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THE PAKISTAN MARKET FOR ELECTRIC VEHICLES AND IMPACT ON CURRENT MANUFACTURERS

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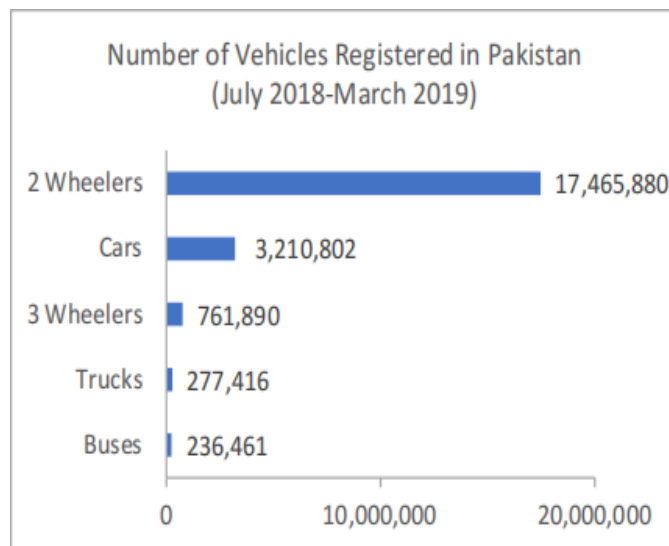
ABSTRACT

In the near future, road transportation might set transformed from conventional petroleum vehicles to electric vehicles (EVs). Despite being environmentally friendly, electric vehicles have a poor market share in the majority of developing nations. The new auto policy has been just announced in Pakistan that aims to enhance the country's EV adoption over the period of five years. The research analyzes and investigates the factors and variables that impact the mindset of consumers regarding the adoption of EVs. Other than environmental concerns and the affordability of EVs, social influence and enabling factors are also considered in this study as deterministic factors for EV adoption. . An online survey was carried out in Lahore, Pakistan, to gather data to support the assumptions, which were based on existing research. Structural equation modeling's partial least square root modeling technique was utilized to verify the hypothesis. The result shows that EV manufacturers should improve marketing strategies in order to properly communicate environmental advantages, performance, and usage of EVs.

Index Terms-- China Pakistan Economic Corridor (CPEC), custom study, compressed natural gas, Electric Vehicle Policy (EVP), Electric Vehicle Reacting Problem (EVRP), greenhouse gases (GHGs), general sales tax, Government of Pakistan (GOP), Import Strategy Regulation (ISR), Jones effect, Special Technology Zone Authority (STZA), United Nation Economic Commission for Europe (UNECE),

INTRODUCTION

Several multi-sectoral and diverse difficulties confront Pakistan at this time. To cope with this obstacle, an auto policy has been introduced that proposed the introduction of Electric Vehicle in Pakistan not only revitalize the transport industry but also put a healthy impact on the environment, the economy, and the Energy sector. Electric Vehicles (EVs) will bring innovation in many modes of transportation viz. motorbikes, buses, lorries, and automobiles. This specific report is solely applicable to automobiles. The intend of this study is to investigate the variables that impact Pakistan's consumers' behavioral intentions to acquire electric vehicles (EVs), such as concern for the environment, facilitating conditions of use, effort expectations, cultural pressure, and perceived enabling circumstances. We will be delivering an addition to this study at a future stage to cover the other three points. In Pakistan, the transportation industry has seen double-digit growth during the last several years. Most of the nation's transportation industry is reliant on oil-based goods, and the government spends nearly USD 13 billion per year on oil imports, according to the World Bank. According to current estimates, if our transportation industry continues to develop at its current double-digit pace, the cost for oil imports would approach USD thirty billion by 2025 [1].



Number Of Vehicles Registered in Pakistan

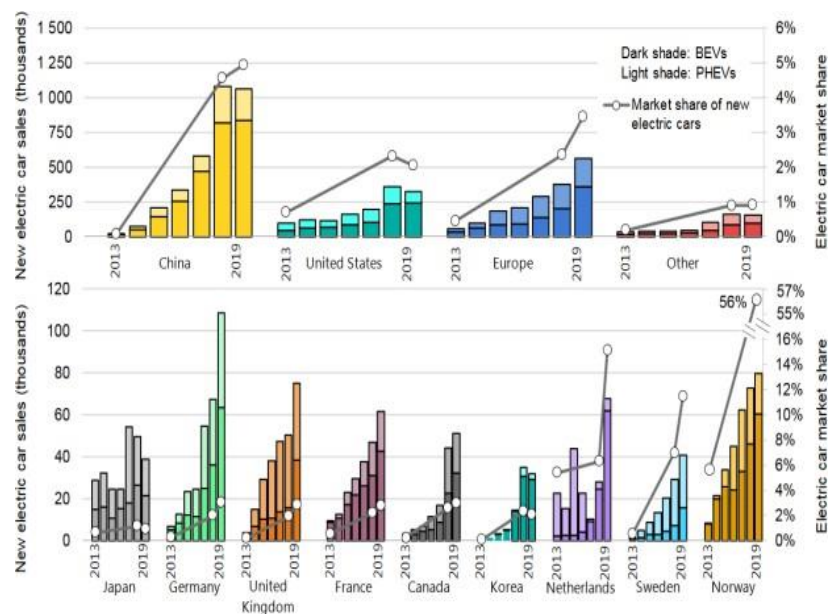
Hybrid cars like the Honda Vezel, Toyota Prius, and Toyota Aqua are running on Pakistan's roads. The China-Pakistan Economic Corridor (CPEC) and the Automotive Development Policy (2016-2021), collaborating with Pakistan's top automaker to launch new car brands enchanting EV models at various price points to grab the attention of customers of various income levels [2]. Several multinational automakers including South Korea, Japan, and China declare the Pakistan market has a large potential for electric vehicles (EVs), and local enterprises are collaborating with them to deliver EVs to Pakistan.

Current Auto Industry Production

In the recent budget of 2021, an additional Special Technology Zones Authority (STZA) has been created for the promotion of technology related to the auto industry. Pakistan offers a potentially huge HR resource with 40,000 IT graduates entering the workforce every year. The aim of STZA is to facilitate collaboration between industry, academia, and the government for a tech-driven Pakistan. The Special Technology Zones are slated to be set up in Islamabad Capital Territory and each of the provincial capitals of Karachi, Lahore, Quetta, and Peshawar. In addition to the incentives provided to STZA, STZA provides an exemption from property tax and exemption of GST for import of machinery, plant, equipment, and raw materials for feeding of these substances within regions by the STZA [2].

At this time of year, a combination of heavy usage of fossil-fuel-powered cars for transportation and seasonal crop burning contributes to the issue. Two years after announcing its ambitious green strategy, Pakistan is ramping up its campaign for electric vehicles, with the goal of having 30% of the country's vehicles be electric by 2030 and 90% by 2040.

New EV sales in Different Countries



Electric vehicles have the potential to make a significant difference in terms of air quality in urban areas. Pure electric vehicles don't emit any carbon dioxide into the atmosphere since they have no exhaust pipe. This has a significant impact on reducing air pollution. Pedestrians and bikers will enjoy cleaner streets thanks to electric automobiles, creating our urban areas more pleasant places to live. A single electric vehicle on the road may save 1.5 million grams of CO₂ over the course of a year.

To encourage EV adoption and indigenous manufacturing, the GOP has announced a set of incentives and tax breaks as summarized below:

- EV specific parts like batteries, motors, motor control units, and others can be imported at 1% custom duty (CD) compared to the 25% CD for non-EV specific parts.
- All indigenously manufactured EVs can be sold at 1% general sales tax (GST) compared to the standard 17% GST.
- Duty-free import of machinery and hardware has been allowed to establish EV and EV specific parts manufacturing facilities.
- The corporate income tax has been abolished for companies manufacturing EVs and EV-specific parts.
- The provincial governments have been directed to reduce the rates for registration of EVs and yearly token tax on these vehicles [2].

The following table shows the cumulative number of registered vehicles in the country during 2020, classified into vehicular categories

	VEHICLES	NUMBER (In Million)
1	2-wheelers	22.72
2	CARS	3.93
3	3-wheelers	0.94
4	Trucks	0.29
5	Buses	0.25

Table: total registered vehicles in Pakistan (in millions)

Pakistan stands out as an attractive emerging market for EVs in the developing world. Presently, the EV value chain provides a level playing field for the new or existing market players. Like the shift to compressed natural gas (CNG) operated vehicles, history shows that the Pakistani market enthusiastically embraces the ‘Jones Effect’ after crossing the initial technology adoption curve. Therefore, the early entrants may be best positioned to reap the benefits of a large market in Pakistan and export prospects in regional countries [3].

Customers want automobiles that are enjoyable to drive, as well as having the most up-to-date in terms of amenities and technology. Because the surge is coming sooner than planned, automakers are putting in place new internal power centers and external collaborations to meet the demands. As electric vehicle operating costs are predicted to be cheaper than those of traditional cars, the retailer business model will alter. Suppliers in the powertrain industry will have to rethink their business models if they want to remain competitive.

The electric vehicle industry is still in its infancy, and in order for it to thrive and grow, we must break through the barriers of design and foundation. Customers, however, have already made money in this sector as a large number of EVs, including Taycan, Porsche, Nissan, and Leaf Tesla, have been imported worldwide. As a result, these cars are likely to be shown to the public in the near future. There are now two electric SUVs on the market, the Audi E-Tron and the

MG ZS.

As a result of all of this, it is likely that the car sector in Pakistan would see a drop in output in the future years. Automobile manufacturers such as Toyota, Honda, and Suzuki will see a decline in the number of automobiles they produce. The importers of electric vehicles have an influence on the decline in the manufacture of gasoline-powered vehicles. EV will be imported into a graph with an increasing slope.

Fuel Prices Statistics

Following a government announcement on Wednesday, the new rates for gasoline will happen immediately on December 16 and would reduce prices by more than Rs7.01 per liter for the country's inflation-weary citizens. But the Financial Department has decreased the price of fuel by Rs5 - Rs140.82 per liter, which is lower than the Rs11 reduction envisaged by the government [3].

Price of Petroleum Products					
Product	Existing price w.e.f 01.12.2021 (per liter)	New prices w.e.f 16.12.2021 (per liter)	PL/ Ltr	ST/Ltr %	Increase/ Decrease (Per liter)
MS (Petrol)	Rs145.82	Rs140.82	13.62	4.77 %	-5.00
High Speed Diesel	Rs142.62	Rs137.62	13.14	9.08 %	-5.00
Kerosene (SKO)	Rs116.53	Rs109.53	5.91	8.30 %	-7.00
Light Diesel	Rs114.07	Rs107.06	3.66	2.70 %	-7.01

By Rs5, kerosene has been slashed to Rs109.53 a liter, while light diesel has been reduced by Rs7.01, both of which are now cheaper than diesel.

PL and ST per liter on MS fuel have been maintained at 13.62 & 4.77 percent, respectively, by the government. With oil prices down globally and a desire to decrease the burden on consumers, the statement said, "the prices have been cut. As the price of petroleum products fluctuates on the global market, the rates have been cut [3].

Global Trends & Challenges

For the first time in a decade, the worldwide stock of electric vehicles will surpass 10 million in 2020, an increase of 43% over 2019, and a share of 1%. There were 2/3 of new EV registrations in 2020, and 2/3 of the stock. As of 2020, Europe has the highest yearly growth rate of 3.2 million electric vehicles, with China having 4.5 million.

	Vehicle Category	Committed Investment
1	2-Wheelers	EUR 1.5 billion
2	3-Wheelers	EUR 102 million
3	Cars	EUR 1.2 billion
4	Buses	EUR 175 million
5	Light Commercial Vehicles	EUR 233 million

According to the NEMMP, the total amount invested in each vehicle category is shown in the Table.

The economic consequences of the Covid-19 epidemic have had a profound impact on the worldwide market for all sorts of automobiles. New automobile registrations fell by almost a third in the first half of 2020 compared to the same period in 2019. Overall, there was a 16% reduction in year-on-year sales, although this was somewhat offset by increased interest in the second half. However, despite a decline in traditional and new automobile registrations globally, the market share of electric vehicles is expected to reach a historic high of 4.6% by 2020 [4].

An estimated 3 million electric vehicles are expected to be registered in the United States by the year 2025. Europe had the highest number of new registrations for the very first time, at 1.4 million. China had 1.2 million new electric vehicle registrations, whereas the United States had 295 000.

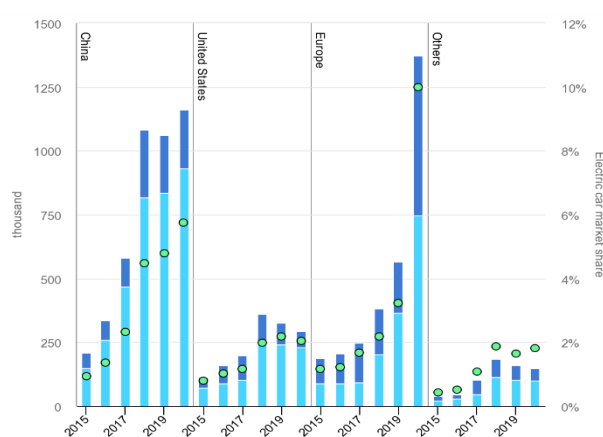
Several reasons pushed electric vehicle registrations up in 2020. The cost of ownership of electric vehicles is getting increasingly competitive in several nations [4]. As the market for automobiles slowed, some governments offered or extended financial incentives to encourage people to buy electric cars.

By 2020, the European automobile market is expected to have shrunk by 22%. Registrations for new electric cars have more than quadrupled, reaching 1.4 million, and accounting for 10% of all vehicle sales. Germany recorded 395,000 new electric vehicles, whereas France registered 185, 0000. Registrations in the United Kingdom increased by more than twofold, reaching a total of 176 000. A record 75% of Norway's vehicle sales were electric, up roughly a third from this time last year. The percentage of electric automobiles in Iceland, Sweden, and the Netherlands has surpassed 50%, 30%, and 25%, respectively [4].

The set target for the production of EVs till 2030 for different countries are given in the table

	Country	Targets
1	China	Increase funding for electrified transportation systems including public transportation and waste collection vehicles.
2	India	Individuals and companies may set up EV charging stations without the necessity for a license under the Electricity Act of 2003.
3	Mexico	The adoption of electric vehicles will result in a 22% decrease in GHG emissions from the transportation sector by 2030.
4	Norway	Transport GHG emissions must be reduced by 40% by 2030.
5	Sweden	By 2030, EVs will be responsible for reducing emissions from transportation by 70%.
6	France	7 million EV and PHEV charging stations around the nation.
7	Finland	Reduction of GHG emissions from transportation by half by 2030.

Car registrations in the United States plummeted 23% in 2020, with electric vehicles accounting for a smaller share of the drop. Roughly 78% of new electric vehicles registered in 2020 will be EVs, down from about 327,500 in 2019. They gained 2% of the market share. Due to the expiration of internal revenue service incentives for Tesla and General Motors that make up the vast majority of electric vehicle registrations government incentives will be reduced in 2020. Tesla and General Motors. [4].



Government Policies

Electric vehicles (EVs) are slowly taking over the automotive industry across the world, in part because of worldwide promises to reduce greenhouse gas

(GHG) emissions, of which transportation-related emissions constitute a significant portion. For a country to introduce and sustain EVs and its infrastructure. It is important to determine penetration targets of EVs. The Prime Minister's Committee on Climate Change in its meeting held on 11 May 2019 has approved minimum mandated targets for guiding EV penetration in the country. Table 1 mentions these targets along with the expected penetration time frame [5].

Incentives for New Cars

The government of Pakistan is taking good incentives to lower the cost of the purchase of EVs. In an effort, few succeeding procedures are declared. [6].

□ According to the Auto Development Policy 2016-2021 all existing incentives remain intact, but to promote the manufacturing industry, the government will do the following further Incentives for the growth of EV in Pakistan only for local units.

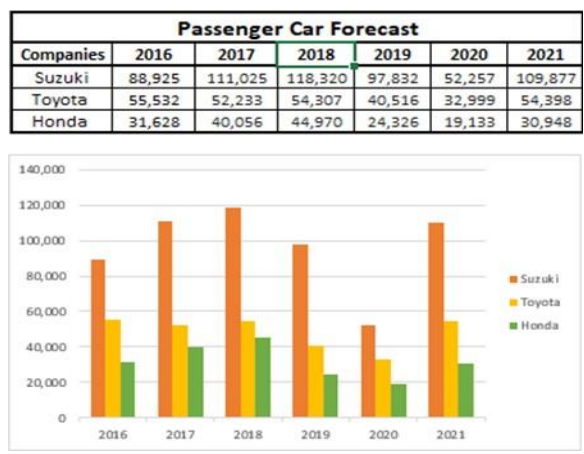
- i) To bring the acquisition value of EVs down all the manufacturers of EVs in Pakistan will sell the EVs at less than 1% GST for the next 7 years.
- ii) To encourage the buyers EVs manufactured by Pakistan will be dispensed off registering fee and annually benefit of perfunctory tax. Imported EVs will undergo the same for the next five years [6].

- According to United Nations Economic Commission for Europe (UNECE) Agreement 1958, 'WP 29' (World Forum for Harmonization of Vehicle Regulations) standards specific EV components and parts cannot be manufactured locally to meet the international standard applied by the United States. European Union and other major EV manufacturers will be permitted importation at 1% custom duty for the succeeding 2 years until 2021 [7].

- The registration of electric vehicles will have a unique design. It will also have various incentives for buyers.

- The Green Banking Guidelines might also provide incentives for the purchase of new electric vehicles. This will help lower the cost of these vehicles in the country. [7].

The forecast for the cars is given below



Current EV production in Pakistan Industry is shown in the following table

Company	Product	Price (\$)	Battery (KWH)	Range (KM)	Imported
MG JW Automobile Pakistan	ZS EV	<43,400	44	300	Imported
Audi	E-Tron	<92000	55	300	Imported
Zia Electromotive	M7	<12,400	10	200	Imported

Incentives for 2-Wheelers/Low-Speed Electric Cars

Low-speed vehicles will also have the same restrictions such as 2 & 3 wheelers in their admittance to highways and other admittance switch roads in the opinion of the above the Government of Pakistan in alliance with pertinent units shall take the resulting measures [8].

- All existing incentives of the automobile development coverage 2016-2021 are to remain intact but, the government will supply the subsequent in addition incentives to jumpstart Electric Vehicle EVs production in Pakistan
 - a. All two and three-wheeler EVs imported shall be wholesaled at 1% GST for the subsequent five years.
 - b. All 2 and 3 wheelers EVs mass-produced nationally will be traded at much less than 1 % GST for the following 7 years to deliver the acquisition price of EVs down.
 - c. EVs could be exempted from registration prices and token tax to encourage prospective buyers and the FBR shall evolve a coverage to conform tax incentives for searching for what you offer of the 2- wheeler and 3 wheelers [8].
- EV precise components and components no longer being manufactured domestically compliant to UNECE 1958 settlement WP-29 standards in addition to equal worldwide general implemented by means of the USA, ECU Union, and other most important EV producers [9].
- Registration number plates of Electric Vehicles w-11 have a wonderful color/design to create EV precise zones in excessive density areas. The registration wide variety plates could be one of a kind from other typical motors to distinguish among, 3 and low pace four-wheel electric cars and other automobile segments [9].
- The aforementioned policy incentives will bring the costs of two and three-wheelers at a competitive degree with their equivalent internal combustion automobiles and could provide the initial incentive for EV advent into the country

Incentives for Buses

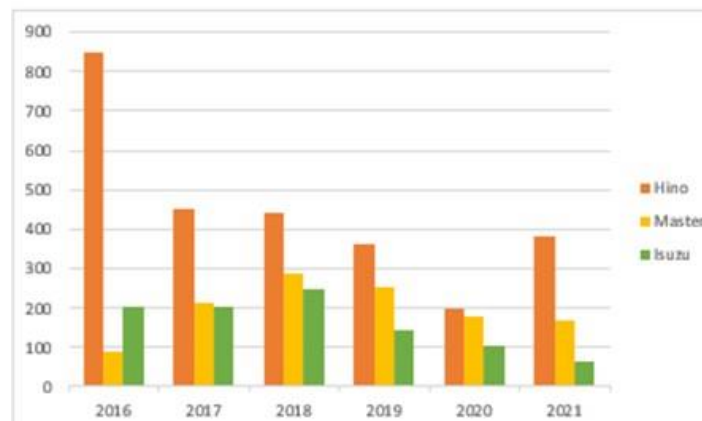
Currently, electric-powered buses are nearly four times high priced. However, because of their extensive use, they lessen emissions substantially. As a consequence, Pakistan's authorities will collaborate with appropriate groups to implement the following moves [10].

There might be a thousand electric buses bought via the government so that you can be operated on a concessionary basis by means of industrial operators.

- The economic operators will be selected for a competitive constructing process and have to ensure the improvement of sufficient charging infrastructure for buses and provide a business plan for his or her usage [10].
- The government may also invite 2-three producers thru government-to-authorities contracts to encourage manufacturers to set up assembly plants because the volume of buses is low.
- Customs duties and sales taxes at the very first 200 electric buses can be slashed from the cutting-edge 1% to much less than 1%, with a settlement that the ultimate 800 automobiles would be produced in Pakistan.
- There may be a 1% customs tax exemption for Electric Vehicles specific components imported into locally constructed buses. Further, a 1% GST could be carried out to the purchase of buses produced in the country [10].
- There might be no annually token tax or registration prices for electric buses. The State bank of Pakistan could also permit EVs to be obtained below the green Banking guidelines or similar financing schemes.

The forecast for the buses is given below

Busses Forecast						
Companies	2016	2017	2018	2019	2020	2021
Hino	847	449	443	361	199	384
Master	88	211	288	253	180	167
Isuzu	204	203	250	143	103	66



Current Buses and Trucks production in Pakistan is given in the following table

Company	Product	Expected Price (\$)	Range (KM)	Imported / Indigenously developed
VPL	Golden Dragon	-	-	Imported
Sapphire Group	BYD K9	324	250	Imported

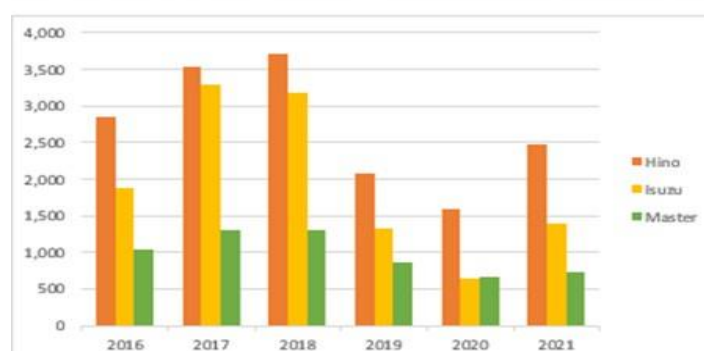
Incentives for Trucks

There is the unique impetus for trucks, as properly. Due to this, the Pakistani government will work with appropriate agencies to implement the subsequent measures.

- Initially, electric motors of more than one ton could be hired for metropolis-extensive hauling considering their charging needs are less complicated to satisfy in the close to a term of 1-2 years. However, within the subsequent 5 years charging infrastructure may be advanced for long-distance hauling [11].
- Two thousand electric-powered trucks might be bought and leased to industrial organizations at a discounted fee by means of the government.
- The commercial operators shall be decided via a competitive bidding method and have to ensure the improvement of sufficient charging infrastructure for buses and offer a business plan for their utilization.
- Government-to-government contracts are placed to encourage the manufacturers to set up assembly plants after observing the volume of trucks is low.
- The vehicles may also be synthetic alongside the strains of buses since the variety of trucks required in Pakistan is small, the trucks may be bought via government-to-government contracts for uploading the first two hundred vehicles and production the opposite 800 domestically [12].
- In Pakistan as per the plan, the very first 200 electric trucks will be bought at 1% customs tax and sold at 1% GST, while the last 800 vehicles could be manufactured in China.
- For trucks heavily produced regionally the EV particular components might be authorized import at much less than 1% custom obligation. Moreover, such trucks could be sold with less than 1% GST [12].

The forecast for the trucks is given below

Trucks Forecast						
Companies	2016	2017	2018	2019	2020	2021
Hino	2,858	3,525	3,702	2,087	1,593	2,471
Isuzu	1,882	3,298	3,178	1,331	650	1,390
Master	1,043	1,313	1,298	876	666	741



Targets for EV penetration is given below

EV Penetration targets	Cars	2 & 3 Wheelers	Buses	Trucks
Medium Term Targets (5 years)	100,000	500,000	1000	1000
Long-term Targets (2030)	30% of new sales	50% of new sales	50% of new sales	30% of new sales
Ultimate Targets (2040)	90% of new sales	90% of new sales	90% of new sales	90% of new sales

Import Policies

An aspirational National Electric Vehicle Policy (EVP) has been published by the government of Pakistan (GOP). By 2030, Pakistan hoped to have replaced 30 percent of its passenger cars with electric vehicles thanks to a new policy that mandated that all imports and manufacture of electric vehicles be handled by the government. A poll performed by Profit found that several electric vehicle owners have voiced their worries and protested to the government about the arduous auto registration procedure. Many tax deductions and advantages had been promised to electric vehicle users by the government, but they had not been carried out, according to an e-Tron client named Aamir Shakeel [13].

Eligibility

- Importing or gifting a car to a Pakistani citizen is permissible provided certain requirements are met. Remittances to Pakistani students, non-earning members of the Pakistani family, and individuals who have recently imported, given, or received a car are ineligible for this program.

- Importing a vehicle as personal luggage, as part of a relocation, or as a gift is permissible [14].

Conditions of Import

- Under the gift, personal luggage, and transfer of residence programs, automobiles that are more than five years old are not permitted to be imported, however, this does not refer to used bullet-proof vehicles.
- Gift, personal luggage, and exchange of residence programs can't bring in cars older than 3 years.
- A minimum of 180 days of travel outside the country is required prior to filing an application for importation as personal baggage.
- Requirements for importing a car under transfer of residency or giving one must have been met for at least 700 days in the last three years.
- A car may only be gifted to a member of the family who is ordinarily based in Pakistan.
- Import duties and taxes will be charged out of Pakistani citizens' own funds or those of the local receiver in the event of automobiles with engine capacities of 1800 cc and higher and 4x4 vehicles in new condition [15].

Provided, however, that the importer is subject to any additional penalty that may be applied under current legislation and the seizure of the car in cases where the vehicle is stolen, chassis tampered with, or documentation has been removed and fabricated. Such cars will not be eligible for re-exportation. In the event that a Pakistani person imports a car, but is unable to release it due to a high tax or other cause, the FBR may approve the re-export of such a vehicle provided there was no violation of the Import Strategy Regulation during the import stage [15].

Impact on Automakers

The manufacture of automobiles declines as a result of the importation of electric vehicles (trucks, buses, motorcycles, and cars). There is no doubt that electric vehicles are the way of the future, and they are here now, sooner than anybody could have predicted. Next, five to ten years will be an interesting opportunity in the automotive industry. To remain competitive, automakers will pour billions of dollars on this new technology. It's likely to be a challenging time for traditional carmakers as they make investment choices. Even though automotive manufacturers' electric vehicle divisions are now unprofitable, the electric car tidal will compel them to study it. Toyota, Honda, and Suzuki are among the automakers surveyed in the poll shown below.

Survey at Toyota

Conventional automakers like Toyota would be severely impacted since they will be forced to abandon the majority of the current generation's innovations. The economics of the business will be completely upended since there will be no mutability between current models and future ones. These sections of automotive corporations will lose their influence. In other words, they're not going to give the electric divisions any more money or influence. Similar

precedents may be found: As a result of their refusal to change, Control Data Corporation, Burroughs, and Kodak all went out of business.

Survey at Honda

With regards to the import of electric vehicles and their cost, Honda Atlas Cars is in litigation with the government. For the last two years, prices have increased by 50-70%, according to Honda Atlas Cars, and the government should be held more accountable for this than the industry's top three. Manufacturers will only pay a 1% tax on EV components imported under the current legislation, and the government will waive the registration and yearly renewal fees for EVs used in the information and communications technology industry. In addition, the Ministry of Industry's official says that cars with an engine size of more than 1,800cc are subject to a 50% regulatory duty. According to a ministry official, the localization of automobiles was impossible at the present market size of roughly 200,000 vehicles sold each year.

Survey at Suzuki

Our apparent benefits include lower oil imports, lower maintenance costs, and a reduction in pollution for the whole nation. We also have a lower cost per gallon of gasoline. In contrast, the disadvantages include a low top speed, limited battery range, and a lack of alternatives in this new market. If Pakistan decides to import electric vehicles in the near future, Suzuki manufacturers will face challenges as well. The demand for Suzuki vehicles may decline if electric vehicle technology advances faster than expected during the next five to ten years.

Operational Constraints

Markets are becoming more open and competitive in today's economy. An effective, sustainable, and ecologically responsible freight transportation infrastructure is essential to a business's success. Modern businesses striving to limit their usage of energy and the emission of greenhouse gases (GHGs) as a result are increasingly focused on environmental problems and freight flow management difficulties. In the EU, 30% of CO₂ emissions are attributable to transportation, but in metropolitan areas, this percentage rises to 40%. It has been for this reason that attempts have been made in recent decades to enhance transportation and innovation, and electric delivery trucks have become the new trend for firms such as FedEx and UPS in the United States [16].

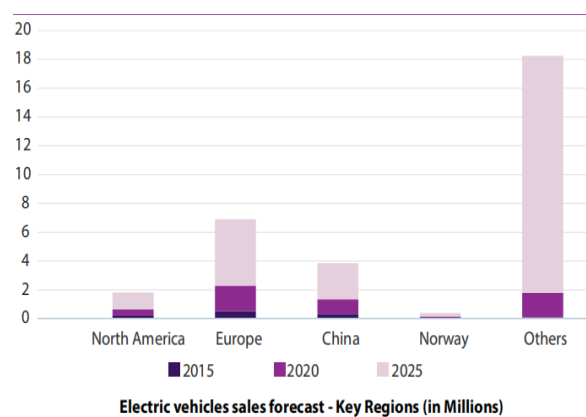
For electric goods vehicles to be competitive, they must be affordable, fuel efficient, have a long battery life, and be able to be used often. The EV industry will undoubtedly benefit from both increasing conventional gasoline prices and declining battery prices. The cost of purchasing more electric cars than the needed number of traditional vehicles makes them uncompetitive at the moment. Because of this, optimizing delivery freight EVs in Urban environments are now the top focus until any future technology breakthroughs [17].

As environmental awareness has grown, electric cars' economic and environmental value for efficient and power urban freight transportation has become vital in recent years. Using current EVRP trends and the well-known VRPTW as inspiration, this research makes key insights and provides a mathematical model. To give an overview of the existing literature and existing frameworks for solution development, the primary focus is on identifying interesting research avenues with a high likelihood of bearing fruit in the field of practical application. later shows that as issues get more realistic and complex, real-world case studies and data sets will become more important as a foundation for evaluating and comparing various solutions. Moreover, the construction of more advanced solution schemes that are more efficient may guarantee that electric cars will continue to grow in popularity and effectiveness in the future [18].

Future Works

Pakistan has already begun to import all of the electric vehicles it expects to need in the future years. Recently, two- and three-wheelers have been successfully imported into Pakistan, as well as being manufactured here. The notion of bringing this technology down to the level of transportation is becoming more popular by the day. By 2030, electric vehicles will account for about 30% of all traffic on Pakistan's highways. Furthermore, all the vehicles will be transformed from hybrid to electric vehicles without losing any of their horsepower (Horse Power). This revolution will continue from automobiles to buses, lorries, and tractors, and eventually to aero planes [19]. In North America, sales of electric vehicles are expected to rise from a 2015 low of 200,000 to a projected 2025 high of 1.17 million. In Europe, sales are anticipated to grow from a 2015 low of 0.3 million to a projected 2025 high of 2.5 million. In China, sales are set to rise from a 2015 low of 34,300 to a projected 2025 high of 0.25 million. Since incentives for electric cars, mandated

Zero Emission Vehicle (ZEV) program push, and a shift in consumer attitudes about CO₂ emissions have led to a surge in sales, there has been a significant increase in the number of electric vehicles sold worldwide.



CONCLUSION

Our hope would be that this EV set of guidelines would serve as a springboard for future initiatives to promote electric vehicles in Pakistan. Because of the

changes in the types of their uses, each kind of vehicle needs a distinct approach. 2 and 3 wheelers are often used in urban areas and maybe recharged using a standard wall outlet or a car charger. Because buses and trucks are often used to transport large groups of people over longer distances, introducing them demands an entirely new approach. One of our initiatives is also looking into electrifying road transportation in Pakistan's Northern Areas, which is now underway. Icecaps in the Karakorum and Himalayas area are under grave danger as a result of the China-Pakistan Economic Corridor and increased transit. The use of an all-electric road transportation fleet will aid in reducing the environmental effect on these glaciers in the future. Hydropower is freely accessible throughout the year in the Northern area, and this energy might be utilized to charge electric vehicles (EVs) with relative ease. This will not only remove road transportation emissions but will also increase the amount of road transportation that takes place. [20]

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