

# A Study on the Impact of Electric Cars on Diesel Cars

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**Abstract:** *The purpose of this study is to examine how diesel automobiles affect the uptake of electric vehicles. Governments everywhere have been supporting the switch to electric vehicles because diesel automobiles have been linked to high levels of air pollution and contribute to climate change. Using information from a variety of sources, such as vehicle registration statistics, public transit usage, and consumer surveys, the study will look at the relationship between the number of diesel automobiles in a region and the adoption rate of electric vehicles. The results will give policymakers information about how to encourage the switch to sustainable transportation and give insights into the variables that affect the uptake of electric vehicles.*

**Keywords:** Electric cars, Diesel cars, Comparison, Fuel efficiency, Air pollution, CO2 emissions, Energy consumption, Battery technology, Charging infrastructure, Consumer Behavior, and Market Trends

## 1. Introduction

With a 76-year experience, India's biggest OEM (original equipment manufacturer), Tata Motors Ltd. (Tata Motors), leads the commercial vehicles market with a market rate of over 45%. One of the top 3 brands in the passenger car industry, with a double-digit market share that is more than increasing from the past year. With a global network of more than 8,400 touch points, Tata Motors is active in over 125 countries. The highest quality standards, safety, environmental requirements, and passenger comfort are offered by more than 8.5 million.

With the recent introduction of 21 new commercial vehicles in all segments in a single day, the carmaker has been in the news. With a \$1 billion investment from leading private equity firm TPG Rise Climate, Tata Motors is creating a new subsidiary to expand its passenger electric vehicle (PEV) business. Tata Motors is also introducing its cutting-edge STARBUS electric buses for intercity public transportation.

With the 2020 release of the Tata Nexon EV, the corporation has recently expanded into the production of electric vehicles (EVs). The influence of EVs on the sale and demand for diesel vehicles has been questioned since they were first introduced to the market.

This study examines the effect of electric vehicles on diesel vehicles with a focus on Tata Motors. The market trends, consumer preferences, governmental regulations, and other elements that affect the sales of diesel and electric vehicles will be looked at. By doing this, we intend to learn more about the auto industry's future and how Tata Motors can adjust to shifting market conditions.

### Technology Using Ziptron Advanced Electric Drive Experience

Our Revolutionary Electric Cars are built on Ziptron technology. It embodies every good thing about Tata Motors' electric vehicle technology. The misconceptions about electric vehicles are likely to be quickly changed by this technology.

Ziptron will demonstrate to the world how hassle-free,

tremendously quiet, and unbelievably fast electric vehicles can be. And while you're taking advantage of all these advantages of automobile ownership, and also help save the planet.

Three steps that companies can select to promote electric cars:

- 1) Battery
- 2) Motor
- 3) Power Electronics

- Battery

The battery has an 8-year guarantee and has built up over 1 Million km of testing experience. A future-proof lithium-ion battery chemistry that is compatible with emerging fast-charging networks will power your drive. Dust and water resistance are ensured by the IP67 battery pack. Across a wide range of operating temperatures, chilled liquid cool batteries reliably offer peak charging and outstanding performance.

- Motor

Improved performance characterizes the permanent magnet synchronous motor. With the Quick Torque, enjoy an unparalleled electric performance. You have incredibly smooth driving because of the flat torque curve across the whole drivable RPM range. With the dedicated cooling circuit, get top performance that endures.

- Power Electronics

See the brilliance of modern technology as it reduces weight and improves efficiency with the integrated motor controller. The architecture of water-cooled power electronics provides dependable performance and long-lasting toughness. It is optimized for effective performance throughout a broad range of operating temperatures.

## 2. Need for Study

- Environmental issues: Compared to diesel vehicles, which release hazardous emissions that worsen air pollution and climate change, electric vehicles are considered a more environmentally friendly option. We can learn more about the potential environmental

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advantages of electric cars and how they can contribute to lowering the transportation sector's carbon footprint by analyzing how they affect diesel cars.

- Economic repercussions: The switch to electric vehicles might have a huge financial impact on the automobile sector, particularly on companies that make diesel vehicles. Understanding how electric cars will affect diesel automobiles could aid industry participants in preparing for this transition and changing their business models accordingly.
- Public policy: To cut emissions and fight climate change, governments from all over the world are supporting the usage of electric vehicles more and more. Policymakers can create more effective rules and incentives to assist the switch to electric vehicles if they have a better grasp of how electric cars affect diesel vehicles.
- Electric vehicles are becoming more and more common as a result of government incentives, advancements in technology, and worries about climate change and air pollution.
- Potential economic impacts: Both diesel car producers and dealerships, as well as the larger automotive sector, may experience considerable financial losses as a result of the transition to electric vehicles.
- Environmental advantages: Air pollution and greenhouse gas emissions, two important environmental concerns, might be considerably reduced with the use of electric vehicles.
- Rules implications: To boost the adoption of electric vehicles and lessen the negative economic effects on diesel car producers and dealerships, regulatory adjustments and government subsidies will probably be necessary.
- In general, research on how electric vehicles compare to diesel vehicles can offer important insights into the environmental, financial, and political ramifications of the transition to electric mobility.

### 3. Objectives

The study would aim to analyze market trends and sales data for both electric and diesel cars, in order to understand the current state of the market and any shifts in consumer preferences.

- To determine what is causing the shift to electric vehicles: The goal of the study would be to pinpoint the elements such as governmental regulations, environmental concerns, and technological advancements that are prompting consumers to move from diesel to electric vehicles.
- To assess the environmental effects of the switch to electric vehicles: The study's goal is to assess any potential environmental advantages of the switch to electric cars, such as decreased air pollution and greenhouse gas emissions.
- To evaluate the potential economic effects on diesel car producers and dealers, including potential changes in the used car market, potential changes in the demand for diesel vehicles, and the necessity for producers and dealers to adjust to market changes, the study will look at a variety of factors.

- To determine the impact on policy: The study's goal is to uncover potential policy ramifications of the move to electric vehicles, such as the need for government incentives to promote the use of electric vehicles and regulations to lessen the financial impact on dealerships and manufacturers of diesel vehicles.
- To provide information for making policy decisions and assisting stakeholders in making decisions about the future of the automotive sector.

### 4. Research Methodology

In our study, the data collected is from authentic secondary resources from research papers, books, and websites of the companies, case studies as well as journals across the globe and was collected between 2019 -2022. In this article, the systematic and content analysis method is utilized to review the literature. This strategy is used in some studies to acquire valid data to generate fresh insights, through knowledge for readers and researchers, and management or practical actions.

### 5. Literature Review

Diesel automobiles have been blamed for significantly contributing to air pollution and climate change, whereas electric vehicles (EVs) are becoming more and more popular as a greener substitute for conventional gasoline-powered vehicles. An overview of the studies on the effect of diesel vehicles on the uptake of electric vehicles is the goal of this research review.

- Health and Environmental Impact of Diesel Cars: Nitrogen oxides (NOx), particulate matter (PM), and other dangerous pollutants are known to be released in large quantities by diesel vehicles. Many health issues, like cardiovascular and respiratory disorders, have been associated with these emissions. Diesel emissions not only have negative effects on health, but they also have an impact on climate change. Research has shown that diesel engines are less effective at converting fuel to energy and that diesel cars release more carbon dioxide (CO<sub>2</sub>) per kilometer driven than their gasoline-powered counterparts.
- Impact of Diesel Cars on Electric Vehicle Adoption: Several studies have examined the relationship between the number of diesel cars in a region and the adoption rate of electric vehicles. One study conducted in California found that areas with high levels of diesel emissions had a lower uptake of electric vehicles, suggesting that diesel pollution may deter people from buying EVs. Another study conducted in the United Kingdom found that diesel car owners were less likely to switch to electric vehicles than gasoline car owners, highlighting the need for targeted policies to promote EV adoption among diesel car owners.
- Policies to Promote Electric Vehicle Adoption: To encourage the transition to electric vehicles, governments around the world have implemented a range of policies, including financial incentives, charging infrastructure development, and regulations to phase out diesel cars. A study conducted in Norway, which has one of the highest

electric vehicle adoption rates in the world; found that a combination of financial incentives, infrastructure development, and other supportive policies contributed to the success of EV adoption.

- There are a number of limitations that prevent demand and growth in the electric car market. There are factors that are already raising concerns as well as others that will likely do so in the future.
- These issues are covered in this article along with some suggested fixes.
- They consist of battery capacity, for instance. Obviously, plug-in electric vehicles need to be charged frequently regardless of how far they can travel on a single charge. Home charging accounts for about 80% of electric vehicle charging. Energy is used extensively by electric vehicles.
- As less than 2% of all vehicles on American roads are electric, their influence on the electrical system is now negligible. However, we should anticipate infrastructure burdens as the number of 12 electric vehicles on the road increases. Energy Sector Alternatives Other Than Electricity and Fossil Fuel.
- Nuclear power, solar power, ethanol, and wind power are some of the primary substitutes for oil and gas energy. In the domestic and international energy markets, fossil

fuels still outweigh these alternatives, but there is strong public pressure to boost their use as businesses move towards sustainability and cleaner, and greener business practices.

- By 2020, fossil fuels—which mostly consist of coal, oil, propane, and natural gas—will supply 79 percent of all the energy used in the US.
- Alternative energy sources have so far proven to be more expensive and inefficient than fossil fuels, making them uneconomical replacements for them. As a result, the government now offers a variety of incentives to anyone who decides to power their homes or vehicles with cleaner renewable energy sources.
- The laws of supply and demand economics will eventually force costs down to be competitive as more research and development is done in this industry.

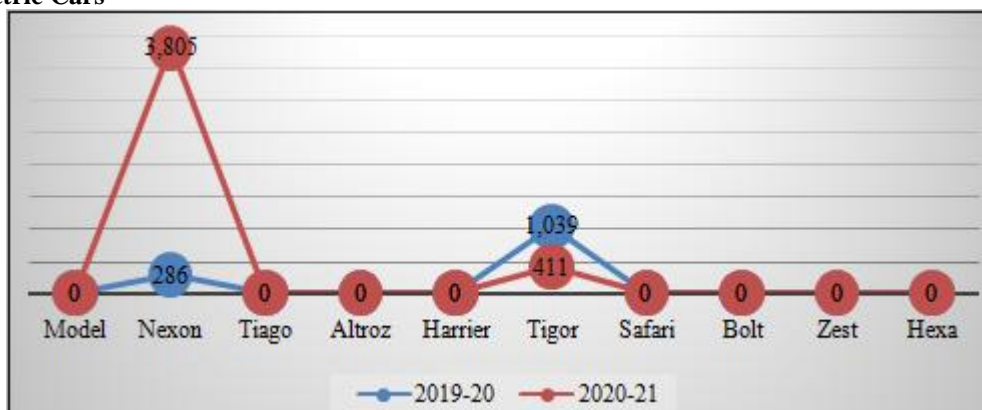
**Hypothesis**

- 1) There is no association between electric cars & diesel cars.
- 2) There is an association between electric cars & diesel cars.

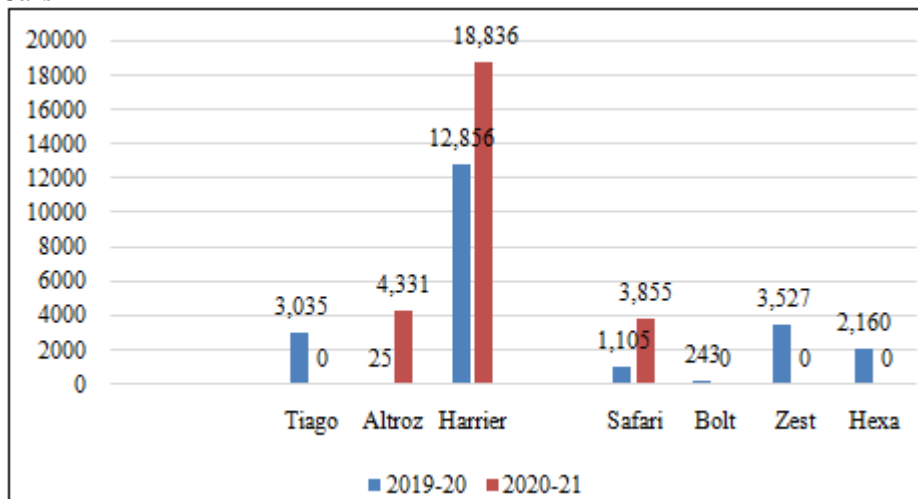
**Analysis**

Tata Motors	Fuel Mix Sales Comparison FY2020 vs FY2021									
	2019-20					2020-21				
Model	Petrol	Diesel	CNG	Electric	Total	Petrol	Diesel	CNG	Electric	Total
Nexon	30,157	12,817	0	286	43,260	46,278	13,673	0	3,805	63,756
Tiago	46,330	3,035	0	0	49,365	60,711	0	0	0	60,711
Altroz	8,433	25	0	0	8,458	56,048	4,331	0	0	60,379
Harrier	0	12,856	0	0	12,856	0	18,836	0	0	18,836
Tigor	7,448	1,561	0	1,039	10,048	14,077	0	0	411	14,488
Safari	0	1,105	0	0	1,105	0	3,855	0	0	3,855
Bolt	18	243	0	0	261	0	0	0	0	0
Zest	157	3,527	0	0	3,684	0	0	0	0	0
Hexa	0	2,160	0	0	2,160	0	0	0	0	0
Total	92,543	37,329	0	1,325	131,197	177,114	40,695	0	4,216	2,22,25

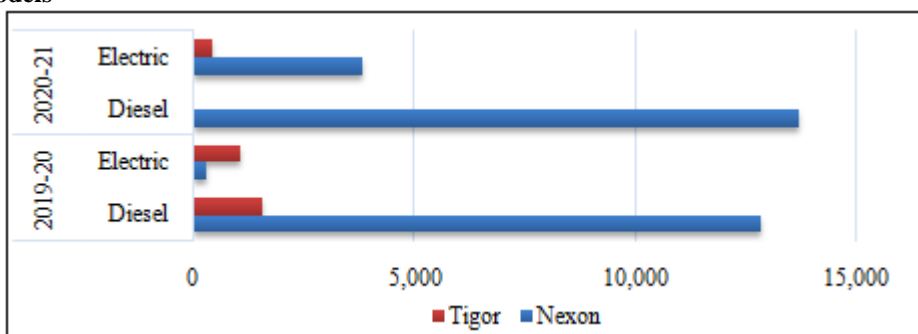
**Analysis of Electric Cars**



Analysis of Diesel Cars



Analysis of two models



Tata Motors	Growth rate 2 years				
Model	Petrol	Diesel	CNG	Electric	Total
Nexon	53%	1%	0%	1230%	47%
Tiago	31%	-100%	0%	0%	23%
Altroz	S6S%	17224%	0%	0%	614%
Harrier	-	47%	0%	0%	47%
Tigor	89%	-100%	0%	-60%	44%
Safari	-	249%	0%	0%	249%
Bolt	-100%	-100%	0%	0%	-100%
Zest	-100%	-100%	0%	0%	-100%
Hexa	-	-100%	0%	0%	-100%
Total	91%	9%	0%	218%	69%

- As for diesel cars, Tata Motors has been facing challenges due to increasing regulations on emissions and growing demand for electric vehicles. In 2020, the company announced that it would be phasing out the production of its diesel cars in India due to these factors. However, the company has stated that it will continue to produce electrical cars for export markets.
- The Federation of Automobile Dealers Association (FADA) today disclosed sales figures for several EV companies in the passenger car class, along with information about the data for electric vehicle sales in India in January 2023 and the rise over the previous year. In December 2022, there was 1.3 percent of electric automobiles on the PV market in India. This percentage dropped to 0.6 percent in January 2022, but it increased back to 1.0 percent last month.

According to reports,

- The total sales of electric vehicles increased from 1,325 in FY2020 to 4,216 in FY2021, which is a growth of over 200%. In the meantime, sales of diesel vehicles fell from 37,329 in FY2020 to 40,695 in FY2021, a decline of almost 8.9%. With sales rising from 92,543 in FY2020 to 177,114 in FY2021 or a gain of approximately 91%, petrol automobiles continued to be the most popular.
- The sale of electric vehicles has increased significantly in just one year, according to the data, proving that Tata Motors' emphasis on them is paying off. Additionally, it implies that customer tastes are changing in favor of cleaner transportation options, which is encouraging for the Indian market for electric vehicles.
- Tata Motors' electric cars have been gaining popularity in India, with the Nexon EV becoming the country's best-selling electric car in 2021. The company has also been expanding its electric vehicle portfolio, with plans to launch more electric cars in the coming years.

India's market for electric vehicles is anticipated to rise to one crore units of annual sales by 2030, according to the Economic Survey 2022–23, which was just issued. According to the poll presented to Parliament on Tuesday, India would surpass Germany and Japan to become the third-largest vehicle market by December 2022.

6. Findings

- India is not an exception to the global demand growth for electric vehicles. India's EV sales are anticipated to increase by 36% yearly through 2030, according to a report by Bloomberg New Energy Finance. To meet this rising demand, Tata Motors, and other top automakers

are making significant investments in the creation of electric vehicles.

- Despite the price and fuel efficiency of diesel cars, which have long been a popular choice in India, people are becoming more aware of the negative effects these vehicles have on the environment. Nowadays, many customers are exploring electric cars as more environmentally friendly transportation solutions. For many consumers, the expensive cost of electric vehicles still prevents their widespread adoption.
- The Indian government has launched a number of initiatives and regulations to encourage the use of electric vehicles, including tax breaks and financial assistance for EV buyers. Tata Motors is likely to gain from these policies because they have had a beneficial effect on the sale and demand for electric vehicles.
- Electric car production has benefited greatly from considerable expenditures made by Tata Motors. The Tata Tigor EV, the company's first electric vehicle, debuted in 2018, and the Tata Nexon EV followed suit in 2020. Additionally, the business has stated that it will introduce a number of other electric vehicles in the upcoming years, demonstrating its dedication to environmentally friendly transportation.

## 7. Suggestions

- Focus more on EVs: Tata Motors should concentrate more on creating and promoting EVs because the demand for them is anticipated to grow in the upcoming years. To increase the efficiency and driving range of its EVs, the corporation should continue to make research and development investments.
- Product portfolio diversification: By providing a variety of EVs and diesel automobiles, Tata Motors can better serve various client segments. This would allow the business to meet the needs of clients who favor diesel vehicles while also taking advantage of the rising demand for EVs.
- Work together with technological partners to develop more advanced EVs and to take advantage of their experience if Tata Motors wants to remain competitive in the EV market. Tata Motors might produce more effective and potent EVs with the aid of partnerships with businesses like Tesla, which has expertise in battery technology.

## 8. Conclusion

- In order to meet the rising demand for electric automobiles in India, Tata Motors has made considerable investments in the manufacture of electric vehicles.
- Although diesel vehicles have historically been popular in India, consumer preferences are evolving towards more environmentally friendly modes of transportation, raising questions about the environmental effects of diesel vehicles.
- Tata Motors is poised to profit from government initiatives that have a beneficial effect on the sale and demand for electric vehicles.
- The development of electric vehicles and Tata Motors' dedication to environmentally friendly transportation are

examples of the company's adaptability to shifting market circumstances.

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