



# Conversion of Petrol Bike to an Electric Bike

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**Abstract:** An electric vehicle is a type of vehicle that uses electric motor and battery pack instead of an internal combustion engine. Power is given from battery-pack rather than petrol. This saves money and has smaller impact on the environment as well. There are few barriers for the rapid adoption of electric vehicles, like lack of charging infrastructure, limitations of battery technology and high purchase costs. In this project, I am going to converting a petrol bike into electric bike using lithium-ion battery and HUB motor.

**Keywords:** :bike, Battery , Electric motor, affordable, conversion kit.

## I. INTRODUCTION

Operating cost of the electric vehicles is less than that of gasoline powered vehicles. As price of fuel increasing, it is difficult to use internal combustion engine vehicles. The future of automobile is going to be electric. The pollution emitted by the automobiles is increasing rapidly nearly about 73% of total pollution due to the usage of internal combustion engines. If we go for newly launched electric vehicle, they are highly priced compare to conventional IC engine vehicle. Battery used by these EVs are costlier, they use lithium-ion batteries which prices around thousands. Obviously, everyone is looking towards making electric vehicles pocket friendly. There is a method of doing this is to converting an internal combustion engine (ICE) vehicle into an electric one. There are a number of kits on the market that can be utilized to do this conversion. Electric vehicles use batteries to power the vehicle, an electric motor as powertrain. For this conversion, the vehicle's gasoline engine, exhaust system, petrol tank, and clutch assembly will no longer be needed. Electric vehicle conversion is the replacement of a vehicle's combustion engine and connected components with an electric motor and batteries, to create an all-electric vehicle. Setup of my project consists of an ordinary bike, lithium-ion battery, a BLDC motor, a controller and wire harness. A new and improved design for the conversion of IC engine vehicle to electric vehicle was developed based on the literature review and the problem identification. The proposed design consists of electric rear wheel-drive with a BLDC motor, battery and chain drive.

## II. METHODOLOGY

As electric vehicles are going to replace the existing IC engine vehicles, existing IC engine vehicles cannot be completely demolished. We can make use of these scrap vehicles by converting conventional gasoline powered vehicle into electric vehicles. A lot of vehicle scrap is collected every year which is creating pollution, so basically this is the problem identified in problem identification stage. Then in literature review stage, the patents, journals, online references were collected, studied in detail and the literature review was summarized. Based on the problem identification and literature review, the conversion of gasoline powered vehicles to electric vehicles was designed. Then the calculations were made to select the required components. After the fabrication work of our vehicle with proposed design, the performance, efficiency, speed of the vehicle and also the load carrying capacity of the vehicle will be tested.

## III COMPONENTS USED

1. Bike
2. BLDC motor
3. Lithium-ion battery
4. Controller
5. DC-DC converter
6. Charger



### 3.1 Bike

For this project, I have used a four-stroke gasoline powered bike. And then I removed engine, gearbox and other components. As I replaced these components with motor, battery and controller.



### 3.2 HUB Motor

A wheel hub motor, hub motor, or in-wheel motor is a motor that is incorporated into the hub of the wheel. Wheel-hub motors are commonly found on electric bicycles. Electric hub motors were well-received in early electric cars, but have not been commercially successful in modern production cars.



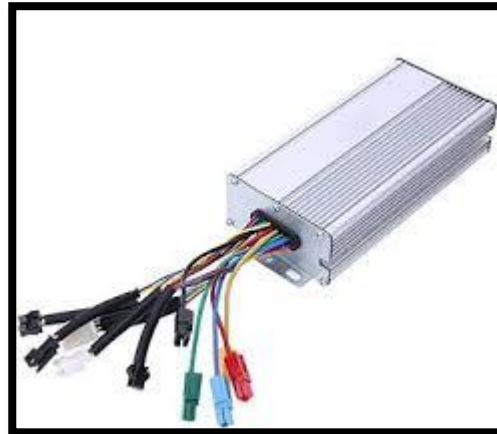
### 3.3 Lithium-Ion Battery





The battery is the source of power supply to the motor. Selection of battery pack is an important part of an electric vehicle. I have Done several calculations then I selected 48 V & 15 Ah NMC battery pack. The lithium-ion battery has less weight compared to the lead acid battery and has high energy density and low self-discharge rate. Thus, the efficient battery that is required for driving the motor is to be used. Major consideration is weight of the battery and its power output for the rated speed.

### 3.4 Controller



While BLDC motors are mechanically relatively simple, they do require sophisticated control electronics and regulated power supplies. Thus, a 48 V drive controller is selected which is required to control the BLDC motor. The controller choosing for the project must match up with the battery specifications as well as with the motor specifications.

### 3.5 DC-DC Converter



Battery pack gives a fixed voltage, but the voltage requirement of different accessories such as horn, headlamps and turn indicators in the vehicle may vary. This device converts 48 V to 12 V as per requirements.

## IV WORKING

The battery pack powers the motor and bike starts running. The motor is made to run with the help of lithium-ion battery. The specification of lithium-ion battery is about 48 V & 15 Ah. A 750 W motor is used for this project. The electric current from the battery is passed to the controller then the required amount of current will be flown into the motor. The voltage of the controller must match with the battery pack. A sine-wave controller is used for this project. The motor drives the rear wheel of the vehicle with the help of a chain drive. The range of the vehicle can be increased by increasing the battery capacity, and speed can be increased by selecting another motor. Battery can be charged with the selected charger.



## V. RESULTS AND DISCUSSION

- Top speed of 50 Km/h was achieved on a level road.
- The range of bike is 30-40 Km after full charge.
- A BMS and lithium Ion battery can be added for more range and reduced weight.
- Bike was tested successfully for light daily use.
- Battery charging takes around 8 hours for full charge.

## VI. CONCLUSIONS

- [1] The objective of the study was to design a customisable vehicle which will be affordable to everyone.
- [2] We mitigated problems faced by existing model.
- [3] As compared to IC engine vehicle, running cost of our E-bike is almost 1/10th .
- [4] E-bike has been fabricated and tested successfully. Different parameters like running range, cost per kilometer, Discharge time of battery has been measured with actual running condition and it delivered better results.

## REFERENCES

- [1] Jiejunyi Liang, Haitao Yang, Jinglai Wu, Nong Zhang, Paul D. Walker, "E-vehicles - Types and Importance in day to day life" Journal homepage: [www.elsevier.com/locate/mechmachtheory](http://www.elsevier.com/locate/mechmachtheory).
- [2] M.A. Kluger, D.M. Long, An Overview of Current Automatic, Manual and Continuously Variable Transmission Efficiencies and their Projected Future Improvements, Technical Report 1999-01-1259, SAE Technical Paper, 1999.
- [3] R. Maruthi Prasad, A. Krishnamoorthy, "Design, construction, testing and performance of split power solar source using mirror photovoltaic glass for electric vehicles" Journal homepage: [www.elsevier.com/locate/energy](http://www.elsevier.com/locate/energy)
- [4] V.B. Bhandari "Design of Machine Elements", Tata McGraw Hill Pvt. Ltd., 3rd Edition.
- [5] Haying Wang, "Study on state of charge estimation of batteries for electric vehicle", Vol. 18 pp. 10-14, 2013. ]
- [6] Peter Weldon, Patrick Morrissey, Margaret O'Mahony "Long-term cost of ownership comparative analysis between electric vehicles and internal combustion engine vehicles". Journal homepage: [www.elsevier.com/locate/scs](http://www.elsevier.com/locate/scs)