Design and Fabrication of Solar Assist Vehicle with Dual Charging System

Ankush Hadge[1], Bhagyashri Bhendarkar[2], Jivan Nagose[3], Lokesh Dhandhare[4], Prem Katre[5], Ritesh Motghare[6], Shubham Vikharkar[7], Shubham Daf[8]
[1,2,3,4,5,6,7,8] *Student, KDK College of Engineering, Umrer, Nagpur, MH- 441204*

***Abstract*- This project can run both solar energy as well as electrical charging (by charger) using dual charging system. project is mainly designed to build solar and electrical powered vehicle. The greater community on alternative energy and its applications, as well as to build a solar and electrical powered vehicle . This project has a strong desire to innovate and use local technology and resources. When sunlight falls on the solar panel then solar energy gets converted into electrical energy and stored in the battery, .Since petrol and diesel is not required it uses solar energy which is abundant in nature. Sunlight is now-a-days considered to be a source of energy which is implemented in various day to day applications. Solar energy is being used to produce electricity through sunlight. With the help of this technology we aim to make solar and electrical energy powered vehicle. Preliminarily our objective would be to implement our idea on a remote control toy vehicle and afterwards with help of this prototype we can extend our future work on building an actual vehicle powered by the solar and electrical energy which is both cost effective and of course environment friendly.**

Index Terms- local technology, plug charging, solar vehicle, sustainable design, Solar Charging.

I. INTRODUCTION

A solar vehicle is a solar vehicle used for land transport. Solar vehicles combine technology typically used in the aerospace, bicycle, alternative energy and automotive industries. The design of a solar vehicle is severely limited by the amount of energy input into the vehicle. Most solar vehicles have been built for the purpose of solar vehicle races. Since 2011 also solar powered vehicles for daily use on public roads are designed. Solar vehicles depend on PV cells to convert sunlight into electricity. Unlike solar thermal energy which converts solar energy to heat for either household purposes, A industrial purposes or to be converted to electricity, PV cells directly convert sunlight into electricity. When sunlight (photons) strikes PV cells, they excite electrons and allow them to flow, creating an electrical current. PV cells are made of semiconductor materials such as silicon and alloys of indium, gallium and nitrogen. Silicon is the most common material used and has an efficiency rate of 15-20%.

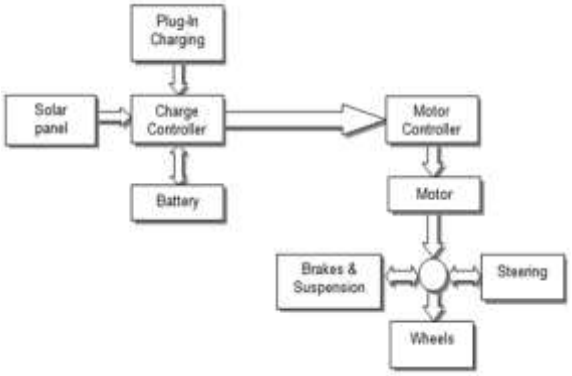

Figure 1: Block Diagram Of Solar Assist Vehicle.

II. OBJECTIVE

- The main objective of this project is to construct a solar vehicle to allow transport for people travelling a certain amount of distance every day, for instance, the office commuters with virtually no cost as it will run off free renewable solar energy.
- The proto-type solar powered vehicle to be designed and built specifically for the daily office would be light-weight, clean, environment friendly and completely independent of fossil fuels.
- Solar energy is the most effective energy supply for electric vehicle in comparing with other renewable energy source.

III. MODEL OF SOLAR VEHICLE

IV. DATA ANALYSIS

- Solar energy calculation:- One battery of 12 V/26 Ah has a capacity of 48 V x 26 Ah = 1248 Wh.
- E = A × r × H × PR
- E = Energy (kWh)
- A = Total solar panel Area (m²)
- r = solar panel yield (%)
- H = Annual average solar radiation on tilted panels (shadings not included)
- PR = Performance ratio, coefficient for losses (range between 0.5 and 0.9, default value = 0.75)

V .MECHANICAL CALCULAITON

- Power Required (Continuous) = Air Resistance + Rolling Resistanc
- Continuous Speed = Average Speed x 60 /(2 x π x Radius of Wheel)
- Torque Required (Continuous) = (Air Resistance + Rolling Resistance) x 60 / (2 x π x Continuous Speed)
- Braking Force (Fb) = μ x f
- Load Torque (TL) = m x g x r N-m
- Using the formula Kinetic Energy (K.E.) = (J x ωm2) / 2 Jules.

VI. ADVANTAGES & DISADVANTAGES

Advantages:

- Unlike regular vehicles, solar energy powered vehicles are able to utilize their full power at any speed.
- Since Solar powered vehicles run by solar so, do not require any expense for running.
- Solar vehicles are quite & noiselessly.
- Solar vehicles require very low maintenance.
- A solar vehicle produces no harmful emissions.
- They are able to utilize their full power at any speed.

Disadvantages:

- Solar vehicles don't have speed or power that regular vehicles have.
- Solar powered vehicles can operate only for limited distance.
- Good solar powered vehicle is expensive. It cost around $200,000 or more.
- Parts used in solar vehicles are not produced in large quantity so they are expensive.

VII. CONCLUSION

Solar vehicles have the easiest energy output around, yet our technology is still far. A solar vehicle is really an electric vehicle powered by solar energy .The solar vehicle can solve the problems of environment for IC engine vehicles and is the best pollution free method. We need to make use of them so that we can reduce our dependence on fossil fuels. Solar vehicles have some disadvantages like less speed, initial cost is high, but these disadvantages can overcome in further research. The major problem of IC engine vehicles i.e. pollution can be solved through this method.

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