

# The Electric Vehicle Conversion

## *Convert IC engine bikes to electric bike*

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**Abstract**—One of the best method to control the pollution and achieving the clean environment is to adopt electric vehicle. There are previously many electric vehicles are present in the market, normally two types of vehicles is mostly used, one is lead acid powered vehicle and second is lithium powered vehicles. The lead acid batteries as compared to the lithium ion batteries are very less costly but, the range and charging capacity of li-ion batteries are better than lead acid batteries, but the cost of li-ion pack is very high. After some days it is sure that all vehicles on the roads are the electric vehicles, in this direction our government has took one step towards this mission. Our government aim is up to 2030 there are more than 30 percent vehicles on the road are the electric vehicles, but there is one big question ‘what about the old IC engine (Gasoline) vehicles? That’s why we were started study on conversion of old IC engine vehicles into the electric vehicles, and finally we conclude that the cost of converted vehicle is definitely less than new electric vehicles. In this way our two problems are getting solved one is, in affordable price people can able to use the electric vehicles and second is, old bikes are able to work with modern trends.

**Key words**—Pollution, Lead acid, Lithium ion, Electric vehicles, Gasoline.

### 1. INTRODUCTION

In this paper we the information about the conversion of conventional IC engine vehicle into the modified electric vehicle. But there is a one question ‘How it can be carried out?’, so following is the introduction of our study or process of conversion and then we deeply see all process.

We have to remove all the parts in the IC engine vehicle which are not required or not used in electric vehicle following are the list of their components.

- IC engine
- Fuel tank
- Carburetor
- Exhaust pipe
- Radiator
- Complex transmission system
- Clutches

Like that many more dynamic part.

And then replace that parts by the electric parts like motor, controller, battery, harness system, accelerator, and many more required parts. There is almost all vehicles can be converted into the electric vehicles, but vehicles with low aerodynamic drag increase efficiency and range of the vehicles. There are mainly two types of batteries can be used for the conversion lead acid and lithium ion batteries. And motor used for the conversion is BLDC hub motor having 24 v and 250 w specifications.

An electric vehicle conversion is the modification of IC engine vehicle to electric propulsion, by replacing engine with Electric motor (Dc or Induction) and fossil fuel with battery pack(Li ,Lead Acid, Ni-hydride) and controller. Almost all vehicles can be converted into EVs, But vehicles with Low Aerodynamic drag increases efficiency and Range. Electric vehicles eliminates use of fossil fuels, Low efficient IC engines, Exhaust pipes, Fuel tank, Radiator, Complex Transmission Systems with single Gear Pair, Clutches and many more dynamic parts. Range depends on vehicle weight, Aerodynamic drag, Rolling resistance, Gradient slope and finally Battery pack.

### 2.PROBLEM STATEMENT

- All vehicles Conventional IC engine vehicles works on non renewable fossil fuels which effectively predicted to Out-dated by2088. As we currently consume the equivalent of over 11 billion tonnes of oil in fossil fuels every year.
- They enormously contributes in Global warming by producing CO<sub>2</sub> ,A greenhouse gas.
- The average new car emits 120.1-153.0g/km of CO<sub>2</sub>.
- To overcome these all gasoline vehicle environmental issues, An electric vehicle is Effective Solution as it Works on Renewable and sustainable energy & Doesn't contributes to Global warming
- IC engine vehicles have so dynamic parts that why they often require maintenance and replacement of parts, caused due to wear and tear due to friction.

- In fact, Electric vehicles only have one moving part, which is the electric motor. Due to this it has significantly lower maintenance.
- Due to all these contrast of the IC engines vehicles now need to switch to electric ones to avoid or mitigate this harm.

**3.OBJECTIVES**

- To overcome these all gasoline vehicle environmental issues, An electric vehicle is Effective Solution as it Works on Renewable and sustainable energy & Doesn't contributes to Global Warming.
- As Government has already taken step towards Green India by manufacturing, focusing on creating charging infrastructure and policy framework so that by 2030 more than 30% of vehicles are electric vehicle
- To create Butter smooth and almost noiseless driving experience.
- So IC Engine vehicles are about to phase out by upcoming decade.
- Only concern is about existing IC Engine vehicles, what about that?
- Simply convert the electrical energy from a battery to rotate a motor which in turn rotates the wheels. So they produce zero levels of any pollutant gas or particulate matter and effectively run on 100% clean energy.
- HERE'S OUR EV CONVERSION PROJECT PLAYS AN IMPORTANT ROLE!!

**4.METHODOLOGY**

- Selection of vehicle.
- Analysis of vehicle.
- Removing components associated with IC engine.
- Designing for EV.
- Mounting of motor and other EV components.
- Modification by feedback analysis

**Selection of vehicle**

The vehicle selected for the conversion process is TVS scooty ES two wheeler bike.

**Analysis of vehicle**

In the analysis of the vehicle the following are the general specifications of the bike.

**DIMENSIONS:**

Overall Length	1685 mm
Overall Width	590 mm
Overall Height	1060 mm
Wheelbase	1220 mm
Ground Clearance	120 mm
Kerb Weight	79.5 kg
Fuel Capacity	3.5 Litres

**WHEELS & TYRES:**

Front Tyre (Full Spec)	2.75 X 10
Rear Tyre (Full Spec)	2.75 X 10

**Removing components associated with IC engine**

The components of associated with IC engine are engine, exhaust system, fuel tank, carburetor, aluminum alloy cast body, regular Rear wheel, Starter system.

**Designing for Electric vehicle**

Designing for the electric vehicle includes the custom designing for Li ion battery pack design, Modified Suspension Frame.

**Design of battery pack**

Cells	Cells in series	Cells in parallel	Voltage per cell	Current per cell	Total voltage	Total capacity (Ah)
Lithium ion battery 18650	15	5	3.3V	2000mAh	49.9	10

The above figure shows the how should be an arrangement of each cell in the array to get the desired power, capacity. It includes the voltage basic output.

### ***Design of Suspension frame***

The original suspension frame comes with mono shock and the spline fitting on one side. But with the DC hub motor which comes axel on both side.so it requires slight modification in the main frame.

The material chosen for the is the mild steel.

The rectangular crosssectional tube of the following dimensions. 50mm \* 25mm \* 3mm. And the ARC welding is used for joining operation.

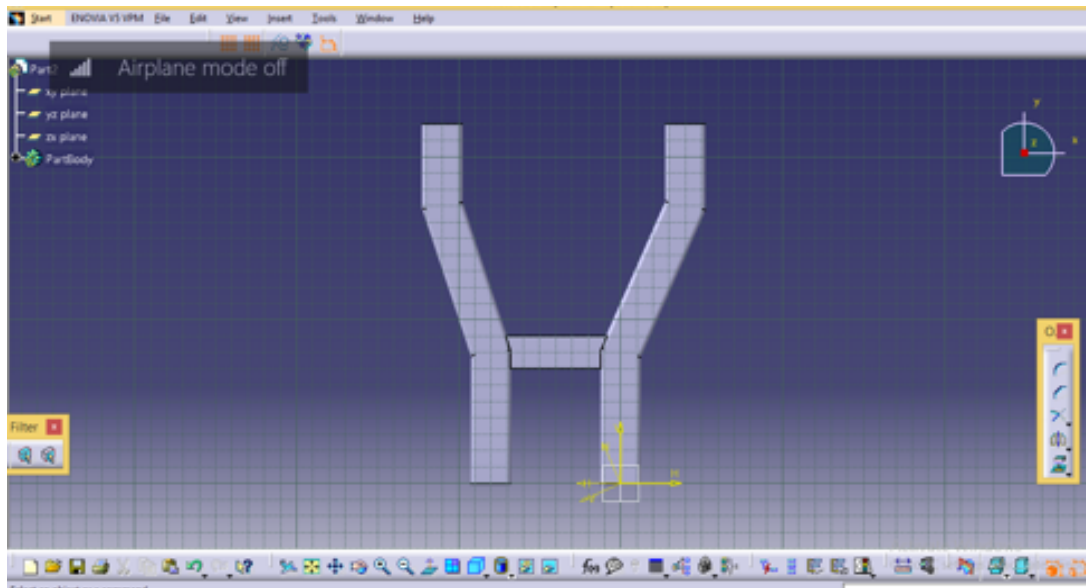


Figure no.1

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