

# Solar Powered Electric Bicycle

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**Abstract** - A method of upgrade a normal bicycle into electric powered bicycle that powered by hub motor which gets supply from battery. And upgrade an electric powered bicycle into solar powered electric bicycle which gets supply from solar panels. The solar panels are mounted in the bicycle and the hub motor connected to the effortless riding. A solar controller is connected to the battery for collecting the solar energy to electrical energy. A battery is used to store the electrical power and gives the supply to hub motor to drive the motor.

**Keywords**-Solar panel, hub motor, Battery, throttle and hub motor.

## 1.INTRODUCTION

We have to introduce our new project about "SOLAR POWERED ELECTRIC BICYCLE" which runs with the help of sun light without any fuel. In this project we have implemented our ideas to future generations for transportation. In our solar bicycle solar energy is converted into electrical energy by means of solar panel, battery, solar controller. The electrical energy is stored in the battery and supplied to hub motor through controller. This project deals with this system, which covert solar energy to electrical energy. The main objective of our project is Now a days the usage of bicycle for shorter distance has reduced because of the pedaling, time etc. Our project about solar powered electric bicycle which runs with help of both sunlight and the help of pedaling. The solar energy is converted into electrical energy by solar panel, battery, converter and the power is transmitted to the hub motor to run the cycle. We hope that this model bicycle runs with the operation of no emission. Due to this in upcoming years the usage of the bicycle for shorter distance will be increased and it also helps to reduce the pollutions like air & noise.

### 1.1 Problem Identification

In electrical bicycle, charging is required for battery and battery takes long duration for charging so it results in the payment of electric bills higher than usual.

## 1.2 Summary

To perform this project, literature review has made from various journals and articles. The main of this survey is to run the bicycle using solar panels. A solar panel will be fixed on the rear carrier and solar cells charged and stored in the battery. The battery supply power to the hub motor of the rear axle and bicycle run on the road.

## 3.COMPONENTS USED

Components used

SL.NO.	ITEM/COMPONENT
1	Bicycle
2	Solar panel
3	Battery
4	Hub motor
5	Controller
6	Throttle

### 3.1 BICYCLE:

In this project we use E-Bicycle.



E-Bicycle

### 3.2 SOLAR PANEL:

The Solar panel which produce the electrical energy from the solar energy. It converts the heat energy into electric energy and stores it in battery According to the size, quality and the platelets present in the solar panel the power output differs. The amps of the solar panel differs according to the size of the panel. So, the charging time of the battery will be different.



Solar panel

### 3.3 BATTERY:

A battery can be charged electrically and released electric charge when needed. The battery consist of anode, cathode and electrolyte. In our project lead acid battery 12V-7AH is used and three battery is connected in series.



Battery

### 3.4 HUB MOTOR:

The hub motor is also called as hub wheel and the hub motor is an electric motor in the hub of the wheel. To run the bicycle and reduce the human effort the hub motor is used.



Hub motor

### 4.CALCULATIONS:

Weight of the bicycle = 35kg  
Weight of the rider = 75kg

Normal reaction on each tire(N)  
 $=W/2 = 110/2 = 55\text{kg}$   
 $= 55 \times 9.89 = 539.55\text{N}$

Battery,  
Lead acid battery  
Three 24v 7.5ah battery connected in series

By using solar panel,  
 $T = (36 \times 7.5) / 40$   
Charging time = 6.75 hrs

Motor specification  
Volt= 36V  
Power = 250W

Electrical (electric) power equation:

$$\text{Power } P = I \times V$$

Where

$$V = 36$$

$$P = 250$$

$$I = 250 / 36$$

$$= 6.94 \text{ A}$$

### 5.WORKING

solar powered electric bicycle which gets supply from solar panels. The solar panels are mounted in the bicycle and the hub motor connected to the effortless riding. A solar controller is connected to the battery for collecting the solar energy to electrical energy. A battery is used to store the electrical power and gives the supply to hub motor to drive the motor. And the motor controller is used control the speed and the throttle is used to vary the speed of the bicycle.



Assembled solar bicycle

### 5.1 BICYCLE VS SOLAR BICYCLE

The below table represents the comparison of bicycle and solar bicycle.

Bicycle vs Solar Bicycle

	<b>Bicycle</b>	<b>Solar Bicycle</b>
<b>Maximum speed</b>	15 km/hr	25 km/hr
<b>Power required for riding</b>	Human power	Solar power and human power
<b>Bicycle weight</b>	18 kg	35 kg

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### 6.CONCLUSION

The project carried out by an impressive task in the field of automobile department. It is very useful for having the two wheelers, because need not to spend the lot of money for the fuel. This project will reduce the cost involved in the concern. Project has been designed to perform the entire requirement task at the shortest time available. Due to this pollution can be controlled.

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