Hybrid Car

Shalini Tripathi
Assistant professor
Department of Mechanical Engineering
Dr. A.P.J Abdul Kalam University, Buddha Institute of Technology, Gida Gorakhpur (U.P) INDIA

Abstract— A hybrid car is a combination of different type of energy like conventional or non-conventional energy. But here this hybrid car is made of different form of non-conventional energy source, like – solar energy, sound energy, and shocker energy. There is no conventional energy (petrol, diesel) required to run the vehicle. The total power is required to run the vehicle 2.877 Watt. Power produce by solar, sound and shocker energy are 3 Watt, 4 Watt, 3 to 3.5 Watt. These powers are sufficient to run the weight of 2 kg vehicle.

Key words: Solar energy, Shocker energy, Sound energy

I. INTRODUCTION

A hybrid electric vehicle (HEV) is a type of internal combustion engine vehicle and electric vehicle which combines a conventional internal combustion engine (ICE) propulsion system with an electric propulsion system. The presence of the electric powertrain is intended to achieve either better fuel economy than a conventional vehicle, or better performance[1]. A variety of types of HEV exist, and the degree to which they function as EVs varies as well. The most common form of HEV is the hybrid electric car, although hybrid electric trucks (pickups and tractors) and buses also exist[2]. Modern HEVs make use of efficiency-improving technologies. Some varieties of HEVs use their internal combustion engine to generate electricity by spinning an electrical generator (this combination is known as a motor-generator), to either recharge their batteries or to directly power the electric drive motors [3]. Many HEVs reduce idle emissions by shutting down the ICE at idle and restarting it when needed; this is known as a start-stop system [4].

Fig. 1: Hybrid Solar Car

Power-split hybrids have the benefits of a combination of series and parallel characteristics [5]. As a result, they are more efficient overall, because series hybrids tend to be more efficient at lower speeds and parallel tend to be more efficient at high speeds; however, the power-split hybrid is higher than a pure parallel[6].

Transformations of energy means one form of energy can often be readily transformed into another with the help of a device- for instance, a battery, from chemical energy to electric energy; a dam: gravitational potential energy to kinetic energy of moving water (and the blades of a turbine) and ultimately to electric energy through an electric generator [7]. Similarly, in the case of a chemical explosion, chemical potential energy is transformed to kinetic energy and thermal energy in a very short time. Yet another `example is that of a pendulum [8]. At its highest points the kinetic energy is zero and the gravitational potential energy is at maximum. At its lowest point the kinetic energy is at maximum and is equal to the decrease of potential energy [9]. If one (unrealistically) assumes that there is no friction, the conversion of energy between these processes is perfect, and the pendulum will continue swinging forever [10].

II. OBJECTIVE

The main objective of this project is to reduce the use of conventional energy resource by using non-conventional energy resource.

III. METHODOLOGY

A. Sound Energy

Sound energy may be converted into electrical energy for transmission, and later the electrical energy can be converted back into sound energy at the receiving end. An example of such transformations could be seen in the microphone and the loudspeaker.

The project here is all about Power-Generating Shock Absorber (PGSA). The Power-Generating Shock Absorber (PGSA) converts kinetic energy into electricity through the use of a Linear Motion Electromagnetic System (LMES). An electromagnetic linear generator and regenerative electromagnetic shock absorber is disclosed which converts variable frequency, repetitive intermittent linear displacement motion to useful electrical power. In the project here is all about Power-Generating Shock Absorber (PGSA). The Power-Generating Shock Absorber (PGSA) converts kinetic energy into electricity through the use of a Linear Motion Electromagnetic System (LMES).

The Power-Generating Shock Absorber (PGSA) converts this kinetic energy into electricity instead of heat through the use of a Linear Motion Electromagnetic System (LMES). The LMES uses a dense permanent magnet stack embedded in the main piston, a switchable series of stator coil windings, a rectifier, and an electronic control system to manage the varying electrical output and dampening load. The bottom shaft of the PGSA mounts to the moving suspension member and forces the magnet stack to

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reciprocate within the annular array of stator windings, producing alternating current electricity. That electricity is then converted into direct current through a full-wave rectifier and stored in the vehicle's batteries.

Fig. 2: Microphone

B. Shocker Energy

Servo motor along with rack and pinion converts kinetic energy into electricity. Here (mechanical) motion is transformed into electrical energy. The idea is to absorb shocks from uneven road and breaker points and breaks, this energy leads to the motion of rack and pinion which rotates motor shaft and transforms shock energy into electrical energy. Servo motor works on the principle of electromagnetic motor.

In this motor there is magnetic field generated due to magnetic poles , now when the shaft rotates in this magnetic field ,the flux of magnetic field is cut through this shaft, this ultimately generates electricity .

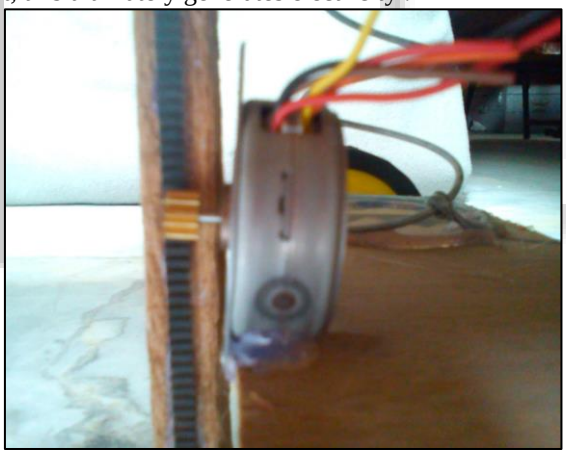

Fig. 3: Shock Absorber

C. Solar cell

Solar cells are made by a semiconductors such as silicon and gallium. Those solar devices which convert the solar radiation into electricity are called Solar Cells. Solar energy is transformed in the form of electromagnetic radiations of different wavelength. These radiations comprise visible light and invisible light (infrared) Solar cells can transform light energy into electrical energy which can also be converted into mechanical energy.

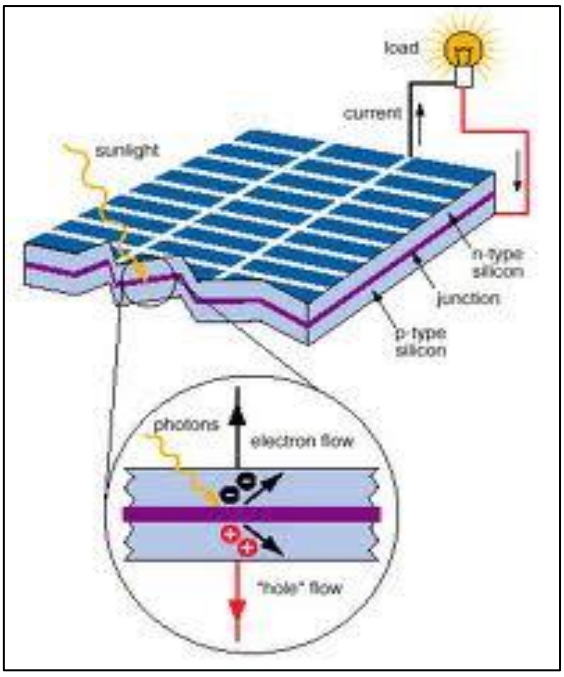

Fig. 4: Solar Energy

Fig. 5: Solar Plate

The conductivity of solar cells, that is ability to conduct electricity of semi conduct electricity of semi-conductors increases if certain impurities like Boron and Arsenic are added to them. These can be explained from following. When the sunlight falls on wafer of selenium, it is converted into electricity due to emission of electrons.

D. Introduction - DC Motor

When a current is passes through the wire, circular lines of force are produced around the wire. Those flux lines go in a direction described by the left-hand rule. The lines of force of the magnet go from the N pole to the S pole You can see that on one side of the wire, the magnetic lines of force are going in the opposite direction as a result the wire, s flux lines oppose the magnet's flux line since flux lines takes the path of least resistance, more lines concentrate on the other side of the wire conductor, the lines are bent and are very closely spaced.

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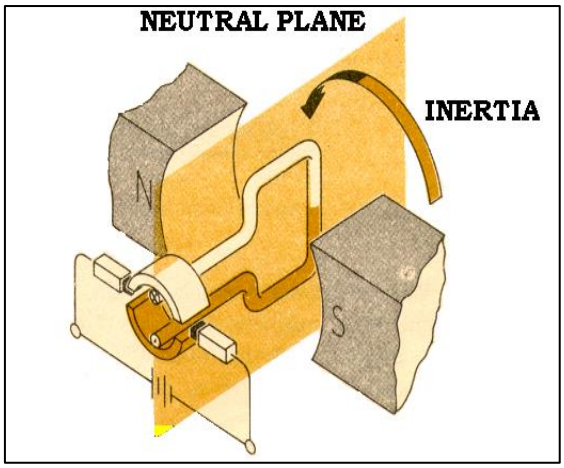

Fig. 6: DC motor

E. Transformer

The 220 volts AC power supply is connected with input terminals of a 12-0-12 step down transformer, which step down this voltage to 12 volts ac. The output terminals of transformer are connected to four diodes for full wave/bridge rectifier. This full wave bridge rectifier rectifies the input voltage to pulsating dc. This dc voltage is used to operate the electromagnetic relay. The 6 volts 100 ohms relay plays the role of twin switch here. The circuit consists of two parts:

– Charging unit.
– Inverter unit.

Two coils are wound over a core such that they are magnetically coupled. the two coils are known as the primary and secondary windings. In a Transformer, an iron core is used. The coupling between the coils is source of making a path for the magnetic flux to link both the coils. A core as in fig.2 is used and the coils are wound on the limbs of the core. Because of high permeability of iron, the flux path for the flux is only in the iron and hence the flux links both windings. Hence there is very little 'leakage flux'. This term leakage flux denotes the part of the flux, which does not link both the coils, i.e., when coupling is not perfect. In the high frequency transformers, ferrite core is used. The transformers may be step-up, step-down, frequency matching, sound output, amplifier driver etc. The basic principles of all the transformers are same.

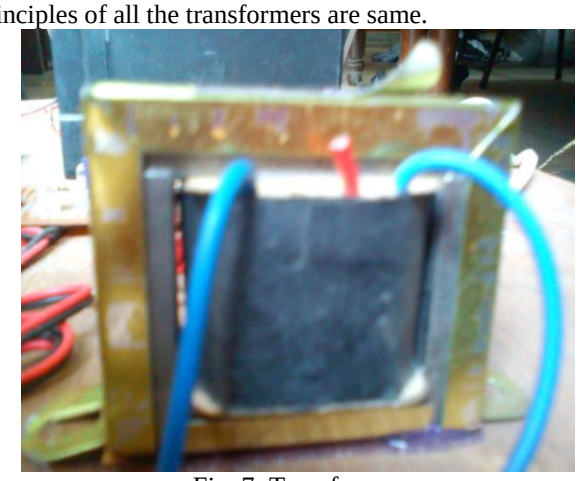
Fig. 7: Transformer

F. Transistor

There are mainly two types of transistor-

1) NPN
2) PNP

1) PNP Type:

This is formed by joining a layer of P type of germanium to an N-P Junction.

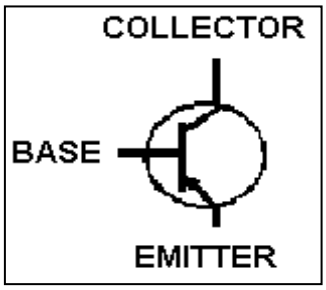

Fig. 8: PNP Transistor

2) NPN Type:

This is formed by joining a layer of N type germanium to a P-N Junction.

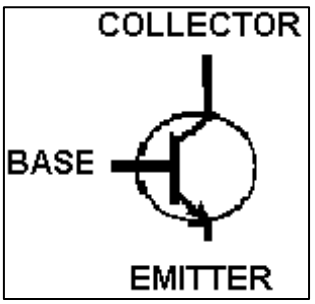

Fig. 9: NPN Transistor

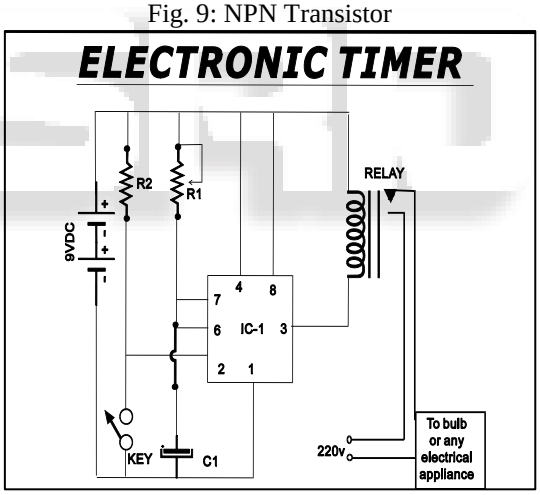

Fig. 10: Electronic Circuit

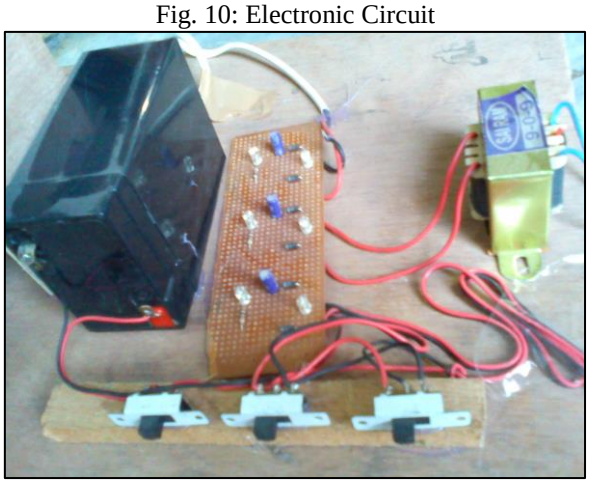
Fig. 11: Electronic Component

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IV. EXAMINATION OF THE DATA

A. Table of examination of the data

Components	Specification
Size of Solar Plate	6 x 6 cm
Max. power voltage of solar plate	6-8 volt
Max. power current of solar plate	0.3-0.34 A
Semiconductors	IC 1 TIMER
Resistors R1, R2	100 ohm
Capacitor C1	100 mf
9VDC Battery	RELAY (6V) DC,100 W
Volume of sound in microphone	93 db
Transformer	-
Transistor	-
Mass of hybrid car	2 kg
friction	0.5
No. of revolution	60 rev/sec
Radius of wheel	0.0425 meter
Wooden Sheet	10 x 10 cm
Range of sound	1 meter

B. Design Assumptions

1) All losses negligible.
2) There is no friction or eddy current loss.
3) Uniform power distribution to both wheel.

C. Calculation

1) Mass of vehicle, M = 2 kg
2) Weight of vehicle, W = m x g = 21.56 N
3) Coefficient of friction, f = 0.5
4) Force of friction, F = f x W = 10.78 N
5) Number of Revolution, N = 60 rev/min. Number of Revolution, N = 60 rev/sec
6) Angular Velocity, ω = 2 x Π x N Angular Velocity, ω = 6.28 rev/sec
7) Liner Velocity, V = ω x R = 0.2669 m/sec
8) Power P = F x V = 2.877 Watt
9) Radius of wheel, R = 0.0425 m,
10) Torque, T = F x R = 0.45815 N-m
11) Power required to run the vehicle = 2.877 Watt
12) Power produce from solar plate = 3 Watt
13) Power produce from sound energy = 4 Watt
14) Power produce from shocker energy = 3 - 3.5 Watt
15) Distance covered in one minute = 16.014 meter

V. CONCLUSION

In this project non-conventional resources are used for running of hybrid car. There is total 2.877 Watt of energy required to run the vehicle but solar, sound and shocker energies are 3 Watt, 4 Watt and 3.5 Watt. This is greater than the required power. It means non-conventional energy is sufficient to run the vehicle without using conventional resource.

VI. SYMBOLS

M	Mass
W	Weight
f	Coefficient of friction
F	Force of friction
N	Number of Revolution
ω	Angular Velocity
V	Liner Velocity
P	Power
R	Radius of wheel
T	Torque

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