

## Study & Modelling of Hybrid Mild Vehicle

Bharat M. Jibhakate<sup>1</sup> Rupesh Pandey<sup>2</sup> Deepak Sharma<sup>3</sup> Tejukumar Sah<sup>4</sup> Prasad Lonare<sup>5</sup>

<sup>1</sup>Professor <sup>2,3,4,5</sup>Student

<sup>1,2,3,4,5</sup>Department of Mechanical Engineering  
<sup>1,2,3,4,5</sup>JDCOEM, Maharashtra, India

**Abstract**— A large amount of research on solar energy operated solar cars and hybrid mild cars are considering the recent one and half decade development. In this review paper, a study on past, present and future solar energy applications related to solar car and the model structure is discussed. On the basis of this we have collected various research works. The data presented in this study will consider as a good database for the researchers in this field. This paper illustrates an implementation of Solar/Electric/Reduced Fuel consumption (I.C. Engine) Hybrid Powered Vehicle (SEFPHV) technology which is the combination of multi sources. Hybrid vehicle can be powered by solar energy, electrical energy and less amount of fuel energy is used to charge the batteries and to drive a vehicle/car. Rechargeable battery is used to drive the hub motor into vehicle. Battery is charged with the aid of solar power, plug-in altered electric current. In sunny days, solar panel is used to charge the solar batteries. Instead of using engines, very less amount of fuel energy is used to charge the battery in rainy seasons. This multi charging vehicle can charge itself from both solar powers and altered electric current. The objective of this work is to estimate the potential of energies, solar energy and electrical energy for the power transmission of vehicles/cars. Both powers will be utilized in near future work.

**Key words:** Hybrid solar car, solar energy, I. C. engine operated car, solar electrical shrink car

### I. INTRODUCTION

Different fossil fuels like petroleum, diesel, natural gas and coal etc. from which world getting most of energy demand today, are being depleted rapidly day to day. Combustion of these products are causing global problems such as the greenhouse effect, ozone layer depletion, acid rains and pollution, which are poisoning great hazardous for our environment and eventually for the total life span on our planet getting reducing [1]. This paper proposes the brief study of how this hybrid solar car is efficient in our daily life because now a day pollution and fuel rate is very big problem many people having petrol cars. Use of solar energy is being used for vehicles, besides the control of vehicles pollution in the city, less consumption of fuel. Hybrid solar car are effective reducing global warming and environmental problems in big frame. These Hybrid electric vehicle (HEV) benefits are prompted by automakers to develop hybrid vehicles, most of which are available in Canada today. However consumer acceptance to hybrid vehicles remains low, mostly due to public unawareness regarding the performance and reliability of HEV technology and the high initial cost of hybrid car [4]. Over the last 15 year, a larger amount of solar car, hybrid solar car and electric operated car research is carried out which is originating from several independent developments that all resulted in the idea of hybrid solar car and electric operated car. These are three main developments as discussed.

### II. SOLAR OPERATED CARS

A solar car is driven by solar energy obtained from solar panels on the surface which may be top, side or bonnet of the car. Photovoltaic cells convert the solar energy directly into electrical energy. Solar car combined technology generally used in the bicycle, auto-rickshaw, four wheeler and automotive industries. Solar cars are mostly fitted with gauges as observed in Conventional cars. For smooth running of car/vehicle, the driver must keep an eye on these gauges to spot and to avoid possible problem. The term of "Solar car" usually implies that solar energy is used to power all or part of propulsion of vehicle. Solar car are not sold much as practically day-to-day transportation devices at present day, but are primarily demonstration vehicles and engineering exercises or projects and model of a car. The proper knowledge regarding it, guidance and benefits regarding solar car will help in focusing the customer's attraction towards it and indirectly will lead in demand for it in the market as well which will lead in utilization of natural solar energy to a great extent. Thus it will help in creating a pollution free environment and also will result in less usage of fossil fuels by acting as an alternative of it.

### III. HYBRID ELECTRIC OPERATED CARS

Hybrid electric vehicles (HEVs) were designed to overcome the disadvantages of battery electric vehicles. HEVs combine the conventional Internal Combustion Engine driven mechanical drive train with a motor propelled electric drive train. Electric power to the motor in a hybrid vehicle is usually provided by a chemical battery. The presence of an on-board electric motor allows optimized operation of the engine in its maximum efficiency region, thus providing higher fuel efficiency than internal combustion electric vehicles. The electric motor also enables regenerative braking and shutting down the engine during idling further increases the efficiency of the vehicle [4]. A hybrid car is a vehicle that uses two or more distinct power sources to move the car. Thus Electric Source can also be used with any other source to form a hybrid car. The term most commonly refers to hybrid electric vehicle (HEVs), which combine a solar energy and electric energy. But in spite of using energy from solar panel, electric cars obtained their energy from batteries. When the batteries get discharged they must be recharged by plugging or solar panel the car into an electric power outlet like home. In order to drive an electric car, we have to recharge its batteries overnight while sleeping. For mileage rating among all cars, Hybrid cars are mostly preferable. There are so many hybrid cars available to buy today in market.

### IV. HYBRID SOLAR ENERGY AND IC ENGINE OPERATED CARS

Hybrid solar car uses a combination of internal combustion (I.C.) engine and solar panel, electric motor powered by

stored battery system. It is driven by specified petrol engine and solar energy obtained from solar panels on the surface (generally the top or window) of the car vehicle. The stored battery system is to be recharged by the solar energy and IC energy as well as regenerating braking system [2]. Photovoltaic cells convert the sun's energy directly into electrical energy. Hybrid Solar cars combine technology typically used in the bicycle, auto three-wheeler, four wheelers, and automotive industries and used as alternative energy.

#### V. WORKING PRINCIPLE OF SOLAR ELECTRICAL SHRINK CAR

The project consists of different parts like vehicle model, solar panel, hub motor, battery control unit etc. The solar panel is fixed on top of the vehicle model and it provides the supply to the battery from direct sunlight. The power from the battery is used to operate the control unit of vehicle. The control unit is the main device to operate the motor to control the directions of the solar car. The solar car can be easily moved in various directions. The car can be shrunk and extended using the extension bar provided at the sides of the car. This link can be extended and can be fixed certainly so that the length of the car is increased or decreased. The steering is controlled by the driver by means of a rack and pinion arrangement.

#### VI. OBJECTIVE OF WORK

It can be seen from various last 15 year research works of application and utilization of renewable energy for hybrid solar car [2]. Forecast more and more relative issue of future to presence of Global Warming and clean renewable energy source will be used in run down the solar car because it is helpful to reduce pollution [5]. The objective of this work is to estimate the potential of both energy as solar panel produced and electrical energy and electric power. And both powers will be utilization in future work for study and design of hybrid solar Electrical operated car. Hybrid solar cars (solar energy and IC engine powered) further implementation which is minimization of fossil fuel (like petrol, LPG, etc.) consumption, reduce pollution, improved the efficiency of vehicle because vehicle is having a more light weight, and utilizes solar energy.

#### VII. FUTURE OF HYBRID SOLAR CAR

In the present scenario, more utilization of car design and the car efficiency, aerodynamic structure of a vehicle or using a renewable energy in our research work, minimum consumption of fuel, less requirement of space during parking all are the requirements of model car. In the last 15 years research, work is utilization of over work from proposed a design of a solar energy with IC engine used a car which is more effective and efficient energy utilization in the vehicle running time as firstly start in I.C. engine and full charging system then after vehicle is fully run down in solar energy in day time. In case of winter climate, rainy season and night time for vehicle run down for IC engine because its time minimum time of sun light are provided in the earth surface as this reason for vehicle battery operated charging system are not properly work but to overcome these we have provided the electrical charging battery

system so that it can run effectively and can get the future demand.

#### VIII. SOLAR HYBRID CAR MODEL

In this work is going too justified and studies of different types of hybrid solar car models and structure, as parallel, series and combination of parallel series as followed. All the study of solar operated car are the relative to drive mechanism, and structure as shown below with detail of vehicle driving system rare wheel drive and operating system of is run down by using energy from solar or electrical energy[2]. A structure and model are given by research of hybrid solar electrical mild car. In this modeling assume the following main component of its control unit, battery, rack and pinion and hub motor which is the drive wheel of motor or work propulsion of wheel. it can be run down only one drives either rare or front wheel drive but we have used as a rare drive.

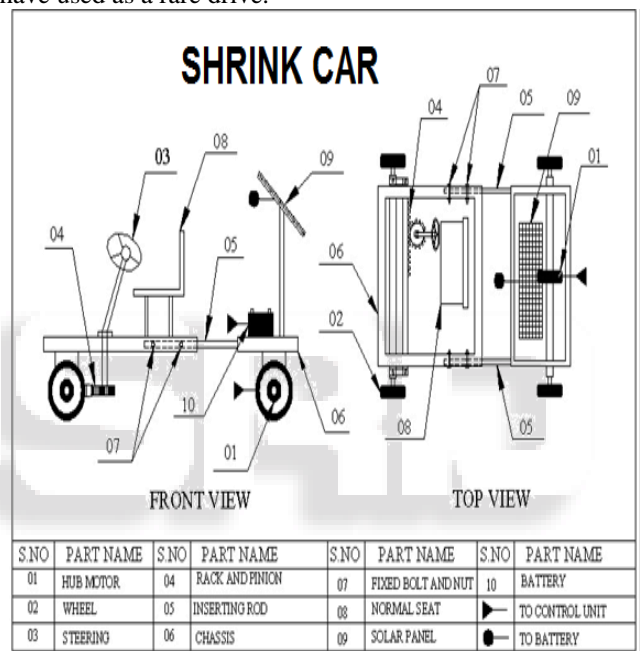


Fig. 1: Shrink Car

#### IX. ADVANTAGES

- Solar energy is used to control the Petroleum car so we can save the power.
- Solar energy available at free of cost.
- It compensates all vehicles.
- Pollution Free.
- Less space required for parking

#### X. CONCLUSIONS

It can be finally concluded from the above considerations that large research have done in the last 15 year as described in the text to be followed which have been utilized or to be utilized in the nearby the future . The project carried out by us making an impressing task in the field of automobile. It is very useful for having the vehicle, because they need not spend the lot of money for the fuel. In the absence of sun light, problem of vehicle battery operated charging can be avoided by providing the electrical charging battery system which helps to run effectively and can get the better future demand. 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.

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