What Electric Cars on the European Market Are the Best Value for Consumers?
By Carlos Acosta

With many car manufacturers stopping the production of gasoline engines in the near future, a lot of us have been looking into getting an electric powered vehicle. As the due date gets closer, more and more brands start revealing their new EVs. Tesla is a brand that is arguably one of the most popular currently due to its innovation and the fact that, when it was revealed, there was not much competition for it.

Hypothesis: Electric cars that offer the best value for consumers are those that have a combination of purchase prices, high fuel efficiency, and a long driving range.

Process: For this, I have selected three categories to research. These are the budget, middle, and luxury class EVs that are going to be the best value. I used Kaggle.com to get a spreadsheet comparing cars from 21,000 euros to 218,000 euros. This spreadsheet has every electric car on the market and shows the range, price, and speed of charge. I downloaded the spreadsheet as a csv file and made my own spreadsheet from it so I could compare and see which 3 vehicles were going to be the best for their own separate categories.

Starting off with the High end EVs, I put the most efficient with the price and the cost as well as the charging. Although the price is a whopping 105,000-109,00 euros, this car gets 640 km (400 mi) per charge. This luxury car is 100,000 euros cheaper than its counterpart, which came in second place for high end EVs.

Mercedes EQS 450+

Mercedes EQS 450+	107.8 kWh useable battery Available since October 2021	6.2 sec	210 km/h	640 km	168 Wh/km	960 km/h	Rear Wheel Drive	5	€109,551	£105,610

This car goes for 218,000 euros and only gets 5 kilometers more of distance per charge. Although this one is All wheel drive, the drivetrain does not make up for its 100,000 differences, therefore making me put it in second place. The last place would go to Tesla.

Lucid Air Dream Edition P

Lucid Air Dream Edition P	118 kWh useable battery Available since	2.7 sec	270 km/h	645 km	183 Wh/km	820 km/h	All Wheel Drive	5	€218,000	N/A

|	January 2022									

Although Tesla does get a lot of publicity, this car unfortunately does not come close to the Lucid Air or the Mercedes when it comes to charge as it gets 570 km and costs 113,000 euros. This car gets 70 km less than the Mercedes and 75 km less than the Lucid Air per charge.

Tesla Model S dual motor

Tesla Model S Dual Motor	95 kWh useable battery Available since January 2023	3.2 sec	250 km/h	570 km	167 Wh/km	790 km/h	All Wheel Drive		5	€112,990	£100,000

To put it into perspective, here is a chart to make it a little easier to visualize.
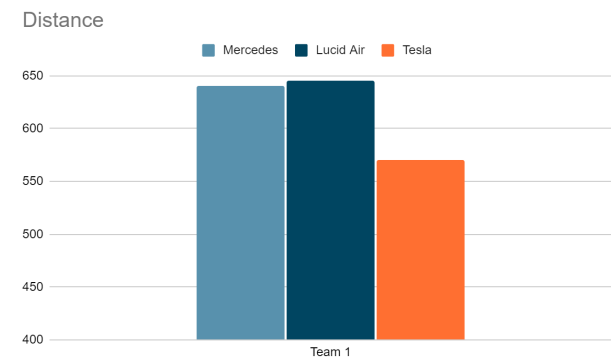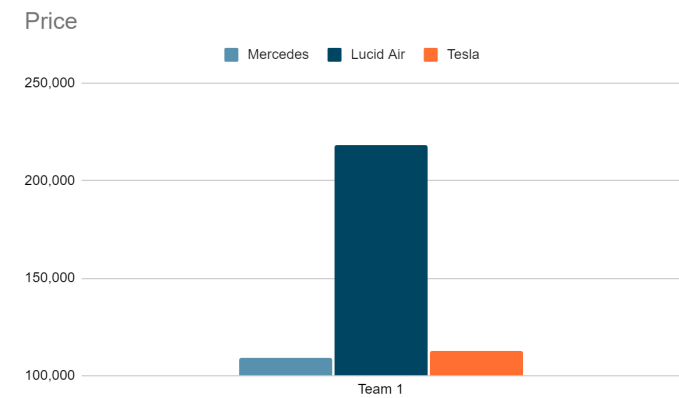
Price

Distance

When it comes to Middle class EVs (100,000-40,000) there were 3 cars that had the best value for their price.

Coming in first place is the Polestar 4. Getting 510 km of distance while having a price range of 60,00-55,000. This car has the most range for its price.

Polestar 4 Long Range Single Motor	94 kWh useable battery Expected from February 2024	7.4 sec	180 km/h	510 km	184 Wh/km	760 km/h	Rear Wheel Drive		5	€60,000	£55,000

In second place is the Tesla Model 3. Although this car has a fairly similar price range to the Polestar, its mileage on a full battery is 25 km less than the Polestar and costs roughly the same, putting it in the #2 spot.

Tesla Model 3 Long Range

| Tesla Model 3 Long Range Dual Motor	75 kWh useable battery Available since November 2021	4.4 sec	233 km/h	485 km	155 Wh/km	750 km/h	All Wheel Drive		5	€53,668	£50,990

In third place is the Cupra A Born this car gets 450 km per charge, which is near the price of the Tesla, making it have less value than the Tesla but still falls in the middle class category since it is just above 40,000 euros.
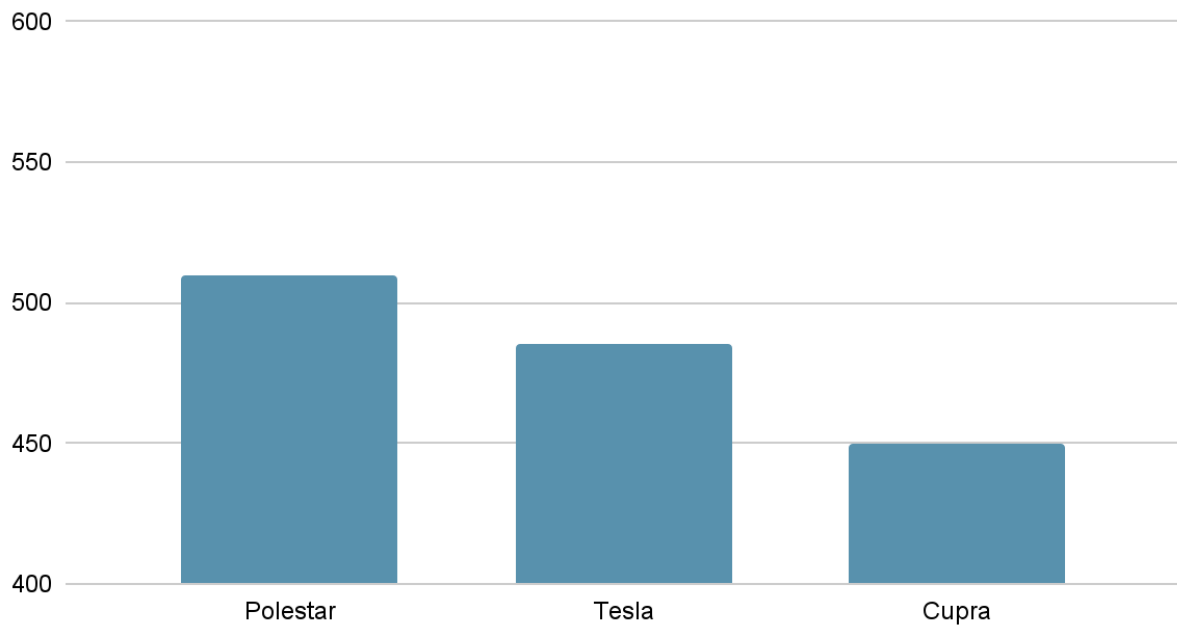
Cupra A Born

CUPRA Born 170 kW - 77 kWh	77 kWh useable battery Available since March 2022	7.0 sec	160 km/h	450 km	171 Wh/km	570 km/h	Rear Wheel Drive		4	€46,450	£41,975

Here are charts to visualize the three cars and their value.

Price in euros

| | Polestar | Tesla | Cupra |

Distance per Charge in Km

| | Polestar | Tesla | Cupra |
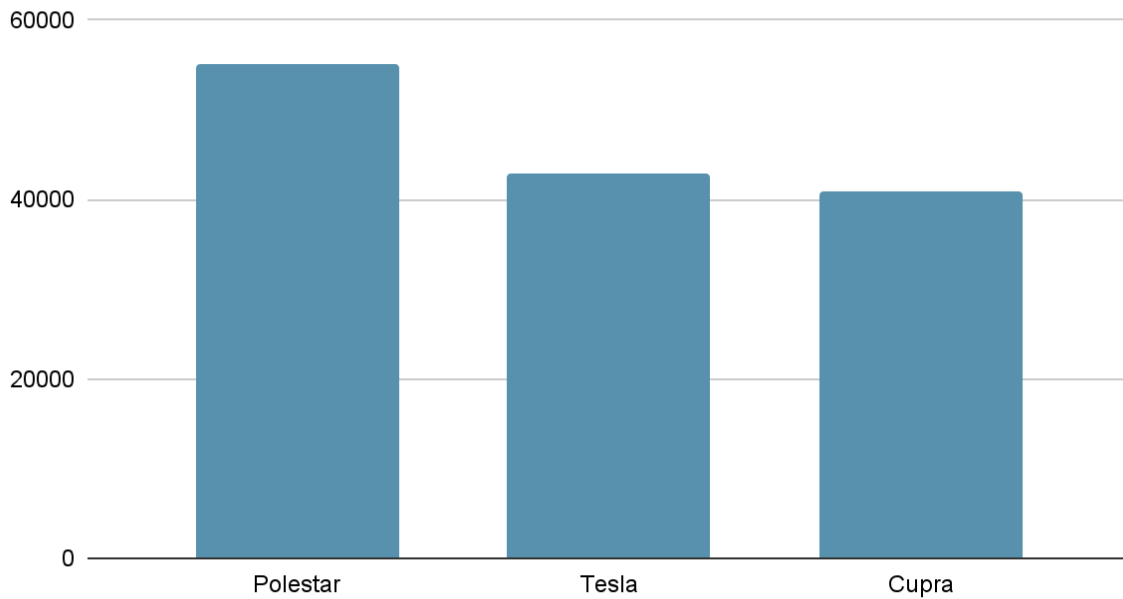
To finish the list, we have the budget friendly EVs. These include three vehicles in the price range of 40,000-20,000.   In first place is the Mg Mg4 Electric 64, costing 35,990 euros and having a range of 300 Km. This car was the best for its value class because it had the best mileage and did not exceed the 40,000 euro threshold.

MG MG4 Electric 64

MG MG4 Electric 64 kWh	61.7 kWh useable battery Available since October 2022	7.9 sec	160 km/h	365 km	169 Wh/km	450 km/h	Rear Wheel Drive		5	€35,990	£28,495

In second place is another Mg, the Mg64 electric 51, which is the same model as the electric 64 presented above but does not get as good fuel economy as it. This car still does 300 km per charge and is about 4 thousand euros cheaper as well, putting it at the number 2 spot.
MG MG64 Electric 51

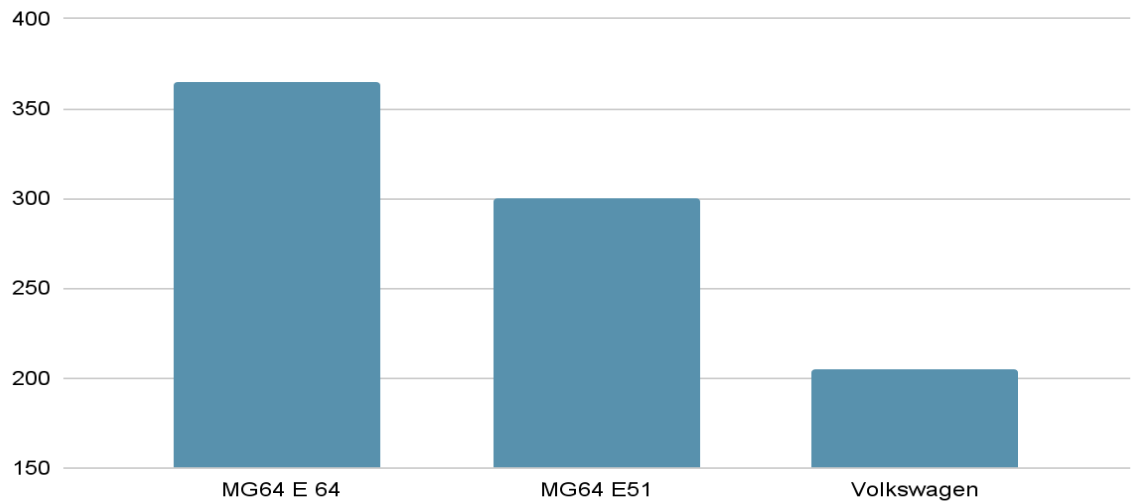|											
MG MG4 Electric 51 kWh	50.8 kWh useable battery Available since October 2022	7.7 sec	160 km/h	300 km	169 Wh/km	340 km/h	Rear Wheel Drive		5	€31,990	£25,995

In last place is the Volkswagen E UP! This car made it on the list due to its price but did not have a very impressive fuel economy. This car costs 29,995 euros and covers 205 km of distance per charge.
Volkswagen E UP!

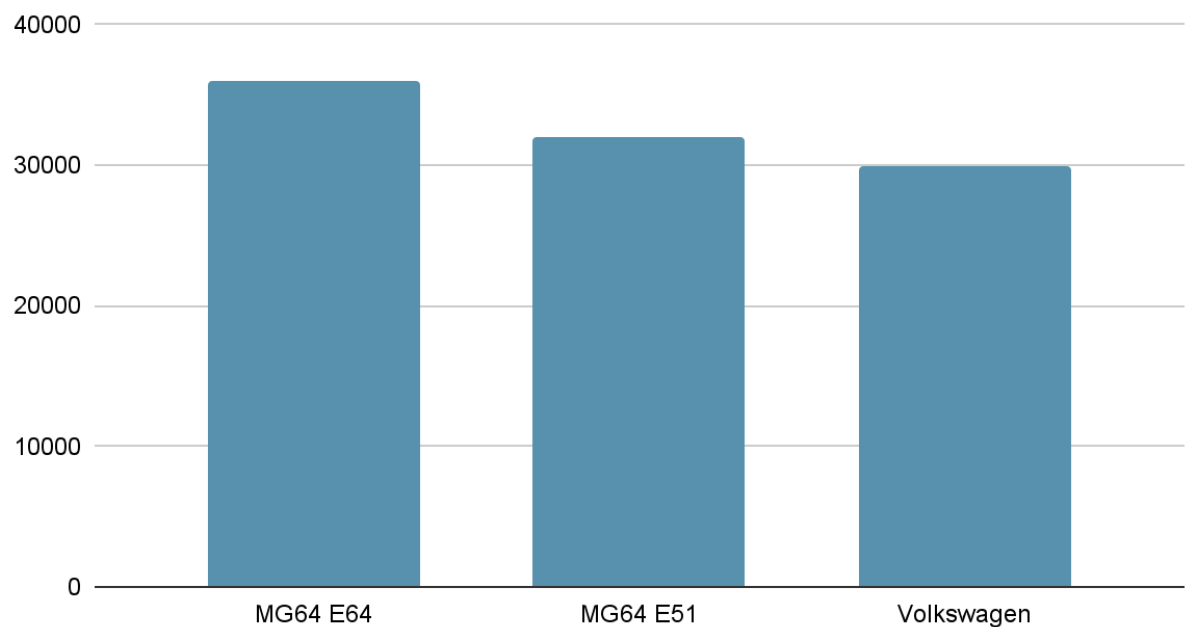|											
Volkswagen e-Up!	32.3 kWh useable battery Available since August 2021	11.9 sec	130 km/h	205 km	158 Wh/km	170 km/h	Front Wheel Drive		4	€29,995	N/A

Finally, here is another graph to display the EVs and their value.

Distance per Charge in Km

400	
350	
300	
250	
200	
150	

MG64 E 64   MG64 E51   Volkswagen

Price in euros

40000	
30000	
20000	
10000	
0	

MG64 E64   MG64 E51   Volkswagen

Conclusion: In this data analysis, I used the data sheet to look at over 300 different types of EVs and categorize them into those that would be the best value for their class. The three winners were the Mercedes EQS 450+ for the high class EVs, the Polestar 4 for the middle class, and the economic EVs was the MG MG64 E64. These vehicles out of the 300 were the best in value and price, as they got the best mileage for the price. If one wishes to view this statistics the link is here:

Khan Academy Results and Reflection

Computing basic statistics involves using mathematical formulas and algorithms to analyze and summarize a set of numerical data, providing important insights into data patterns, trends, and relationships that can be used to inform decision-making in various fields. To interpret the data more thoroughly, measures of central tendency, variability, correlation, and regression are frequently utilized. Utilizing statistical and data analysis methods like clustering, classification, regression, and association rule mining, finding patterns in data sets entails spotting and examining patterns, relationships, and anomalies. The objective is to find significant insights and data, such as periodicity, trends, clusters, outliers, and correlations between variables, that may be utilized to make educated judgments or predictions. Once patterns have been found, they can be used to create more precise models or predictive algorithms, offering insightful data that can assist people and organizations in making better decisions.

In machine learning, bias arises when an algorithm consistently favors or disadvantages particular groups, people, or outcomes as a consequence of latent prejudices or insufficient data. Machine learning algorithms are taught using previous data that can already be biased in certain ways, such as racial or gender prejudices. This might cause the algorithm to become more biased in the future, which will affect how accurate and impartial its outputs are. Bias may also result from the characteristics chosen for analysis, the algorithm or model adopted, or the methods used for data collection and labeling. This may have detrimental effects, including the maintenance of prejudices, inequality, and discrimination. As a result, bias in machine learning must be identified and reduced using a variety of strategies, including data pretreatment, feature engineering, and algorithm selection.

"Big data" refers to enormous and complicated amounts of data that are too diverse, big, or dynamic to be properly handled and evaluated with conventional data management and analysis techniques. Volume is the total quantity of data present, which might be at the terabyte, petabyte, or even exabyte level. Velocity is the term used to describe the rate at which data is created, gathered, and processed. This velocity might be batch or close to real-time. Variety refers to the range of data sources and forms, including text, audio, video, and sensor data. It also includes structured, semi-structured, and unstructured data. For businesses in a variety of industries, including marketing, social media, healthcare, and finance, big data poses both many obstacles and many possibilities.

The unit test at the end of the lessons was a good wrap up of all the modules I just did. It had everything on it, from data tools, big data, to bias in machine learning. It also kind of mixed and matched them together to make the questions a bit more challenging. It definitely tested my knowledge of everything I had just read and learned from the modules. Although these questions were a bit harder than the modules, they definitely strengthened my understanding of data analysis and prepared me a bit more for the final project.