1 2 3	Adi a tuan						rear)	4WD	95.0	438	3130.0	640.0	5	5	19	200	660.0	5.7	150	
3	Audi e-tron 50 quattro	Audi	e-tron 50 quattro e-tron S	308400	313	540	disc (front + rear)	4WD	71.0	340	3040.0	670.0	5	5	19	190	660.0	6.8	150	23.80
	S quattro Audi e-tror	Audi	quattro e-tron Sportback	414900 319700	503 313		(front + rear) disc (front +		95.0 71.0	346	3130.0	565.0 640.0	5	5	19	190	660.0 615.0	4.5 6.8	150	27.55
4	50 quattro Audi e-tror Sportback 55 quattro	Audi	50 quattro e-tron Sportback 55 quattro	357000	360	664	rear) disc (front + rear)	4WD	95.0	447	3130.0	670.0	5	5	19	200	615.0	5.7	150	23.85
	rows × 25 col	umns	·	he criter:	ia of buc	dget of 3		PLN and v	wants an	EV with a m	inimum range	of 400 km								
	Apply the filtered_df		f['Minimal	price (gr	ross) [PI	LN]'] <=	350000)	& (df['I	Range (WI	TP) [km]']	>= 400)]									
	Show the filtered_df. Car full	head()		Minimal price	Engine	Maximum	Type of	Drive	Battery	Range	Permissable	M aximum load	Number	Number	Tire	Maximum	Boot	Acceleration	Maximum DC	mean - Energy
_	name Audi e-	Make	e-tron	(gross) [PLN]	power [KM]	torque [Nm]	brakes	type	[kWh]	[km]	gross weight [kg]	capacity [kg]	of seats	of doors	size [in]	speed [kph]	(VDA) [i]	0-100 kph [s]	charging power [k W]	consumption [kWh/100 km]
	tron 55 quattroBMW iX3	Audi BMW	55 quattro iX3	345700 282900	360 286	400	(front + rear) disc (front +	4WD 2WD	95.0 80.0	438	3130.0 2725.0	640.0 540.0	5	5	19 19	200	510.0	5.7 6.8	150 150	24.45
1	Hyundai Kona 15 electric	Hyundai	Kona electric	178400	204	395	rear) disc (front +	(rear) 2WD (front)	64.0	449	2170.0	485.0	5	5	17	167	332.0	7.6	100	15.40
1	64kWh Kia e-Niro 64kWh	Kia	64kWh e-Niro 64kWh	167990	204	395	disc (front +	2WD (front)	64.0	455	2230.0	493.0	5	5	17	167	451.0	7.8	100	15.90
2	Kia e- 20 Soul 64kWh	Kia	e-Soul 64kWh	160990	204	395	disc (front + rear)	2WD (front)	64.0	452	1682.0	498.0	5	5	17	167	315.0	7.9	100	15.70
	rows × 25 co		e manufact	urer																
8]: f		groupby ake Car		Model'].co	ount().re	eset_inde	x(name='	'Car Coun	nt')											
1	Bl 2 Hyur	ИW	1																	
3 4 5	Mercedes-B	Kia enz esla	1 3																	
6	Volkswa		3 erage batt	ery capac.	ity for e	each manu	factureı	r.												
a ⁻	.vg_battery_ .vg_battery_	by_make by_make	rename(co	lumns={'Ba	attery ca					an().reset_i Capacity (k	ndex() Wh)'}, inplac	e =True)								
0	I В	udi MW		95.0000 80.0000	00															
3	•	Kia		64.0000 64.0000 80.0000	00															
6		gen		68.0000 70.6666																
W	Task 1 An Ve filtered ele Grouping	ctric vehic							00 km . Th	e resulting dat	aset includes m	odels from	multiple m	anufacture	ers.					
Т	We then of	alculated	the average	battery cap	oacity per b	orand to ev	valuate wh	hich manu	-	provide better	pattery performa	nce under	the given	budget and	d range	constraints				
25]: in	mport numpy mport matpl mport seabo	otlib.py		lt																
32]: f	From scipy.s	tats im y	port zscor	е		umption [kWh/100	km] colu	umn.											
d d	col = 'mean df[col] = po df_clean = c * Calculate df_clean['z_	.to_nume f.dropna Z-scores	eric(df[co a(subset=[l], errors	s='coerce	e')														
# t:	Use a lowe hreshold =	r thresh 2 f_clean	hold (like [(df_clean	2) ['z_score	'] > thre		(df_cle	ean['z_so	core'] <	-threshold)]									
Nur C:	outliers.head mber of out \Users\Shru value is tr	d() liers fo ti\AppDa	ound: 1	Temp\ipyke	ernel_125	12\20910			ingWithCo	pyWarning:										
See	y using .lo e the cavea df_clean['z	ts in th	ne documen	tation: ht	ctps://pa [col])	ndas.pyd		/pandas-c			de/indexing.h Maximum	tml#retur						Maximum	ı _	
_	Car fo	e N	Make Mode	(gross) [PLN]	power	torqu	Iype o Je brake	es type	capacity [k W h	y (WLTP)	load capacity [kg]	Number of seats	Number		kimum speed [kph]	Boot capacity (VDA) [I]	Acceleratio 0-100 kph [consump [kWh/100	otion z_score
	61 Benz EQ (long rows × 26 col	j)	edes- EQ\ Benz (long	339480	204	36	62 Na	N (front)	90.0	356	. 865.0	6	5	17	160	NaN	Na	N 110)	28.2 2.107645
p. #	Set figure (full state of the s	igsize= ox plot		color='sky	yblue')															
p	Add title olt.title('Colt.xlabel('	utliers Energy (in Mean -					fontsiz	ze=14)											
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	14		16	18	20		22	24	ı	26	28									
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[4]: d. d. p.	t# Task 3 to lata = df [[lata.columns plt.scatter(plt.xlabel("	'Battery = ['Bat data['Ba Battery Range (F	f there's y capacity ttery','Ra attery'],d Capacity KM)")	Energy a strong : [kWh]','I nge'] ata['Range (KWH)")	Consum relations Range (WI	nption (k	cWh/10	0 km)			28									
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In []: ## Task 1

Out[5]:

In [1]: import pandas as pd

df.head()

In [5]: # load the Excel File.

Car full name

df = pd.read_excel('FEV-data-Excel.xlsx')

Minimal

price

(gross)

[PLN]

Engine

power

[KM]

Maximum

torque

[Nm]

Type of Drive

brakes type

Maximum

[kg]

load Number Number

capacity of seats of doors

Tire

[in]

Maximum

speed

[kph]

Boot

capacity

(VDA) [l]

Acceleration

0-100 kph [s]

Permissable

[kg]

(WLTP) ... gross weight

Range

[km]

Battery

capacity

[kWh]

Maximum

charging

power [kW]

DC

mean - Energy

consumption

[kWh/100 km]

display the few rows of data.

Make