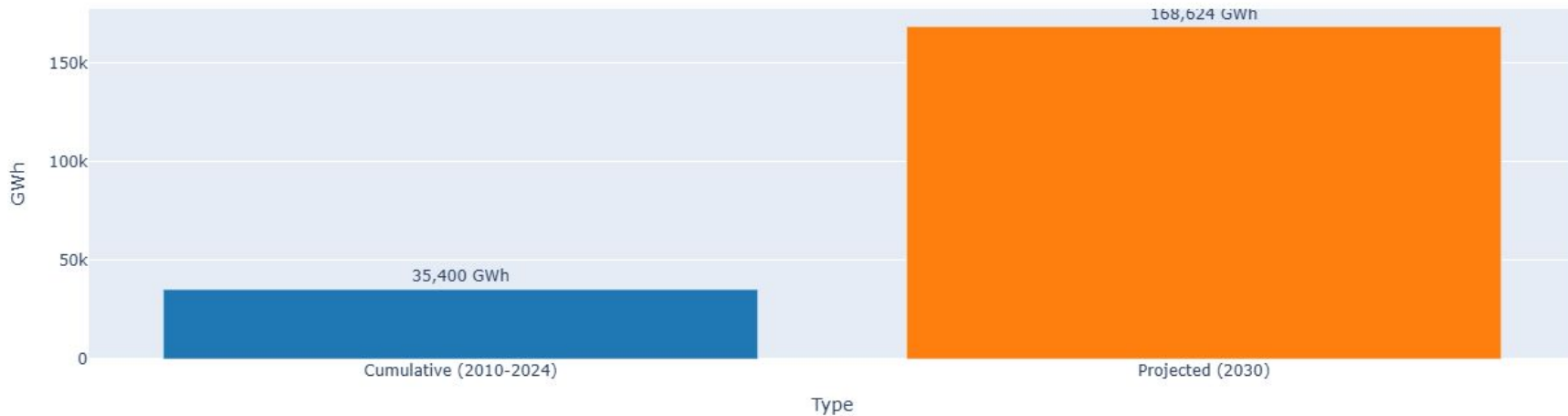
**Annual** electricity usage for **10M** households



# Environmental Impact

# Let's put into perspective...

EV Electricity Consumption: 2010-2024 vs Projected 2030



Projected EV electricity demand (2025-2030): **168,624 GWh**



# Environmental Impact

# Let's put into perspective...

# Projected EV electricity demand (2025-2030): **168,624 GWh**



Projected demand **168,624 GWh**  
until the year **2030**



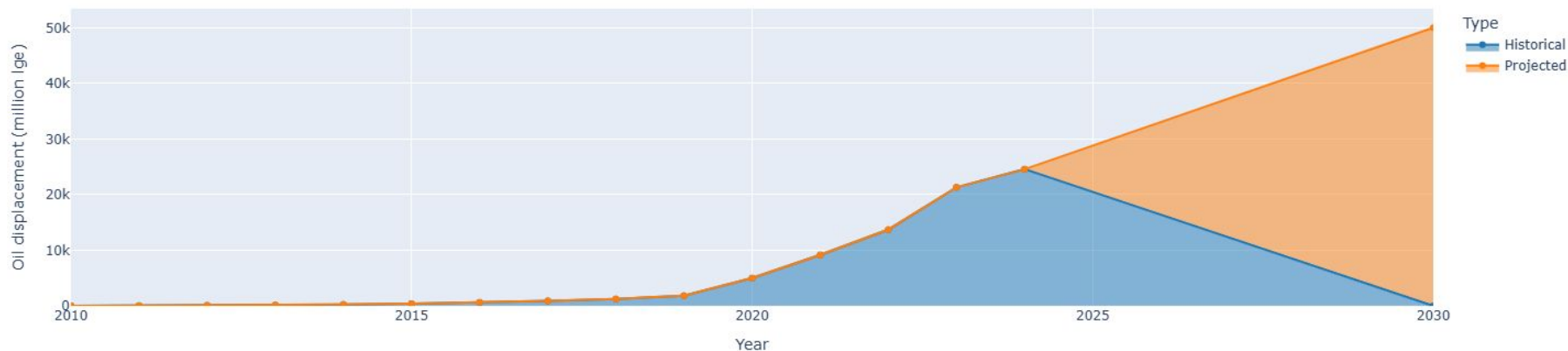
Annual electricity usage for **42 - 48 million**  
European households



# Environmental Impact

# Let's put into perspective...

Oil Displacement by EVs in Europe (2010–2030)



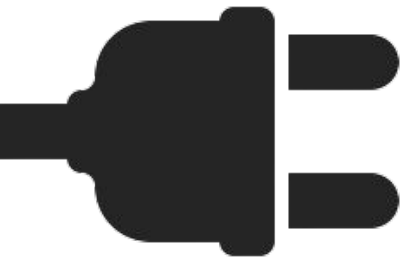
# Total projected displacement (2025–2030): **86,9 billion lge**



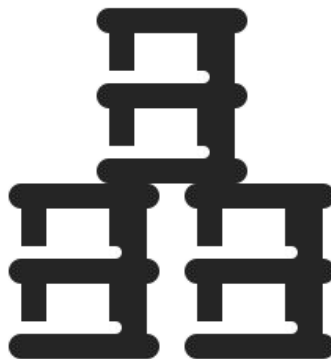
# Environmental Impact

# Let's put into perspective...

# Total projected displacement (2025-2030): **86,9 billion lge**



Represents **86.9 billion** liters of gasoline not burned.



**546.5 million barrels** of oil avoided.



# Key Insights

# Wrapping up

- **Germany leads in EV adoption**, registering the highest growth in EV adoption. **In contrast**, the **Netherlands** invested in infrastructure, creating one of the largest networks.

This shows us two different national strategies: ***acquisition vs preparation.***





# Key Insights

## # Wrapping up

- Electric Vehicles **reduce oil dependency, but shift the demand to electricity.**

While EVs drastically reduce oil displacement—**saving millions of barrels per year**—they demand a **massive amount of electrical** energy to operate



# Key Insights

# Wrapping up

- **Grid innovation vs Car acquisition**

As EV adoption increases, European countries must address how to generate, store, and distribute clean energy at scale—**without shifting the environmental burden elsewhere.**



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