In [1]:
```python
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

In [2]:
```python
pa=pd.read_csv("Electric_Vehicle_Population_Data.csv")
pa
```
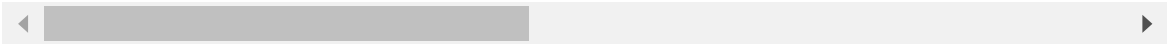
Out[2]:

	VIN (1-10)	County	City	State	Postal Code	Model Year	Make	Mo
0	3C3CFFGE4E	Yakima	Yakima	WA	98902.0	2014	FIAT	5
1	5YJXCBE40H	Thurston	Olympia	WA	98513.0	2017	TESLA	MOD

In [3]:
```python
pa.drop_duplicates()
```

Out[3]:

	VIN (1-10)	County	City	State	Postal Code	Model Year	Make	Model
0	3C3CFFGE4E	Yakima	Yakima	WA	98902.0	2014	FIAT	500
1	5YJXCBE40H	Thurston	Olympia	WA	98513.0	2017	TESLA	MODEL X
2	3MW39FS03P	King	Renton	WA	98058.0	2023	BMW	330E
3	7PDSGABA8P	Snohomish	Bothell	WA	98012.0	2023	RIVIAN	R1S
4	5YJ3E1EB8L	King	Kent	WA	98031.0	2020	TESLA	MODEL 3
...	...	...	...	...	...	...	...	...
166795	3FA6P0SU4D	Spokane	Spokane	WA	99223.0	2013	FORD	FUSION
166796	5YJYGDEE5M	King	Sammamish	WA	98074.0	2021	TESLA	MODEL Y
166797	7SAYGDEE5N	Snohomish	Mukilteo	WA	98275.0	2022	TESLA	MODEL Y
166798	1G1RH6E43D	Lewis	Mossyrock	WA	98564.0	2013	CHEVROLET	VOLT
166799	5YJSA1E27H	Pierce	Gig Harbor	WA	98332.0	2017	TESLA	MODEL S

166800 rows × 17 columns

```
In [4]: pa.drop_duplicates()
```

Out[4]:

	VIN (1-10)	County	City	State	Postal Code	Model Year	Make	Model
0	3C3CFFGE4E	Yakima	Yakima	WA	98902.0	2014	FIAT	500
1	5YJXCBE40H	Thurston	Olympia	WA	98513.0	2017	TESLA	MODEL X
2	3MW39FS03P	King	Renton	WA	98058.0	2023	BMW	330E
3	7PDSGABA8P	Snohomish	Bothell	WA	98012.0	2023	RIVIAN	R1S
4	5YJ3E1EB8L	King	Kent	WA	98031.0	2020	TESLA	MODEL 3
...	...	...	...	...	...	...	...	...
166795	3FA6P0SU4D	Spokane	Spokane	WA	99223.0	2013	FORD	FUSION
166796	5YJYGDEE5M	King	Sammamish	WA	98074.0	2021	TESLA	MODEL Y
166797	7SAYGDEE5N	Snohomish	Mukilteo	WA	98275.0	2022	TESLA	MODEL Y
166798	1G1RH6E43D	Lewis	Mossyrock	WA	98564.0	2013	CHEVROLET	VOLT
166799	5YJSA1E27H	Pierce	Gig Harbor	WA	98332.0	2017	TESLA	MODEL S

166800 rows × 17 columns

```
In [5]: pa.dropna()
```

Out[5]:

	VIN (1-10)	County	City	State	Postal Code	Model Year	Make	Model
0	3C3CFFGE4E	Yakima	Yakima	WA	98902.0	2014	FIAT	500
1	5YJXCBE40H	Thurston	Olympia	WA	98513.0	2017	TESLA	MODEL X
2	3MW39FS03P	King	Renton	WA	98058.0	2023	BMW	330E
3	7PDSGABA8P	Snohomish	Bothell	WA	98012.0	2023	RIVIAN	R1S
4	5YJ3E1EB8L	King	Kent	WA	98031.0	2020	TESLA	MODEL 3
...	...	...	...	...	...	...	...	...
166795	3FA6P0SU4D	Spokane	Spokane	WA	99223.0	2013	FORD	FUSION
166796	5YJYGDEE5M	King	Sammamish	WA	98074.0	2021	TESLA	MODEL Y
166797	7SAYGDEE5N	Snohomish	Mukilteo	WA	98275.0	2022	TESLA	MODEL Y
166798	1G1RH6E43D	Lewis	Mossyrock	WA	98564.0	2013	CHEVROLET	VOLT
166799	5YJSA1E27H	Pierce	Gig Harbor	WA	98332.0	2017	TESLA	MODEL S

166435 rows × 17 columns
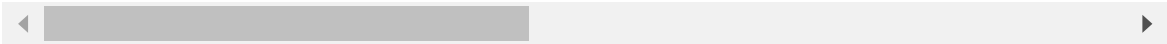
In [6]: `pa.info()`

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 166800 entries, 0 to 166799
Data columns (total 17 columns):
 #   Column                                              Non-Null Count   D
type
---  ------                                              --------------   -
----
 0   VIN (1-10)                                          166800 non-null  o
bject
 1   County                                              166795 non-null  o
bject
 2   City                                                166795 non-null  o
bject
 3   State                                               166800 non-null  o
bject
 4   Postal Code                                         166795 non-null  f
loat64
 5   Model Year                                          166800 non-null  i
nt64
 6   Make                                                166800 non-null  o
bject
 7   Model                                               166800 non-null  o
bject
 8   Electric Vehicle Type                               166800 non-null  o
bject
 9   Clean Alternative Fuel Vehicle (CAFV) Eligibility   166800 non-null  o
bject
 10  Electric Range                                      166800 non-null  i
nt64
 11  Base MSRP                                           166800 non-null  i
nt64
 12  Legislative District                                166440 non-null  f
loat64
 13  DOL Vehicle ID                                      166800 non-null  i
nt64
 14  Vehicle Location                                    166790 non-null  o
bject
 15  Electric Utility                                    166795 non-null  o
bject
 16  2020 Census Tract                                   166795 non-null  f
loat64
dtypes: float64(3), int64(4), object(10)
memory usage: 21.6+ MB
```

In [7]: `pa.describe()`

Out[7]:

|	Postal Code	Model Year	Electric Range	Base MSRP	Legislative District	DOL Ve
count	166795.000000	166800.000000	166800.000000	166800.000000	166440.000000	1.668000
mean	98173.713750	2020.341793	61.508993	1152.723171	29.178941	2.172420
std	2442.584415	3.001465	93.271747	8661.081091	14.853534	7.727458
min	1730.000000	1997.000000	0.000000	0.000000	1.000000	4.385000
25%	98052.000000	2018.000000	0.000000	0.000000	18.000000	1.790741
50%	98122.000000	2021.000000	0.000000	0.000000	33.000000	2.244045
75%	98371.000000	2023.000000	84.000000	0.000000	42.000000	2.513421
max	99577.000000	2024.000000	337.000000	845000.000000	49.000000	4.792548

In [8]: `correlation =pa.corr()`
`correlation`

Out[8]:

	Postal Code	Model Year	Electric Range	Base MSRP	Legislative District	DOL Vehicle ID	2020 Census Tract
Postal Code	1.000000	0.001500	-0.000367	-0.004988	-0.415292	0.006709	0.523285
Model Year	0.001500	1.000000	-0.463441	-0.230892	-0.012976	0.110701	0.009710
Electric Range	-0.000367	-0.463441	1.000000	0.106972	0.022580	-0.077422	-0.002070
Base MSRP	-0.004988	-0.230892	0.106972	1.000000	0.012216	-0.023412	-0.001268
Legislative District	-0.415292	-0.012976	0.022580	0.012216	1.000000	-0.009893	-0.103565
DOL Vehicle ID	0.006709	0.110701	-0.077422	-0.023412	-0.009893	1.000000	0.003954
2020 Census Tract	0.523285	0.009710	-0.002070	-0.001268	-0.103565	0.003954	1.000000

In [35]:
```python
plt.figure(figsize=(8,8),dpi=100)
sns.heatmap(correlation, annot = True)
plt.title('heat map for every correlation ' ,fontsize= 20, pad =40)
```

Out[35]: Text(0.5, 1.0, 'heat map for every correlation ')

heat map for every correlation
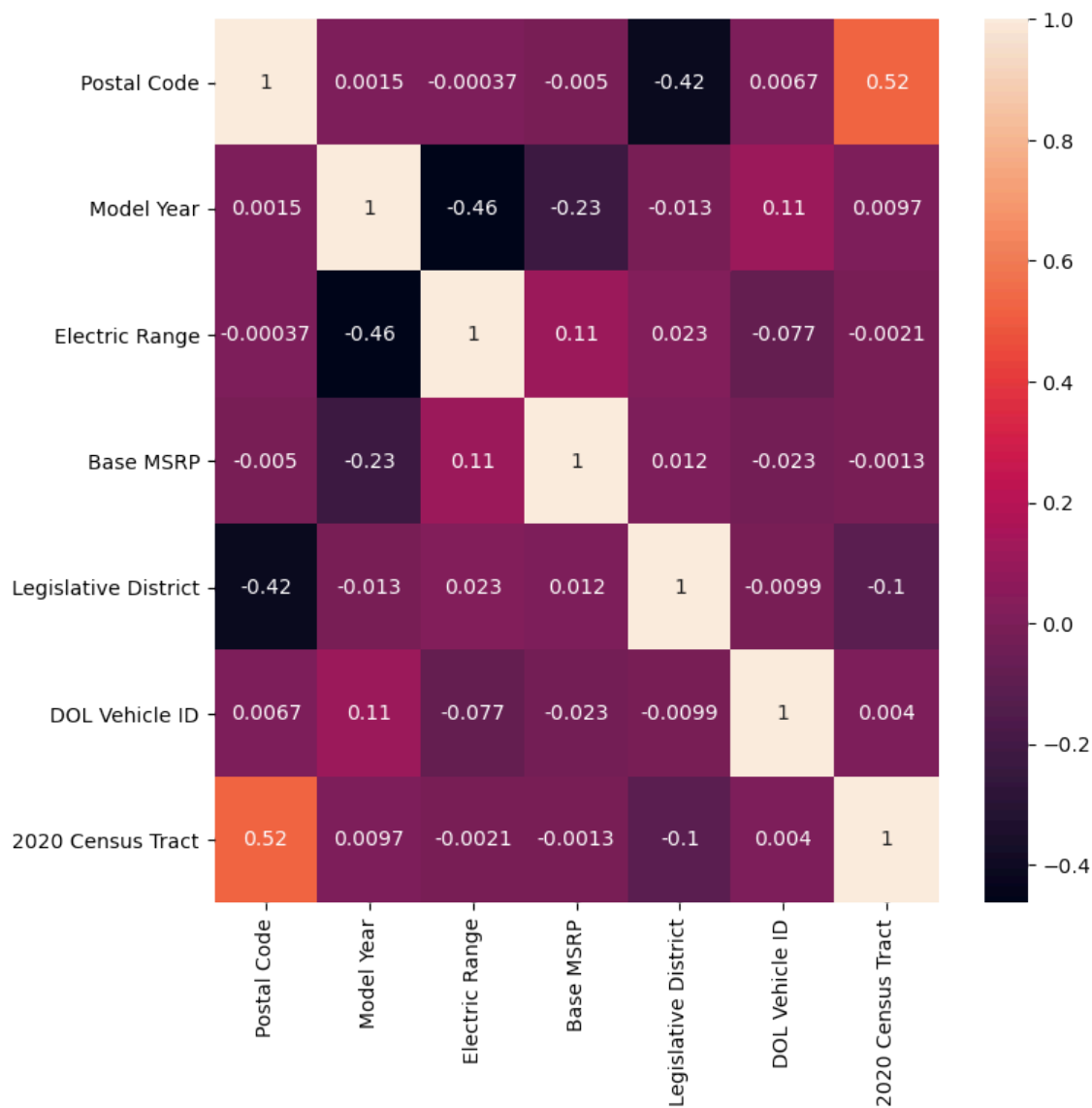
```
In [11]: data= pa.head(n=100)
         data
```

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Out[11]:

VIN (1-10)	County	City	State	Postal Code	Model Year	Make	Model	Electric Vehicle Type
C3CFFGE4E	Yakima	Yakima	WA	98902.0	2014	FIAT	500	Battery Electric Vehicle (BEV)
YJXCBE40H	Thurston	Olympia	WA	98513.0	2017	TESLA	MODEL X	Battery Electric Vehicle (BEV)
MW39FS03P	King	Renton	WA	98058.0	2023	BMW	330E	Plug-in Hybrid Electric Vehicle (PHEV)
PDSGABA8P	Snohomish	Bothell	WA	98012.0	2023	RIVIAN	R1S	Battery Electric Vehicle (BEV)
5YJ3E1EB8L	King	Kent	WA	98031.0	2020	TESLA	MODEL 3	Battery Electric Vehicle (BEV)
...	...	...	...	...	...	...	...	...
5YJXCBE29J	Skagit	La Conner	WA	98257.0	2018	TESLA	MODEL X	Battery Electric Vehicle (BEV)
G1RC6S50J	Skagit	Burlington	WA	98233.0	2018	CHEVROLET	VOLT	Plug-in Hybrid Electric Vehicle (PHEV)
C4JJXR65M	Yakima	Selah	WA	98942.0	2021	JEEP	WRANGLER	Plug-in Hybrid Electric Vehicle (PHEV)
YJXCAE24H	NaN	NaN	BC	NaN	2017	TESLA	MODEL X	Battery Electric Vehicle (BEV)
N4AZ1CP3J	King	Issaquah	WA	98027.0	2018	NISSAN	LEAF	Battery Electric Vehicle (BEV)

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*N*s × 17 columns

In [21]:
```python
x= data['County'].value_counts()
x.plot(kind='bar',figsize=(10,10))
plt.xlabel('country',fontsize=20)
plt.title('bar plot represent count of individual country',fontsize=20)
```
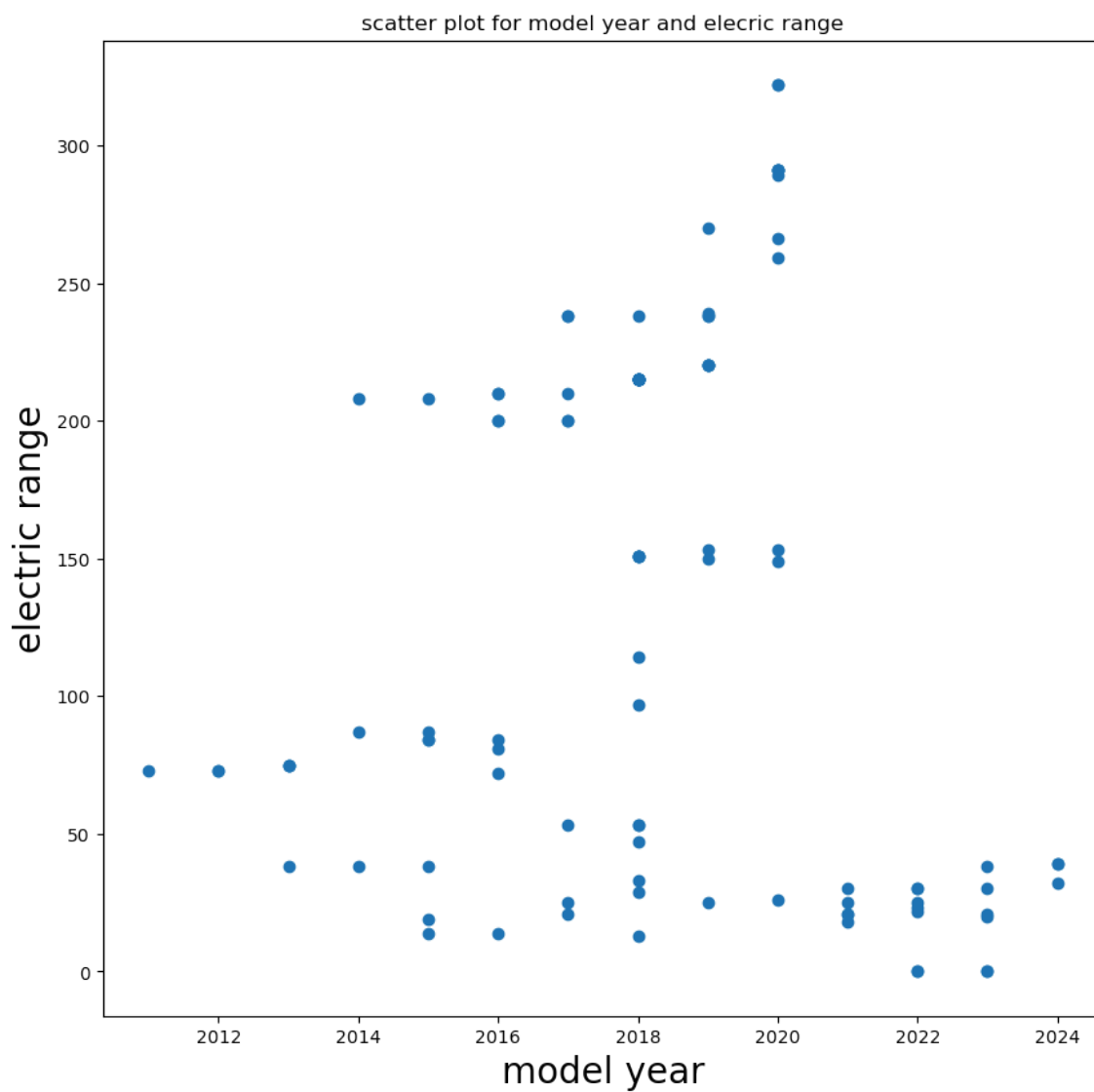
Out[21]: Text(0.5, 1.0, 'bar plot represent count of individual country')

bar plot represent count of individual country
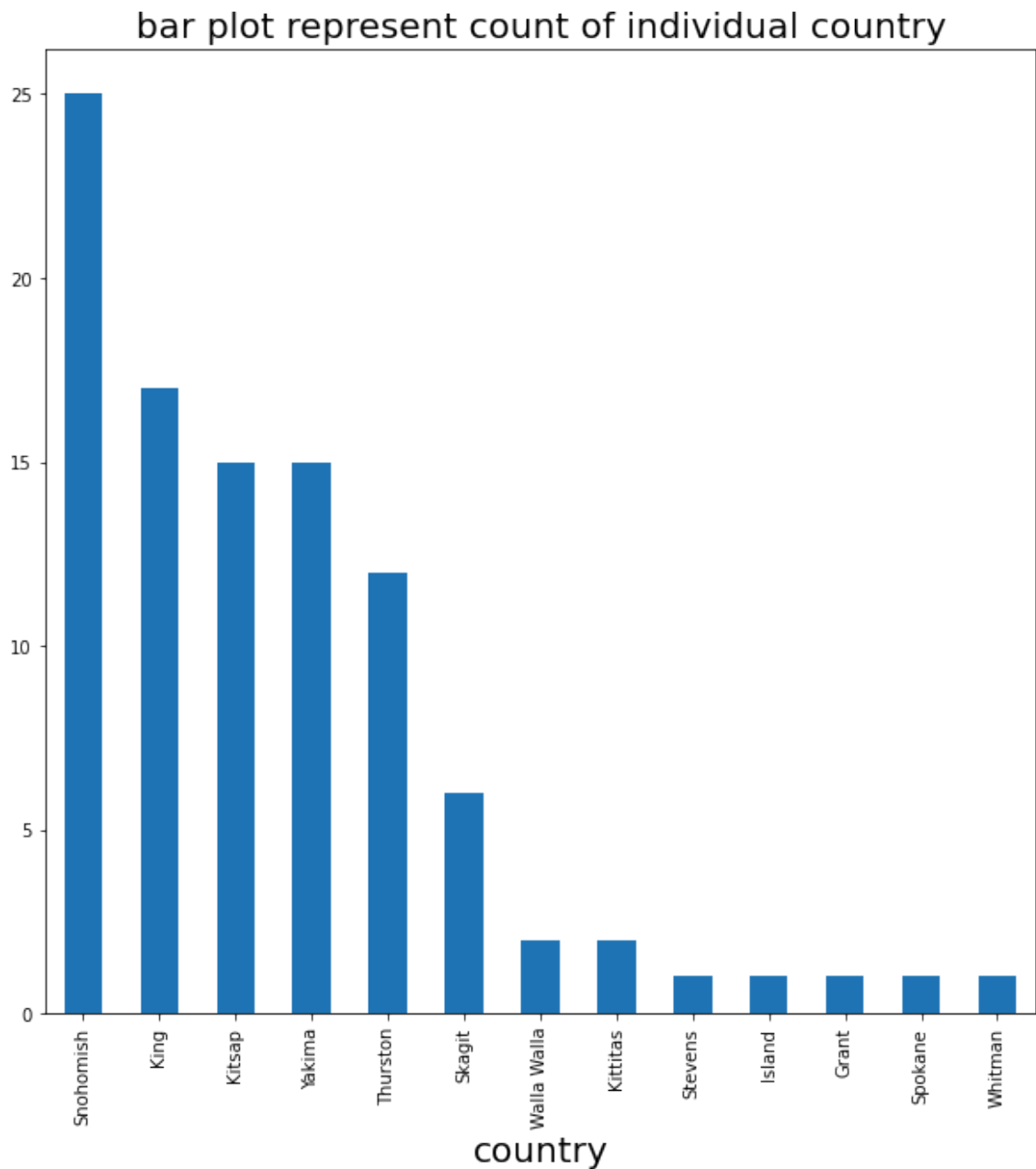
In [27]:
```python
x = data['Model Year']
y= data['Electric Range']
plt.figure(figsize=(10,10),dpi=100)
plt.scatter(x,y)
plt.xlabel('model year' ,fontsize=20)
plt.ylabel('electric range',fontsize=20)
plt.title('scatter plot for model year and elecric range')
```

Out[27]: Text(0.5, 1.0, 'scatter plot for model year and elecric range')