

Electric Vehicle Data Analysis

This analysis shows the electric vehicle (EV) market in the U.S., focusing on Washington State. It provides insights into market size, trends, and strategic recommendations for stakeholders.

Presented By
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▼ Problem Statement/Object

▼ Electric Vehicle Data Analysis

Market Size Analysis is the process of estimating the potential sales for a product or service within a particular market segment. In the context of electric vehicles (EVs), it involves assessing the total volume of EV registrations to understand the growth of the market, forecast future trends, and help stakeholders make informed decisions regarding production, infrastructure development, and policy-making.

The provided dataset contains the following columns, each representing different aspects of the electric vehicle (EV) population in the United States:

- **VIN (1-10):** Partial Vehicle Identification Number.
- **County:** The county in which the vehicle is registered.
- **City:** The city in which the vehicle is registered.
- **State:** The state in which the vehicle is registered. It appears that this dataset may be focused on Washington (WA) state.
- **Postal Code:** The postal code where the vehicle is registered.
- **Model Year:** The year of the vehicle model
- **Make:** The manufacturer of the vehicle.
- **Model:** The model of the vehicle.
- **Electric Vehicle Type:** The type of electric vehicle, e.g., Battery Electric Vehicle (BEV).
- **Clean Alternative Fuel Vehicle (CAFV) Eligibility:** Eligibility status for clean alternative fuel vehicle programs.
- **Electric Range:** The maximum range of the vehicle on a single charge (in miles).
- **Base MSRP:** The Manufacturer's Suggested Retail Price.
- **Legislative District:** The legislative district where the vehicle is registered.

- **DOL Vehicle ID:** Department of Licensing Vehicle Identification.
- **Vehicle Location:** Geographic coordinates of the vehicle location.
- **Electric Utility:** The electric utility service provider for the vehicle's location.
- **2020 Census Tract:** The census tract for the vehicle's location.

Start coding or generate with AI.

Mounted at /content/drive

Start coding or generate with AI.

```
→ <ipython-input-2-e61b9b7624f6>:8: DtypeWarning: Columns (10,12) have mixed types. Specify dtype option on import o
  data =pd.read_csv("/content/drive/MyDrive/BootCamp/EV Project/6-Electric_Vehicle_Population_Data New.csv")
```

Basic Steps

1- Display the top 5 rows.

Start coding or generate with AI.

→

	VIN (1-10)	County	City	State	Postal Code	Model Year	Make	Model	Electric Vehicle Type	Clean Alternative Fuel Vehicle (CAFV) Eligibility	Electric Range	Base MSRP
0	5YJYGDEE1L	King	Seattle	WA	98122.0	2020	TESLA	MODEL Y	Battery Electric Vehicle (BEV)	Clean Alternative Fuel Vehicle Eligible	291	0
1	7SAYGDEE9P	Snohomish	Bothell	WA	98021.0	2023	TESLA	MODEL Y	Battery Electric Vehicle (BEV)	Eligibility unknown as battery range has not b...	0	0
2	5YJSA1E4XK	King	Seattle	WA	98109.0	2019	TESLA	MODEL S	Battery Electric Vehicle (BEV)	NaN	270	0
3	5YJSA1E27G	King	Issaquah	WA	98027.0	2016	TESLA	MODEL S	Battery Electric Vehicle (BEV)	Clean Alternative Fuel Vehicle Eligible	210	0
4	5YJYGDEE5M	Kitsap	Suquamish	WA	98392.0	2021	Nan	MODEL Y	Battery Electric Vehicle (BEV)	Eligibility unknown as battery range has not b...	0	0

Output:

The output of data.head() presents the initial rows of the DataFrame

✓ 2- Display the last 5 rows

Start coding or generate with AI.

→

	VIN (1-10)	County	City	State	Postal Code	Model Year	Make	Model	Electric Vehicle Type	Clean Alternative Fuel Vehicle (CAFV) Eligibility	Ele
177861	7SAYGDEE3N	Pierce	Bonney Lake	WA	98391.0	2022	TESLA	MODEL Y	Battery Electric Vehicle (BEV)	Eligibility unknown as battery range has not b...	
177862	KM8K23AG1P	Mason	Shelton	WA	98584.0	2023	HYUNDAI	KONA ELECTRIC	Battery Electric Vehicle (BEV)	Eligibility unknown as battery range has not b...	
177863	5YJYGDEE6M	Grant	Quincy	WA	98848.0	2021	TESLA	MODEL Y	Battery Electric Vehicle (BEV)	Eligibility unknown as battery range has not b...	
177864	WVGKMPE27M	King	Black Diamond	WA	98010.0	2021	VOLKSWAGEN	ID.4	Battery Electric Vehicle (BEV)	Eligibility unknown as battery range has not b...	
177865	5YJ3E1EA8M	Pierce	Tacoma	WA	98422.0	2021	TESLA	MODEL 3	Battery Electric Vehicle (BEV)	Eligibility unknown as battery range has not b...	

Output: The output of data.tail() presents the end rows of the DataFrame

✓ 3- Check the shape of dataset.

Start coding or generate with AI.

→ (177866, 17)

Output:

The dataset's shape(data.shape) , as reported, indicates its dimensionality. For instance, if the dataset contains 1000 rows and 15 columns, it is conveyed as (1000, 15). This succinct representation denotes the number of observations (rows) and variables (columns) within the dataset.

✓ 4- Check the datatypes of each feature.

Start coding or generate with AI.

→

VIN (1-10)	object
County	object
City	object
State	object
Postal Code	float64
Model Year	int64
Make	object
Model	object
Electric Vehicle Type	object
Clean Alternative Fuel Vehicle (CAFV) Eligibility	object

```

Electric Range          object
Base MSRP              int64
Legislative District    object
DOL Vehicle ID         int64
Vehicle Location        object
Electric Utility        object
2020 Census Tract      float64
dtype: object

```

Output:

The output displays the data types of each column in a tabular format, with column names on the left and their corresponding data types on the right. For example:

▼ 5- Check the Statistical summary

Start coding or generate with AI.

```

→ Postal Code      Model Year      Base MSRP  DOL Vehicle ID \
count 177861.000000 177866.000000 177866.000000 1.778660e+05
mean  98172.453506 2020.515512 1073.109363 2.202313e+08
std   2442.450668 2.989384 8358.624956 7.584987e+07
min   1545.000000 1997.000000 0.000000 4.385000e+03
25%   98052.000000 2019.000000 0.000000 1.814743e+08
50%   98122.000000 2022.000000 0.000000 2.282522e+08
75%   98370.000000 2023.000000 0.000000 2.548445e+08
max   99577.000000 2024.000000 845000.000000 4.792548e+08

2020 Census Tract
count 1.778610e+05
mean 5.297672e+10
std  1.578047e+09
min 1.001020e+09
25% 5.303301e+10
50% 5.303303e+10
75% 5.305307e+10
max 5.603300e+10

```

Output:

The code provided utilizes the `describe()` function to generate summary statistics for the numerical columns in the dataset.

The output displays various descriptive statistics for each numerical column, including count, mean, standard deviation, minimum, 25th percentile (1st quartile), median (50th percentile), 75th percentile (3rd quartile), and maximum

▼ 6- Check the null values

Start coding or generate with AI.

```

→ VIN (1-10)           0
County                 5
City                   5
State                  0
Postal Code            5
Model Year             0
Make                   7
Model                  4
Electric Vehicle Type 6
Clean Alternative Fuel Vehicle (CAFV) Eligibility 2
Electric Range          3
Base MSRP              0
Legislative District    389
DOL Vehicle ID          0
Vehicle Location         9
Electric Utility         5
2020 Census Tract       5
dtype: int64

```

Output:

The provided code calculates the number of missing values (null values) in each column of the dataset and prints the results.

The output displays the count of missing values for each column in the dataset

✓ 7- Check the duplicate values

Start coding or generate with AI.

```
Empty DataFrame
Columns: [VIN (1-10), County, City, State, Postal Code, Model Year, Make, Model, Electric Vehicle Type, Clean Alternative Fuel Vehicle (CAFV) Eligibility, Legislative District, Vehicle Location, Electric Utility, 2020 Census Tract]
Index: []
```

Output:

The provided code identifies duplicate rows in the dataset and prints them.

The output indicates that there are no duplicate rows in the dataset. It returns an empty DataFrame, implying that each row in the dataset is unique.

This information suggests that there are no identical observations present in the dataset, which can be beneficial for ensuring data integrity and avoiding redundancy in subsequent analyses

✓ 8- Check the anomalies or wrong entries

Start coding or generate with AI.

```
Missing Values:
County           5
City             5
Postal Code      5
Make             7
Model            4
Electric Vehicle Type    6
Clean Alternative Fuel Vehicle (CAFV) Eligibility 2
Electric Range     4
Legislative District 389
Vehicle Location    9
Electric Utility     5
2020 Census Tract    5
dtype: int64
```

```
11     13  Plug-in Hybrid Electric Vehicle (PHEV)

Clean Alternative Fuel Vehicle (CAFV) Eligibility  Electric Range  \
11           Clean Alternative Fuel Vehicle Eligible      1260000.0

Base MSRP Legislative District  DOL Vehicle ID  \
11          0            23        228846642

Vehicle Location      Electric Utility 2020 Census Tract
11 POINT (-122.5235781 47.6293323)  PUGET SOUND ENERGY INC      5.303509e+10

Values above 200000 in Base MSRP:
VIN (1-10) County      City State Postal Code Model Year  Make \
63678 WP0CA2A13F King  Hunts Point WA      98004.0      2015 PORSCHE

Model      Electric Vehicle Type  \
-----  -----
```

Output

the output shows the analysis of a dataset, resulting in three histograms illustrating the distribution of numerical variables ('Model Year', 'Electric Range', 'Base MSRP'), and a heatmap indicating missing values across all columns. Additionally, it prints the unique values and their counts for categorical variables ('Make', 'Electric Vehicle Type').

▼ 9- Check the outliers and their authenticity.

Start coding or generate with AI.

Dataset Info:

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 177866 entries, 0 to 177865
Data columns (total 17 columns):
 #   Column           Non-Null Count Dtype  
 --- 
 0   VIN (1-10)      177866 non-null  object  
 1   County          177861 non-null  object  
 2   City            177861 non-null  object  
 3   State           177866 non-null  object  
 4   Postal Code     177861 non-null  float64 
 5   Model Year      177866 non-null  int64  
 6   Make            177859 non-null  object  
 7   Model           177862 non-null  object  
 8   Electric Vehicle Type 177860 non-null  object  
 9   Clean Alternative Fuel Vehicle (CAFV) Eligibility 177864 non-null  object  
 10  Electric Range   177862 non-null  float64 
 11  Base MSRP        177866 non-null  int64  
 12  Legislative District 177477 non-null  object  
 13  DOL Vehicle ID   177866 non-null  int64  
 14  Vehicle Location  177857 non-null  object  
 15  Electric Utility  177861 non-null  object  
 16  2020 Census Tract 177861 non-null  float64 
dtypes: float64(3), int64(3), object(11)
memory usage: 23.1+ MB
None
```

Model Year - Lower Bound: 2013.0, Upper Bound: 2029.0

Number of outliers in Model Year: 2453

	Model Year	Make	Model	VIN (1-10)	County	\
24	2012	NISSAN	LEAF	JN1AZ0CP8C	Thurston	
151	2012	NISSAN	LEAF	JN1AZ0CP6C	Island	
154	2012	NISSAN	LEAF	JN1AZ0CP0C	Grant	
173	2012	NISSAN	LEAF	JN1AZ0CP6C	Snohomish	
177	2012	CHEVROLET	VOLT	1G1RD6E48C	Yakima	
...
177326	2012	MITSUBISHI	I-MIEV	JA3215H18C	Snohomish	
177361	2012	FORD	FOCUS	1FAHP3R46C	Clark	
177602	2012	NISSAN	LEAF	JN1AZ0CP3C	Spokane	
177763	2011	NISSAN	LEAF	JN1AZ0CP6B	Snohomish	
177831	2012	TOYOTA	PRIUS PLUG-IN	JTDKN3DP1C	Pacific	
	City	State	Postal Code		Electric Vehicle Type	\
24	Tenino	WA	98589.0	Battery	Electric Vehicle (BEV)	
151	Langley	WA	98260.0	Battery	Electric Vehicle (BEV)	
154	Moses Lake	WA	98837.0	Battery	Electric Vehicle (BEV)	
173	Mukilteo	WA	98275.0	Battery	Electric Vehicle (BEV)	
177	Yakima	WA	98908.0	Plug-in	Hybrid Electric Vehicle (PHEV)	
...
177326	Mukilteo	WA	98275.0	Battery	Electric Vehicle (BEV)	
177361	Ridgefield	WA	98642.0	Battery	Electric Vehicle (BEV)	
177602	Spokane	WA	99201.0	Battery	Electric Vehicle (BEV)	
177763	Snohomish	WA	98290.0	Battery	Electric Vehicle (BEV)	
177831	North Cove	WA	98590.0	Plug-in	Hybrid Electric Vehicle (PHEV)	

	Clean Alternative Fuel Vehicle (CAFV) Eligibility	Legislative District	\
24	Clean Alternative Fuel Vehicle Eligible	20	
151	Clean Alternative Fuel Vehicle Eligible	10	
154	Clean Alternative Fuel Vehicle Eligible	13	
173	Clean Alternative Fuel Vehicle Eligible	21	
177	Clean Alternative Fuel Vehicle Eligible	14	
...	
177326	Clean Alternative Fuel Vehicle Eligible	21.0	
177361	Clean Alternative Fuel Vehicle Eligible	18.0	
177602	Clean Alternative Fuel Vehicle Eligible	3.0	
177763	Clean Alternative Fuel Vehicle Eligible	44.0	
177831	Not eligible due to low battery range	19.0	

	DOL Vehicle ID	Vehicle Location	\
24	131685669	POINT (-122.85403 46.856085)	
151	5819362	POINT (-122.408015 48.03557)	
154	255859096	POINT (-119.2599876 47.1240154)	
173	165818663	POINT (-122.299965 47.94171)	
177	165207150	POINT (-120.6027202 46.5965625)	
...	
177326	252837399	POINT (-122.299965 47.94171)	
177361	1798688	POINT (-122.74291 45.818445)	
177602	105144532	POINT (-117.431895 47.667155)	
177763	309088244	POINT (-122.091505 47.915555)	

177831

123492729

POINT (-123.99449 46.71071)

		Electric Utility	2020 Census Tract
24		PUGET SOUND ENERGY INC	5.306701e+10
151		PUGET SOUND ENERGY INC	5.302997e+10
154		PUD NO 2 OF GRANT COUNTY	5.302501e+10
173		PUGET SOUND ENERGY INC	5.306104e+10
177		PACIFICORP	5.307700e+10
...	
177326		PUGET SOUND ENERGY INC	5.306104e+10
177361	BONNEVILLE POWER ADMINISTRATION	PUD NO 1 OF C...	5.301104e+10
177602		MODERN ELECTRIC WATER COMPANY	5.306300e+10
177763		PUGET SOUND ENERGY INC	5.306105e+10
177831	BONNEVILLE POWER ADMINISTRATION	PUD NO 2 OF P...	5.304995e+10

[2453 rows x 15 columns]

Electric Range - Lower Bound: -112.5, Upper Bound: 187.5

Number of outliers in Electric Range: 32542

	Electric Range	Make	Model	VIN (1-10)	County	\
0	291.0	TESLA	MODEL Y	5YJYGDEE1L	King	
2	270.0	TESLA	MODEL S	5YJSA1E4XK	King	
3	210.0	TESLA	MODEL S	5YJSA1E27G	King	
10	291.0	TESLA	MODEL Y	5YJYGDEEXL	King	
11	1260000.0	BMW	I3	WBY8P8C53K	Kitsap	
...
177850	215.0	TESLA	MODEL 3	5YJ3E1EBXJ	Benton	
177852	215.0	TESLA	MODEL 3	5YJ3E1EA8J	Snohomish	
177854	220.0	TESLA	MODEL 3	5YJ3E1EB2K	King	
177855	215.0	TESLA	MODEL 3	5YJ3E1EB0J	Spokane	
177860	238.0	CHEVROLET	BOLT EV	1G1FX6S00J	Clallam	

	City	State	Postal Code	\
0	Seattle	WA	98122.0	
2	Seattle	WA	98109.0	
3	Issaquah	WA	98027.0	
10	Seattle	WA	98144.0	
11	Bainbridge Island	WA	98110.0	
...
177850	Kennewick	WA	99338.0	
177852	Everett	WA	98203.0	
177854	Issaquah	WA	98029.0	
177855	Mead	WA	99021.0	
177860	Sequim	WA	98382.0	

	Electric Vehicle Type	\
0	Battery Electric Vehicle (BEV)	
2	Battery Electric Vehicle (BEV)	
3	Battery Electric Vehicle (BEV)	
10	Battery Electric Vehicle (BEV)	
11	Plug-in Hybrid Electric Vehicle (PHEV)	
...
177850	Battery Electric Vehicle (BEV)	
177852	Battery Electric Vehicle (BEV)	
177854	Battery Electric Vehicle (BEV)	
177855	Battery Electric Vehicle (BEV)	
177860	Battery Electric Vehicle (BEV)	

	Clean Alternative Fuel Vehicle (CAFV) Eligibility	Legislative District	\
0	Clean Alternative Fuel Vehicle Eligible	37	
2	NaN	36	
3	Clean Alternative Fuel Vehicle Eligible	5	
10	Clean Alternative Fuel Vehicle Eligible	37	
11	Clean Alternative Fuel Vehicle Eligible	23	
...
177850	Clean Alternative Fuel Vehicle Eligible	16.0	
177852	Clean Alternative Fuel Vehicle Eligible	38.0	
177854	Clean Alternative Fuel Vehicle Eligible	41.0	
177855	Clean Alternative Fuel Vehicle Eligible	7.0	
177860	Clean Alternative Fuel Vehicle Eligible	24.0	

	DOL	Vehicle ID	Vehicle Location	\
0	125701579		POINT (-122.30839 47.610365)	
2	156773144		POINT (-122.34848 47.632405)	
3	165103011		POINT (-122.03646 47.534065)	
10	113323024		POINT (-122.30823 47.581975)	
11	228846642		POINT (-122.5235781 47.6293323)	
...
177850	177537027		POINT (-119.1973001 46.1911488)	
177852	160838149		POINT (-122.213105 47.95479)	

```
177854    172843891 POINT (-121.9993659 47.5484866)
177855    244100594 POINT (-117.35761 47.76885)
177860    347972607 POINT (-123.105015 48.08125)
```

		Electric Utility	2020 Census Tract
0	CITY OF SEATTLE - (WA) CITY OF TACOMA - (WA)	5.303301e+10	
2	CITY OF SEATTLE - (WA) CITY OF TACOMA - (WA)	5.303301e+10	
3	PUGET SOUND ENERGY INC CITY OF TACOMA - (WA)	5.303303e+10	
10	CITY OF SEATTLE - (WA) CITY OF TACOMA - (WA)	5.303301e+10	
11	PUGET SOUND ENERGY INC	5.303509e+10	
...	
177850	BONNEVILLE POWER ADMINISTRATION PUD NO 1 OF B...	5.300501e+10	
177852	PUGET SOUND ENERGY INC	5.306104e+10	
177854	PUGET SOUND ENERGY INC CITY OF TACOMA - (WA)	5.303303e+10	
177855	BONNEVILLE POWER ADMINISTRATION AVISTA CORP ...	5.306301e+10	
177860	BONNEVILLE POWER ADMINISTRATION PUD NO 1 OF C...	5.300900e+10	

[32542 rows x 15 columns]

Base MSRP - Lower Bound: 0.0, Upper Bound: 0.0

Number of outliers in Base MSRP: 3344

	Base MSRP	Make	Model	VIN (1-10)	County	City	State	\
30	32250	KIA	SOUL EV	KNDJX3AE9H	Thurston	Olympia	WA	
71	31950	KIA	SOUL	KNDJX3AE5G	Snohomish	Edmonds	WA	
187	69900	TESLA	MODEL S	5YJSA1DN6D	Yakima	Yakima	WA	
218	69900	TESLA	MODEL S	5YJSA1CG6D	Kitsap	Port Orchard	WA	
293	44100	BMW	330E	WBA8E1C52H	King	Tukwila	WA	
...	WA	
177581	31950	KIA	SOUL	KNDJP3AE2G	King	Vashon	WA	
177591	32250	KIA	SOUL EV	KNDJX3AE3H	Whatcom	Bellingham	WA	
177605	69900	TESLA	MODEL S	5YJSA1DP4D	Pierce	Gig Harbor	WA	
177723	52900	VOLVO	XC60	LYVBR0DK8K	King	Renton	WA	
177739	44100	BMW	330E	WBA8E1C54H	King	Bothell	WA	

	Postal Code	Electric Vehicle Type	\
30	98502.0	Battery Electric Vehicle (BEV)	
71	98020.0	Battery Electric Vehicle (BEV)	
187	98903.0	Battery Electric Vehicle (BEV)	
218	98367.0	Battery Electric Vehicle (BEV)	
293	98168.0	Plug-in Hybrid Electric Vehicle (PHEV)	
...	
177581	98070.0	Battery Electric Vehicle (BEV)	
177591	98225.0	Battery Electric Vehicle (BEV)	
177605	98335.0	Battery Electric Vehicle (BEV)	
177723	98055.0	Plug-in Hybrid Electric Vehicle (PHEV)	
177739	98011.0	Plug-in Hybrid Electric Vehicle (PHEV)	

	Clean Alternative Fuel Vehicle (CAFV) Eligibility	Legislative District	\
30	Clean Alternative Fuel Vehicle Eligible	22	
71	Clean Alternative Fuel Vehicle Eligible	32	
187	Clean Alternative Fuel Vehicle Eligible	14	
218	Clean Alternative Fuel Vehicle Eligible	26	
293	Not eligible due to low battery range	11	
...	
177581	Clean Alternative Fuel Vehicle Eligible	34.0	
177591	Clean Alternative Fuel Vehicle Eligible	40.0	
177605	Clean Alternative Fuel Vehicle Eligible	26.0	
177723	Not eligible due to low battery range	33.0	
177739	Not eligible due to low battery range	1.0	

	DOL	Vehicle ID	Vehicle Location	\
30	140569600	POINT (-122.92145 47.045935)		
71	158961099	POINT (-122.37507 47.80807)		
187	156737612	POINT (-120.477805 46.553505)		
218	124244284	POINT (-122.6847073 47.50524)		
293	139331412	POINT (-122.286465 47.476)		
...		
177581	146484964	POINT (-122.46049 47.44873)		
177591	251839507	POINT (-122.486115 48.761615)		
177605	231046714	POINT (-122.5835454 47.3234488)		
177723	289237567	POINT (-122.197 47.43876)		
177739	256615488	POINT (-122.20578 47.762405)		

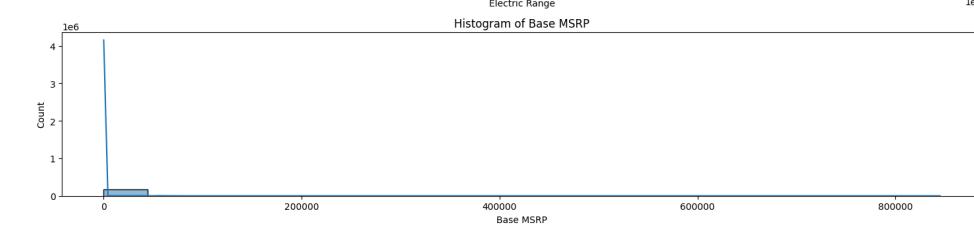
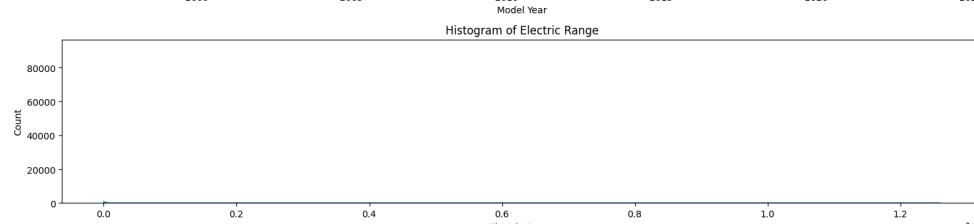
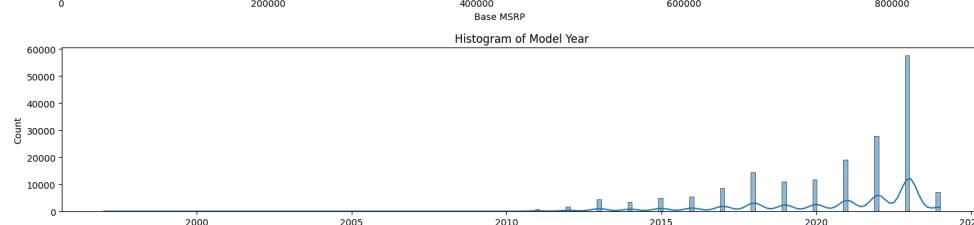
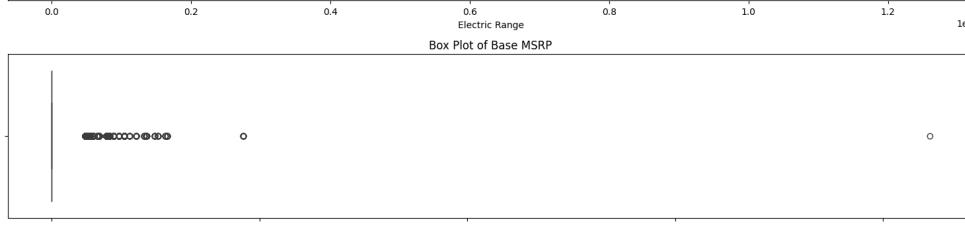
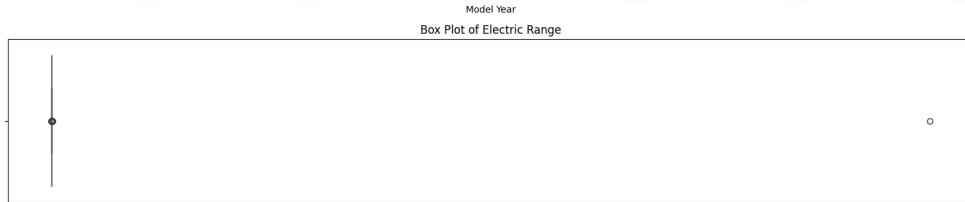
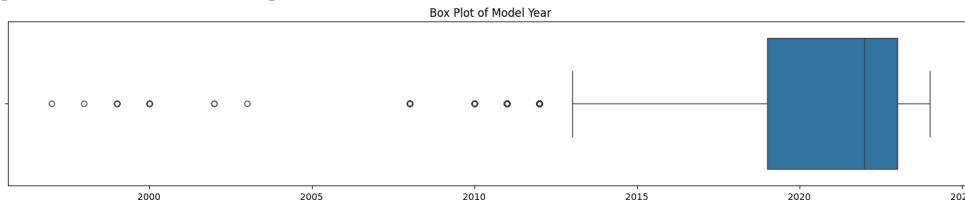
	Electric Utility	2020 Census Tract
30	PUGET SOUND ENERGY INC	5.306701e+10
71	PUGET SOUND ENERGY INC	5.306105e+10
187	PACIFICORP	5.307700e+10
218	PUGET SOUND ENERGY INC	5.303509e+10
293	CITY OF SEATTLE - (WA) CITY OF TACOMA - (WA)	5.303303e+10

```

...
177581 PUGET SOUND ENERGY INC||CITY OF TACOMA - (WA)      5.303303e+10
177591 PUGET SOUND ENERGY INC||PUD NO 1 OF WHATCOM CO...  5.307300e+10
177605 BONNEVILLE POWER ADMINISTRATION||CITY OF TACOM...  5.305307e+10
177723 PUGET SOUND ENERGY INC||CITY OF TACOMA - (WA)      5.303303e+10
177739 PUGET SOUND ENERGY INC||CITY OF TACOMA - (WA)      5.303302e+10

```

[3344 rows x 15 columns]



Streaming output truncated to the last 5000 lines.

```

Outlier Index: 163851
VIN (1-10)
County
City
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type          Battery Elec
Clean Alternative Fuel Vehicle (CAFV) Eligibility  Clean Alternative Fue
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID
Vehicle Location                POINT (-119.1
Electric Utility
2020 Census Tract
Name: 163851, dtype: object

```


		WBA
Outlier Index:	164315	
VIN (1-10)		
County		
City		
State		
Postal Code		
Model Year		
Make		
Model		
Electric Vehicle Type	Plug-in Hybrid Electric Vehicle	
Clean Alternative Fuel Vehicle (CAFV) Eligibility	Not eligible due to low battery	
Electric Range		
Base MSRP		
Legislative District		
DOL Vehicle ID		19
Vehicle Location	POINT (-117.431895 47.	
Electric Utility	MODERN ELECTRIC WATER	
2020 Census Tract		530630
Name:	164315, dtype: object	

Outlier Index: 164534
VIN (1-10)
County
City
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type Battery Elec
Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fue
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID
Vehicle Location POINT (-122
Electric Utility PUGET SOUND ENERGY INC|PUD NO
2020 Census Tract
Name: 164534, dtype: object

Outlier Index: 164552
VIN (1-10)
County
City
State
Postal Code
Model Year
Make
Model COU
Electric Vehicle Type Plug-in Hybrid Electric Vehicle
Clean Alternative Fuel Vehicle (CAFV) Eligibility Not eligible due to low battery
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID 27
Vehicle Location POINT (-122.64177 47.
Electric Utility PUGET SOUND ENE
2020 Census Tract 530350
Name: 164552, dtype: object

Outlier Index: 164578
VIN (1-10) 5Y
County S
City
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type Battery Electric Vehic
Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fuel Vehicle
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID 1
Vehicle Location POINT (-122.2551991 47.
Electric Utility PUGET SOUND EN
2020 Census Tract 53061
Name: 164578, dtype: object

Outlier Index: 164586
VIN (1-10) 5Y
County
City
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type Battery Electric Vehic
Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fuel Vehicle
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID 1
Vehicle Location POINT (-119.8493873 47.
Electric Utility PUD NO 2 OF GRAN
2020 Census Tract 53025
Name: 164586, dtype: object

Outlier Index: 165029
VIN (1-10) JF2
County Sn
City Mary
State
Postal Code
Model Year
Make
Model CR
Electric Vehicle Type Plug-in Hybrid Electric Vehicle
Clean Alternative Fuel Vehicle (CAFV) Eligibility Not eligible due to low battery
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID 25
Vehicle Location POINT (-122.17673 48
Electric Utility PUGET SOUND ENE
2020 Census Tract 530610
Name: 165029, dtype: object

Outlier Index: 165093
VIN (1-10) KN
County
City
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type Battery Electric Vehic
Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fuel Vehicle
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID 2
Vehicle Location POINT (-122.89692 47
Electric Utility PUGET SOUND EN
2020 Census Tract 53067
Name: 165093, dtype: object

Outlier Index: 165204
VIN (1-10) KN
County
City Moun
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type Battery Electric Vehic
Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fuel Vehicle
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID 2
Vehicle Location POINT (-122.338975 4
Electric Utility PUGET SOUND EN
2020 Census Tract 53057
Name: 165204, dtype: object

Name: 165314, dtype: object

Outlier Index: 165351
VIN (1-10) KN
County S
City S
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type Battery Electric Vehic
Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fuel Vehicle
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID 1
Vehicle Location POINT (-122.091505 47
Electric Utility PUGET SOUND EN
2020 Census Tract 53061
Name: 165351, dtype: object

Outlier Index: 165392
VIN (1-10) 5Y
County S
City A
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type Battery Electric Vehic
Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fuel Vehicle
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID 1
Vehicle Location POINT (-122.12324 4
Electric Utility PUGET SOUND EN
2020 Census Tract 53061
Name: 165392, dtype: object

Outlier Index: 165398
VIN (1-10)
County
City
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type Plug-in Hybrid Electric '
Clean Alternative Fuel Vehicle (CAFV) Eligibility Not eligible due to low
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID
Vehicle Location POINT (-122.25047
Electric Utility PUGET SOUND ENERGY INC||CITY OF
2020 Census Tract
Name: 165398, dtype: object

Outlier Index: 165404
VIN (1-10)
County
City
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type Battery Electric '
Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fuel Veh
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID
Vehicle Location POINT (-122.343
Electric Utility CITY OF SEATTLE - (WA)|CITY OF
2020 Census Tract

Name: 165404, dtype: object

```

Outlier Index: 165453
VIN (1-10)
County
City
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type          Battery Elec
Clean Alternative Fuel Vehicle (CAFV) Eligibility      Clean Alternative Fue
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID
Vehicle Location
Electric Utility
2020 Census Tract
Name: 165453, dtype: object

```

POINT (-122
BONNEVILLE POWER ADMINISTRATION

```

Outlier Index: 165500
VIN (1-10)
County
City
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type          Battery Elec
Clean Alternative Fuel Vehicle (CAFV) Eligibility      Clean Alternative Fue
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID
Vehicle Location
Electric Utility
2020 Census Tract
Name: 165500, dtype: object

```

POINT (-122.5
BONNEVILLE POWER ADMINISTRATION

```

Outlier Index: 165527
VIN (1-10)
County
City
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type          Battery Electric
Clean Alternative Fuel Vehicle (CAFV) Eligibility      Clean Alternative Fuel Ve
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID
Vehicle Location
Electric Utility
2020 Census Tract
Name: 165527, dtype: object

```

POINT (-122.20
PUGET SOUND ENERGY INC||CITY OF

```

Outlier Index: 165559
VIN (1-10)
County
City
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type          Battery Elec
Clean Alternative Fuel Vehicle (CAFV) Eligibility      Clean Alternative Fue
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID
Vehicle Location
Electric Utility
Name: 165559, dtype: object

```

POINT (-1
BONNEVILLE POWER ADMINISTRATION

2020 Census Tract
Name: 165559, dtype: object

2020 Census Tract

Name: 165736, dtype: object

Outlier Index: 165738

VIN (1-10)

County

City

State

Postal Code

Model Year

Make

Model

Electric Vehicle Type

Plug-in Hybrid Electric

Clean Alternative Fuel Vehicle (CAFV) Eligibility

Clean Alternative Fuel

Electric Range

Base MSRP

Legislative District

DOL Vehicle ID

Vehicle Location

POINT (-122.8

Electric Utility

BONNEVILLE POWER ADMINISTRATION

2020 Census Tract

Name: 165738, dtype: object

Outlier Index: 165827

VIN (1-10)

County

City

State

Postal Code

Model Year

Make

Model

Electric Vehicle Type

Battery Elec

Clean Alternative Fuel Vehicle (CAFV) Eligibility

Clean Alternative Fue

Electric Range

Base MSRP

Legislative District

DOL Vehicle ID

Vehicle Location

POINT (-11

Electric Utility

2020 Census Tract

BONNEVILLE POWER ADMINISTRATION

Name: 165827, dtype: object

Outlier Index: 165899

VIN (1-10)

WMZ'

County

Sn

City

L'

State

Postal Code

Model Year

Make

Model

COU

Electric Vehicle Type

Plug-in Hybrid Electric Vehicle

Clean Alternative Fuel Vehicle (CAFV) Eligibility

Not eligible due to low batter

Electric Range

Base MSRP

Legislative District

DOL Vehicle ID

23

Vehicle Location

POINT (-122.316675 47.

Electric Utility

PUGET SOUND ENE

2020 Census Tract

530610

Name: 165899, dtype: object

Outlier Index: 165996

VIN (1-10)

County

City

State

Postal Code

Model Year

Make

Model

Electric Vehicle Type

Battery Electric

Clean Alternative Fuel Vehicle (CAFV) Eligibility

Clean Alternative Fuel Ve

Electric Range

Base MSRP

Legislative District

DOL Vehicle ID

Vehicle Location

POINT (-122.2

Electric Utility

PUGET SOUND ENERGY TNCI LCTTV OF

ELECTRIC UTILITY

2020 Census Tract

Name: 165996, dtype: object

Outlier Index: 166005

VIN (1-10)

5Y

County

S

City

Woo

State

Postal Code

Model Year

Make

Model

Electric Vehicle Type

Battery Electric Vehic

Clean Alternative Fuel Vehicle (CAFV) Eligibility

Clean Alternative Fuel Vehicle

Electric Range

Base MSRP

Legislative District

2

DOL Vehicle ID

POINT (-122.151665 4

Vehicle Location

PUGET SOUND EN

Electric Utility

53061

2020 Census Tract

Name: 166005, dtype: object

Outlier Index: 166243

VIN (1-10)

KN

County

City

State

Postal Code

Model Year

Make

Model

Electric Vehicle Type

Battery Electric Vehic

Clean Alternative Fuel Vehicle (CAFV) Eligibility

Clean Alternative Fuel Vehicle

Electric Range

Base MSRP

Legislative District

1

DOL Vehicle ID

POINT (-122.8285 4

Vehicle Location

PUGET SOUND EN

Electric Utility

53067

2020 Census Tract

Name: 166243, dtype: object

Outlier Index: 166277

VIN (1-10)

County

City

State

Postal Code

Model Year

Make

Model

Electric Vehicle Type

Plug-in Hybrid Elect

Clean Alternative Fuel Vehicle (CAFV) Eligibility

Not eligible due to

Electric Range

Base MSRP

Legislative District

POINT (-1

DOL Vehicle ID

BONNEVILLE POWER ADMINISTRATION

Vehicle Location

Electric Utility

2020 Census Tract

Name: 166277, dtype: object

Outlier Index: 166321

VIN (1-10)

County

City

State

Postal Code

Model Year

Make

Model

Electric Vehicle Type

Battery Electric

Clean Alternative Fuel Vehicle (CAFV) Eligibility

Clean Alternative Fuel Ve

Electric Range

Base MSRP

Legislative District

DOL Vehicle ID

Vehicle Location

POINT (-122.2757

Electric Utility
2020 Census Tract
Name: 166321, dtype: object

Outlier Index: 166467
VIN (1-10)
County KN
City
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type Battery Electric Vehic
Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fuel Vehicle
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID 2
Vehicle Location POINT (-122.89692 47
Electric Utility PUGET SOUND EN
2020 Census Tract 53067
Name: 166467, dtype: object

Outlier Index: 166474
VIN (1-10) WBA
County Sn
City Lake
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type Plug-in Hybrid Electric Vehicle
Clean Alternative Fuel Vehicle (CAFV) Eligibility Not eligible due to low battery
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID 16
Vehicle Location POINT (-122.112265 4
Electric Utility PUGET SOUND ENE
2020 Census Tract 530610
Name: 166474, dtype: object

Electric Utility
2020 Census Tract
Name: 166633, dtype: object

Outlier Index: 166741
VIN (1-10) WP0/
County Sn
City Lake
State
Postal Code
Model Year
Make
Model P,
Electric Vehicle Type Plug-in Hybrid Electric Vehicle
Clean Alternative Fuel Vehicle (CAFV) Eligibility Not eligible due to low battery
Electric Range
Base MSRP
Legislative District 14
DOL Vehicle ID POINT (-122.112265 4
Vehicle Location PUGET SOUND ENE
Electric Utility 530610
2020 Census Tract
Name: 166741, dtype: object

Outlier Index: 166952
VIN (1-10) 5Y
County S
City
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type Battery Electric Vehic
Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fuel Vehicle
Electric Range
Base MSRP
Legislative District 1
DOL Vehicle ID POINT (-122.335685 4
Vehicle Location PUGET SOUND EN
Electric Utility 53061
2020 Census Tract
Name: 166952, dtype: object

Outlier Index: 166977
VIN (1-10) 5Y
County S
City I
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type Battery Electric Vehic
Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fuel Vehicle
Electric Range
Base MSRP
Legislative District 1
DOL Vehicle ID POINT (-122.299965 4
Vehicle Location PUGET SOUND EN
Electric Utility 53061
2020 Census Tract
Name: 166977, dtype: object

Outlier Index: 166995
VIN (1-10) 5Y
County S
City Ma
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type Battery Electric Vehic
Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fuel Vehicle
Electric Range
Base MSRP
Legislative District 1
DOL Vehicle ID POINT (-122.175775 4

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E V Data Analysis Report1zm.ipynb - Colab

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venue location
Electric Utility
2020 Census Tract
Name: 166995, dtype: object
```

PUGET SOUND EN
53061

Outlier Index: 167078
VIN (1-10)
County
City
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type Battery Elec
Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fue
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID
Vehicle Location POINT (-1
Electric Utility
2020 Census Tract BONNEVILLE POWER ADMINISTRATION
Name: 167078, dtype: object

Outlier Index:	167235	
VIN (1-10)		YV4
County		
City		Oak
State		
Postal Code		
Model Year		
Make		
Model		
Electric Vehicle Type	Plug-in Hybrid Electric Vehicle	
Clean Alternative Fuel Vehicle (CAFV) Eligibility	Not eligible due to low battery	
Electric Range		
Base MSRP		
Legislative District		
DOL Vehicle ID	34	
Vehicle Location	POINT (-122.6788673 48.2	
Electric Utility	PUGET SOUND ENE	
2020 Census Tract	530299	
Name: 167235, dtype: object		

Outlier Index: 167382
VIN (1-10) 2C
County
City
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type Plug-in Hybrid Electric Vehicle
Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fuel Vehicle
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID 4

Vehicle Location
 Electric Utility
 2020 Census Tract
 Name: 167382, dtype: object

POINT (-119.4385556 48.
 PUD NO 1 OF OKANOGA
 53047

Outlier Index: 167384
 VIN (1-10)
 County
 City
 State
 Postal Code
 Model Year
 Make
 Model
 Electric Vehicle Type
 Clean Alternative Fuel Vehicle (CAFV) Eligibility
 Electric Range
 Base MSRP
 Legislative District
 DOL Vehicle ID
 Vehicle Location
 Electric Utility
 2020 Census Tract
 Name: 167384, dtype: object

Plug-in Hybrid Electric
 Not eligible due to

POINT (-122.5
 BONNEVILLE POWER ADMINISTRATION

Outlier Index: 167448
 VIN (1-10)
 County
 City
 State
 Postal Code
 Model Year
 Make
 Model
 Electric Vehicle Type
 Clean Alternative Fuel Vehicle (CAFV) Eligibility
 Electric Range
 Base MSRP
 Legislative District
 DOL Vehicle ID
 Vehicle Location
 Electric Utility
 2020 Census Tract
 Name: 167448, dtype: object

Battery Electric
 Clean Alternative Fuel Ve

POINT (-122.12988
 PUGET SOUND ENERGY INC||CITY OF

Outlier Index: 167559
 VIN (1-10)
 County
 City
 State
 Postal Code
 Model Year
 Make
 Model
 Electric Vehicle Type
 Clean Alternative Fuel Vehicle (CAFV) Eligibility
 Electric Range
 Base MSRP
 Legislative District
 DOL Vehicle ID
 Vehicle Location
 Electric Utility
 2020 Census Tract
 Name: 167559, dtype: object

WBA
 Sn
 Sn

Plug-in Hybrid Electric Vehicle
 Not eligible due to low batter

11
 POINT (-122.15134 47.8
 PUGET SOUND ENE
 530610

Outlier Index: 167676
 VIN (1-10)
 County
 City
 State
 Postal Code
 Model Year
 Make
 Model
 Electric Vehicle Type
 Clean Alternative Fuel Vehicle (CAFV) Eligibility
 Electric Range
 Base MSRP
 Legislative District
 DOL Vehicle ID

LR
 Spot
 Freder

Plug-in Hybrid Electric Vehicle
 Clean Alternative Fuel Vehicle

2.

DOL Vehicle ID
 Vehicle Location POINT (-77.497285 3
 Electric Utility NON WASHINGTON STATE ELECTRIC
 2020 Census Tract 51177
 Name: 167676, dtype: object

Outlier Index: 167707
 VIN (1-10)
 County
 City
 State
 Postal Code
 Model Year
 Make
 Model
 Electric Vehicle Type Battery Electric
 Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fuel Veh
 Electric Range
 Base MSRP
 Legislative District
 DOL Vehicle ID
 Vehicle Location POINT (-122.308
 Electric Utility CITY OF SEATTLE - (WA)|CITY OF
 2020 Census Tract
 Name: 167707, dtype: object

Outlier Index: 167777
 VIN (1-10) WBA
 County
 City
 State
 Postal Code
 Model Year
 Make
 Model
 Electric Vehicle Type Plug-in Hybrid Electric Vehicle
 Clean Alternative Fuel Vehicle (CAFV) Eligibility Not eligible due to low batter
 Electric Range
 Base MSRP
 Legislative District
 DOL Vehicle ID 21
 Vehicle Location POINT (-117.425265 47.
 Electric Utility MODERN ELECTRIC WATER
 2020 Census Tract 530630
 Name: 167777, dtype: object

Outlier Index: 167862
 VIN (1-10)
 County
 City
 State
 Postal Code
 Model Year
 Make
 Model
 Electric Vehicle Type Plug-in Hybrid Electric
 Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fuel Ve
 Electric Range
 Base MSRP
 Legislative District
 DOL Vehicle ID
 Vehicle Location POINT (-122.18
 Electric Utility PUGET SOUND ENERGY INC||CITY OF
 2020 Census Tract
 Name: 167862, dtype: object

Outlier Index: 167907
 VIN (1-10)
 County
 City
 State
 Postal Code
 Model Year
 Make
 Model
 Electric Vehicle Type Plug-in Hybrid Elect
 Clean Alternative Fuel Vehicle (CAFV) Eligibility Not eligible due to
 Electric Range
 Base MSRP
 Legislative District


```
DOL Vehicle ID          1
Vehicle Location        POINT (-122.240535 46.720535)
Electric Utility         PUGET SOUND ENCLAVE
2020 Census Tract       53061
Name: 168193, dtype: object
```

Outlier Index: 168281
VIN (1-10) 5Y
County S
City Lake
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type Battery Electric Vehicle
Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fuel Vehicle
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID 3
Vehicle Location POINT (-122.112265)
Electric Utility PUGET SOUND EN
2020 Census Tract 53061
Name: 168281, dtype: object

Outlier Index: 168438	
VIN (1-10)	
County	
City	
State	
Postal Code	
Model Year	
Make	
Model	
Electric Vehicle Type	Plug-in Hybrid Electric
Clean Alternative Fuel Vehicle (CAFV) Eligibility	Not eligible due to
Electric Range	
Base MSRP	
Build Date	

Legislative District

DOL Vehicle ID

Vehicle Location

Electric Utility

2020 Census Tract

Name: 168438, dtype: object

POINT (-122.3

BONNEVILLE POWER ADMINISTRATION

Outlier Index: 168440

VIN (1-10)

County

City

State

Postal Code

Model Year

Make

Model

Electric Vehicle Type

Plug-in Hybrid Elect

Clean Alternative Fuel Vehicle (CAFV) Eligibility

Not eligible due to

Electric Range

Base MSRP

Legislative District

DOL Vehicle ID

Vehicle Location

POINT (-122.9

Electric Utility

2020 Census Tract

Name: 168440, dtype: object

BONNEVILLE POWER ADMINISTRATION

Outlier Index: 168520

VIN (1-10)

5Y

County

City

State

Postal Code

Model Year

Make

Model

Electric Vehicle Type

Battery Electric Vehic

Clean Alternative Fuel Vehicle (CAFV) Eligibility

Clean Alternative Fuel Vehicle

Electric Range

Base MSRP

Legislative District

DOL Vehicle ID

Vehicle Location

POINT (-120.32009 4

Electric Utility

PUD NO 1 OF CHELA

2020 Census Tract

53007

Name: 168520, dtype: object

Outlier Index: 168521

VIN (1-10)

County

City

State

Postal Code

Model Year

Make

Model

Electric Vehicle Type

Battery Elec

Clean Alternative Fuel Vehicle (CAFV) Eligibility

Clean Alternative Fue

Electric Range

Base MSRP

Legislative District

DOL Vehicle ID

Vehicle Location

POINT (-122.4

Electric Utility

BONNEVILLE POWER ADMINISTRATION

2020 Census Tract

Name: 168521, dtype: object

Outlier Index: 168573

VIN (1-10)

County

City

State

Postal Code

Model Year

Make

Model

Electric Vehicle Type

Battery Electric '

Clean Alternative Fuel Vehicle (CAFV) Eligibility

Clean Alternative Fuel Veh

Electric Range

Base MSRP

Legislative District
DOL Vehicle ID
Vehicle Location
Electric Utility
2020 Census Tract
Name: 168573, dtype: object

Outlier Index: 168579
VIN (1-10)
County
City
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type
Clean Alternative Fuel Vehicle (CAFV) Eligibility
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID
Vehicle Location
Electric Utility
2020 Census Tract
Name: 168579, dtype: object

WMZ' POINT (-122.3
T CITY OF SEATTLE - (WA)|CITY OF
I COU
Plug-in Hybrid Electric Vehicle
Not eligible due to low batter'
25 POINT (-122.92145 47.
PUGET SOUND ENE
530670

Outlier Index: 168620
VIN (1-10)
County
City
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type
Clean Alternative Fuel Vehicle (CAFV) Eligibility
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID
Vehicle Location
Electric Utility
2020 Census Tract
Name: 168620, dtype: object

Battery Elec
Clean Alternative Fue
POINT (-1
BONNEVILLE POWER ADMINISTRATION

Outlier Index: 168634
VIN (1-10)
County
City
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type
Clean Alternative Fuel Vehicle (CAFV) Eligibility
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID
Vehicle Location
Electric Utility
2020 Census Tract
Name: 168634, dtype: object

Plug-in Hybrid Elect
Clean Alternative Fue
POINT (-123
BONNEVILLE POWER ADMINISTRATION

Outlier Index: 168716
VIN (1-10)
County
City
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type
Clean Alternative Fuel Vehicle (CAFV) Eligibility
Electric Range
Base MSRP

Plug-in Hybrid Electric V
Not eligible due to low

Legislative District
DOL Vehicle ID
Vehicle Location
Electric Utility
2020 Census Tract
Name: 168716, dtype: object

Outlier Index: 168719
VIN (1-10)
County
City
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type
Clean Alternative Fuel Vehicle (CAFV) Eligibility
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID
Vehicle Location
Electric Utility
2020 Census Tract
Name: 168719, dtype: object

Outlier Index: 168758
VIN (1-10)
County
City
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type
Clean Alternative Fuel Vehicle (CAFV) Eligibility
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID
Vehicle Location
Electric Utility
2020 Census Tract
Name: 168758, dtype: object

Outlier Index: 168910
VIN (1-10)
County
City
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type
Clean Alternative Fuel Vehicle (CAFV) Eligibility
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID
Vehicle Location
Electric Utility
2020 Census Tract
Name: 168910, dtype: object

Outlier Index: 168935
VIN (1-10)
County
City
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type
Clean Alternative Fuel Vehicle (CAFV) Eligibility
Electric Range

POINT (-122.37
CITY OF SEATTLE - (WA)|CITY OF

Plug-in Hybrid Elect
Not eligible due to

POINT (-11
BONNEVILLE POWER ADMINISTRATION

Battery Elec
Clean Alternative Fue

POINT (-122
PUGET SOUND ENERGY INC||PUD NO

Plug-in Hybrid Elect
Not eligible due to

POINT (-12
BONNEVILLE POWER ADMINISTRATION

Battery Electric
Clean Alternative Fuel Ve

Base MSRP
Legislative District
DOL Vehicle ID
Vehicle Location POINT (-122.18
Electric Utility
PUGET SOUND ENERGY INC CITY OF

PUGET SOUND ENERGY INC | CITY OF

```
Outlier Index: 168953
VIN (1-10)
County
City
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type          Plug-in Hybrid Electric '
Clean Alternative Fuel Vehicle (CAFV) Eligibility      Not eligible due to low
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID
Vehicle Location                  POINT (-122.2757
Electric Utility
2020 Census Tract
Name: 168953, dtype: object
PUGET SOUND ENERGY INC||CITY OF
```

Base MSRP
Legislative District
DOL Vehicle ID
Vehicle Location POINT (-122.3
Electric Utility CITY OF SEATTLE - (WA)|CITY OF
2020 Census Tract
Name: 169055, dtype: object

Outlier Index: 169106
VIN (1-10) 2C
County
City C
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type Plug-in Hybrid Electric Vehicle
Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fuel Vehicle
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID 2
Vehicle Location POINT (-77.497965 3
Electric Utility NON WASHINGTON STATE ELECTRIC
2020 Census Tract 51107
Name: 169106, dtype: object

Outlier Index: 169237	
VIN (1-10)	5Y
County	
City	
State	
Postal Code	
Model Year	
Make	
Model	
Electric Vehicle Type	Battery Electric Vehic
Clean Alternative Fuel Vehicle (CAFV) Eligibility	Clean Alternative Fuel Vehicle

```
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID
Vehicle Location
Electric Utility
2020 Census Tract
Name: 169237, dtype: object
```

Outlier Index: 169327
VIN (1-10) KN
County S
City Mountlake
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type Battery Electric Vehic
Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fuel Vehicle
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID 3
Vehicle Location POINT (-122.30842 4
Electric Utility PUGET SOUND EN
2020 Census Tract 53061
Name: 169327, dtype: object

Outlier Index: 169508	
VIN (1-10)	JF2
County	
City	F
State	
Postal Code	
Model Year	
Make	
Model	CRA
Electric Vehicle Type	Plug-in Hybrid Electric Vehicle
Clean Alternative Fuel Vehicle (CAFV) Eligibility	Not eligible due to low battery

Electric Range
 Base MSRP
 Legislative District
 DOL Vehicle ID
 Vehicle Location POINT (-122.544745 48
 Electric Utility PUGET SOUND ENE
 2020 Census Tract 530299
 Name: 169508, dtype: object

Outlier Index: 169511
 VIN (1-10) 5Y
 County S
 City
 State
 Postal Code
 Model Year
 Make
 Model
 Electric Vehicle Type Battery Electric Vehic
 Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fuel Vehicle
 Electric Range
 Base MSRP
 Legislative District 1
 DOL Vehicle ID
 Vehicle Location POINT (-122.37507 4
 Electric Utility PUGET SOUND EN
 2020 Census Tract 53061
 Name: 169511, dtype: object

Outlier Index: 169530
 VIN (1-10) 5Y
 County S
 City Lake
 State
 Postal Code
 Model Year
 Make
 Model
 Electric Vehicle Type Battery Electric Vehic
 Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fuel Vehicle
 Electric Range
 Base MSRP
 Legislative District 2
 DOL Vehicle ID
 Vehicle Location POINT (-122.112265 4
 Electric Utility PUGET SOUND EN
 2020 Census Tract 53061
 Name: 169530, dtype: object

Outlier Index: 169538
 VIN (1-10)
 County
 City
 State
 Postal Code
 Model Year
 Make
 Model
 Electric Vehicle Type Battery Elec
 Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fue
 Electric Range
 Base MSRP
 Legislative District
 DOL Vehicle ID
 Vehicle Location POINT (-119 4
 Electric Utility BONNEVILLE POWER ADMINISTRATION
 2020 Census Tract
 Name: 169538, dtype: object

Outlier Index: 169563
 VIN (1-10) 2C
 County S
 City Ma
 State
 Postal Code
 Model Year
 Make
 Model
 Electric Vehicle Type Plug-in Hybrid Electric Vehic
 Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fuel Vehicle

Electric Range
 Base MSRP
 Legislative District
 DOL Vehicle ID
 Vehicle Location 2
 Electric Utility
 2020 Census Tract
 Name: 169563, dtype: object

POINT (-122.17673 4
 PUGET SOUND EN
 53061

Outlier Index: 169598
 VIN (1-10)
 County
 City
 State
 Postal Code
 Model Year
 Make
 Model
 Electric Vehicle Type Battery Electric
 Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fuel Ve
 Electric Range
 Base MSRP
 Legislative District
 DOL Vehicle ID
 Vehicle Location POINT (-122.341
 Electric Utility PUGET SOUND ENERGY INC|CITY OF
 2020 Census Tract
 Name: 169598, dtype: object

Outlier Index: 169640
 VIN (1-10)
 County
 City
 State
 Postal Code
 Model Year
 Make
 Model
 Electric Vehicle Type Battery Elec
 Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fue
 Electric Range
 Base MSRP
 Legislative District
 DOL Vehicle ID
 Vehicle Location POINT (-122.5
 Electric Utility BONNEVILLE POWER ADMINISTRATION
 2020 Census Tract
 Name: 169640, dtype: object

Outlier Index: 169652
 VIN (1-10)
 County
 City
 State
 Postal Code
 Model Year
 Make
 Model
 Electric Vehicle Type Battery Elec
 Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fue
 Electric Range
 Base MSRP
 Legislative District
 DOL Vehicle ID
 Vehicle Location POINT (-122.6
 Electric Utility BONNEVILLE POWER ADMINISTRATION
 2020 Census Tract
 Name: 169652, dtype: object

Outlier Index: 169730
 VIN (1-10)
 County
 City
 State
 Postal Code
 Model Year
 Make
 Model
 Electric Vehicle Type Plug-in Hybrid Elect

Clean Alternative Fuel Vehicle (CAEV) Eligibility
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID
Vehicle Location
Electric Utility
2020 Census Tract
Name: 169730, dtype: object

Not eligible due to
POINT (-122.5
BONNEVILLE POWER ADMINISTRATION

Outlier Index: 170164
VIN (1-10) 5Y
County S
City
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type Battery Electric Vehic
Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fuel Vehicle
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID 1
Vehicle Location POINT (-122.297265 4
Electric Utility PUGET SOUND EN
2020 Census Tract 53061
Name: 170164, dtype: object

Outlier Index: 170206
VIN (1-10)
County
City
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type Battery Electric

Clean Alternative Fuel Vehicle (CAFV) Eligibility
 Electric Range
 Base MSRP
 Legislative District
 DOL Vehicle ID
 Vehicle Location
 Electric Utility
 2020 Census Tract
 Name: 170206, dtype: object

POINT (-122.28493
 PUGET SOUND ENERGY INC||CITY OF

Outlier Index: 170246
 VIN (1-10)
 County
 City
 State
 Postal Code
 Model Year
 Make
 Model
 Electric Vehicle Type
 Clean Alternative Fuel Vehicle (CAFV) Eligibility
 Electric Range
 Base MSRP
 Legislative District
 DOL Vehicle ID
 Vehicle Location
 Electric Utility
 2020 Census Tract
 Name: 170246, dtype: object

Battery Electric Vehic
 Clean Alternative Fuel Vehicle

1.
 POINT (-122.338975 4
 PUGET SOUND EN
 53057

Outlier Index: 170389
 VIN (1-10)
 County
 City
 State
 Postal Code
 Model Year
 Make
 Model
 Electric Vehicle Type
 Clean Alternative Fuel Vehicle (CAFV) Eligibility
 Electric Range
 Base MSRP
 Legislative District
 DOL Vehicle ID
 Vehicle Location
 Electric Utility
 2020 Census Tract
 Name: 170389, dtype: object

Plug-in Hybrid Elect
 Not eligible due to

POINT (-119.
 BONNEVILLE POWER ADMINISTRATION

Outlier Index: 170473
 VIN (1-10)
 County
 City
 State
 Postal Code
 Model Year
 Make
 Model
 Electric Vehicle Type
 Clean Alternative Fuel Vehicle (CAFV) Eligibility
 Electric Range
 Base MSRP
 Legislative District
 DOL Vehicle ID
 Vehicle Location
 Electric Utility
 2020 Census Tract
 Name: 170473, dtype: object

Battery Electric '
 Clean Alternative Fuel Veh

POINT (-122.348.
 CITY OF SEATTLE - (WA)||CITY OF

Outlier Index: 170480
 VIN (1-10)
 County
 City
 State
 Postal Code
 Model Year
 Make
 Model
 Electric Vehicle Type

Battery Elec

ELECTRIC VEHICLE TYPE

Clean Alternative Fuel Vehicle (CAFV) Eligibility **BATTERY LIFE**

Electric Range Clean Alternative Fuel

Base MSRP

Legislative District

DOL Vehicle ID

Vehicle Location POINT (-122.4

Electric Utility PUGET SOUND ENERGY INC||PUD NO

2020 Census Tract

Name: 170480, dtype: object

Outlier Index: 170516

VIN (1-10)

County

City

State

Postal Code

Model Year

Make

Model

Electric Vehicle Type Plug-in Hybrid Elect

Clean Alternative Fuel Vehicle (CAFV) Eligibility Not eligible due to

Electric Range

Base MSRP

Legislative District

DOL Vehicle ID

Vehicle Location POINT (-

Electric Utility BONNEVILLE POWER ADMINISTRATION

2020 Census Tract

Name: 170516, dtype: object

Outlier Index: 170554

VIN (1-10)

County

City

State

Postal Code

Model Year

Make

Model

Electric Vehicle Type COU

Clean Alternative Fuel Vehicle (CAFV) Eligibility Plug-in Hybrid Electric Vehicle

Electric Range Not eligible due to low batter

Base MSRP

Legislative District

DOL Vehicle ID

Vehicle Location 23

Electric Utility POINT (-117.425265 47.

2020 Census Tract MODERN ELECTRIC WATER

Name: 170554, dtype: object 530630

Outlier Index: 170600

VIN (1-10)

County

City

State

Postal Code

Model Year

Make

Model

Electric Vehicle Type Battery Electric

Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fuel Ve

Electric Range

Base MSRP

Legislative District

DOL Vehicle ID

Vehicle Location POINT (-122.28493

Electric Utility PUGET SOUND ENERGY INC||CITY OF

2020 Census Tract

Name: 170600, dtype: object

Outlier Index: 170731

VIN (1-10)

County

City

State

Postal Code

Model Year

Make

Model

Electric Vehicle Type	Battery Elec
Clean Alternative Fuel Vehicle (CAFV) Eligibility	Clean Alternative Fue
Electric Range	
Base MSRP	
Legislative District	
DOL Vehicle ID	
Vehicle Location	POINT (-1
Electric Utility	BONNEVILLE POWER ADMINISTRATION
2020 Census Tract	
Name: 170731, dtype: object	

Outlier Index: 170794	
VIN (1-10)	
County	
City	
State	
Postal Code	
Model Year	
Make	
Model	
Electric Vehicle Type	Plug-in Hybrid Electric V
Clean Alternative Fuel Vehicle (CAFV) Eligibility	Not eligible due to low
Electric Range	
Base MSRP	
Legislative District	
DOL Vehicle ID	
Vehicle Location	POINT (-122.308
Electric Utility	CITY OF SEATTLE - (WA) CITY OF
2020 Census Tract	
Name: 170794, dtype: object	

Outlier Index: 170815	
VIN (1-10)	
County	
City	
State	
Postal Code	
Model Year	
Make	
Model	
Electric Vehicle Type	Plug-in Hybrid Electric V
Clean Alternative Fuel Vehicle (CAFV) Eligibility	Not eligible due to low
Electric Range	
Base MSRP	
Legislative District	
DOL Vehicle ID	
Vehicle Location	POINT (-122.317
Electric Utility	CITY OF SEATTLE - (WA) CITY OF
2020 Census Tract	
Name: 170815, dtype: object	

Outlier Index: 170821	
VIN (1-10)	KN
County	
City	G
State	
Postal Code	
Model Year	
Make	
Model	
Electric Vehicle Type	Battery Electric Vehic
Clean Alternative Fuel Vehicle (CAFV) Eligibility	Clean Alternative Fuel Vehicle
Electric Range	
Base MSRP	
Legislative District	
DOL Vehicle ID	1
Vehicle Location	POINT (-122.6071588 48.
Electric Utility	PUGET SOUND EN
2020 Census Tract	53029
Name: 170821, dtype: object	

Outlier Index: 170885	
VIN (1-10)	
County	
City	
State	
Postal Code	
Model Year	
Make	
Model	

Electric Vehicle Type Battery Electric
Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fuel Ve
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID
Vehicle Location POINT (-122.02227
Electric Utility PUGET SOUND ENERGY INC||CITY OF
2020 Census Tract
Name: 170885, dtype: object

Outlier Index: 171075	
VIN (1-10)	
County	
City	
State	
Postal Code	
Model Year	
Make	
Model	
Electric Vehicle Type	Plug-in Hybrid Electric
Clean Alternative Fuel Vehicle (CAFV) Eligibility	Not eligible due to
Electric Range	
Base MSRP	
Legislative District	
DOL Vehicle ID	
Vehicle Location	POINT (-12
Electric Utility	BONNEVILLE POWER ADMINISTRATION
2020 Census Tract	
Name: 171075	dtype: object

Outlier Index: 171109
VIN (1-10)
County
City
State
Postal Code
Model Year
Make
Model

```
Electric Vehicle Type          Battery Elec
Clean Alternative Fuel Vehicle (CAFV) Eligibility   Clean Alternative Fue
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID
Vehicle Location             POINT (-122.3
Electric Utility           BONNEVILLE POWER ADMINISTRATION
2020 Census Tract
Name: 171109, dtype: object
```

Outlier Index: 171227
VIN (1-10)
County
City
State
Postal Code
Model Year
Make

Model
 Electric Vehicle Type Plug-in Hybrid Electric V
 Clean Alternative Fuel Vehicle (CAFV) Eligibility Not eligible due to low
 Electric Range
 Base MSRP
 Legislative District
 DOL Vehicle ID
 Vehicle Location POINT (-122.2
 Electric Utility CITY OF SEATTLE - (WA)|CITY OF
 2020 Census Tract
 Name: 171227, dtype: object

Outlier Index: 171237
 VIN (1-10)
 County
 City
 State
 Postal Code
 Model Year
 Make
 Model
 Electric Vehicle Type Battery Electric
 Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fuel Ve
 Electric Range
 Base MSRP
 Legislative District
 DOL Vehicle ID
 Vehicle Location POINT (-122.180
 Electric Utility PUGET SOUND ENERGY INC||CITY OF
 2020 Census Tract
 Name: 171237, dtype: object

Outlier Index: 171370
 VIN (1-10)
 County
 City
 State
 Postal Code
 Model Year
 Make
 Model
 Electric Vehicle Type Battery Electric
 Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fuel Ve
 Electric Range
 Base MSRP
 Legislative District
 DOL Vehicle ID
 Vehicle Location POINT (-122.15
 Electric Utility PUGET SOUND ENERGY INC||CITY OF
 2020 Census Tract
 Name: 171370, dtype: object

Outlier Index: 171397
 VIN (1-10) KN
 County
 City Moun
 State
 Postal Code
 Model Year
 Make
 Model
 Electric Vehicle Type Battery Electric Vehic
 Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fuel Vehicle
 Electric Range
 Base MSRP
 Legislative District
 DOL Vehicle ID 1
 Vehicle Location POINT (-122.322955
 Electric Utility PUGET SOUND EN
 2020 Census Tract 53057
 Name: 171397, dtype: object

Outlier Index: 171622
 VIN (1-10) 5Y
 County
 City
 State
 Postal Code
 Model Year
 Make

```
Name
Model
Electric Vehicle Type          Battery Electric Vehicle
Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fuel Vehicle
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID                 1
Vehicle Location                POINT (-122.408015 4
Electric Utility                  PUGET SOUND EN
2020 Census Tract               53029
Name: 171622, dtype: object
```

Outlier Index: 171838
VIN (1-10) 5Y
County S
City
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type Battery Electric Vehic
Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fuel Vehicle
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID 2
Vehicle Location POINT (-122.297265 4
Electric Utility PUGET SOUND EN
2020 Census Tract 53061
Name: 171838, dtype: object

Outlier Index: 171961
VIN (1-10)
County
City
State
Postal Code
Model Year

Make	
Model	
Electric Vehicle Type	Plug-in Hybrid Electric
Clean Alternative Fuel Vehicle (CAFV) Eligibility	Not eligible due to
Electric Range	
Base MSRP	
Legislative District	
DOL Vehicle ID	
Vehicle Location	POINT (-1
Electric Utility	BONNEVILLE POWER ADMINISTRATION
2020 Census Tract	
Name: 171961, dtype: object	

Outlier Index: 172442
VIN (1-10)
County
City
State
Postal Code
Model Year

Make		
Model		
Electric Vehicle Type	Battery Electric	
Clean Alternative Fuel Vehicle (CAFV) Eligibility	Clean Alternative Fuel Ve	
Electric Range		
Base MSRP		
Legislative District		
DOL Vehicle ID		
Vehicle Location	POINT (-122.29	
Electric Utility	PUGET SOUND ENERGY INC CITY OF	
2020 Census Tract		
Name: 172442, dtype: object		
Outlier Index: 172504		
VIN (1-10)		5Y
County		S
City		
State		
Postal Code		
Model Year		
Make		
Model		
Electric Vehicle Type	Battery Electric Vehic	
Clean Alternative Fuel Vehicle (CAFV) Eligibility	Clean Alternative Fuel Vehicle	
Electric Range		
Base MSRP		
Legislative District		
DOL Vehicle ID		34
Vehicle Location	POINT (-122.1873 47	
Electric Utility	PUGET SOUND EN	
2020 Census Tract		53061
Name: 172504, dtype: object		
Outlier Index: 172511		
VIN (1-10)		
County		
City		
State		
Postal Code		
Model Year		
Make		
Model		
Electric Vehicle Type	Battery Electric	
Clean Alternative Fuel Vehicle (CAFV) Eligibility	Clean Alternative Fuel Ve	
Electric Range		
Base MSRP		
Legislative District		
DOL Vehicle ID		
Vehicle Location	POINT (-122.11	
Electric Utility	PUGET SOUND ENERGY INC CITY OF	
2020 Census Tract		
Name: 172511, dtype: object		
Outlier Index: 172517		
VIN (1-10)		
County		
City		
State		
Postal Code		
Model Year		
Make		
Model		
Electric Vehicle Type	Plug-in Hybrid Electric V	
Clean Alternative Fuel Vehicle (CAFV) Eligibility	Not eligible due to low	
Electric Range		
Base MSRP		
Legislative District		
DOL Vehicle ID		
Vehicle Location	POINT (-122.32	
Electric Utility	CITY OF SEATTLE - (WA) CITY OF	
2020 Census Tract		
Name: 172517, dtype: object		

Outlier Index:	172561
VIN (1-10)	WBA
County	
City	Sedro-Wallace
State	WA
Postal Code	98274
Model Year	2018
Make	BMW
Model	5 Series
Electric Vehicle Type	Plug-in Hybrid Electric Vehicle
Clean Alternative Fuel Vehicle (CAFV) Eligibility	Not eligible due to low battery range
Electric Range	100 miles
Base MSRP	\$45,000
Legislative District	34
DOL Vehicle ID	POINT (-122.234 48.052)
Vehicle Location	PUGET SOUND ENE
Electric Utility	530579
2020 Census Tract	
Name: 172561, dtype: object	

Outlier Index: 172634
VIN (1-10) KN
County ()
City
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type Battery Electric Vehic
Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fuel Vehicle
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID 1
Vehicle Location POINT (-119.903265 4
Electric Utility PUD NO 1 OF OKANOGA
2020 Census Tract 53047
Name: 172634, dtype: object

Outlier Index: 172667
VIN (1-10)
County
City
State
Postal Code

Outlier Index: 172845
VIN (1-10) WBA
County Sn
City
State
Postal Code

Model Year	
Make	
Model	
Electric Vehicle Type	Plug-in Hybrid Electric Vehicle
Clean Alternative Fuel Vehicle (CAFV) Eligibility	Not eligible due to low battery
Electric Range	
Base MSRP	
Legislative District	
DOL Vehicle ID	10
Vehicle Location	POINT (-122.335685 47
Electric Utility	PUGET SOUND ENE
2020 Census Tract	530610
Name: 172845, dtype: object	

Outlier Index: 173304
VIN (1-10)
County
City
State

Postal Code
Model Year
Make
Model
Electric Vehicle Type Battery Electric
Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fuel Ve
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID
Vehicle Location POINT (-122.18209
Electric Utility PUGET SOUND ENERGY INC||CITY OF
2020 Census Tract
Name: 173304, dtype: object

Outlier Index: 173323
VIN (1-10) 5Y
County S
City
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type Battery Electric Vehic
Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fuel Vehicle
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID 2
Vehicle Location POINT (-122.2247757 47.
Electric Utility PUGET SOUND EN
2020 Census Tract 53061
Name: 173323, dtype: object

Outlier Index: 173379
VIN (1-10) KN
County
City A
State

Outlier Index: 173607
VIN (1-10)
County
City
State

Outlier Index: 173632
VIN (1-10) 5Y
County
City Moun
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type Battery Electric Vehic
Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fuel Vehicle
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID 3
Vehicle Location POINT (-122.322955 4
Electric Utility PUGET SOUND EN
2020 Census Tract 53057
Name: 173632, dtype: object

Outlier Index: 173674
VIN (1-10)
County
City

Outlier Index: 173762
VIN (1-10) WBA
County T
City I
State 1
Postal Code
Model Year
Make
Model
Electric Vehicle Type Plug-in Hybrid Electric Vehicle
Clean Alternative Fuel Vehicle (CAFV) Eligibility Not eligible due to low battery
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID 27
Vehicle Location POINT (-122.92145 47.
Electric Utility PUGET SOUND ENE
2020 Census Tract 530670
Name: 173762, dtype: object

Outlier Index: 173991
VIN (1-10)
County
City

Outlier Index: 174035
VIN (1-10)
County WMZ
City
State Sedro-W
Postal Code
Model Year
Make
Model COU
Electric Vehicle Type Plug-in Hybrid Electric Vehicle
Clean Alternative Fuel Vehicle (CAFV) Eligibility Not eligible due to low battery
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID 19
Vehicle Location POINT (-122.234 48.
Electric Utility PUGET SOUND ENE
2020 Census Tract 530579
Name: 174035, dtype: object

Outlier Index: 174138
VIN (1-10) 5Y
County
City L
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type Battery Electric Vehic
Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fuel Vehicle
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID 2
Vehicle Location POINT (-115.2677 36
Electric Utility NON WASHINGTON STATE ELECTRIC
2020 Census Tract 32003
Name: 174138, dtype: object

Outlier Index: 174150
VIN (1-10)
County

City
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type Battery Elec
Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fue
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID
Vehicle Location POINT (-122
Electric Utility PUGET SOUND ENERGY INC|PUD NO
2020 Census Tract
Name: 174150, dtype: object

Outlier Index:	174222	
VIN (1-10)		WMZV
County		
City		
State		
Postal Code		
Model Year		
Make		
Model		COU
Electric Vehicle Type	Plug-in Hybrid Electric Vehicle	
Clean Alternative Fuel Vehicle (CAFV) Eligibility	Not eligible due to low battery	
Electric Range		
Base MSRP		
Legislative District		
DOL Vehicle ID	26	
Vehicle Location	POINT (-122.64177 47.	
Electric Utility	PUGET SOUND ENE	
2020 Census Tract		530350
Name: 174222, dtype: object		

Outlier Index: 174240
VIN (1-10) 5Y
County S
City
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type Battery Electric Vehic
Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fuel Vehicle
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID 1
Vehicle Location POINT (-122.297265 4
Electric Utility PUGET SOUND EN
2020 Census Tract 53061
Name: 174240, dtype: object

Outlier Index: 174281
VIN (1-10)
County

Outlier Index: 174581
VIN (1-10) 5Y
County
City Moun
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type Battery Electric Vehic
Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fuel Vehicle
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID 1
Vehicle Location POINT (-122.338975 4
Electric Utility PUGET SOUND EN
2020 Census Tract 53057
Name: 174581, dtype: object

Outlier Index: 174622
VIN (1-10) County 5Y
S

Outlier Index: 174731
VIN (1-10) WBA

County
City
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type Plug-in Hybrid Electric Vehicle
Clean Alternative Fuel Vehicle (CAFV) Eligibility Not eligible due to low battery
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID 24
Vehicle Location POINT (-122.6788673 48.2
Electric Utility PUGET SOUND ENE
2020 Census Tract 530299
Name: 174731, dtype: object

Outlier Index: 174770
VIN (1-10)
County 5Y
City
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type Battery Electric Vehicle
Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fuel Vehicle
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID 2
Vehicle Location POINT (-122.335685 4
Electric Utility PUGET SOUND EN
2020 Census Tract 53061
Name: 174770, dtype: object

Outlier Index: 174824
VIN (1-10)
County
City
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type Battery Electric
Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fuel Veh
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID
Vehicle Location POINT (-122.32
Electric Utility
2020 Census Tract
Name: 174824, dtype: object

Outlier Index: 174876
VIN (1-10)
County
City
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type Battery Elec
Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fue
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID
Vehicle Location
Electric Utility POINT (-
2020 Census Tract
Name: 174876, dtype: object

Outlier Index: 175051
VIN (1-10)

Outlier Index: 175135
VIN (1-10) 5Y
County S
City Ma
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type Battery Electric Vehic
Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fuel Vehicle
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID 1
Vehicle Location POINT (-122.17673 4
Electric Utility PUGET SOUND EN
2020 Census Tract 53061
Name: 175135, dtype: object

Outlier Index: 175214

Outlier Index: 175368

VIN (1-10)
 County
 City
 State
 Postal Code
 Model Year
 Make
 Model
 Electric Vehicle Type
 Clean Alternative Fuel Vehicle (CAFV) Eligibility
 Electric Range
 Base MSRP
 Legislative District
 DOL Vehicle ID
 Vehicle Location
 Electric Utility
 2020 Census Tract
 Name: 175368, dtype: object

Plug-in Hybrid Electric
 Not eligible due to low

POINT (-122.28493
 PUGET SOUND ENERGY INC||CITY OF

Outlier Index: 175378
 VIN (1-10)
 County
 City
 State
 Postal Code
 Model Year
 Make
 Model
 Electric Vehicle Type
 Clean Alternative Fuel Vehicle (CAFV) Eligibility
 Electric Range
 Base MSRP
 Legislative District
 DOL Vehicle ID
 Vehicle Location
 Electric Utility
 2020 Census Tract
 Name: 175378, dtype: object

Plug-in Hybrid Electric Vehicle
 Not eligible due to low batter

47.
 POINT (-120.477805 46.
 PAC
 530770

Outlier Index: 175427
 VIN (1-10)
 County
 City
 State
 Postal Code
 Model Year
 Make
 Model
 Electric Vehicle Type
 Clean Alternative Fuel Vehicle (CAFV) Eligibility
 Electric Range
 Base MSRP
 Legislative District
 DOL Vehicle ID
 Vehicle Location
 Electric Utility
 2020 Census Tract
 Name: 175427, dtype: object

Battery Elec
 Clean Alternative Fue

POINT (-12
 BONNEVILLE POWER ADMINISTRATION

Outlier Index: 175554
 VIN (1-10)
 County
 City
 State
 Postal Code
 Model Year
 Make
 Model
 Electric Vehicle Type
 Clean Alternative Fuel Vehicle (CAFV) Eligibility
 Electric Range
 Base MSRP
 Legislative District
 DOL Vehicle ID
 Vehicle Location
 Electric Utility
 2020 Census Tract
 Name: 175554, dtype: object

Battery Elec
 Clean Alternative Fue

POINT (-12
 BONNEVILLE POWER ADMINISTRATION

Outlier Index: 175695

Outlier Index: 175706
VIN (1-10) 5Y
County
City G
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type Battery Electric Vehic
Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fuel Vehicle
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID 2
Vehicle Location POINT (-122.6071588 48.
Electric Utility PUGET SOUND EN
2020 Census Tract 53029
Name: 175706, dtype: object

Outlier Index: 176083
VIN (1-10) KN
County S
City S
State Lake
Postal Code
Model Year
Make
Model
Electric Vehicle Type Battery Electric Vehic
Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fuel Vehicle
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID 3
Vehicle Location POINT (-122.112265 4
Electric Utility PUGET SOUND EN
2020 Census Tract 53061
Name: 176083, dtype: object

Outlier Index: 176155
VIN (1-10)
County
City
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type
Clean Alternative Fuel Vehicle (CAFV) Eligibility
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID
Vehicle Location
Electric Utility
2020 Census Tract
Name: 176155, dtype: object

WH
Plug-in Hybrid Electric
Clean Alternative Fuel
POINT (-122.1 55.25)
BONNEVILLE POWER ADMINISTRATION

Outlier Index: 176306
VIN (1-10)
County
City
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type
Clean Alternative Fuel Vehicle (CAFV) Eligibility
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID
Vehicle Location
Electric Utility
2020 Census Tract
Name: 176306, dtype: object

5Y
Battery Electric Vehicle
Clean Alternative Fuel Vehicle
POINT (-119.168765 46.25)
PUD NO 2 OF GRAN
53025

Outlier Index: 176330
VIN (1-10)
County
City
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type
Clean Alternative Fuel Vehicle (CAFV) Eligibility
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID
Vehicle Location
Electric Utility
2020 Census Tract
Name: 176330, dtype: object

Battery Electric
Clean Alternative Fuel Vehicle
POINT (-122.1 55.25)
PUGET SOUND ENERGY INC||CITY OF

Outlier Index: 176378
VIN (1-10)
County
City
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type
Clean Alternative Fuel Vehicle (CAFV) Eligibility
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID
Vehicle Location
Electric Utility
2020 Census Tract
Name: 176378, dtype: object

Plug-in Hybrid Electric
Not eligible due to low
POINT (-122.20125 55.25)
PUGET SOUND ENERGY INC||CITY OF

Outlier Index: 176478
VIN (1-10) 5Y
County S
City Ma
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type Battery Electric Vehic
Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fuel Vehicle
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID 2
Vehicle Location POINT (-122.17673 4
Electric Utility PUGET SOUND EN
2020 Census Tract 53061
Name: 176478. dtvne: object

Outlier Index: 176554
VIN (1-10) 5Y
County S
City
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type Battery Electric Vehic
Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fuel Vehicle
Electric Range
Base MSRP
Legislative District 2
DOL Vehicle ID
Vehicle Location POINT (-121.972215 4
Electric Utility PUGET SOUND EN
2020 Census Tract 53061
Name: 176554, dtype: object

Outlier Index: 176575
VIN (1-10)
County
City
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type Battery Electric
Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fuel Ve
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID
Vehicle Location POINT (-121.91059,
Electric Utility PUGET SOUND ENERGY INC||CITY OF
2020 Census Tract
Name: 176575, dtype: object

Outlier Index: 176677
VIN (1-10)
County
City
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type Plug-in Hybrid Elect
Clean Alternative Fuel Vehicle (CAFV) Eligibility Not eligible due to
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID
Vehicle Location POINT (-12
Electric Utility BONNEVILLE POWER ADMINISTRATION
2020 Census Tract
Name: 176677, dtype: object

Outlier Index: 176708
VIN (1-10) KN
County S
City
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type Battery Electric Vehic
Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fuel Vehicle
Electric Range
Base MSRP
Legislative District 2
DOL Vehicle ID
Vehicle Location POINT (-122.1873 47
Electric Utility PUGET SOUND EN
2020 Census Tract 53061
Name: 176708, dtype: object

Name: 176708, dtype: object

Outlier Index: 176760
VIN (1-10) KN
County
City A
State
Postal Code
Model Year
Make
Model
Electric Vehicle Type Battery Electric Vehic
Clean Alternative Fuel Vehicle (CAFV) Eligibility Clean Alternative Fuel Vehicle
Electric Range
Base MSRP
Legislative District
DOL Vehicle ID 1
Vehicle Location POINT (-122.615305 48
Electric Utility PUGET SOUND EN
2020 Census Tract 53057
Name: 176760, dtype: object

Outlier Index: 176790	
VIN (1-10)	YV4
County	T
City	(
State)
Postal Code	
Model Year	
Make	
Model	
Electric Vehicle Type	Plug-in Hybrid Electric Vehicle
Clean Alternative Fuel Vehicle (CAFV) Eligibility	Not eligible due to low battery
Electric Range	
Base MSRP	
Legislative District	
DOL Vehicle ID	25
Vehicle Location	POINT (-122.8874781 47.0
Electric Utility	PUGET SOUND ENE
2020 Census Tract	530670

Name: 176790, dtype: object
Outlier Index: 176836
VIN (1-10)
County
City
State
Postal Code
Model Year
Make
Model

```
Electric Vehicle Type          Plug-in Hybrid Electric  
Clean Alternative Fuel Vehicle (CAFV) Eligibility  Clean Alternative Fuel  
Electric Range  
Base MSRP  
Legislative District  
DOL Vehicle ID  
Vehicle Location             POINT (-122  
Electric Utility           PUGET SOUND ENERGY INC|PUD NO  
2020 Census Tract  
Name: 176836, dtype: object
```

Outlier Index: 176961	
VIN (1-10)	
County	
City	
State	
Postal Code	
Model Year	
Make	
Model	
Electric Vehicle Type	Plug-in Hybrid Electric
Clean Alternative Fuel Vehicle (CAFV) Eligibility	Not eligible due to
Electric Range	
Base MSRP	
Legislative District	
DOL Vehicle ID	
Vehicle Location	POINT (-122
Electric Utility	BONNEVILLE POWER ADMINISTRATION
2020 Census Tract	

2020 Census Tract

Name: 176961, dtype: object

Outlier Index: 177022

VIN (1-10)

County

City

State

Postal Code

Model Year

Make

Model

Electric Vehicle Type

Battery Electric

Clean Alternative Fuel Vehicle (CAFV) Eligibility

Clean Alternative Fuel Ve

Electric Range

Base MSRP

Legislative District

DOL Vehicle ID

Vehicle Location

POINT (-122.234

Electric Utility

2020 Census Tract

Name: 177022, dtype: object

Outlier Index: 177034

VIN (1-10)

County

City

State

Postal Code

Model Year

Make

Model

Electric Vehicle Type

Plug-in Hybrid Elect

Clean Alternative Fuel Vehicle (CAFV) Eligibility

Clean Alternative Fue

Electric Range

Base MSRP

Legislative District

DOL Vehicle ID

Vehicle Location

POINT (-122.3

Electric Utility

2020 Census Tract

Name: 177034, dtype: object

Outlier Index: 177040

VIN (1-10)

County

City

State

Postal Code

Model Year

Make

Model

Electric Vehicle Type

Battery Elec

Clean Alternative Fuel Vehicle (CAFV) Eligibility

Clean Alternative Fue

Electric Range

Base MSRP

Legislative District

DOL Vehicle ID

Vehicle Location

POINT (-

Electric Utility

2020 Census Tract

BONNEVILLE POWER ADMINISTRATION

Name: 177040, dtype: object

Outlier Index: 177072

VIN (1-10)

County

City

State

Postal Code

Model Year

Make

Model

Electric Vehicle Type

Plug-in Hybrid Electric V

Clean Alternative Fuel Vehicle (CAFV) Eligibility

Not eligible due to low

Electric Range

Base MSRP

Legislative District

DOL Vehicle ID

Vehicle Location

POINT (-122.32

Electric Utility

CITY OF SEATTLE - (WA)|CITY OF

2020 Census Tract
Name: 177072, dtype: object

Electric Utility
2020 Census Tract
Name: 177605, dtype: object

Output:

The code identifies outliers in the 'Electric Range' and 'Base MSRP' columns, visualizes them using box plots, and validates these outliers based on specified valid ranges. Outliers outside the range of 50 to 350 miles for electric range and 20,000 to 150,000 for base MSRP are flagged as invalid. The output includes listings of all detected outliers and the subset of invalid outliers based on domain knowledge.

10- Do the necessary data cleaning steps like dropping duplicates, unnecessary columns, null value imputation, outliers treatment etc

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Start coding or generate with AI.

Start coding or generate with AI.

→ Summary after Data Cleaning:

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 177866 entries, 0 to 177865
Data columns (total 12 columns):
 #   Column           Non-Null Count   Dtype  
 ---  -- 
 0   County          177861 non-null    object  
 1   City            177861 non-null    object  
 2   State           177866 non-null    object  
 3   Postal Code     177861 non-null    float64 
 4   Model Year      177866 non-null    int64  
 5   Make            177859 non-null    object  
 6   Model           177862 non-null    object  
 7   Electric Vehicle Type 177860 non-null    object  
 8   Clean Alternative Fuel Vehicle (CAFV) Eligibility 177864 non-null    object  
 9   Electric Range   177866 non-null    float64 
 10  Base MSRP        177866 non-null    float64 
 11  Legislative District 177477 non-null    object  
dtypes: float64(3), int64(1), object(8)
memory usage: 16.3+ MB
None
```

Sample of Cleaned Data:

	County	City	State	Postal Code	Model Year	Make	Model	\
0	King	Seattle	WA	98122.0	2020	TESLA	MODEL Y	
1	Snohomish	Bothell	WA	98021.0	2023	TESLA	MODEL Y	
2	King	Seattle	WA	98109.0	2019	TESLA	MODEL S	
3	King	Issaquah	WA	98027.0	2016	TESLA	MODEL S	
4	Kitsap	Suquamish	WA	98392.0	2021	NaN	MODEL Y	

	Electric Vehicle Type	\
0	Battery Electric Vehicle (BEV)	
1	Battery Electric Vehicle (BEV)	
2	Battery Electric Vehicle (BEV)	
3	Battery Electric Vehicle (BEV)	
4	Battery Electric Vehicle (BEV)	

	Clean Alternative Fuel Vehicle (CAFV) Eligibility	Electric Range	\
0	Clean Alternative Fuel Vehicle Eligible	187.5	
1	Eligibility unknown as battery range has not b...	0.0	
2	NaN	187.5	
3	Clean Alternative Fuel Vehicle Eligible	187.5	
4	Eligibility unknown as battery range has not b...	0.0	

	Base MSRP	Legislative District
0	0.0	37
1	0.0	1
2	0.0	36
3	0.0	5
4	0.0	23

Output:

The code performs data cleaning by removing duplicates and unnecessary columns, converting columns to appropriate data types, imputing missing values with medians, and treating outliers using the IQR method. The cleaned dataset retains essential information, ensuring accuracy and consistency for further analysis. The output includes an updated dataset structure and a sample of the cleaned data.

✓ The primary objective of this analysis

The primary objective of this analysis is to leverage historical EV registration data to understand the current market penetration of EVs, predict future market growth, and identify key trends and factors driving market expansion. The specific goals include:

✓ 1- Descriptive Statistics:

- What are the mean, median, and standard deviation of the base MSRP for the vehicles in the dataset?

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→ Mean of MSRP : 1073.1093632284978
Median of MSRP : 0.0
Standard Deviation of MSRP : 8358.624956091093

Functionality:

- .mean() calculates the mean of the base MSRP.
- .median() computes the median of the base MSRP.
- .std() computes the standard deviation of the base MSRP.
- print() displays the mean, median, and standard deviation of the base MSRP.

Output Summary:

The code effectively computes and prints the mean, median, and standard deviation of the base MSRP for the vehicles in the dataset, providing a summary of the pricing distribution.

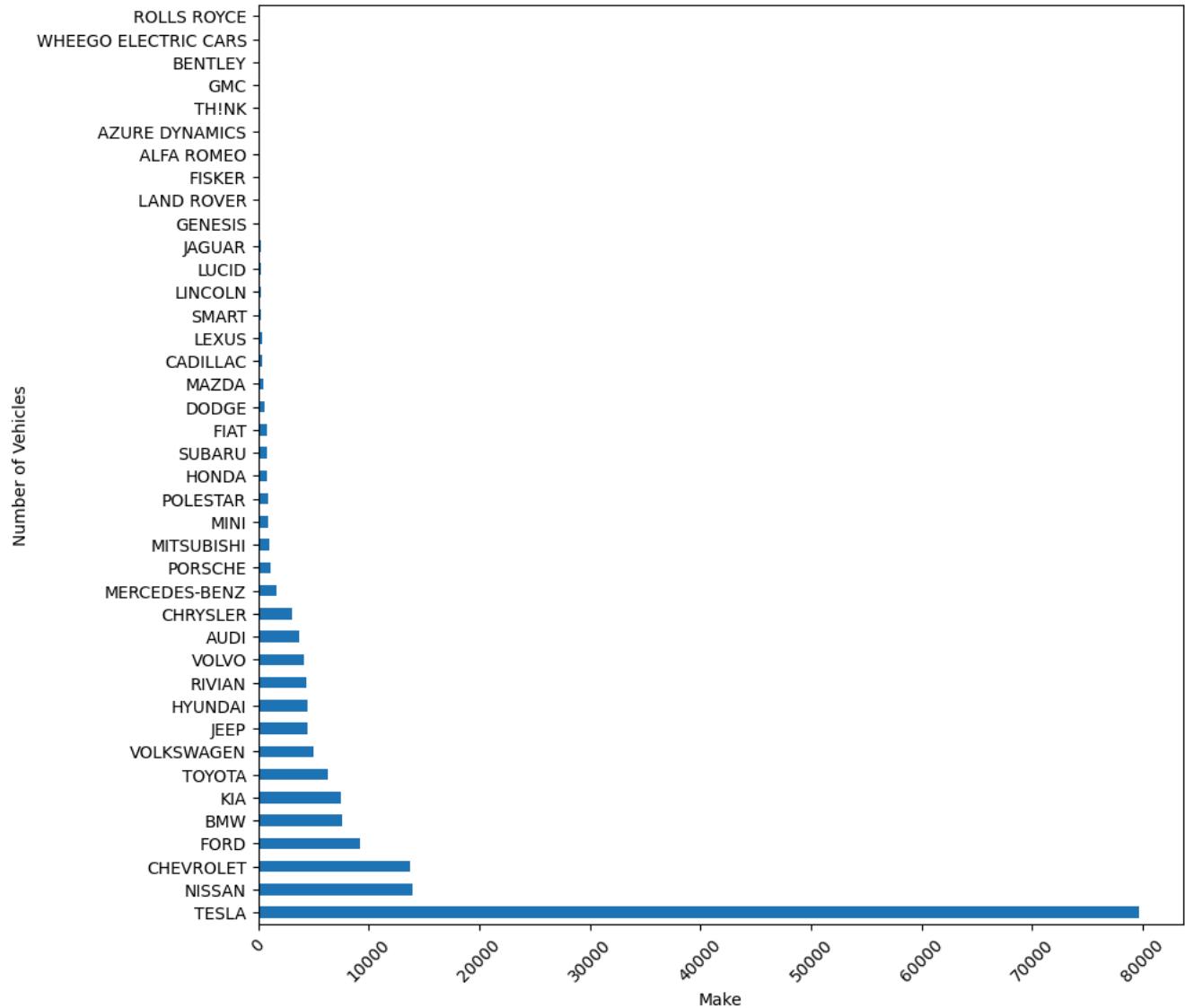
✓ 2- Data Distribution:

- What is the distribution of vehicle makes in the dataset? Represent it using a bar chart.

Start coding or generate with AI.



Distribution of Vehicle Makes



Functionality:

- `.value_counts()` computes the count of each vehicle make.
- `.plot(kind='barh')` plots a horizontal bar chart to visualize the distribution of vehicle makes.
- `plt.xticks(rotation=45)` rotates the x-axis labels for better readability.

Output Summary:

The code effectively visualizes the distribution of vehicle makes using a horizontal bar chart, providing insights into the prevalence of different vehicle manufacturers in the dataset.

▼ 3- Model Year Analysis:

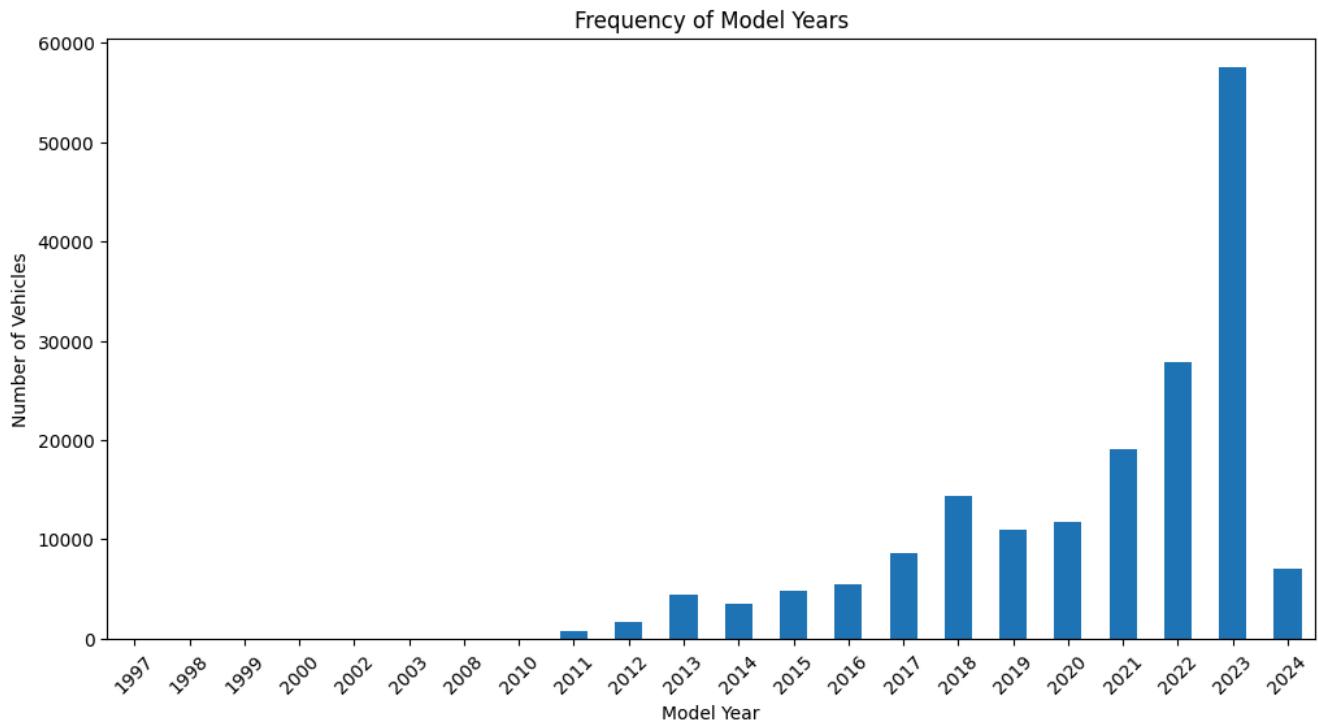
- What are the most common model years in the dataset? Provide a frequency table and histogram.

Start coding or generate with AI.

Frequency Table of Model Years:

Model Year	Count
1997	1
1998	1
1999	5
2000	7
2002	2
2003	1
2008	20
2010	23
2011	775
2012	1618
2013	4409
2014	3509
2015	4844
2016	5483
2017	8562
2018	14323
2019	10940
2020	11768
2021	19132
2022	27776
2023	57587
2024	7080

Name: count, dtype: int64



Functionality:

- print() displays the frequency table of model years.
- .plot(kind='bar') plots a histogram to visualize the distribution of model years.
- plt.xticks(rotation=45) rotates the x-axis labels for better readability.

Output Summary:

The code effectively provides insights into the most common model years in the dataset through both a frequency table and a histogram, facilitating easy interpretation of the distribution of model years.

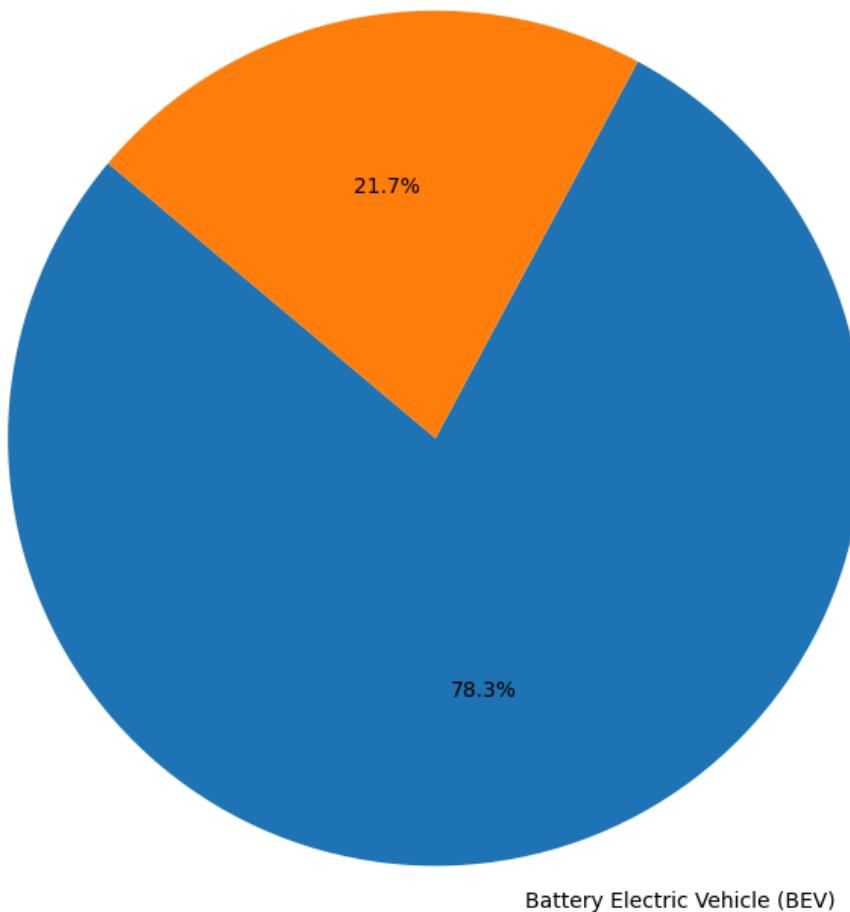
4- Electric Vehicle Type:

- What is the proportion of Battery Electric Vehicles (BEV) versus other types of electric vehicles?

Start coding or generate with AI.

	EV Type	Count
0	Battery Electric Vehicle (BEV)	139204
1	Other Electric Vehicles	38656

Proportion of BEV vs Other Electric Vehicles
Other Electric Vehicles



Functionality:

- `.value_counts()` computes the count of each electric vehicle type.
- `.get('Battery Electric Vehicle (BEV)', 0)` retrieves the count of BEVs.
- `pd.DataFrame()` creates a DataFrame to store the proportions.
- `plt.pie()` plots a pie chart to visualize the proportions.

Output Summary:

The code effectively calculates and displays the proportion of Battery Electric Vehicles (BEV) versus other electric vehicle types through both a DataFrame and a pie chart, providing clear insights into the distribution of electric vehicle types in the dataset.

✓ 5- Electric Range Analysis:

- What is the average electric range for vehicles of different makes? Provide a summary table.

Start coding or generate with AI.

	Make	Average Electric Range
0	ALFA ROMEO	33.000000
1	AUDI	50.984641
2	AZURE DYNAMICS	56.000000
3	BENTLEY	19.666667
4	BMW	201.159730
5	CADILLAC	8.798429
6	CHEVROLET	94.552785

7	CHRYSLER	32.212162
8	DODGE	32.000000
9	FIAT	85.645408
10	FISKER	8.755102
11	FORD	10.812914
12	GENESIS	0.000000
13	GMC	0.000000
14	HONDA	46.600240
15	HYUNDAI	19.362914
16	JAGUAR	203.741379
17	JEEP	22.365402
18	KIA	44.650161
19	LAND ROVER	25.000000
20	LEXUS	18.800000
21	LINCOLN	23.543071
22	LUCID	0.000000
23	MAZDA	25.781513
24	MERCEDES-BENZ	9.346130
25	MINI	18.036789
26	MITSUBISHI	30.646138
27	NISSAN	80.348053
28	POLESTAR	37.776644
29	PORSCHE	44.812116
30	RIVIAN	0.000000
31	ROLLS ROYCE	0.000000
32	SMART	62.325926
33	SUBARU	1.350181
34	TESLA	77.341268
35	TH!NK	100.000000
36	TOYOTA	28.095102
37	VOLKSWAGEN	22.927058
38	VOLVO	16.135737
39	WHEEGO ELECTRIC CARS	100.000000

Functionality:

- pd.to_numeric(df['Electric Range'], errors='coerce') converts the 'Electric Range' column to numeric values, ignoring errors for non-convertible values.
- .dropna(subset=['Electric Range']) removes rows with missing or non-convertible values in the 'Electric Range' column.
- .groupby('Make')['Electric Range'].mean() groups the data by make and calculates the mean of the electric range for each make.
- .reset_index() resets the index of the resulting DataFrame.
- .columns = ['Make', 'Average Electric Range'] renames the columns of the DataFrame.
- print() displays the summary table.

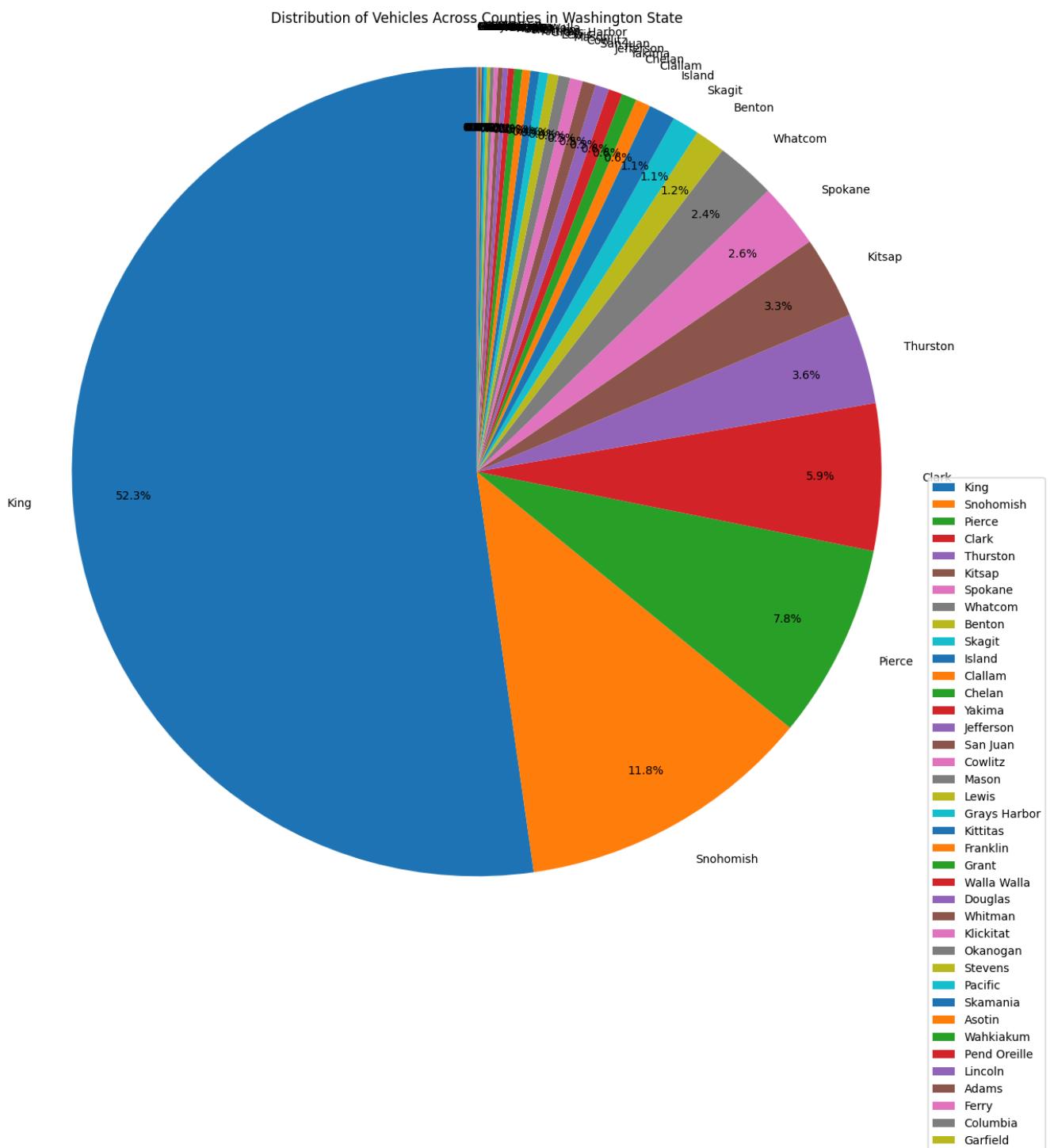
Output Summary:

The code effectively calculates and displays the average electric range for vehicles of different makes in a summary table, providing insights into the variation in electric range across different vehicle manufacturers.

✓ 6- County Distribution:

- How are vehicles distributed across different counties in Washington state? Represent the distribution using a pie chart

Start coding or generate with AI.



Functionality:

- df[df['State'] == 'WA'] filters the data for vehicles registered in Washington state.
- .value_counts() calculates the count of vehicles for each county.
- plt.pie() plots a pie chart to visualize the distribution of vehicles across counties.
- plt.legend() adds a legend to the pie chart.

Output Summary:

The code effectively calculates and visualizes the distribution of vehicles across different counties in Washington state using a pie chart, providing insights into the geographical distribution of vehicle registrations.

▼ 7- Price Analysis:

- Compare the average base MSRP of vehicles eligible for the Clean Alternative Fuel Vehicle (CAFV) program versus those that are not.

Start coding or generate with AI.

```
↳ Average Base MSRP of Vehicles Eligible for CAFV Program: nan
    Average Base MSRP of Vehicles Not Eligible for CAFV Program: 1073.133496755912
```

Functionality:

- `df[df['Clean Alternative Fuel Vehicle (CAFV) Eligibility'] == 'Eligible']` filters the dataset for vehicles eligible for the CAFV program.
- `df[df['Clean Alternative Fuel Vehicle (CAFV) Eligibility'] != 'Eligible']` filters the dataset for vehicles not eligible for the CAFV program.
- `.mean()` calculates the average base MSRP for each group.
- `print()` compares and displays the average base MSRP for both eligible and non-eligible vehicles.

Output Summary:

The code effectively separates the dataset based on CAFV eligibility, calculates the average base MSRP for each group, and compares the results, providing insights into the pricing differences between vehicles eligible and not eligible for the CAFV program.

▼ 8- Geographical Analysis:

- How does the base MSRP vary across different cities in Washington state?

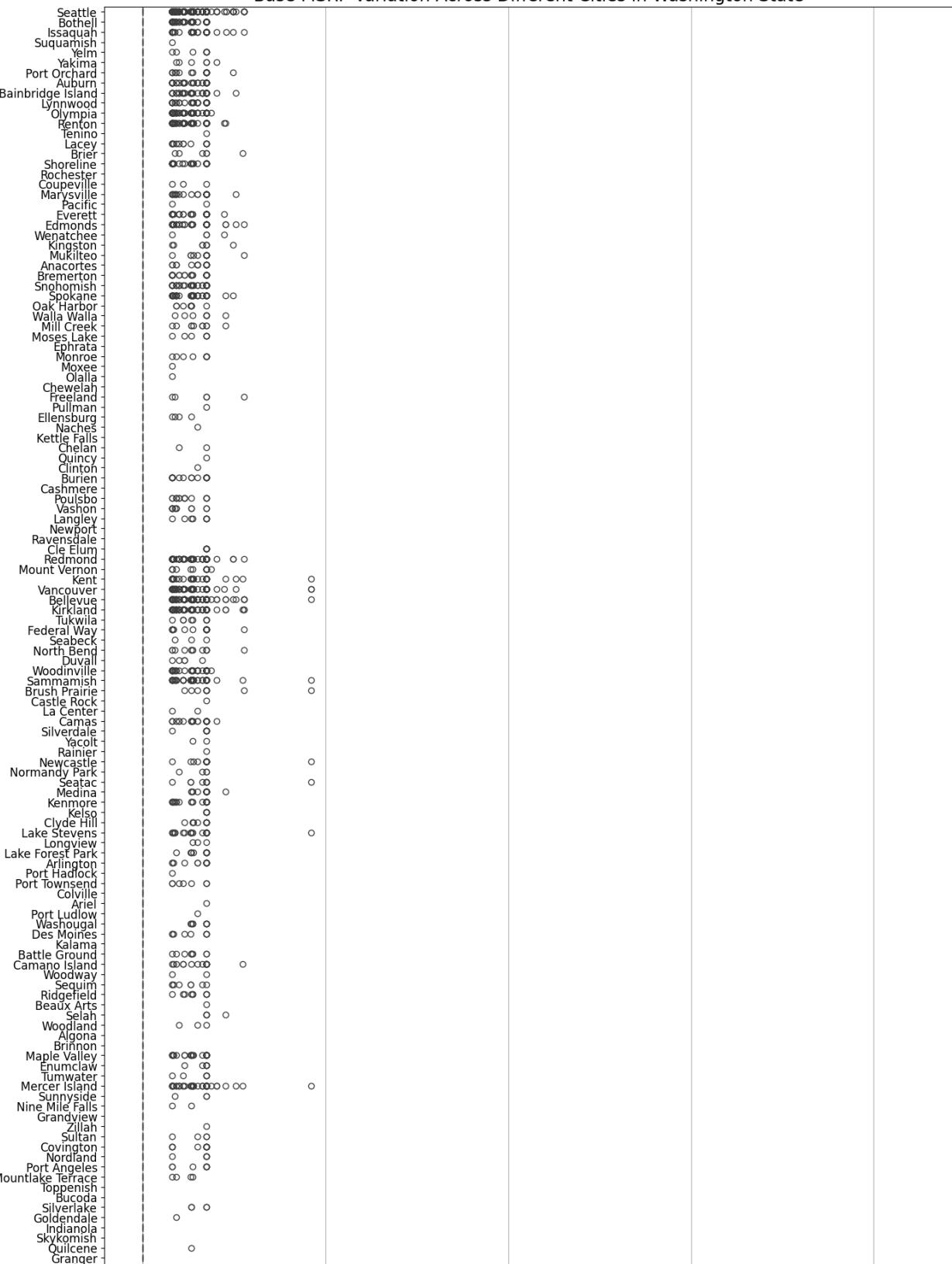
Start coding or generate with AI.

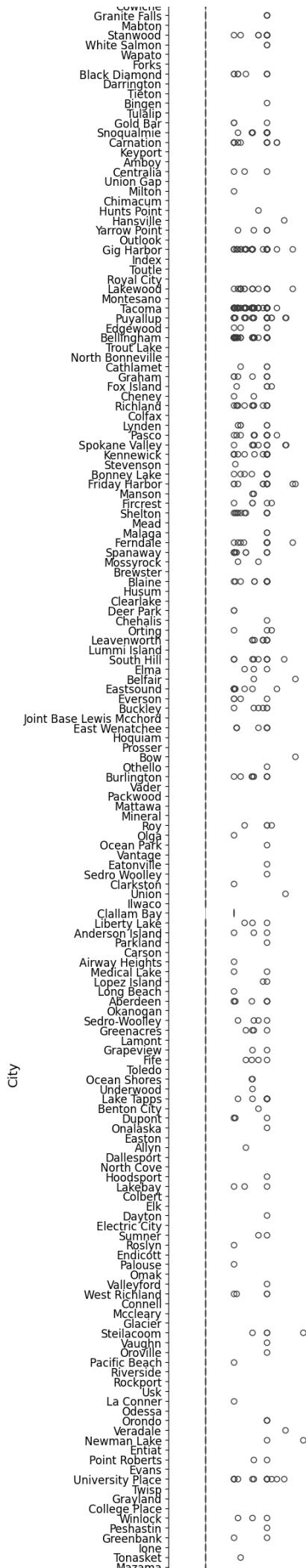
Base MSRP Statistics Across Different Cities in Washington State:

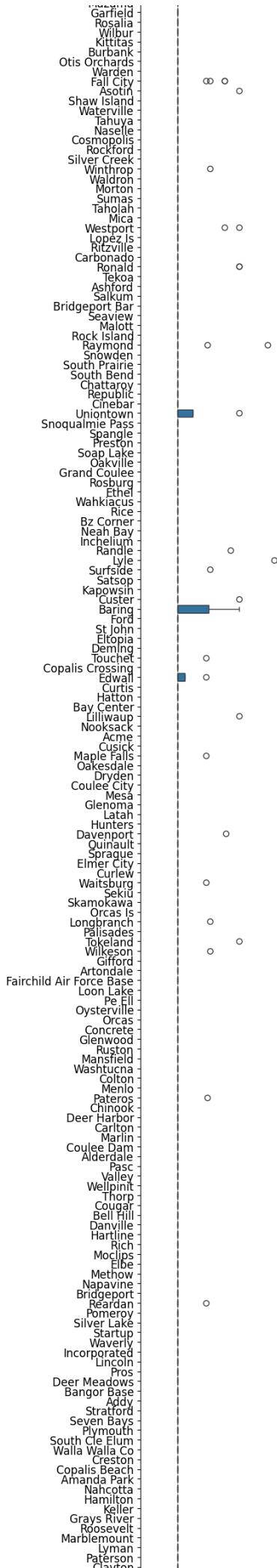
City		mean	median	min	max
Aberdeen	2758.974359	0.0	0	69900	
Acme	0.000000	0.0	0	0	
Addy	0.000000	0.0	0	0	
Adna	0.000000	0.0	0	0	
Airway Heights	1112.068966	0.0	0	32250	
...
Yacolt	2312.037037	0.0	0	69900	
Yakima	532.971125	0.0	0	81100	
Yarrow Point	1597.586207	0.0	0	69900	
Yelm	1523.018868	0.0	0	69900	
Zillah	1997.142857	0.0	0	69900	

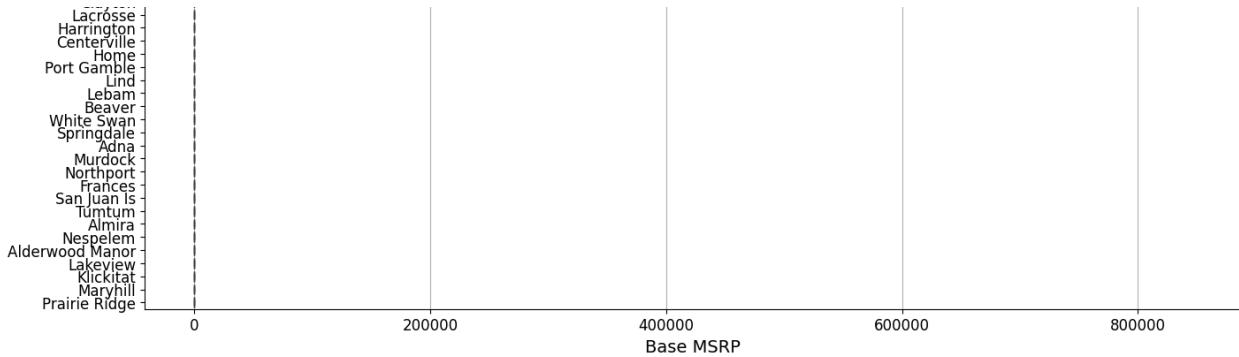
[468 rows x 4 columns]

Base MSRP Variation Across Different Cities in Washington State









Functionality:

- df[df['State'] == 'WA'] filters the data for vehicles registered in Washington state.
- .groupby('City')[‘Base MSRP’].agg(['mean', 'median', 'min', 'max']) groups the data by city and calculates statistics for base MSRP.
- print() displays the statistics.
- sns.boxplot() plots box plots to visualize the variation in base MSRP across different cities.

Output Summary:

The code effectively calculates and displays statistics on base MSRP variation across different cities in Washington state. It further visualizes this variation using box plots, providing insights into the pricing differences among cities.

▼ 9- Legislative Districts:

- Which legislative districts have the highest number of registered electric vehicles? Provide a ranked list.

Start coding or generate with AI.

→ Ranked List of Legislative Districts with the Highest Number of Registered Electric Vehicles:

	Legislative District	Number of Registered EVs
0	41.0	8441
1	45.0	7425
2	5.0	6810
3	48.0	6631
4	1.0	6265
..
87	16	4
88	40	2
89	3	2
90	?	1
91	6	1

[92 rows x 2 columns]

Functionality:

- .value_counts() calculates the count of registered electric vehicles for each legislative district.
- .reset_index() resets the index of the resulting series.

- `.sort_values()` sorts the districts based on the number of registered electric vehicles in descending order.
- `print()` displays the ranked list of legislative districts.

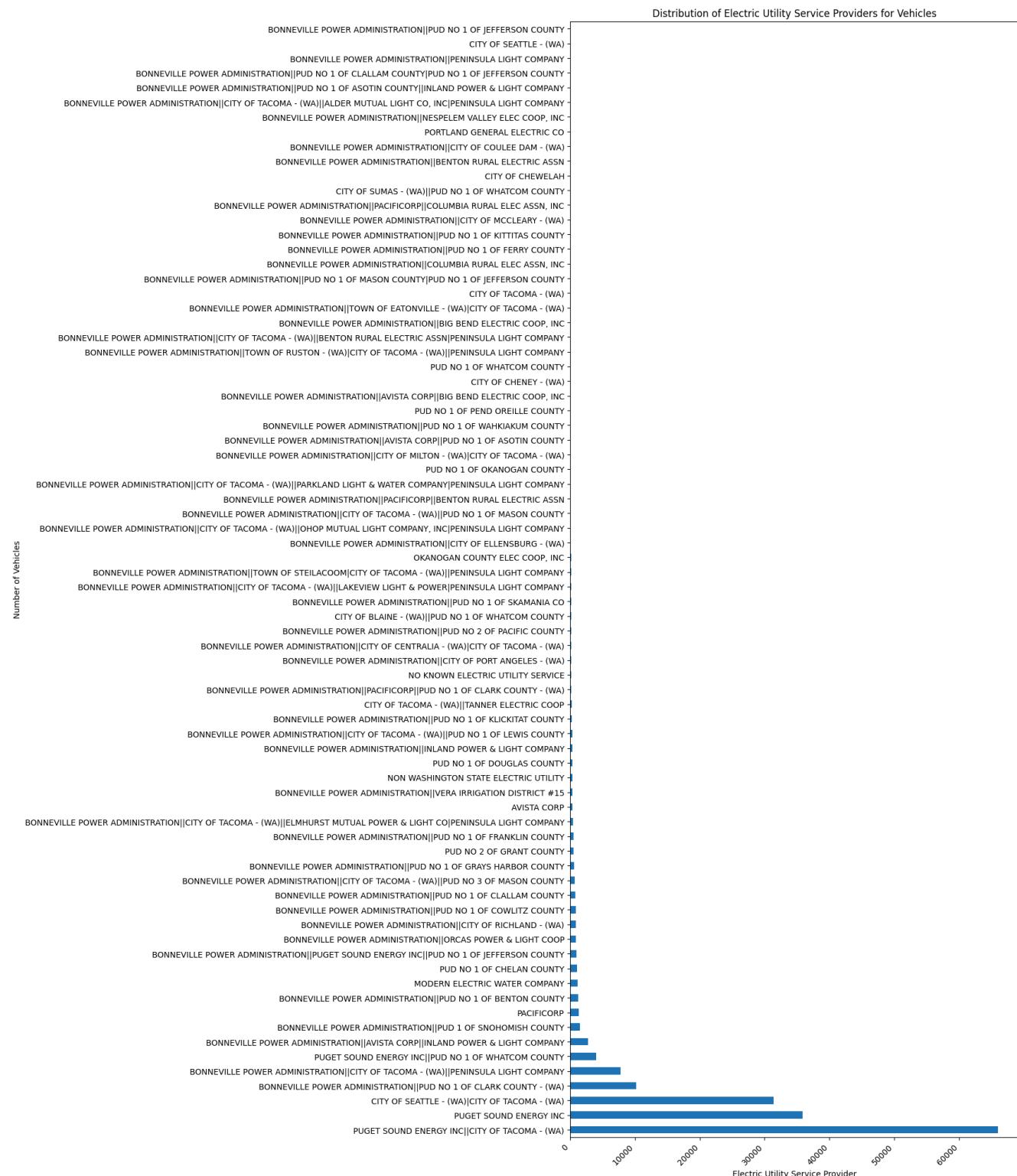
Output Summary:

The code effectively generates and displays a ranked list of legislative districts with the highest number of registered electric vehicles, providing insights into the distribution of electric vehicle registrations across different districts.

▼ 10- Electric Utility Providers:

- What is the distribution of electric utility service providers for the vehicles in the dataset?

Start coding or generate with AI.



Functionality:

- .value_counts() computes the count of vehicles for each electric utility service provider.
- .plot(kind='barh') creates a horizontal bar chart to visualize the distribution of electric utility service providers.
- plt.xticks(rotation=45, ha='right') rotates the x-axis labels for better readability.

Output Summary:

The code effectively analyzes and displays the distribution of electric utility service providers for vehicles in the dataset using a horizontal bar chart, providing insights into the prevalence of different service providers.

✓ 11- Census Tract Analysis:

- ✓ • How are vehicles distributed across different 2020 Census Tracts? Provide insights based on vehicle counts per tract.

Start coding or generate with AI.

→ Insights Based on Vehicle Counts per 2020 Census Tract:

```
Total number of unique 2020 Census Tracts: 2115
Maximum number of vehicles in a single tract: 2479
Minimum number of vehicles in a single tract: 1
Average number of vehicles per tract: 84.09314420803783
```

Top 10 Census Tracts with the Highest Number of Vehicles:

2020 Census Tract	Count
5.303303e+10	2479
5.303303e+10	983
5.303303e+10	820
5.303303e+10	801
5.306701e+10	672
5.303301e+10	651
5.303303e+10	601
5.306105e+10	581
5.303303e+10	577
5.303302e+10	558

Name: count, dtype: int64

Functionality:

- .value_counts() calculates the count of vehicles for each 2020 Census Tract.
- print() displays insights such as total number of unique tracts, maximum and minimum vehicle counts, and average vehicle count per tract.
- .head(10) shows the top 10 Census Tracts with the highest number of vehicles.

Output Summary:

The code effectively analyzes and presents insights on the distribution of vehicles across different 2020 Census Tracts, providing a comprehensive understanding of vehicle counts per tract and highlighting the tracts with the highest vehicle counts.

✓ 12- Electric Range Correlation:

- ✓ • Is there a correlation between the electric range and the base MSRP of the vehicles? Provide the correlation coefficient and interpret the result.

Start coding or generate with AI.

→ Correlation Coefficient between Electric Range and Base MSRP: 0.0030264804621244704

Interpretation: There is a positive correlation

Functionality:

- .corr() calculates the correlation coefficient between electric range and base MSRP.
- print() displays the correlation coefficient and interpretation based on its value.

Output Summary:

The code effectively calculates the correlation coefficient between electric range and base MSRP, interprets the result, and prints the correlation coefficient along with its interpretation, providing insights into the relationship between these two variables.

✓ 13- VIN Analysis:

- Identify any patterns or commonalities in the VIN (1-10) for the vehicles. Are there any frequent prefixes or suffixes

Start coding or generate with AI.

→ Top 10 frequent VIN prefixes:

```
VIN_prefix
7SAYGDEE6P    1239
7SAYGDEE7P    1235
7SAYGDEE8P    1197
7SAYGDEEXP   1191
7SAYGDEE5P    1177
7SAYGDEE2P    1163
7SAYGDEE9P    1161
7SAYGDEE0P    1148
7SAYGDEE3P    1147
7SAYGDEE1P    1119
Name: count, dtype: int64
```

Top 10 frequent VIN suffixes:

```
VIN_suffix
7SAYGDEE6P    1239
7SAYGDEE7P    1235
7SAYGDEE8P    1197
7SAYGDEEXP   1191
7SAYGDEE5P    1177
7SAYGDEE2P    1163
7SAYGDEE9P    1161
7SAYGDEE0P    1148
7SAYGDEE3P    1147
7SAYGDEE1P    1119
Name: count, dtype: int64
```

Functionality:

- `.str[:10]` extracts the first 10 characters (prefix) of the VIN.
- `.str[-10:]` extracts the last 10 characters (suffix) of the VIN.
- `.value_counts()` counts the frequency of prefixes and suffixes.
- `print()` displays the top 10 frequent prefixes and suffixes.

Output Summary:

The code effectively identifies common patterns in the VINs by extracting and counting the frequencies of prefixes and suffixes, providing insights into potential commonalities or trends in the VINs of the vehicles.

▼ 14- Eligibility Status:

- What percentage of vehicles are eligible for the Clean Alternative Fuel Vehicle (CAFV) program?

Start coding or generate with AI.

→ Percentage of vehicles eligible for the CAFV program: 0.0

Functionality:

- `.value_counts().get('Eligible', 0)` counts the number of vehicles eligible for the CAFV program.
- `len(df)` calculates the total number of vehicles.
- `(cafv_eligible_count / total_vehicles) * 100` computes the percentage of vehicles eligible for the CAFV program.
- `print()` displays the percentage of vehicles eligible for the CAFV program.

Output Summary:

The code effectively calculates and prints the percentage of vehicles eligible for the CAFV program, providing insights into the proportion of vehicles in the dataset eligible for clean alternative fuel vehicle programs.

▼ 15- Model Popularity:

- Which vehicle models are the most popular in the dataset? Provide a frequency table of the top 10 models

Start coding or generate with AI.

↳ Frequency Table of Top 10 Most Popular Vehicle Models:

Model	Count
MODEL Y	35989
MODEL 3	30091
LEAF	13363
MODEL S	7734
BOLT EV	6821
MODEL X	5796
VOLT	4796
ID.4	3937
WRANGLER	3392
MUSTANG MACH-E	3322

Name: count, dtype: int64

Functionality:

- .value_counts() computes the count of each vehicle model.
- .head(10) selects the top 10 most popular models.
- print() displays the frequency table of the top 10 models.

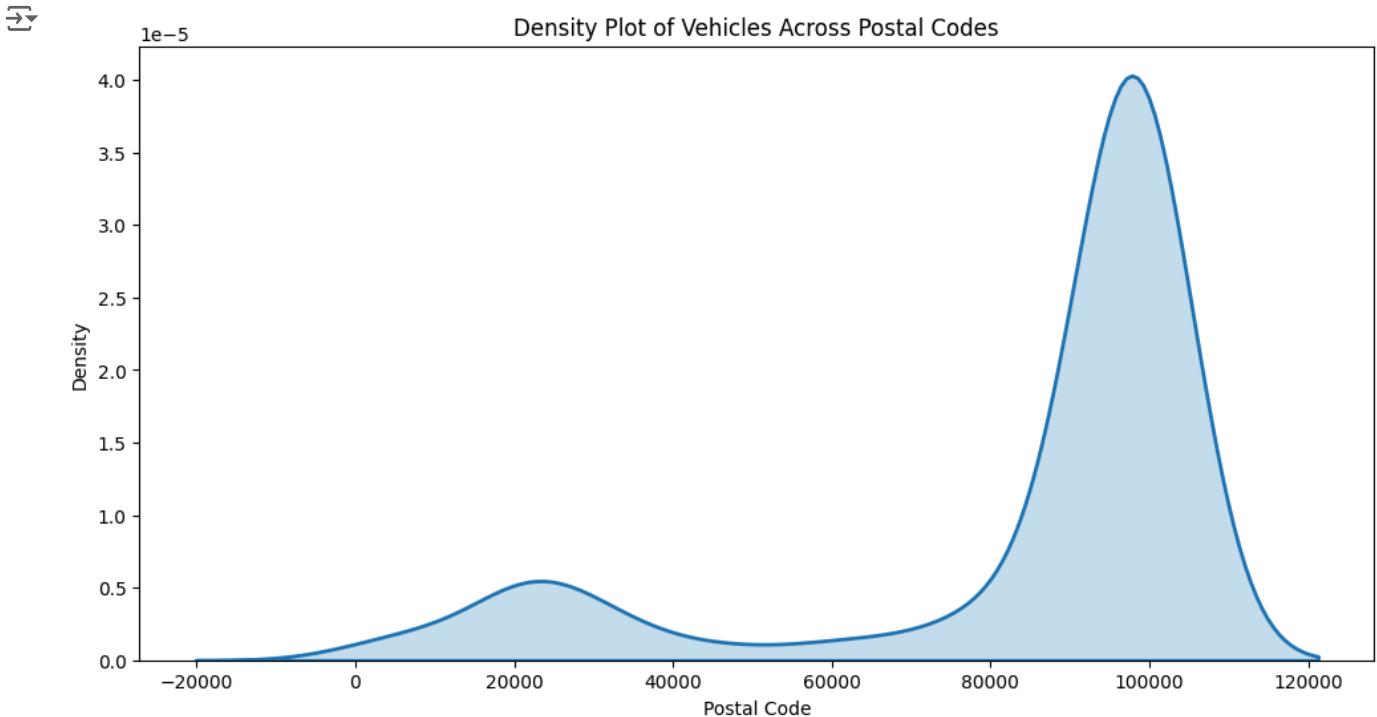
Output Summary:

The code effectively generates and displays a frequency table of the top 10 most popular vehicle models, providing insights into the distribution of vehicle models in the dataset.

▼ 16- Postal Code Distribution:

- How are vehicles distributed across different postal codes? Provide a heatmap or density plot.

Start coding or generate with AI.



Functionality:

- `.value_counts()` computes the count of vehicles for each postal code.
- `.reset_index()` resets the index of the resulting series.
- `.columns = ['Postal Code', 'Vehicle Count']` renames the columns of the DataFrame.
- `sns.kdeplot()` generates the density plot using Seaborn library.

Output Summary:

The density plot visualizes how vehicles are distributed across various postal codes, offering insights into the concentration or dispersion of vehicles within different areas.

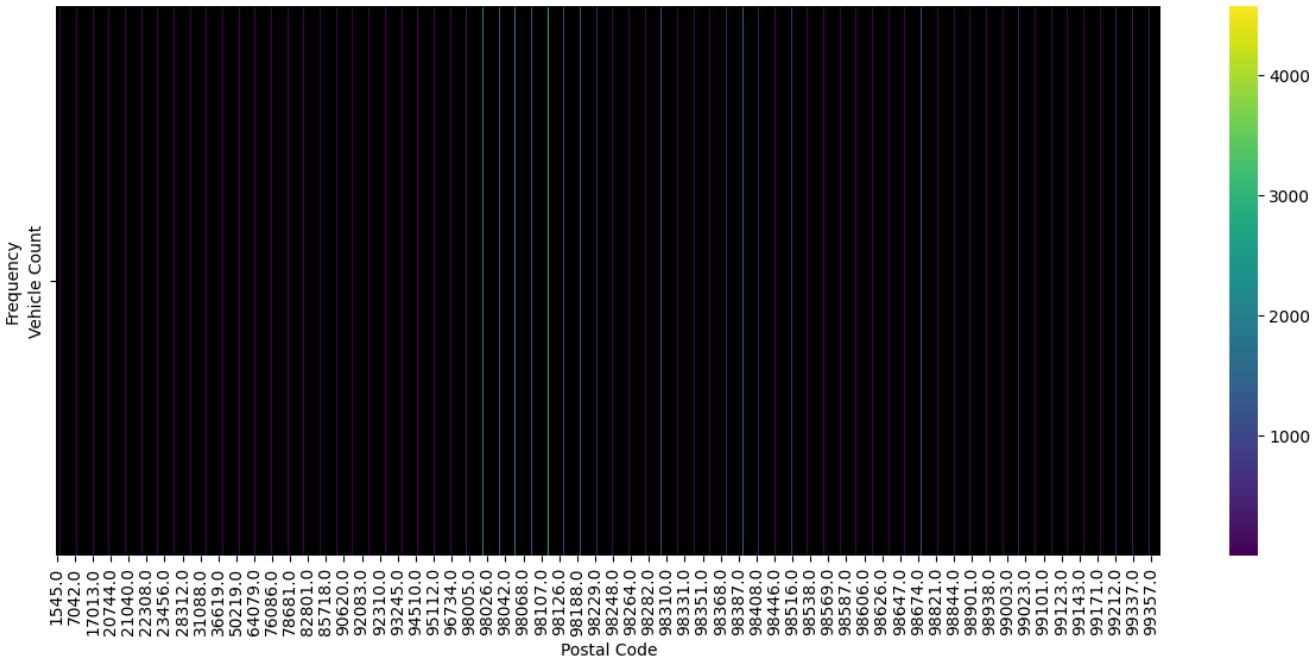
```
# Create a count of vehicles per postal code
postal_code_counts = df['Postal Code'].value_counts().reset_index()
postal_code_counts.columns = ['Postal Code', 'Vehicle Count']

# Create a pivot table for the heatmap
heatmap_data = postal_code_counts.pivot_table(index=None, columns='Postal Code', values='Vehicle Count', aggfunc='sum'

# Create the heatmap
plt.figure(figsize=(15, 6))
sns.heatmap(heatmap_data, cmap='viridis', linewidths=0.5, linecolor='black')
plt.title('Distribution of Vehicles Across Postal Codes')
plt.xlabel('Postal Code')
plt.ylabel('Frequency')
plt.show()
```



Distribution of Vehicles Across Postal Codes



Functionality:

- `.value_counts().reset_index()` calculates the count of vehicles per postal code and resets the index.
- `.pivot_table()` creates a pivot table from the postal code counts data.
- `sns.heatmap()` plots the heatmap using Seaborn, with postal codes on the x-axis and frequency of vehicles on the y-axis.

Output Summary:

The code effectively generates and displays a heatmap showing the distribution of vehicles across postal codes, providing insights into the concentration of vehicle registrations in different areas.

▼ 17- Vehicle Location Analysis:

- Analyze the geographic coordinates to determine any clusters of electric vehicles in certain areas of Washington state.

Start coding or generate with AI.

Latitude 0
Longitude 0
dtype: int64

Functionality:

- `.isnull().sum()` checks for null values in the DataFrame.
- `.dropna()` removes rows with missing values.
- `SimpleImputer(strategy='mean')` creates an imputer object to replace missing values with the mean.
- `.fit_transform()` fits the imputer to the data and transforms it, replacing missing values.

Output Summary:

The code efficiently handles missing geographic coordinates, ensuring completeness for further analysis such as clustering.

Start coding or [generate](#) with AI.

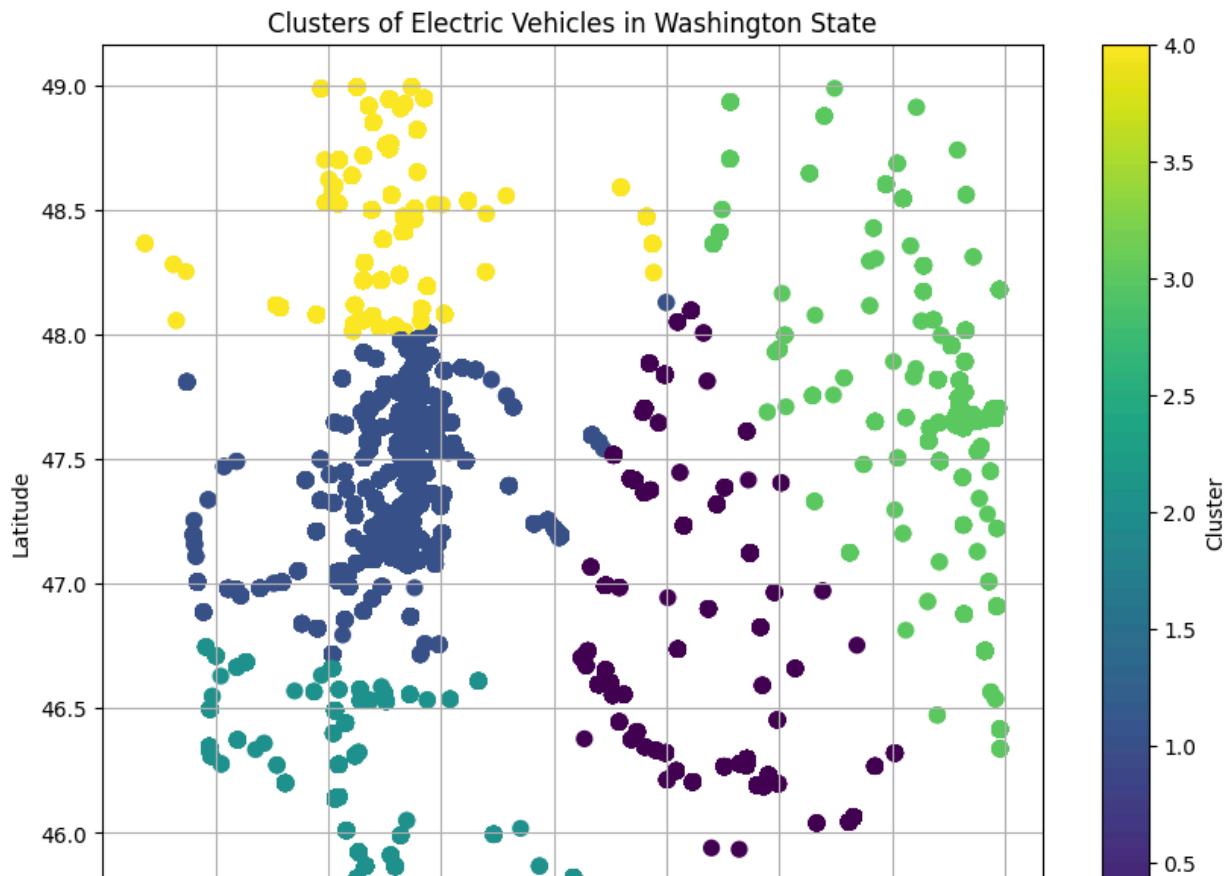
```
→ <ipython-input-57-596e8d264e73>:11: SettingWithCopyWarning:  
A value is trying to be set on a copy of a slice from a DataFrame.  
Try using .loc[row_indexer,col_indexer] = value instead
```

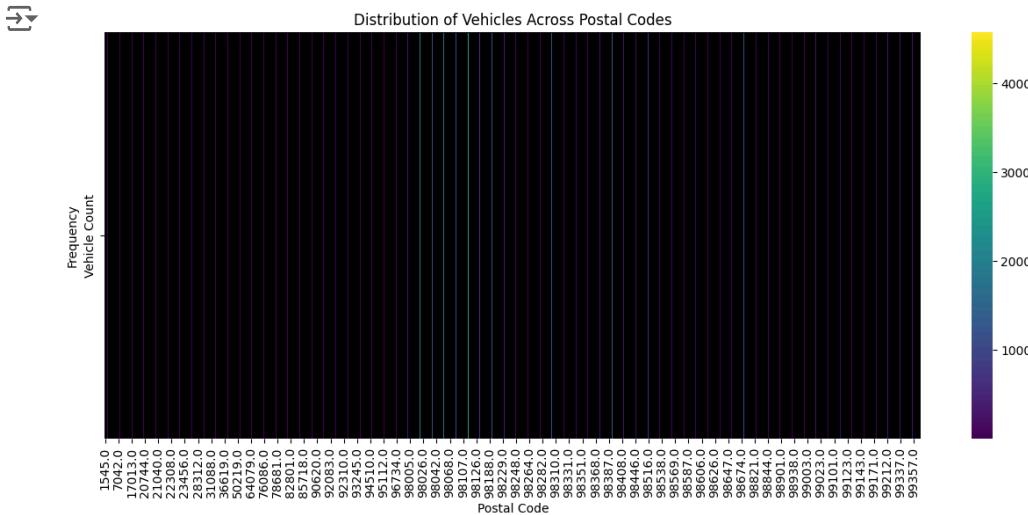
See the caveats in the documentation: [https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#return-washington-data\[\['Longitude', 'Latitude'\]\]](https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#return-washington-data[['Longitude', 'Latitude']])
`washington_data[['Longitude', 'Latitude']] = washington_data['Vehicle Location'].str.extract(r'POINT \(([^\]+)\)')`
<ipython-input-57-596e8d264e73>:11: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: [https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#return-washington-data\[\['Longitude', 'Latitude'\]\]](https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#return-washington-data[['Longitude', 'Latitude']])
`washington_data[['Longitude', 'Latitude']] = washington_data['Vehicle Location'].str.extract(r'POINT \(([^\]+)\)`
<ipython-input-57-596e8d264e73>:14: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: [https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#return-washington-data\['Latitude'\] = washington_data\['Latitude'\].astype\(float\)](https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#return-washington-data['Latitude'] = washington_data['Latitude'].astype(float))
<ipython-input-57-596e8d264e73>:15: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: [https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#return-washington_data\['Longitude'\] = washington_data\['Longitude'\].astype\(float\)](https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#return-washington_data['Longitude'] = washington_data['Longitude'].astype(float))
/usr/local/lib/python3.10/dist-packages/sklearn/cluster/_kmeans.py:870: FutureWarning: The default value of `n_init` warnings.warn(





Functionality:

- `.value_counts().reset_index()` calculates the count of vehicles per postal code and resets the index.
- `.pivot_table()` creates a pivot table from the postal code counts data.
- `sns.heatmap()` plots the heatmap using Seaborn, with postal codes on the x-axis and frequency of vehicles on the y-axis.

Output Summary:

The code effectively generates and displays a heatmap showing the distribution of vehicles across postal codes, providing insights into the concentration of vehicle registrations in different areas.

✓ 17- Vehicle Location Analysis:

- Analyze the geographic coordinates to determine any clusters of electric vehicles in certain areas of Washington state.

Start coding or generate with AI.

```
↳ Latitude      0
Longitude     0
dtype: int64
```

Functionality:

- `.isnull().sum()` checks for null values in the DataFrame.
- `.dropna()` removes rows with missing values.
- `SimpleImputer(strategy='mean')` creates an imputer object to replace missing values with the mean.
- `.fit_transform()` fits the imputer to the data and transforms it, replacing missing values.

Output Summary:

The code efficiently handles missing geographic coordinates, ensuring completeness for further analysis such as clustering.

Start coding or [generate with AI](#).

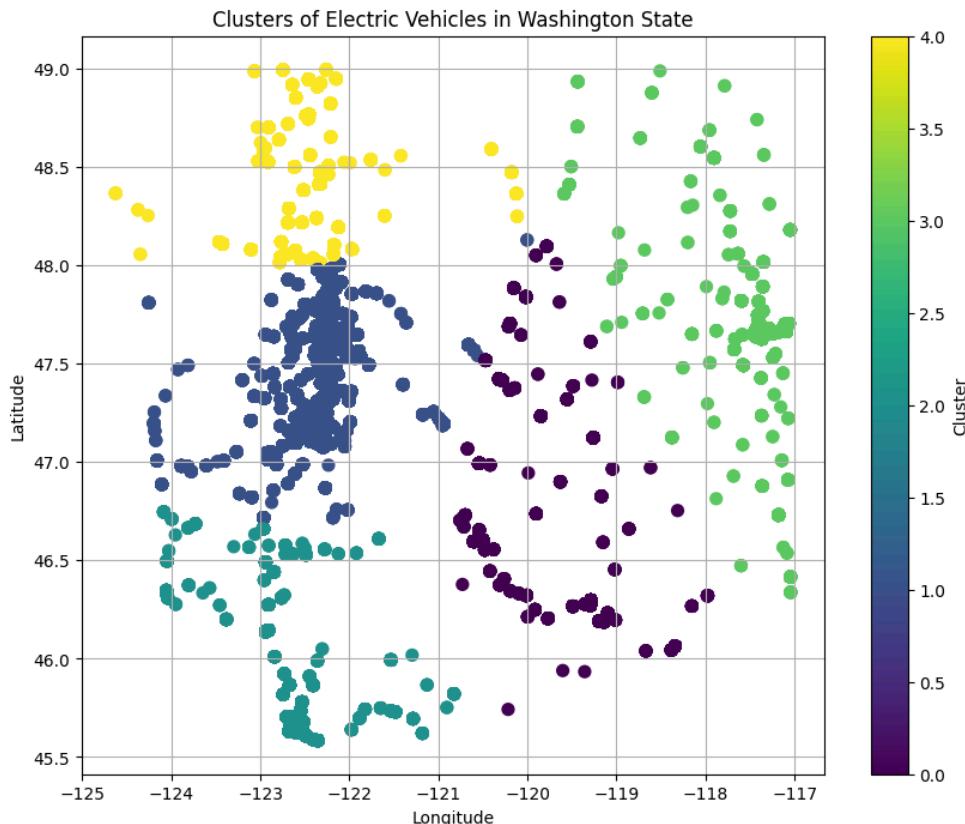
```
→ <ipython-input-57-596e8d264e73>:11: SettingWithCopyWarning:  
A value is trying to be set on a copy of a slice from a DataFrame.  
Try using .loc[row_indexer,col_indexer] = value instead
```

See the caveats in the documentation: <https://pandas.pydata.org/pandas-docs/stable/u>
`washington_data[['Longitude', 'Latitude']] = washington_data['Vehicle Location'].s`
<ipython-input-57-596e8d264e73>:11: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: <https://pandas.pydata.org/pandas-docs/stable/u>
`washington_data[['Longitude', 'Latitude']] = washington_data['Vehicle Location'].s`
<ipython-input-57-596e8d264e73>:14: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: <https://pandas.pydata.org/pandas-docs/stable/u>
`washington_data['Latitude'] = washington_data['Latitude'].astype(float)`
<ipython-input-57-596e8d264e73>:15: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: <https://pandas.pydata.org/pandas-docs/stable/u>
`washington_data['Longitude'] = washington_data['Longitude'].astype(float)`
/usr/local/lib/python3.10/dist-packages/sklearn/cluster/_kmeans.py:870: FutureWarning:
warnings.warn(



Functionality:

- df[df['State'] == 'WA'] filters the dataset to include only records from Washington state.
- .str.extract() extracts latitude and longitude from the "Vehicle Location" column using a regular expression.
- .astype(float) converts latitude and longitude values to float.
- .dropna() removes rows with missing latitude or longitude values.
- StandardScaler() standardizes the coordinates.
- KMeans(n_clusters=5, random_state=42) initializes KMeans clustering with 5 clusters.
- .fit_transform() fits the KMeans model to the standardized coordinates.
- .merge() merges cluster labels back to the original DataFrame.
- plt.scatter() plots the clusters on a scatter plot.

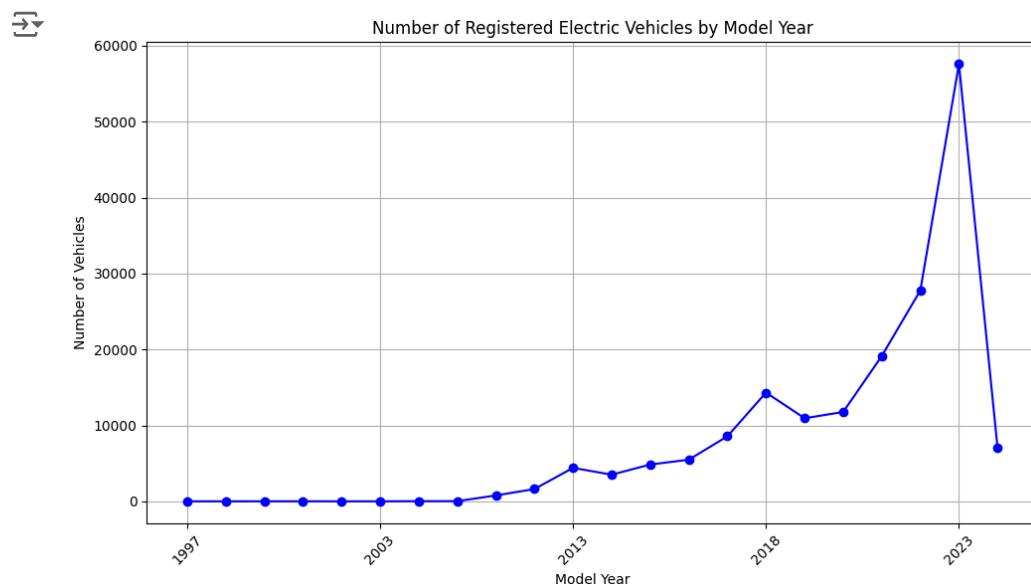
Output Summary:

The code effectively clusters electric vehicles based on their geographic coordinates in Washington state and visualizes the clusters on a scatter plot, providing insights into the spatial distribution of electric vehicles in the region.

▼ 18- Model Year Trend:

- Analyze the trend in the number of registered electric vehicles by model year. Provide a line chart to show any increase or decrease over the years.

Start coding or generate with AI.



Functionality:

- .value_counts() computes the count of registered electric vehicles for each model year.
- .sort_index() sorts the counts by the model year. .plot(kind='line', marker='o', color='blue') creates a line chart with markers and blue color.
- plt.xticks(rotation=45) rotates the x-axis labels for better readability.

Output Summary:

The code effectively analyzes the trend in the number of registered electric vehicles by model year and presents it in a line chart, enabling the visualization of any increase or decrease over the years.

+ Code + Text

19- Range vs. Year:

- Is there a trend between the model year and the electric range of the vehicles? Provide a scatter plot and analyze the trend.

Start coding or [generate](#) with AI.

```
→ ['291' '0' '270' '210' '21' '75' '29' '30' '1260000' '18' '84' '107' '322'  
  '220' '72' '19' '26' '73' '151' '222' '93' '14' '150' '58' '266' '215'  
  '32' '239' '83' '25' '249' '103' '258' '17' '238' '87' '149' '42' '68'  
  '170' '125' '38' '13' '289' '53' '20' '204' '82' '33' '200' '47' '259'  
  '35' '16' '22' '37' '208' '308' '34' '6' '48' '39' '234' '?' '10' '62'  
  '192' '218' '330' '126' '110' '15' '23' '203' '81' '76' '41' '233' '293'  
  '31' '153' '111' '265' '97' '8' '40' '12' '100' '114' '124' '28' '337'  
  '59' '245' '9' '24' '27' '95' '11' '36' '56' '0' '150' '270' '32' '322' '38' '18' '208'  
  16 238 21 76 19 53 215 125 33 75 93 126 72 222 14 266 151 17 291 25 249  
  204 259 47 42 84 35 210 87 124 83 289 10 6 37 203 23 20 110 73 258 220 39  
  200 107 308 330 30 26 234 97 293 27 81 34 31 239 29 265 22 111 13 41 149  
  9 233 337 114 218 58 12 48 100 15 153 24 170 40 103 82 68 8 192 28 62 245  
  11 59 56 57 51 36 74 95]
```

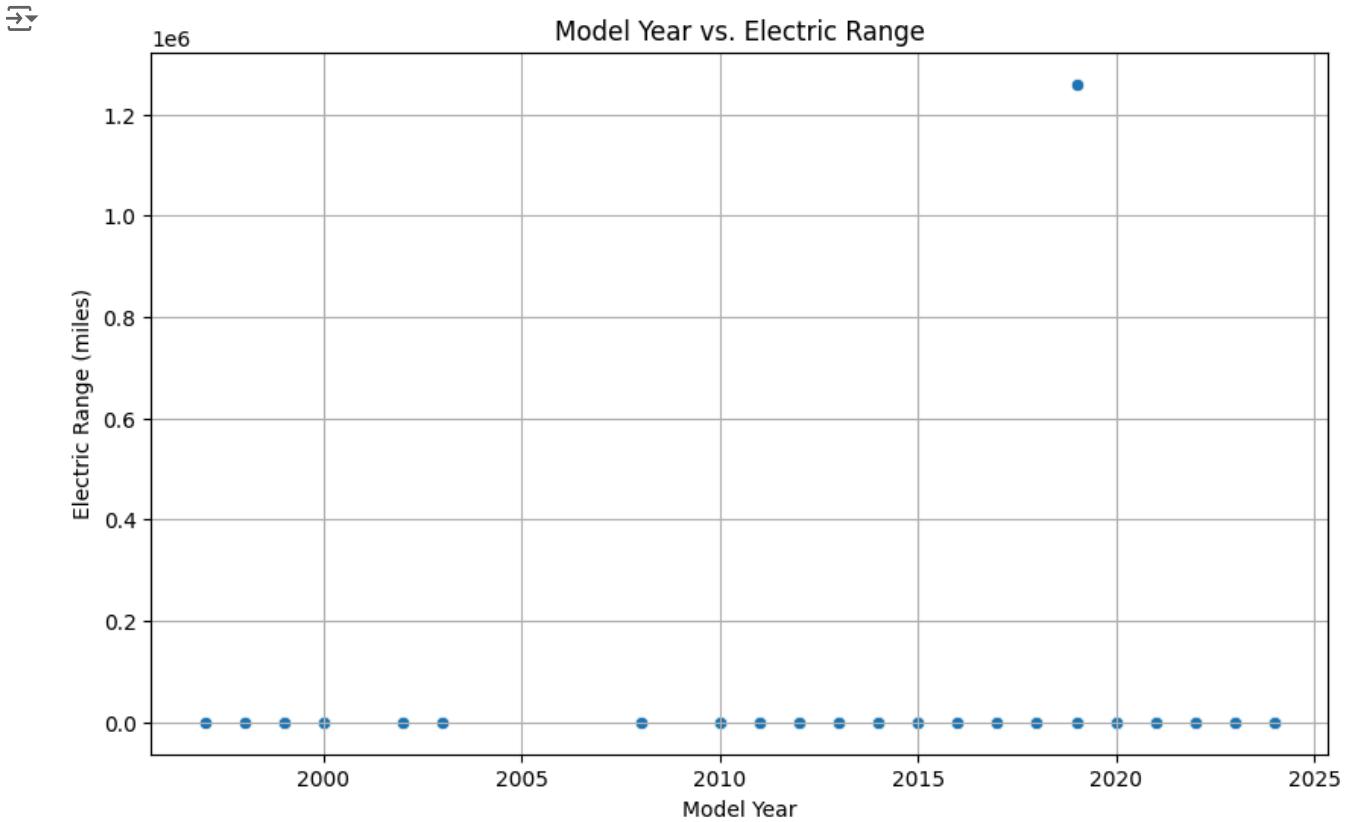
Functionality:

- `.unique()` prints the unique values of the 'Electric Range' column.
- `pd.to_numeric()` converts the 'Electric Range' column to numeric values, coercing non-numeric values to NaN. The `errors='coerce'` parameter ensures that non-numeric values are replaced with NaN.

Output Summary:

The code inspects and converts the 'Electric Range' column to numeric values, which is essential for further analysis. It ensures that non-numeric values do not interfere with computations and enables the exploration of any potential trend between the model year and electric range through scatter plot analysis.

Start coding or [generate](#) with AI.



Functionality:

- .dropna(subset=['Model Year', 'Electric Range']) drops rows with null values in the specified columns.
- pd.to_numeric() converts the 'Electric Range' column to numeric values, coercing non-numeric values to NaN.
- sns.scatterplot() creates a scatter plot to visualize the relationship between the model year and electric range.

Output Summary:

The code effectively handles missing values, converts the 'Electric Range' column to numeric values, and generates a scatter plot to analyze the trend between the model year and electric range of vehicles. This visualization facilitates the examination of any potential correlation between these two variables.

✓ 20- Legislative District and MSRP:

- How does the average base MSRP vary across different legislative districts?

Start coding or generate with AI.

↳ Average Base MSRP Across Different Legislative Districts:

	Legislative District	Base MSRP
0	1.0	770.965682
1	2.0	1091.211957
2	3.0	869.330664
3	4.0	1257.040816
4	5.0	1093.072687
..
87	5	680.348259
88	6	0.000000
89	7	1824.137931
90	9	0.000000
91	?	0.000000

[92 rows x 2 columns]

Functionality:

- `.groupby('Legislative District')[‘Base MSRP’].mean()` groups the data by legislative district and calculates the mean of the base MSRP for each district.
- `.reset_index()` resets the index of the resulting DataFrame.