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# Automobile Powered By Electricity in Future World

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**Abstract:** ***Electric vehicle is additionally said as battery electric vehicle or electrically drive vehicle. It's a vehicle that uses one or additional electrical motors for propulsion. During this feature electricity will be used because the transportation fuel to power electric drive vehicle. This electrical vehicle store electricity in associate degree energy device like battery. As we all known that safety comes first, for the purpose of safety this automobile vehicle or the electric vehicle is preferable one. This commences under the following such as rain and water, heat, cold. Compared to gasoline and diesel engines this electric vehicle is actually safer. This electric motor is supercharged by the reversible batteries that may be charged by common unit electricity. Electricity is created from domestic sources such as coal, nuclear, gas and renewable resources.***

**Keywords:** battery, propulsion, transportation, energy, gasoline, safety, diesel, supercharge, reversible, electric laity, domestic, renewable

## 1. Introduction

Electric vehicle was actually discovered in the year (1880-1920) and it is used in United States. Compared to petrol and other fuel consumptions this electric drive vehicle is easy to use but for the future developments of the world the electric vehicles has been stopped. At present, we are in the need of electric drive vehicle due to high pollution and high noise pollution. Reasons behind the battery electric vehicle are pollution free, no noise and low cost. Components used in electric vehicle are controller, battery or charger, motor, transmission and differential. Connection of these components if defined as the accelerator paddle is connected to the controller and then motor is connected to the transmission and the deferential is connected to both the wheels of the electric vehicle. Developers of the technology and the manufactures of automobile are need in the range to reduce the cost of alternative electric vehicle [1]. Electric vehicle is mainly classified in three types they are hybrid electric vehicle, plug in hybrid electric vehicle electric vehicle, battery electric vehicle. Main source of this electric vehicle is battery. Actually, battery is consisting of the following such as non rechargeable battery or primary batteries and rechargeable battery or secondary batteries.

## 2. Ease of Use

a) *Vehicle maintenance*
Electric vehicle mainly goes through the three maintenance level first level maintenance, second level maintenance, and third level maintenance. Provides in-depth discussions on electric propulsion systems, emerging electric vehicle energy sources and latest electric vehicle auxiliaries [2]. First level maintenance is by the user for an example vehicle cleaning. Second level maintenance is done by the qualified people in a workshop such as replacement of controllers and routine mechanical maintenance. Third level maintenance in the manufactures workshop's such as major electrical repairs should be performed by the qualified people only. Purpose of the vehicle maintenance is to extend the life of the vehicle, to increase safety, replacing parts.

b) *Electric vehicle safety considerations*
Electric vehicles are not simply the wave of the long term, they are saving lives nowadays. Electrical vehicles currently embody cars, transit buses, and trucks of all sizes, and even big-rig tractor trailers that are a minimum of part battery-powered by electricity. Electrical vehicles are saving the climate — and our lives. Electrical vehicles have a smaller carbon footprint than gasoline-powered cars, in spite of wherever your electricity comes from. Through their entire period of time, electrical cars are higher for the climate. Electrical vehicles will agitate reception, at work, whereas you're at the shop. Coming up with currently by states and utilities to create infrastructure for charging electrical vehicles can go a protracted method. Transit buses, that reliable fixture rumbling through our cities and cities, may be the key to the electrical vehicle revolution. Electrical trucks — delivering merchandise from warehouses to homes — will build an enormous, clean distinction. We'd like a lot of them. Through all our electrical vehicle work, Earth justice aims to form certain that those that square measure most compact by pollution has the selection to use very clean and zero-emission vehicles.

c) *Battery in electric vehicle*
Battery is the main component in the electric vehicle. Actually there is different type of battery used in electric vehicle depending upon their construction. Name of the battery used here is Ni-MH, Ni-Zn, Li-ion, Lead acid battery, Ni-Cad. Above all these mentioned batteries we use only the lithium ion battery because of its best advantages. In this lithium ion battery the positive electrode is made up of oxidized cobalt material and the negative electrode is made up of carbon material mostly graphite. Electrolyte of this battery is a lithium salt in organic solvent [3]. Uses of this lithium ion battery is higher energy density, good performance at high temperature, recyclable, low loading effect, high specific power and energy, long life cycle. It also has high power to weight ratio, high energy efficiency, good temperature

range and low self discharge rate. Lithium metal is very reactive it has only one electron in the outer shell. So it loses electron very easily in the reaction. It can form an ion which accuses positive charge by losing an electron. Lithium ion has low specific energy as compared to lithium metal but they are very safe. Every cell is composed of positive electrode, negative electrode and the electrolyte. We all know that anode is positive electrode and the cathode is negative electrode. For the simplicity of understanding current flows from positive terminal to the negative terminal but one thing we missing here is electron [3]. Electron proceeds from the negative terminal to the positive terminal. Hence practically, in battery the current flows from negative terminal to the positive terminal. Anode is the current flows from the out of the device and cathode is the terminal where the current flows inside of the device. So, in the case of batteries cathode is the positive electrode and anode is the negative electrode. So in this lithium ion battery lithium metal oxide is cathode and graphite carbon is anode. When the cell is charging the electrons flow from external circuit to the anode the electrolyte present in-between the electrons flow inside the cell and it acts as a filter. Lithium ion flows from cathode to anode through electrolyte and it if fully charged. When the load is connected to the battery the lithium ion flows from anode to cathode and the cell is in low charge. This is the process of charging and discharging in the lithium ion battery.

## 3. Advantages of Electric Vehicle

*a) Low maintenance*
In this automobile powered electric vehicle the maintenance is very low or else we can say it as for the electric vehicle maintenance is zero. Reason behind the zero maintenance is no fuel tank and no oil is needed for this battery vehicle [12]. It consists only the battery pack and electric motor so the moving equipments are very low. Compared to the petrol and diesel vehicle, the maintenance of the electric vehicle is three by one of that.

*b) No license and registration required for low speed electric vehicle*
One of the best advantages of this electric vehicle is no license and registration required for an low speed electric vehicle. The best example of the low speed electric vehicle motor is a Yulu bike. Speed of this Yulu electric bike is 25 km per hour and it consists of 250 watt motor [12]. This vehicle can be driven by any one. This electric vehicle does not need any license, insurance and registration. Price tag of this Yulu bike in India is Rs 35,000.

c) *Silent*
By using the electric vehicle noise pollution is very low or else we can say it as the zero noise pollution. This is one the best advantages of the automobile powered vehicle. Due to noise pollution human beings can cause common health effects like hearing loss, high blood pressure, heart disease, sleep disturbances, and stress. This noise pollution causes main risk of heart attacks and strokes. So we are surviving in the world of risk, to avoid that our responsibility is to use this type of battery vehicle to avoid such kind of noise pollution.

d) *Charge at comfort*
Electric vehicle can be charged in houses, there is no necessity to charge the vehicle in the charging station [12]. These are best benefit for the users around the world and the cost of the electricity bill for charging is also minimum.

e) *Low cost running*
Running cost of this electric vehicle is very low compared to other internal combustion engines. Let us discuss the best example for this low cost running between the Tata tigor petrol vehicle and Tata tigor electric vehicle. First Tata tigor electric vehicle need just Rs 150 for full charging and its battery power is 21.5 kWh and range of this electric vehicle is 213 KM. Then Tata tigor fuel vehicle needs 12 liters petrol to fill its tank, so the mileage of this vehicle is 216 KM. So the rate of petrol for one KM is Rs 74, as we calculate for 216KM approximately the cost is Rs 888 [12]. According to the comparison between these vehicles by using the electric vehicle we can save Rs 650. Then cost per KM for Tata tigor petrol vehicle cost Rs 4 and Tata tigor electric vehicle cost just Rs 70 Paisa. Let us discuss the low running cost for two wheelers. Here the average mileage for both the electric and petrol vehicle is 50 KM. So the cost per liter for petrol is Rs 74 and cost for 1 kWh battery is just Rs 3. Then cost per KM for petrol vehicle is Rs 1.48 and cost per KM for electric vehicle is Rs 6 paisa. So as per above comparison electric vehicle plays major role in low cost running.

*f) Environmental friendly*
This electric vehicle is very eco- friendly because it causes only zero percent emission and it does not cause any pollution around the surrounding [12]. Most needed technology at this present situation is this automobile powered electric vehicle.

g) *Easy to drive*
Both the electric scooter and electric bike has no gear. It is very easy to drive for both men and ladies. If we consider an electric car there is no clutch and gear stick, by accessing button the speed is detected and it will run according to that. Same technique is followed for electric buses and electric three wheeler, here pressure is low.

h) *Incentives from government*
National electric mobility mission plan was accessed by Indian government to provide FAME India Scheme phase II (National mission on electric mobility). If a customer chooses an electric vehicle he or she will get the subsidy by the Indian government. For 1 kWh battery, subsidy is Rs 10,000 and for 3 kWh batteries, subsidy is Rs 30,000. Then for Tata tigor the battery power is 21.5 kWh, subsidy provided by the Indian government is 2 lakhs.

## 4. Production

According to the growth of the electric vehicle in upcoming days let us calculate the production percentage of the this automobile powered vehicle in our country.

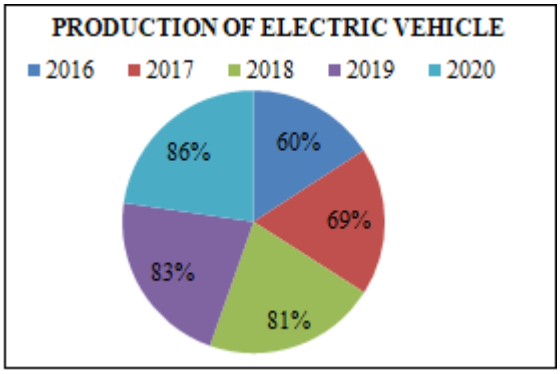


**Figure 1:** Production percentage

## 5. Existing System

This method of system defines that the electric vehicles existing at the moment [6]. Let us discuss the top electric vehicles used around the world because these automobile vehicles are best in their range.

*a) Tata tiago electric vehicle*

First is Tata tiago electric vehicle. The range of this electric vehicle is maximum 100 km powered by lithium ion batteries. It works with 85 kW three phase inductions motor. Top speed of this electric car is hundred and thirty five hours [6]. Safety features include dual air bag, vehicle stability control. Regenerative operating system and quick charging is available in Electric vehicle. Then this car is available in six different colors. Actual price of this Tata tiago electric vehicle is up to 8 to 10 lakhs. This electric vehicle has been launched in November 2019.

b) *Mahindra e2o plus*

The range of this electric car is maximum 110 KM to 140 KM in a single charging. This system is powered by 15 kW lithium ion batteries and it works with 19 KM three phase induction motor at the speed of 80 KM per hour. Another advantage of this Electric vehicle is it has 135 boot spaces for storing laugh age. Actual price of this Mahindra e2o plus is 7.5 lakhs. Currently Mahindra stopped the assembly of e2o plus in India. This electric has launched in 2020.

c) *Tata tigor electric vehicle*

The range of this Tata tigor is 142 KM per hour and it is powered by 16.2 kW lithium ion batteries. Top speed of this car is up to 100 KM and it works with 30 kW 3 phase induction motor. Normal charging speed of this electric vehicle is 6 hours and boot space capacity is up to 300 liters [6]. Actual price of this electric vehicle is 10 lakhs. This electric vehicle is launched in 2019.

d) *Mahindra e-verito*

This Mahindra e-verito is first India electric sudden. This works at the range of 110 KM per hour and it is powered by 18.5 kW lithium batteries. It has four different variants according to its capacity. This e-verito system works with 31 KM three phase induction motor. Top speed of this electric automobile vehicle is 86 KM per hour. Actual price of this electric vehicle is up to 10.3 lakhs. This electric vehicle is launched in 2016.

e) *Mahindra e-KUV 100*

The e-KUV 100 is Mahindra's first SUV (Sport utility vehicle). The range of this electric vehicle is 140 KM per hour and it is powered by 72 kW lithium ion batteries. Top speed of this Mahindra e-KUV 100 is 186 KM per hour and it works with 30.5 kW of three phase induction motor. It can move 0 to 100 KM in just 9 seconds. Actual price of this electric vehicle is 15 lakhs in India. It has been launched in 2019.

*f) Maruti waganor vehicle*

The prototype has been developed by Suzuki motor corporation Japan and it sis manufacturing at good gram facility in India. The range of this electric vehicle is 200 KM on single charge and it's top speed is up to 100 to 142 KM per hour. It works with the capacity of three phase induction motor. This electric vehicle has two charging ports [6]. One is easy charging up to six hour and the other is dc power charging at one hour. Actual price of this car is 7 to 9 lakhs. This electric vehicle has launched in 2020.

g) *Kia soul electric vehicle*

First the Kia motors have developed only the petrol cars in Ananthapur manufacturing plant but for the future development they have introduced the Kia soul electric vehicle. The range of this electric vehicle in 64 kW lithium ion batteries [6]. This electric vehicle can run up to 391 KM in a single charge and it consists of 81.5 KM motor power. Top speed of this electric car is 168 KM per hour. Actual price of this car is 35 lakhs. This electric vehicle is launched in 2020.

h) *Nissan leaf*

After successful test drive in Indian roads Nissan leaf has been launched in 2020.The range of this electric vehicle is 36 KM per hour and it is powered by 64 kW lithium ion batteries. Top speed of this electric automobile vehicle is 153 KM per hour. It can move about 0 to 96 KM per hour in just 9.9 seconds. It can charge 80 percent within half an hour with its fast charger. Actual price of this electric vehicle is 30 lakhs.

i) *Audi etron*

It is one of the most expensive electric cars in India. Actual price is this automobile electric vehicle is 1crore. Specialty of this car is it can generate 30 percent of its energy from the regenerative breaking system. Two powerful motors deliver 280 KM of its output power. So the top speed of this car is 200 KM per hour. It is powered by 95 kW of lithium battery so the range of this powered vehicle is up to 400 KM. And this electric vehicle is launched in 2019.

j) *Uniti one*

This Uniti one electric car is laughing a five seat electric car in India. Actual price of this car is 7 lakhs. Top speed of this electric automobile is 130 KM per hour. It has fast charging. This electric vehicle is launched in 2020.

k) *Hyundai KONA electric vehicle*

This is one of the top most electric cars in the world. The range of this electric vehicle is 452 KM per hour. Top speed of this electric vehicle is 167 KM per hour [6]. Safe measures are highly available in this automobile electric vehicle because it contains 6 airbags. Regenerative system such as APSS and GPS are available in this electric vehicle [6]. It has both the AC and DC fast charging .Alternating current charge is up to 6 hours and direct current charging is charged within one hour with the percent of 80. This electric motor is powered by 39.2 kW of lithium ion battery. Actual price of this electric vehicle is 25 lakhs 30000 rupees.

## 6. Sales

Before knowing about the proposed system of electric vehicle in upcoming days let we discuss about the high production of electric vehicle has been sold from May to August 2020. Here I have chosen the three types of electric automobile vehicle named as Nexon, MG motors and Tata tigor. This automobile vehicle plays the major role such environment friendly, and it helps for the worldwide development of our country.

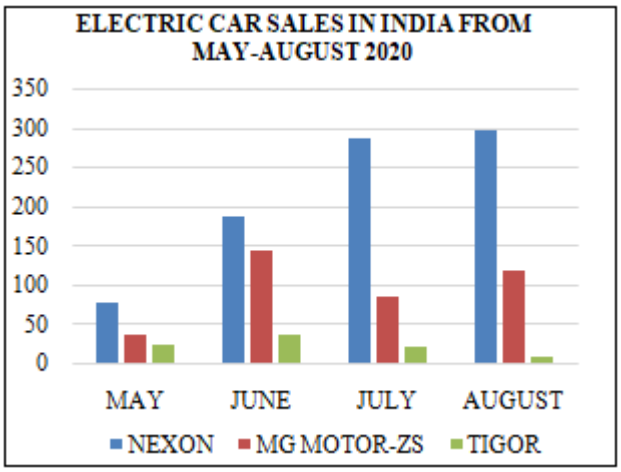


**Figure 2:** Sales of electric automobile vehicle

## 7. Proposed System

This proposed system defines that the upcoming electric car for the future development. This is very useful technology because we can lead our world by go green proverb. In 2020 the best environmental friendly electric vehicle is Tata nexon electric vehicle [9]. Then the Hyundai KONA electric vehicle is high in its range. Let us discuss the upcoming electric automobile vehicle. These are vehicles expected to launch in 2021.

a) *Mahindra e-KUV 100*
This electric SUV is expected to launch in February 2021. The range of e-KUV 100 is 150 KM. Top speed of this electric vehicle is 85 KM. Battery capacity of this vehicle is 15.9 kW with a fast charging time of one hour. And its peak output power is 40 kW. Actual price of this automobile electric vehicle is 8.5 lakhs.

b) *StromR3*
This three seated electric car is expected to launch in the end of 2021. The range of Strom R3 is 200 KM. Top speed of this vehicle is 80 KM and battery capacity of this electric vehicle is 15 kW [9]. Charging time of this vehicle is 3 hours and its motor power is 15 kW. Actual price of Strom R3 is 4.5 lakhs rupees.

c) *Renault kwid*
This electric vehicle is also expected to launch in February 2021. The range of this vehicle is 250 KM. Top speed is 105 KM and its battery capacity is 26.8 kW [9]. Its fast charging time is 30 minutes. Actual price of Renault kwid is 10 lakhs rupees.

d) *BMW i3*
This electric automobile vehicle is expected to launch in June 2021.The range of this vehicle is 200 KM. Top speed of this electric vehicle is 150 KM per hour with a battery capacity of 42 kW. It's charging time is about 6 hours [9]. It has a torque of 150 Newton meters. Actual price of this electric car is 1crore rupees.

e) *Tata altroz electric vehicle*
This electric car is anticipated to launch in July 2021. The range of this electric vehicle is 300 KM with a battery capacity of 30.2 kW. Its motor peak power is 95 kW. This electric vehicle supports both the direct current fast charging and the alternating current slow charging. Actual price of this automobile powered vehicle is under 15 lakhs rupees.

f) *Nissan leaf*
This electric vehicle is expected to launch in June 2021.The range of this electric vehicle is up to 364 KM. Top speed of this electric car is 144 KM per hour. Battery capacity is 62 kW. Fast charging time is one hour and its motor peak power is 80 kW. Actual price of this vehicle is 35 lakhs rupees.

g) *Renault ZOE*
This electric car is anticipated to launch in October 2021. The range of this electric vehicle is 390 KM. Top speed of this electric vehicle is 135 KM per hour. Battery capacity of this electric automobile vehicle is 52 kW. And it's fast charging time is 45 minutes and its motor peak power is 100 kW. It has a force of 220 Newton meters. Actual price of this electric vehicle is 20 lakhs rupees.

h) *Audi Etron*
This electric car is expected to launch is January 2021. The range of Audi Etron is 400 KM. Its top speed is 200 KM per hour. Battery capacity is 95 kW. Fast charging time of this electric vehicle is 50 minutes and its motor power is 265 kW. It has a force of 261 Newton meters. Actual price of this automobile electric vehicle is 1crore rupees.

i) *Volvo XC40*
This electric car is anticipated to launch in the middle of 2021. The range of this electric vehicle is 418 KM. Top speed of this electric vehicle is 180 KM per hour with a battery capacity of 78 kW [9]. Its fast charging time is 40 minutes. Its motor power is 150 kW. It has a torque of 313 Newton meters. Actual price of this automobile electric vehicle is 50 lakhs rupees.

j) *KIA soul electric vehicle*
This electric vehicle is expected to launch in the mid of 2021. The range of this electric vehicle is 450 KM. Top speed of this electric vehicle is 140 KM. And its battery capacity is up to 64 kW. Fast charging time of this electric vehicle is one hour. Motor peak power of this vehicle is 150 kW. It has a force of 395 Newton meters. Actual price of this KIA soul electric vehicle is 30 lakhs rupees.

k) *Porsche Taycan*
This electric vehicle is expected to launch in the mid of 2021. The range of this electric vehicle is 333kms to 463 KM. Top speed of this electric vehicle is 260 KM. And its battery capacity is up to 93.4 kW [9]. Fast charging time of this electric vehicle is 23 minutes. Motor peak power of this vehicle is 560 kW. It has a torque of 1049 Newton meters. Actual price of this electric vehicle is 1.08crore.

l) *Jaguar iPace*
This electric vehicle is expected to launch in the mid of March 2021. The range of this electric vehicle is 470 KM. Top speed of this electric vehicle is 200 KM. And its battery capacity is up to 90 kW. Fast charging time

of this electric vehicle is 43 minutes. Motor peak power of this vehicle is 294 kW. It has a torque of 696 Newton meters. Actual price of this electric vehicle is 1crore.

m) *Volkswagen id crozz*
This electric vehicle is expected to launch in the mid of March 2021. The range of this electric vehicle is 500 KM. Top speed of this electric vehicle is 180 KM. And its battery capacity is up to 83 kW. Fast charging time of this electric vehicle is 30 minutes. Motor peak power of this vehicle is 225 kW [9]. It has a torque of 450 Newton meters. Actual price of this electric vehicle is 40 lakhs.

n) *Tesla model 3*
This electric vehicle is expected to launch in the mid of June 2021. The range of this electric vehicle is 500 KM. Top speed of this electric vehicle is 260 KM. And its battery capacity is up to 60 kW. Fast charging time of this electric vehicle is 30 minutes. Motor peak power of this vehicle is 250 kW. It has a force of 493 Newton meters. Actual price of this electric vehicle is 55 lakhs.

o) *MK 1*
This electric vehicle is expected to launch in the end of March 2021. The range of this electric vehicle is 504 KM. Top speed of this electric vehicle is 196 KM [9]. And its battery capacity is up to 96 kW. Fast charging time of this electric vehicle is 30 minutes. Motor peak power of this vehicle is 150 kW. It has a torque of 2004 Newton meters. Actual price of this electric vehicle is 1crore.

## 8. Conclusion

Automobile powered by electricity is the sentence which is going to change all over the world in future. As we are in the need of the proverb like go green and go electric. Our environment is polluted by the fuel vehicles. Major problem in our country is air pollution. Every human being and living thing are in the need of oxygen. Delhi is the capital city of our country as we are the Indians we should be in the worry of that because, oxygen centre has been launched in 2020 to breath good air and it cost charge is maximum 250 RS. This is the boon development of our country. So we cannot stop using vehicles in this modern world. Now a days there is chance to get rid of this fuel vehicles instead of that we all should move to an electric vehicles. These electric automobile vehicles are highly in the use of the future world. By the above content the cost of these electric vehicles are same as compared to the fuel engine vehicles. Charging supplies energy to the battery and it is often considered along with discharging of the battery, because high rate and safe charging and discharging are essential to EV batteries [8]. Automobile electric vehicle consists of many uses like it is very silent and it can be driven in the low cost running. It can be charged at your comfort zone and it needs only less maintenance. So I would like to conclude it by the proverb prevention is better than cure. So our prevention is the electric vehicles.

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