

# Design and Development of Solar Assisted Bicycle

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**Abstract:** Fuel costs and pollution is increasing day by day. There is a need to search for an alternative non-conventional fuel to decrease the running cost of regular transportation purpose. Here made an effort to build a solar bicycle which is an electric vehicle that provides the alternative by natural resources (solar energy) to charge the battery. The battery supplies required voltage to run the motor. Finally the solar hybrid bicycle can become an alternative to the traditional fuel vehicles and manufacturing of such vehicles will definitely become essential.

**KEYWORDS:** Solar panels, Battery, Bicycle, Hub Motor



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DOI of the Article: <https://doi.org/10.46501/GIETAE11>



Available online at: <http://ijmtst.com/vol7si04.html>



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**To Cite this Article:**

Phani Kumar Dadi; VenkataSivasekhar A; JayadeepManikanta Doki; Brahmareddy Burramukku and Subrahmanyam Vasamsetti. Design and Development of Solar Assisted Bicycle. *International Journal for Modern Trends in Science and Technology* 2021, 7, pp. 55-59. <https://doi.org/10.46501/GIETAE11>

**Article Info.**

Received: 23 June 2021; Accepted: 2 July 2021; Published: 8 July 2021

## INTRODUCTION

Before going to the topic we have to know the three sources of energy is used to move a bicycle.

- 1)Electrical energy
- 2)Solar energy
- 3)Manual energy

Here we have to know about one by one and how it is designed and what are the parts used to build the solar assisted bicycle.

**1)Electrical energy:**Here the electrical energy is used to move the bicycle with the help of charging the battery.The hub motor wheel is used to move the bicycle with the help of electrical energy which is produced from the battery.

**2)Solarenergy:**It is bicycle which runs using the electrical energy of battery to runthe hub motor which is used to run bicycle.the solar energy is used to run bicycle.The solar Energy is used to charge the battery two or more Photovoltaic cells or pv(cells) may be used to generate voltage to charge the battery.it gives the required voltage to charge the batter. It gives the required voltage to the hub motor mounted on the front wheel to run the bicycle.

## STRUCTURE OF PAPER

The paper is organized as follows: In Section 1, the introduction of the paper is provided along with the structure, important terms, objectives and overall description. In Section 2 we discuss related work. In Section 3 we have the complete information about image processing tools. Section 4 shares information about the flexible YAML templating system created for it, its advantages and disadvantages. Section 5 tells us about the methodology and the process description. Section 6 tells us about the future scope and concludes the paper with acknowledgement and references.

## OBJECTIVES

The predominant invoice processing systems are either entirely manual or they follow a rigid single template system. Whether an individual is a buyer or a seller, this leads to a lot of inefficiencies and high costs.

This project aims to address some of the problems in current systems by greatly minimizing the human intervention in the process and thus reducing costs and errors. The aim is to ease the task of both the buyer and the seller.

## RELATED WORK

The solar hybrid bicycle consists of following components Hub Motor, Solar panel, lead acid, Battery, Motor controller, Accelerator, Bicycle, Dynamo.

**HUB MOTOR:** The permanent magnet DC hub motor is a conventional DC motor.the stator is inside the rotor with the premanent magnets placed inside the stator is fine on the anle and the hub will be made to rotate by AC supplied by the batteries.it generates high trque at low speed which is highly efficient and which doesn't need sprockets brackets and drive chains.they are very reliable and have a long life.



**Fig. 1 Hub motor attached to Back wheel**

**Solar cells:**Thesolar bicycle is operated by sol-ar energy the lead acid battery is charged with voltage generated due to solar energy with the help of photovoltaic cell(pv cell).with the help of photovoltaic effect the solar cells conwer the sol-ar energy directly into electricity.the photovoltaic effect involves conversion of electromagnetic radiation into electrical energy.



Fig. 2 Solar panel in closed position

**Lead Acid battery:** Lead acid batteries are very common in our daily life. It is most commonly used battery in electronics. Although it has lower energy density than the lithium ion batteries but since it is very safe to use lead acid battery with proper precautions taken.



Fig. 3 Sealed lead acid battery



Fig. 4 Battery pack

**Motor control:** A motor controller is an important element of solar hybrid bicycle and it can be called as the brains of the vehicle. It controls the amount of power supplied to the hub motor and also to the lights and horn if required.



Fig. 5 Electric conversion kit

CAD DRAWINGS

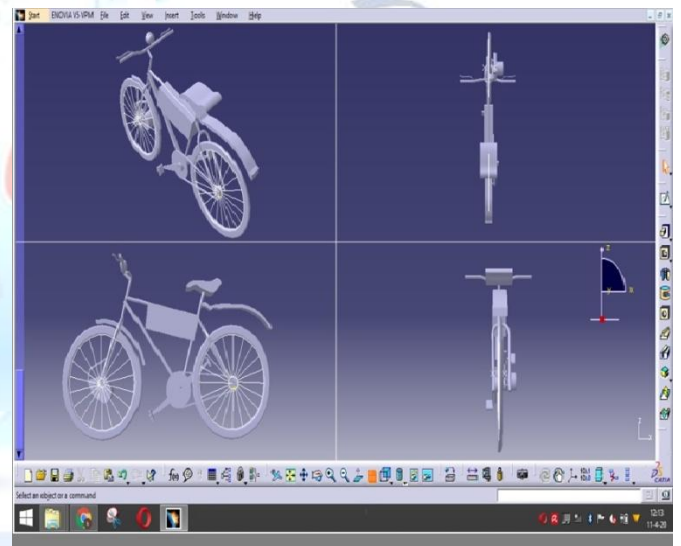


Fig. 6 Views of Electric bicycle

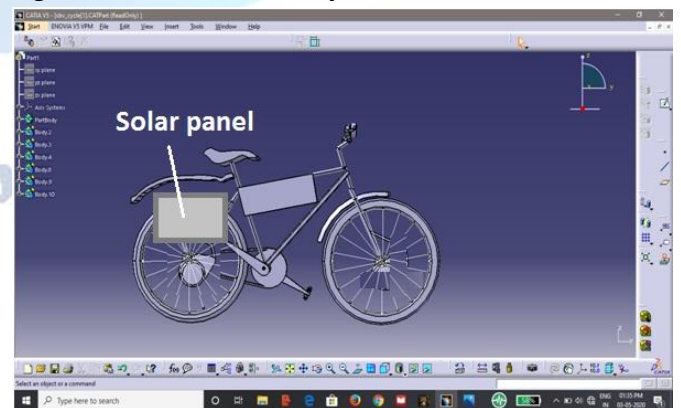
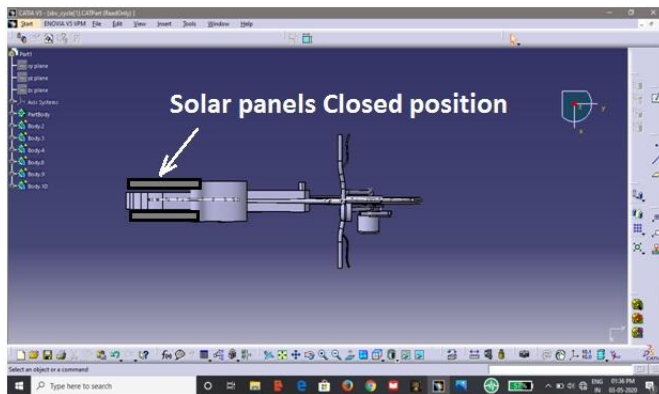
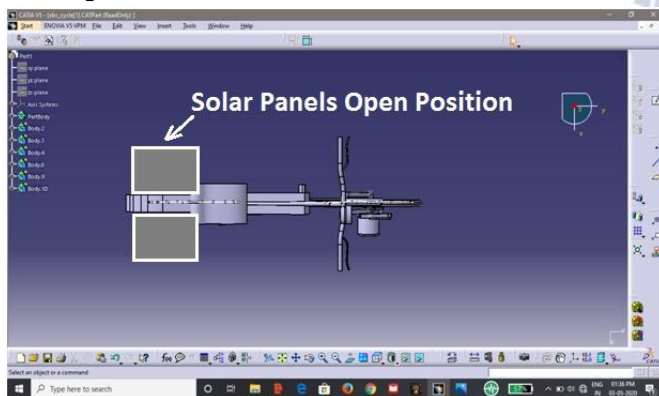


Fig. 7 Side view of electric bicycle with solar panel in closed position





**Fig. 8 Top view of electric bicycle with solar panel in closed position**



**Fig. 9 Top view of electric bicycle with solar panel in open position**

## METHODOLOGY

The solar hybrid bicycle consists of following components Hub Motor, Solar panel, lead acid, Battery, Motor controller, Accelerator, Bicycle, Dynamo.

### Process Description

#### Required essential component of Hybrid bicycle:

##### Battery selection:

Motor selected is of 24v hence battery voltage rating should be 24V. Therefore we select two batteries of 12v and 7.5AH in series. Combination of we get 24 V and 7.5 AH.

##### Charging time:

The required to charge the battery by adapter 12v 12Ah Therefore  $T=3.6$ hrs.

##### Panel selection:

We use two panels of 25w each having dimensioned 850mm 550mm.

##### Motor selection:

Hub motor of 250w 24v.

##### Manual energy:

Here we know the manual energy is nothing but ELECTRICITY GENERATION FROM PEADALLING. the energy is generated manually by using the manual enforse to rotate the motor.

A permanent magnet alternator depends on the magnetic flux generated by a permanent magnet to convert mechanical energy into electrical power.it generates alternating current which charges to battery.

A modern alternator consists of both moving and stationary coils of wire in the alternator however the moving coil which is also called the rotor. Uses current supplied through slidings to generate a moving field is called flux.

Here we have to arrange theAnother battery for charging manually.

If we combining the driving power and charging the battery may leads to expose.

In between to long energy we need not worry about change the battery with this we have to charge the battery while running of An bicycle.

## FUTURE SCOPE AND CONCLUSION

It's a unque type of Design which the solar energy was used as power source and energy. The solar panels can be folded when not in use to save the space requirement and preventing damage of the solar panels. Sun light a source of energy which is used to run the bicycle. Solar charging helps to reduce the pollution and with less effort can travel through two different modes of transportation which is very cheap. Moreover the bicycle can be charged by plugin to the domestic current.

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