1 Duomenų analizei duomenys paimti iš https://www.fueleconomy.gov/ siekiant pažiūrėti automobilių ekonomiškumą ir ekologiškumą

2 Darbo tikslas (Hipotezė)

2.1 Patikrinti ar BMW markės automobiliai yra labiau ekonomiški bei ekologiški nei Volvo

3 Darbui reikalingų paketų importavimas

In [98]:
```
import pandas as pd
pd.set_option('display.max_columns', 150)
pd.options.mode.chained_assignment = None
import numpy as np
import matplotlib
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.linear_model import LinearRegression

```

4 Duomenų sukėlimas į Jupyter

In [6]:
```
d09 = pd.read_csv('C:\\Users\\HP\\OneDrive\\Stalinis kompiuteris\\Data Project\\Fuel\\09tst
d09.head(10)
```

Out[6]:

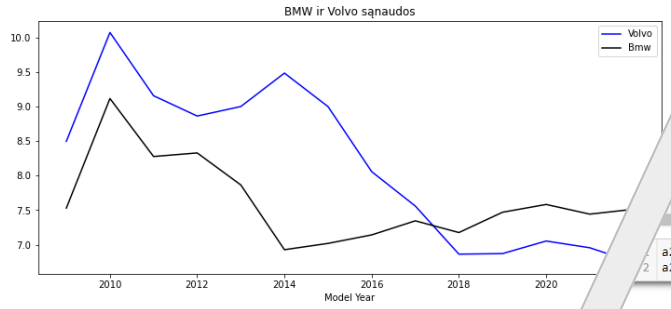
	Model	Vehicle	Veh	Represented	Represented	Test	Test Veh	Test Veh	Actual Tested

In [ ]:
```
plt.rcParams['figure.figsize'] = [12, 5]
```

In [55]:
```

volvo.plot(color = 'b',title = 'BMW ir Volvo sąnaudos',x = 'Model Year', y = 'L/100'),bmw.plot(color =
L=plt.legend()
L.get_texts()[0].set_text('Volvo')
L.get_texts()[1].set_text('Bmw')

```



In [56]:
```
df1 = lentele.groupby(['Vehicle Manufacturer Name','Model Year'])['CO2 Tax
df1
```

Out[56]:
```
Vehicle Manufacturer Name  Model Year
Audi                       2009          63.750000
                           2010         157.582418
                           2011         195.214286
                           2012         199.698795
                           2013         208.022727
                                           ...
aston martin               2017         265.500000
                           2018         255.000000
```

2012 2014 2016 2018 2020

```
d1 = model1.score(X1, y1)
ed1
```

580690566

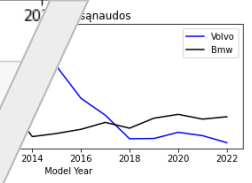
```
tele.to_excel('C:\\Users\\HP\\OneDrive\\Stalinis kompiuteris\
```

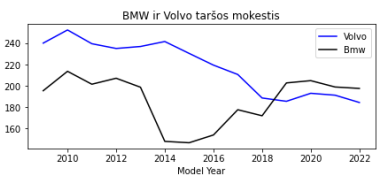
Išvados

10.1 BMW tiek kuro sąnaudų lygiu tiek taršo bei taršos mokestis yra mažesni) o nuo 201

10.2 Volvo metams bėgant sąnaudas sum ml.

10.3 Senesni Volvo varikliai buvo dide BMW, tačiau nuo 2015 metų Volvo gar kuriems reikia mažiau kuro.





regresija

```
 = lentele[lentele['Vehicle Manufacturer Name'] == 'Volvo']
s = volvos[['Model Year','L/100']]
vos
vos = volvos.groupby('Model Year')['L/100'].mean()
lvos
olvos = volvos.to_frame(name = None)
volvos.reset_index(inplace = True)
volvos
```

	Model Year	L/100
0	2009	8.496405
1	2010	10.071963
2	2011	9.156302
3	2012	8.862534
4	2013	9.000187
5	2014	9.484143
6	2015	8.998282
7	2016	8.057615
8	2017	7.559668
9	2018	6.863009

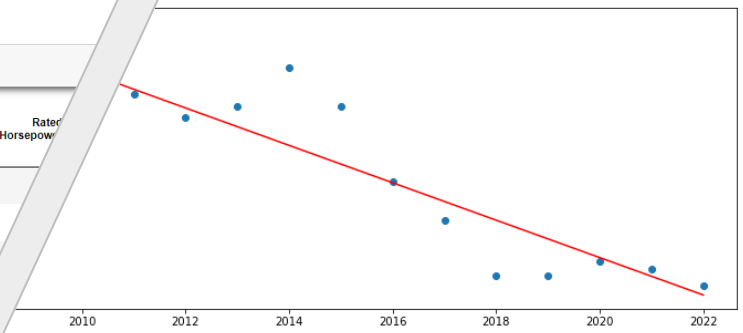
s jungiamos į vieną

```
0,d11,d12,d13,])
```

	Veh Mfr Code	Represented Test Veh Make	Represented Test Veh Model	Test Vehicle ID	Test Veh Configuration #	Test Veh Displacement (L)	Actual Tested Testgroup	Vehicle Type	Rated Horsepow
	ADX	AUDI	A6 QUATTRO	93UF-CAQ	1	2.995	9ADXV03.03UF	Car	
	ADX	AUDI	A6 QUATTRO	93UF-CAQ	1	2.995	9ADXV03.03UF	Car	
	ADX	AUDI	A6 QUATTRO	93UF-CAQ	1	2.995	9ADXV03.03UF	Car	
09	ADX	Audi	Q5	93UC-Q5A	0	3.179	9ADXT03.23UC	T	
2009	ADX	Audi	Q5	93UC-Q5A	0	3.179	9ADXT03.23UC		

```
a2 = pd.concat([d14,d15,d16,d17,d18,d19,d20,d21,d22])
a2
```

	Model Year	Vehicle Manufacturer Name	Veh Mfr Code	Represented Test Veh Make	Represented Test Veh Model	Test Vehicle ID	Test Veh Configuration #	Test Veh Displacement (L)	Actual Tested Testgroup
0	2014	aston martin	ASX	Aston Martin	DB9	143TT1042	0	5.900	DASXV05
1	2014	aston martin	ASX	Aston Martin	DB9	143TT1042	0	5.900	DASX
2	2014	aston martin	ASX	Aston Martin	V8 VANTAGE	210TT241	0	4.700	B




```
x_predict = np.array([2023,2024,2025])
x_predict = x_predict.reshape(-1,1)
x_predict
```

```
array([[2023],
       [2024],
       [2025]])
```

34]:
```
y_predict = model.predict(x_predict)
y_predict
```

[134]: array([6.38665536, 6.1508201 , 5.91498484])

In [135]:
```
plt.scatter(X,y)
plt.plot(X,prediction,'r')
new_volvo = np.arange(2022,2025).reshape(-1,1)
plt.plot(new_volvo,model.predict(new_volvo))
```