

**Project Dissertation Report on**  
**Future of Electric Automobile Industry - India**

Submitted By

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## CERTIFICATE

This is to certify that Sushant Chauhan of EMBA has successfully completed his project on topic “Future of Electric Automobile Industry – India” as prescribed by supervisor during the academic year 2021-2023. as per the guidelines given by Delhi School of Management

Date: 13-May-2023

Mrs Deepali Malhotra



**deepali malhotra**

to me ▼

Approved. Go ahead with the same



--

With Regards

Deepali Malhotra

Assistant Professor

Delhi School of Management

Delhi Technological University

## **DECLARATION BY THE CANDIDATE**

I the undersigned solemnly declare that the project report is based on my own work carried out during our study under the supervision of. I assert the statements made and conclusions drawn are an outcome of my research work. I further certify that

- I. The work contained in the report is original and has been done by me under the general supervision of my supervisor.
- II. The work has not been submitted to any other Institution for any other degree/diploma/certificate in this university or any other University of India or abroad.
- III. We have followed the guidelines provided by the university in writing the report.
- IV. Whenever we have used materials (data, theoretical analysis, and text) from other sources, we have given due credit to them in the text of the report and giving their details in the references.

Sushant Chauhan

## ACKNOWLEDGEMENT

I would like to express my sincere thanks to Mrs. Deepali Malhotra, for his valuable guidance and support in completing my project.

I would also like to express my gratitude towards our principal Mr. Saurabh Agrawal (Program Coordinator) for giving me this great opportunity to do a project on “**Future of Electric Automobile Industry - India** “. Without their support and suggestions, this project would not have been completed.

Sushant Chauhan

## ABSTRACT

The Indian automobile market is one of the largest in the world, both in terms of sales volume and production. With large number people (population) we have large set of consumption also, people use vehicle for their daily commute and travelling etc.

In earlier days we knew only about 2 fuels options petrol and diesel and with the time a new fuel option came which was more economical and have greater fuel efficiency Compressed natural gas CNG, it has brought revolution in taxi field where the taxi owners can save a lot as it has great mileage and now, we are moving towards electric technology

With increase in price of fuel petrol, diesel and CNG, people have started using electric vehicle majorly who has more running in daily basis., Electric is said to new and emerging technology as it is said to be pollution free. With government promoting use of electric vehicle, different car manufacturers are also coming up with electric car with better mileage and performance which is giving major push to Indian buyers to go for electric vehicles.

Also with the world moving today green fuel and sustainable environment we have analysed that daily carbon emission of petrol and diesel vehicle are in huge quantity which is around

0.184 million Tonne / day of petrol vehicle and 1.2926 tonne/ day of diesel vehicle and to reduce the carbon emission government has taken various measures and promote electric cars, which resulted in increased sales of electric vehicle which is around

317830 for year

**Keywords: Car fuel types, pollution, Government initiatives, investments**  
2022.

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## **INTRODUCTION**

The Indian automobile industry has historically been a good indicator of how well the economy is doing, as the automobile sector plays a key role in both macroeconomic expansion and technological advancement. Future market growth is anticipated to be fuelled by new trends including the electrification of vehicles, particularly 4-wheeler or personal car segment and small passenger automobiles.

India enjoys a strong position in the global heavy vehicles market as it is the largest tractor producer, second-largest bus manufacturer, and third-largest heavy trucks manufacturer in the world. India's annual production of automobiles in FY22 was 22.93 million vehicles

India is also a prominent auto exporter and has strong export growth expectations for the near future. In addition, several initiatives by the Government of India such as the Automotive Mission Plan 2026, scrappage policy and production-linked incentive scheme in the Indian market are expected to make India one of the global leaders in the two-wheeler and four-wheeler market by 2022.

## **BACKGROUND**

The Indian automobile market is one of the largest in the world, both in terms of sales volume and production. Talking about the historical roots of the automobile market in India, the vehicle first hit the road in 1897. Till 1930, India had no manufacturing facilities and automobiles were directly imported from other countries. A turning point in the manufacturing process was the 1940s, when Indian companies such as Hindustan Motors and Premier began manufacturing cars of other companies. During the same decade, Mahindra & Mahindra also started manufacturing commercial vehicles.

Soon after independence in 1947, the Indian government attempted to create an auto component manufacturing industry to complement the automotive fraternity. Between 1960 and 1980, Hindustan Motors dominated the Indian market, gaining a large share thanks to its ambassador model. However, during the 1950s and 1960s, the entire industry moved at a slow pace due to trade restrictions on imports. Soon after this repressive phase, demand increased sharply, but to a lesser extent, which was mainly reflected in the tractor and commercial vehicle segment.

It was in the 1980s that these two firms, Hindustan Motors and Premier, were challenged by a new entrant, Maruti Udyog Limited. Soon after the liberalization period, automobile manufacturers, which were previously not allowed to invest in the Indian market due to strict policies, arrived in the country. After liberalization, the alliance between Maruti and Suzuki was the first joint venture between an Indian company and a foreign company. Economic reforms have slowly and steadily led to the entry of large foreign companies such as Hyundai and Honda, which have expanded their bases in the country. From 2000 to 2010, almost every major car manufacturer expanded its presence in India by setting up manufacturing plants in different parts of the country.

As the manufacturing process gained momentum in the early 2000s, car exports were relatively slow during this period. Maruti Suzuki was among the first car brands to start supplying vehicles to major European markets. During the same decade, the Indian government introduced mandatory emission standards to reduce pollution from vehicles. The updated guidelines were known as the "Bharat Stage" came into effect in major cities as these standards were based on strict European standards. Currently, Bharat Stage IV is implemented in 13 cities which include Delhi (NCR), Mumbai, Kolkata, Chennai, Bangalore, Hyderabad, Ahmedabad, Pune, Surat, Kanpur, Lucknow, Solapur and Agra, while the rest of the nation is still under Bharat Stage III.

Over the years, the automobile market in India has developed by leaps and bounds as almost all major companies are present in the country. India has now become a hub for car manufacturers to set up their plants to manufacture vehicles for the domestic and international markets. The three leading regions where most of the Indian automobile industry is concentrated are in the South, West and North. In the southern region, Chennai is the center of vehicle manufacturing, while Mumbai and Pune belt are second. In the north, NCR has a fair share in terms of concentration of manufacturing facilities.

To name a few commendable achievements of the Indian automobile industry, in 2009 it became the fourth largest exporter of passenger cars after Japan, South Korea and Thailand.

While in 2010, India emulated its previous year to become the third largest car exporter in Asia. The Indian automobile market got its biggest reward in 2011 when it became the sixth largest country in the world in terms of production.



## **OBJECTIVES OF THE STUDY:**

The objective of the study is to analyse and study the future of electric vehicles in India, forecasting future sales based on different fuel types, pollution caused by various engines and comparative study CO2 emission from various vehicle types.

This report is about:

1. Different engines/vehicle types.
2. future aspect and growth of electric vehicle in India.
3. Market leader of fuel type in India.
4. Trend in Indian car market

## **PROBLEM STATEMENT**

In Automobile sector major threat is threat to environment, harmful gases release from engine causes environment pollution because of which government is taking initiatives to reduce the use of petrol and diesel vehicle and start search for other fuel.

Based on below analysis we will try to understand

- Is electric the better fuel option than petrol and
- diesel. Is there is research for other fuel option than
- electric Are we good to go with electric model
- Do we still have dependency on electric and diesel vehicles

## **SCOPE/ LIMITATION OF THE STUDY**

One cannot determine all factors associated with pollution caused by a vehicle and issue related to all different kinds of fuel options, which fuel option is future, why some car buyers still prefer going with diesel car despite of 10-year policy of government. The study also excludes the Cost difference between Car prices of different fuel types, fuel cost. The study will exclude any kind of contingency circumstances

## **LITERATURE REVIEW**

With the growing world there is also growing pollution around the globe and one of the major contributors to the pollution is the vehicle running on the road, vehicle runs on petrol diesel causing pollution and release of harmful gaseous so to prevent the environment governments of various countries are going towards more greener option of electric vehicle, in this report we have taken reference from below resources we will study

- [www.statista.com](http://www.statista.com) The increase demand of electric vehicle
- [thehindubusinessline](http://thehindubusinessline) - Calculation based on pollution
- [Kazam platform for single EV charging](http://Kazam) - Electric infrastructure

## **RESEARCH METHODOLOGY**

This research aims to understand how technology has evolved and upcoming technology in the field of automobile and what are the key benefits associated with this technology.

This report is about the outcomes of implementing this technology.

With increasing carbon footprint and pollution caused by emission from different fuels we need to move towards more greener fuel option. With government initiative and promotions from different car manufacturers we need to understand Is electric cars future of India, does it have less carbon footprint. nd more greener fuel option.

Therefore, we will be studying different fuel options available in India, there future growth, comparative analysis of pollution caused by them, predictive analysis of their growth in Indian car market, Infrastructure for electric cars in India. We will briefly understand Infrastructure for electric cars in India

## CAR FUEL OPTIONS IN INDIA

When we think of buying a new car and making purchase, we evaluate all the different segments of cars and different fuel options and go for the option which best suits our requirements

In earlier days we have limited options of fuel type Petrol

Diesel

But the scope of fuel types has increased with options like hybrid and electric

### PETROL



Petrol vehicles are one of the most commonly used fuel type in india, it is basically liquid fuel termed, gasoline is produced by distilling crude oil, and basically used to power vehicle with internal combustion engine via spark which in turn force the wheel to move

#### **Advantages:**

- Petrol vehicle are cheaper in comparison to diesel or any other type of fuel option
- Vehicle can start quickly , as petrol is highly flammable
- Faster acceleration
- Less engine noise and operation compared to diesel

#### **Disadvantages:**

- Petrol vehicle have high fuel consumption than diesel engines
- Price of petrol is higher compared to diesel price
- Petrol is not preferred in heavy vehicles like truck ,

## **DIESEL**



Diesel is one of the most used fuel type as it is used in heavy vehicle, big machineries  
 This fuel type is used in vehicle which are working under logistics company and who have more running and need to bear heavy loads

### **Benefits**

- Superior energy frugality and effectiveness compared to petrol machines.
- Due to its high necklace values, diesel is the stylish preference who drive at high speed and need good performance.
- machines are long lasting that are suitable to outlive an original petrol machine
- More price in the aftermarket compared to petrol buses .
- Diesel machines are known to have a longer lifetime than petrol machines.

### **Disadvantages**

- Diesel vehicles are generally costly as compared to petrol

- Cost of maintenance of diesel vehicle are comparatively higher
- they are generally are assumed to be underpowered compared than petrol machines.
- Making diesel machines environmentally biddable is more delicate.

## **ELECTRICAL ENERGY**



A new fuel type which emerging and preferring is electric. With increase in price of petrol and diesel and world moving toward greener option there was need for some alternative or other fuel , therefore the demand for electric vehicle is increasing as it has fleet of battery which rechargeable and vehicle run from power produced by the battery.

Compared to diesel and it does not have engine rather have electric motor , doesn't have fuel or fuel tank rather have battery

### **Advantages:**

- Less running cost , parking cost
- less in weight hence providing good dynamics
- smallest conservation costs
- No carbon emigrations of any kind
- Quietest lift and manageable avail.

## **Disadvantages**

- Charging takes too much time
- no way out if you run out of battery
- Infrastructure is not completely ready

## **HYBRIDS**



When we want to switch from petrol /diesel fuel but if we think about the infrastructure readiness of electric , we do not find a strong base to switch therefore in middle way we have technology called HYBRID.

Hybrid cars runs on both electric and petrol fuel type these vehicle provide good fuel efficiency which petrol vehicles lack.

In hybrid car there are 2 parts one is electric motor and other is combustion engine. They works simultaneously with both to produce good power and fuel efficiency

## **Advantages :**

- One of the major advantage is it is eco friendly because it has low emission
- Best suited for big cities where there is more traffic.

- Technically advance
- Good mileage

**Disadvantages of hybrid systems**

- This technology makes vehicles quite expensive
- Maintenance is high
- components parts are not easily available

## **INVESTMENT IN ELECTRICITY**

As the world is heading toward greener solution of every aspect which is causing harmful effect to the environment be it automobile sector, industry sector, agriculture sector.

Every country wants their people to live in greener economy for this they are promoting manufactures auto makers, industrialists to go for greener option by giving them various benefits, add-ons, subsidies etc

India government is also promoting greener economy by launching various campaigns, awareness programs, subsidies, promoting manufacturers, promoting customers.

In Indian car manufacturers TATA and Mahindra are also in the game of electrifying the future automobile sector. These car manufacturers have done major invests in electric technology to go with the demand of the world.

## **GOVERNMENT ENTERPRISE**

Government of India is encouraging foreign investments in automobile, machine sectors.

by promoting vendors to set up electric charging stations, developing electric infrastructures.

In union budget also they have allocated separate fund to be invested in developing electric fuel option, Nitin Gadkari in his recent speech has announced that by year 2035 will be going to full electric, it not only save environment but also expense of buying crude oil , gasoline from other countries.

Government initiatives to launch battery exchange programme in which you can bring your vehicle which has near empty battery and fully charged battery with minimal cost.

Putting restriction on running of old petrol and diesel cars which has given a push to India car buyers to opt for electric



## WAY TOWARDS EVS

### Launching electric public transport

Electric buses have been launched and are running in major tier -1 and tier-2 cities, which have given hope to the people that we are ready to go for complete electric future.

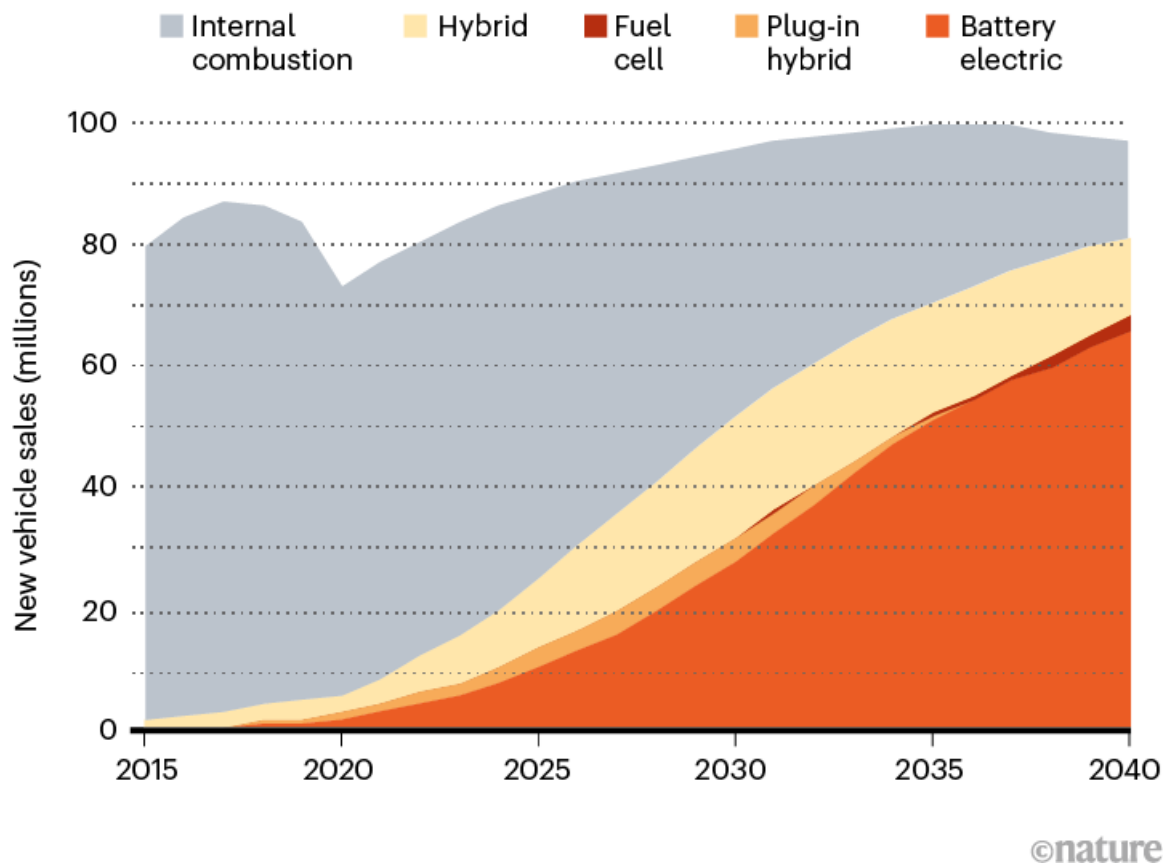
Also it is safer options as in case of petrol and diesel which are highly flammable , where electric is more safer and cost effective.

Currently Indian government along with different vendors , car manufacturers are working to develop more effective technology so that electric vehicle have good range also charging time will be comparatively less.

India electricity are majorly produced from coal which is also are pollution causing process therefore working on exploring other aspects so that we are not that much dependent on burning coal to produce electricity.

## **GOING ELECTRIC**

A forecast suggests that by 2035, more than half of new passenger vehicles sold worldwide will be electric, even without further policies to promote switching.



## BATTERY

To make electric car more effective we need to work on the major components that make up the electric vehicle. Major component that makes a electric vehicle different from other vehicle is its fuel or battery operated engine , since battery is the major component of electric vehicle so , we need to work on optimising it for better performance and affordability

## LITHIUM

Battery of electric vehicle is usually a lithium ion battery .Battery packs in electric vehicle composed of n number of cells which aligned together and are layed on the frame of the vehicle , these cells are arranged together also some cooling system are also placed so as to avoid overheating, a battery packs tens of kg of valuable metals which help in charging and discharging the vehicle.

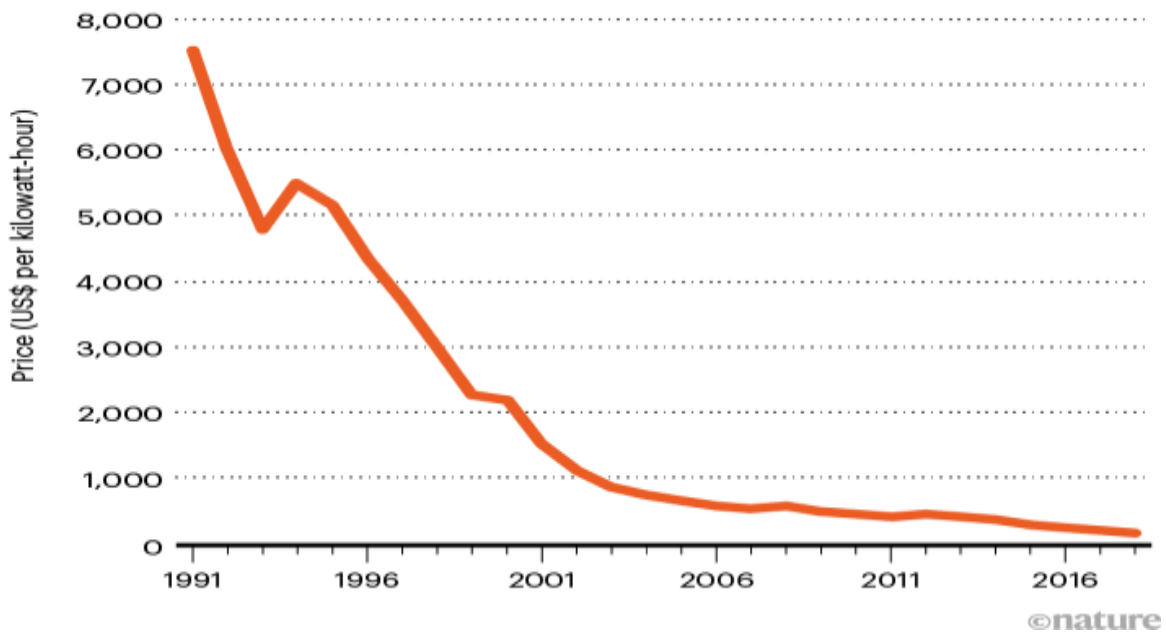
Battery cells are usually comparatively smaller in size and cylindrical in shape and are aligned next to each other to form a pack and these packs and joint together to form a battery.

One lithium -ion battery may contain upto 8 kg of lithium and 35 kg of nickel and 20kg of manganese and 14 kg of cobalt.

Scientists are continuously working on reducing the price of lithium ion battery , by

### **PLUMMETING COSTS OF BATTERIES**

The price of lithium-ion cells has fallen by more than 97% since 1991.



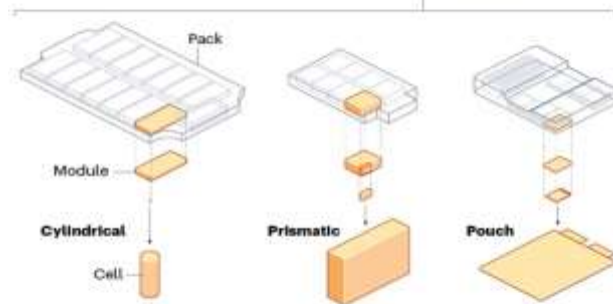
## Process inside a battery

### **ELECTRIC HEART**

The battery packs in electric vehicles are built from thousands of cells, with electronics to manage charging and discharging. To prevent overheating, some units include an active cooling system. A battery pack holds tens of kilograms of valuable metals; researchers hope to make recycling them easier and to reduce the amounts needed in future designs.

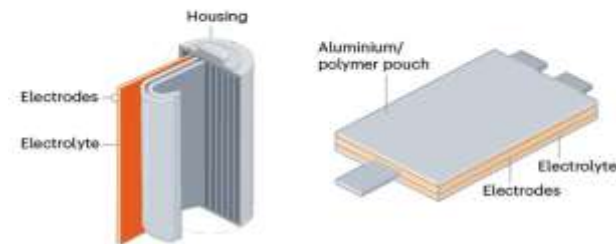
#### **Battery packs**

Battery cells come in cylindrical, prismatic and pouch varieties, and are arranged into modules that are assembled into packs. These packs are typically welded and glued together, which makes them hard to take apart at the end of their life cycle.



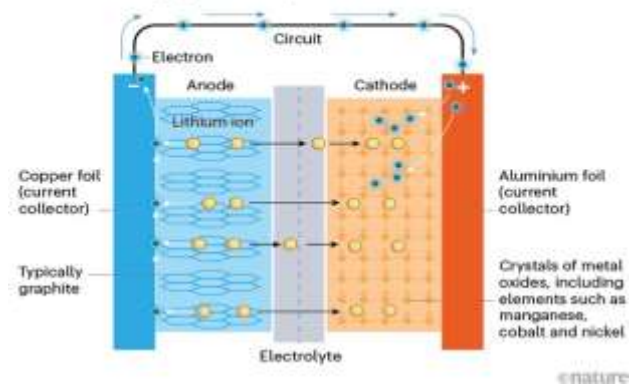
#### **Cell structure**

Inside cells, sheet-like electrodes (anodes and cathodes) are curled up or sandwiched together, with an electrolyte taking up the space in between.



#### **Cell chemistry**

Lithium-ion cells generate electricity when lithium ions flow from the anode through an electrolyte to the cathode, forcing electrons to flow around an outside circuit. Charging reverses that process.



These lithium ion battery move lithium ions internally from one subcaste referred as anode to another cathode which is intern separated by a element called electrolyte . cathode is main factor in lithium ion battery which contains microcrystals that similar structure to minerals

inside earth crust . recharging the battery lithium ions move from oxide chargers and pulls the ion where they are stored.

## **RECYCLE**

Scientists , researchers are working rigorously on process of recycling the battery so that there will be less waste and more usage . research is on to manage the battery in such a way that a process can be developed that will help battery regain its strength / efficiency after a span of years , so that instead of throwing and disposing the battery we can recycle them and recycle in better way so that a more effective way can be developed

Mechanical shredder crushes battery



## **INCREASING VOLUME**

Increasing the production line or producing in bulk so that per unit cost can be reduced, which will intern help in reducing the price of the electric vehicle the final product

Multiple manufacturing unit are being set up by the help of government and vendor companies to set up of battery plant to increase the production and reducing the cost aspect.

## CARBON FOOTPRINT -VARIOUS FUEL TYPES

- o carbon dioxide( CO<sub>2</sub>) is emitted from burning one gallon petrol/ Diesel
- o CO<sub>2</sub> Emigrations from a gallon of gasoline,887 grams CO<sub>2</sub>/ gallon
- o CO<sub>2</sub> Emigrations from a gallon of diesel,180 grams CO<sub>2</sub>/ gallon
- **How much tailpipe carbon dioxide (CO<sub>2</sub>) is emitted from driving one mile?**
  - o The average passenger vehicle emits about 404 grams of CO<sub>2</sub> per mile
- **What is the average annual carbon dioxide (CO<sub>2</sub>) emissions of a typical passenger vehicle?**
  - o A typical passenger vehicle emits about 4.6 metric tons of carbon dioxide per year.
  - o This assumes the average gasoline vehicle on the road today has a fuel economy of about 22.0 miles per gallon and drives around 11,500 miles per year. Every gallon of gasoline burned creates about 8,887 grams of CO<sub>2</sub>.
- **Are there other sources of greenhouse gas (GHG) emissions from a vehicle?**
  - o In addition to carbon dioxide (CO<sub>2</sub>), automobiles produce methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O) from the tailpipe and hydrofluorocarbon emissions from leaking air conditioners. The emissions of these gases are small in comparison to CO<sub>2</sub>; however, the impact of these emissions can be important because they have a higher global warming potential (GWP) than CO<sub>2</sub>.

### Calculation of CO<sub>2</sub> emission from the fuel consumption

#### Diesel:

1 litre of diesel weighs 835 grammes. Diesel consists for 86.2% of carbon, or 720 grammes of carbon per litre diesel. In order to combust this carbon to CO<sub>2</sub>, 1920 grammes of oxygen is needed. The sum is then 720 + 1920 = 2640 grammes of CO<sub>2</sub>/litre diesel.

An average consumption of 5 liters/100 km then corresponds to 5 l x 2640 g/l / 100 (per km) = 132 g CO<sub>2</sub>/km.

#### Petrol:

1 litre of petrol weighs 750 grammes. Petrol consists for 87% of carbon, or 652 grammes of carbon per litre of petrol. In order to combust this carbon to CO<sub>2</sub>, 1740 grammes of oxygen is needed. The sum is then 652 + 1740 = 2392 grammes of CO<sub>2</sub>/litre of petrol.

An average consumption of 5 liters/100 km then corresponds to 5 l x 2392 g/l / 100 (per km) = 120 g CO<sub>2</sub>/km.

## CALCULATION

CO2 Emissions from a gallon of gasoline: 8,887 grams CO<sub>2</sub>/

gallon 1 gallon = 3.78 litre

3.78 litre petrol produce 8,887 gm CO<sub>2</sub>

1 litre produce = 231.05 gm CO<sub>2</sub>

Presently over 5 million barrels of petroleum is consumed every day in india and it is increasing by 3% which is relatively higher than global average which is 1 %

1 barrel = 160 litre

5000000\*160 = 800 million = 80,00,00,000 litre

Daily consumption of petrol in India is 80,00,00,000.

Daily co<sub>2</sub> emission from petrol is vehicle = Daily consumption of petrol \* CO<sub>2</sub> emission per litre

80,00,00,000 \*231.05/1000000 (in Tonne)

**=0.184 million Tonne / day of petrol vehicle**

CO2 Emissions from a gallon of diesel: 10,180 grams CO<sub>2</sub>/ gallon

3 million barrels

1 gallon = 3.78 litre

3.78 litre Diesel produce 10,180 gm CO<sub>2</sub>

1 litre Diesel produce 2693.12 gm CO<sub>2</sub>

3000000\*160 = 480 million litres = 480,00,00,00

Daily consumption of Diesel in India is 480 million

litres Daily co<sub>2</sub> emission from Diesel is vehicle =

Daily consumption of Diesel \* CO<sub>2</sub> emission per litre

=480 million \* 2693.12/1000000 (Tonne)

**= 1.2926 tonne/ day of diesel vehicle**

Electricity produced is 85 % by coal

Pollution associated with producing electricity from

coal Burning 1 kg of bituminous coal will produce 2.42

kg Currently there are 13, 34, 385 Electric vehicles in

india

Taking average electric car (nexon) to full charge takes it is 30kwh

One metric ton of coal can generate 1,927 kilowatt hours of

electricity 1 kg Coal produce =1.927 kwh

Total 13,34,385 electric

vehicle Each car battery is

30kw

To full charge all vehicle it

takes  $30 * 1334385$

=40031550 kwh

1.927 kwh = 1 kg

40031550 kwh =20774026.98 kg of coal

1 kg of coal produce 2.42kg CO<sub>2</sub>

20774026.98 kg of coal produce 50273145.30 kg

**50273.145 tonne of Co<sub>2</sub> if all electric cars run on full range**

Here we have not considered factor of oil extraction

Oil refineries which is one of the are major sources of toxic air pollutants, cancer-causing benzene, particulate matter, nitrogen oxides, carbon monoxide, and sulfur dioxide.

On world scale level 300000 barrel per day refinery which in turn lead to Co<sub>2</sub> emission up to

4.2 million tons of CO<sub>2</sub> per year

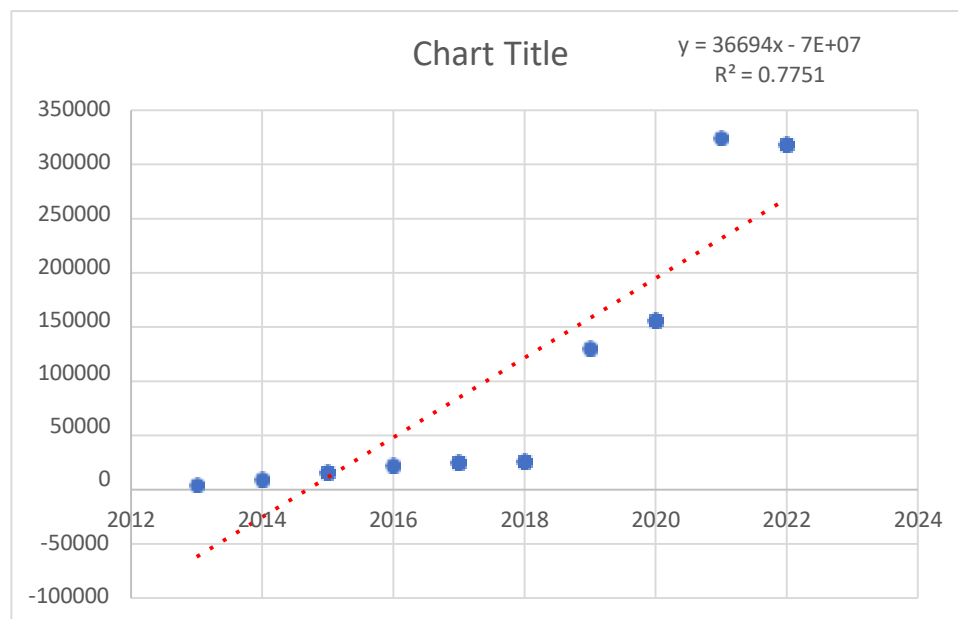
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## PREDICTIVE ANALYSIS

### EV Sales in India from year 2013-2022

Total EV Sales in India by Year: FY 2013 – 2022						
Year	Sales	Forecast-1	Forecast-2	Forecast-3 y=mx +C	Forecast-4 y = 36694x - 7E+07	
2013	4000					
2014	9000					
2015	16000					
2016	22000					
2017	25000					
2018	26000					
2019	130000					
2020	156000					
2021	324,000					
2022	317830					
2023		357487.575	304798.6667	304798.667	4231962	Slope 36693.75758
2024		394167.199	341492.4242	341492.424	4268656	Intercept -73926672.9



Based on forecasting, we have calculated the future sales of electric cars in India for year 2023-2024

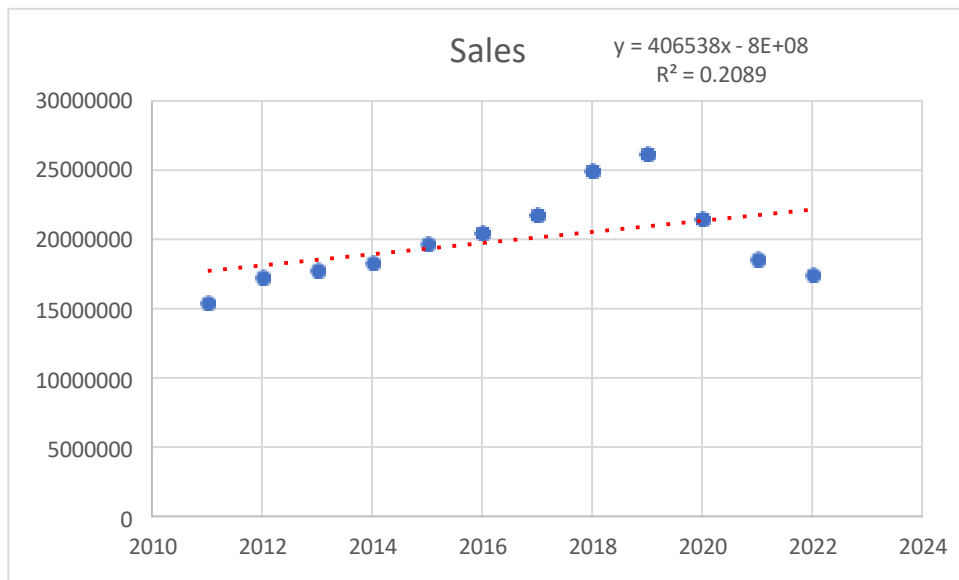
In this we have 4 different forecasting techniques to predict the sale of electric vehicles in year 2023 and 2024

#### 1. Forecasting formula

2. Trend Formula
3. Slope formula using linear regression
4. Equation of line we get from plotting the graph.

### Total Car sale in India

Total Car sale in India					
Year	Sales	Forecast-1	Forecast-2	Forecast-3 $y=mx +C$	Forecast-4 $Y=406538x - 8E+08$
2011	15510000				
2,012	17,320,000				
2013	17,830,000				
2,014	18,410,000				
2015	19,740,000				
2,016	20,530,000				
2017	21,820,000				
2,018	25,000,000				
2019	26,280,000				
2,020	21,550,000				
2021	18,620,000				
2,022	17,520,000				
2023		21825074	22653333.3	22653333.33	22426374
2024		22236994	23059871.8	23059871.79	22832912



Based on forecasting, we have calculated the future sales of cars in india for year 2023-2024

In this we have 4 different forecasting technique to predict the sale of electric vehicle in year 2023 and 2024

1. Forecasting formula
2. Trend Formula
3. Slope formula using linear regression
4. Equation of line we get from plotting the graph

## FINDINGS

Electric vehicles( EVs) are growing in fashionability, and they're clearly growing in fashionability. They are cleaner, more effective, and indeed fun( suppose Tesla). still, its growth is still seen only as a request problem. End- druggies must make choices grounded on accession and operating costs or performance, etc. requests are important, but so are government and political inputs. Eventually, EVs operate within the broader energy and transportation ecosystem and have their own set of deformations. Without understanding India's use cases, motorists( in both senses of the word), constraints and openings, we risk setting ambitious targets.

➤ Deals growth Deals of electric vehicles will increase steadily until 2019. And the EV request has been growing since his 2013. EV deals are anticipated to grow significantly from 2020 to 2030. His EV request in India will grow fleetly as government programs come more strict and favorable to EV deals.

➤ veritably Many Charging Stations Despite the growth in EV deals, governments, EV manufacturers and the private sector have invested little in investing and expanding EV charging structure.

➤ Strong government programs and subventions Governments around the world are making strict CO2 emigrations norms, adding demand for electric vehicles. Also, the government offers impulses and subventions to promote the trade of electric vehicles.

➤ Growing concern about pollution Internal combustion machines release large quantities of hothouse feasts into the atmosphere. To check this, several public governments have taken the lead in the use of electric vehicles. These enterprise help ameliorate air quality. Using electric vehicles reduces our dependence on fossil energies. In addition, electric vehicles are less precious to maintain and operate than internal combustion machine vehicles. Electric Vehicles in India

➤ Indians are known to be sensitive to values. thus, consumers love diesel vehicles despite their advanced MRP and pollution compared to gasoline vehicles. The cost of an electric vehicle is largely dependent on electricity tariffs. With a power of Rs7/ kWh( kilowatt hour), it only costs about Rs1

## PROPOSAL

Some of the key points needed to focus on the development of electric vehicles in India are

### **1. Convert public transport (buses), taxis and tricycles (cars) into his PHEV.**

This is one of the most important prerequisites for the transition to sustainable transport. Not only does it offset your emissions, it also reduces your infrastructure needs.

### **2. Government incentives.**

Another key factor driving the adoption of the XEV market is the identification of strategic EV incentives. Moreover, battery replacement/replacement could be one of the promising and viable options in India.

### **5. Developing a skilled workforce**

In view of safety and advanced technology, the development of certified skilled technicians and professionals is one of the requirements.

### **6. Awareness**

Awareness of the benefits and government support of the XEV can play an important role in its development. This includes extensive advertising using print media (newspapers/magazines/magazines, digital media/radio/electronic media, internet) using banners/signs at airports/bus stops/cinemas/government offices/public places This can be achieved by doing , provides microfinance for TV programs, expert talks, projects/conferences in schools, universities and industry, and provides R&D grants to research scientists/research institutes/industry. Highlights of consumer promotions include:

#### **Green/Low Emissions:**

Electric vehicles emit a variety of air pollutants. Nitrogen oxides, particulate matter and greenhouse gases (such as carbon dioxide CO<sub>2</sub>) are emitted less than vehicles with conventional gasoline and diesel engines.

B.C. Cheaper to Run/More Fuel Efficient: Because electricity is cheaper than gasoline or diesel, electric cars cost less to run than conventional cars.

This will increase adoption and lower the main barrier of EV pricing for customers. The incentive could be an electric vehicle subsidy scheme that bridges the price gap between conventional and electric vehicles in a similar power range. For example, if an internal combustion engine car costs INR 5,000 and an electric car costs INR 6.5,000, the government will provide a refund or subsidy for the difference. In addition, VAT discounts//registration discounts/toll booth discount benefits can be planned to boost sales of electric vehicles.

### **3. Charging Infrastructure**

The development of the charging infrastructure will keep pace with the development of the XEV market. However, through the development of grid-connected

charging stations with moderate tariffs, the promotion of stand-alone renewable

transport and private renewable charging stations.

#### **4. Electric Propulsion System (EPS)**

Currently there is no Indian manufacturer offering an Indian made Electric Propulsion System (EPS) and even REVA has ties with Italy regarding his EPS. Therefore, one of the important tasks is to build support and a positive atmosphere among manufacturers.

Create clear policies to support the growth of propulsion systems supply, manufacturing and recycling. Our technology base in India allows us to develop power electronics converters and motor technology. However, the low-cost lithium-ion technology currently used for battery development is a daunting task as most lithium inventories are available in China and the United States. Less Life Cycle Cost.

d. Perfect for urban use: Reduced levels of pollution and noise make EVs ideal for inner city and urban use.

e. Smooth acceleration and deceleration: EVs benefit from smooth gearless acceleration and deceleration, as a result of the characteristics of the electric motor.

d. Quieter than conventional vehicles: EVs are also quieter than conventional vehicles. Battery operated cars operate in almost complete silence except noise from the tires.

d. Proved Technology (a sharp rise in the market of XEV all over the world).

## **CONCLUSIONS**

Growth in internal combustion engine technology continues to be in demand given developments, the implementation of historic government policies, concerns about Indian people's purchases, and the response to new technologies and economies. Yes, demand will increase. The number of vehicles equipped with automatic transmissions will increase in the future. Growth in hybrid fuel technology will be limited due to cost. Converting conventional cars into plug-in hybrid electric vehicles could create a huge market in India. EVs and PHEVs have a bright future in India, but current growth is limited and its limits are determined by policy and awareness raising. The road to sustainable transport is still in a slow space for some time due to a shortage of EPT manufacturers, clear guidelines and their implementation.

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