1 **Title of the project:** DESIGN AND DEVELOPMENT OF HYBRID/SOLAR POWERED FOUR WHEELER

2 **Name of the College and Department:** KVG COLLEGE OF ENGINEERING SULLIA

DEPARTMENT OF MECHANICAL ENGINEERING

3 **Name of the students:** Mr, Muhammad Jalal

Mr, Manoj Kumar

Name of the guide: Dr Sunil Kumar M

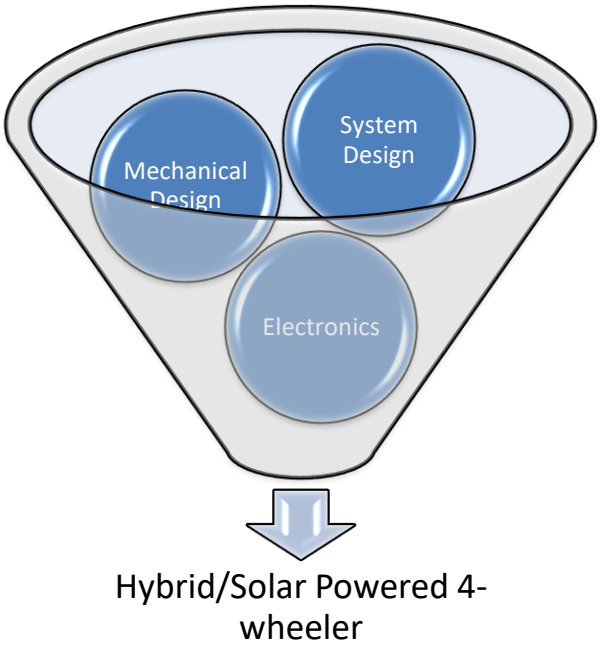
4 **Keywords:** solar powered four wheeler, solar car, solar auto.

5 **Introduction:** In this project we are creating a four wheeler, which is powered by battery and the battery is the charged by the solar panel fitted on the top the vehicle. While running in day time it uses partial power power of solar panel and battery and also battery is charged by the solar panel. The solar pannel can't directliy drive the motor because the battery wont get charged will lead to inefficiency in the range of the vehicle. This vehicle is powered by solar panel but in rainy season this can't work at its fullest power so we added a plug in charger and also the battery is detachable for charging purpose.

6 **Objectives:** In this modern world there is no such electric four-wheeler which works on battery and solar power. Either they are battery powered or hybrid type which includes gasoline engine with them to increase power and efficiency of the vehicle. Fully battery powerd four wheelers can move limited distance they need a charging time 3-4 hours. This can be solved by the hybrid vehicles. But they are only reducing the emission not fully. EV and hybrids are still costlier then a normal gasoline which cannot be affordable by rural peoples. For taxis and other type of small goods vehicles still depends on gasoline. This can't reduce pollution. Still there are people using electric four wheeler in croweded cities for transportation of trourist to show places. The problem they are face is charging. A battery needed 3-4 hours to charge if it is a lithium battery and for lead acid charging time increases, they are cheep compared to lithium. For replacing system also can't use in such places because of short range of battery. Our project is a solution for this small taxis and village people who are working for daily wages. This will be our great effort to our society.

7 **Methodology:**

We are designing the solar powered electric four-wheeler. Therefore, the total design work is divided which is explained below in fig



Flow chart

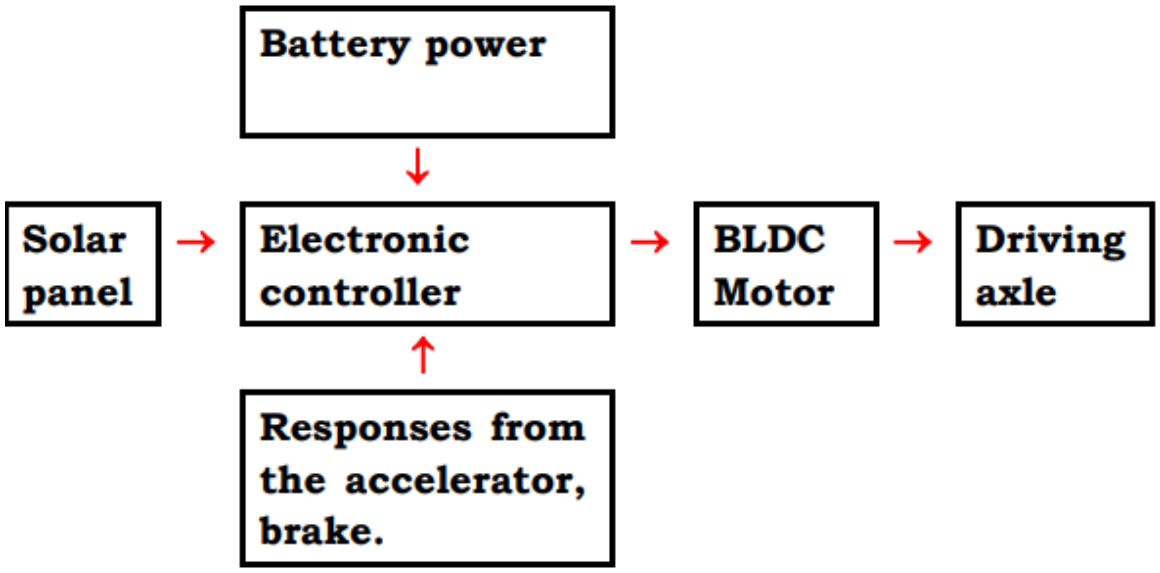
System Design: The system design deals with the various components and their ergonomics appearance. The vehicle should have the capacity to hold four peoples including driver, driver and goods or with a wheel chair compartment

System Design

Mechanical Design : In mechanical design there are parts which can be manufactured and others has to purchased. Parts such as rear axle, suspension, wheel hub, breake system steering system to be purchased. Chasis and body works can be manufactured.

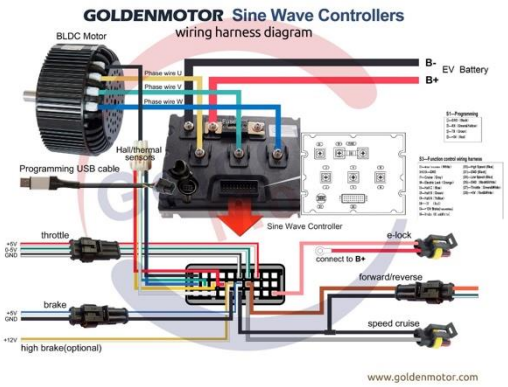
Rear Axle : Thus are the main components where vehicle gets its movement. We bought a ready made rear axle which includes a 3kW BLDC motor to drive the vehicle. Because it is ready mede we can attach it to the chasis with out any problem.

Circuit Design: Circuit design is the heart of this project. A good design can reduse the use of power and can give much range to the vehicle. Motorcontroller has ceveral connection to the motor and the other devices like accelerator, horn,key lock, display, direction control etc.

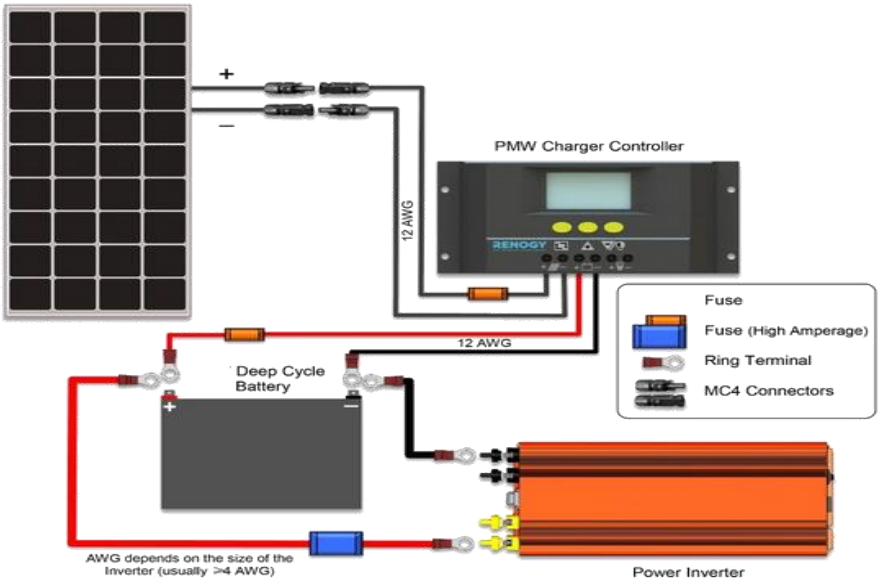


Circuit design

Drive System : Drive system is responsible for the movement of the vehicle. This uses a battery to power the motor, a controller give the cammands and control the rotation speed and acceleration of the motor. Connecton of driving system



Charging system: This system controlls the charging and discharging of battery. In day time it usese solar power which is converted to electricity by solar pannel fitted on the top the vehicle. Charge controller charges battery from the solar panel and gives to the motor for the drive. The charging system is shown in fogure 3.8.



Wiring Diagram

8 Results and Conclusions:

- The EV which we built have better range.
- It uses built in charger system to charge by any plug point available.
- Detachable battery can be charged anywhere without taking the vehicle.
- Material used for the construction are safe and provide highe strength.
- Can be used for multipurpose other than a taking passengers.
- Solar panel fit on the top can provide charging in day time.
- Help of solar panels long distance travel can be achieved.
- Handicaps can also travel in this vehicle.

9 Scope for future work:

- 4-wheel drive can provide higher torque.
- Custom made battery can increase the space inside the vehicles.
- Custom made solar panel can extract or produce more power.
- Providing gear system can enable it to run in all terrain.
- Better design of custom PCB can reduce power loss.