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DESIGN OF 2WH HYBRID ELECTRIC VEHICLE USINGMATLAB-SIMULINK

[1]Aarti Balasaheb Bolij, [2]Sanketan Ashok Mohate, [3]Mrunmai Balasaheb More, [4]Anniruddha Karnasaheb Chavan, [5]Sachin Ganeshrao Phiske, [6]Atul Pawar

[1] UG Scholar Dept. of Electrical Engineering S.N.D.C.O.E.& R. C. Yeola-Nashik, Maharashtra
[2]UG Scholar Dept. of Electrical Engineering S.N.D.C.O.E.& R. C. Yeola-Nashik, Maharashtra
[3]UG Scholar Dept. of Electrical Engineering S.N.D.C.O.E.& R. C. Yeola-Nashik, Maharashtra
[4]UG Scholar Dept. of Electrical Engineering S.N.D.C.O.E.& R. C. Yeola-Nashik, Maharashtra
[5]Asst. Prof., Dept. of Electrical Engineering S.N.D.C.O.E.& R. C. Yeola-Nashik, Maharashtra

ABSTRACT- With the rising gap between the supply and demand of oil and the market monopoly of the countries with oil reserves, the world has turned its back on traditional fuels. Not to mention the everyday risingpollution.The development of electric vehicles is at its pinnacle right now, and new discoveries are bein g developed in this field much like in the industries and the major participants in the market.Despite the fact that twowheelers make up a significant portion of global transportation and receive less study attention than four-wheelers, two-wheelers are still an important mode of transportation.

Our effort brought attention to this issue by developing a simulation model of a twoparallel hybrid electric vehicle.

Index Terms- 2wh vehicle, MATLAB-Simulink Software, Sensors

I. INTRODUCTION

Recently, there has been an increase in research into creating clean, sustainable energy sources for driving ma chinery and generating electricity as a result of the global attraction to non-traditional power sources.

The decrease in resource availability and obvious environmental changes are to blame.The mode of transporta tion is one of the elements that contributes the most to both of these factors.A conventional internal combusti on engine and an electric motor that draws power from a battery combine to power hybrid electric vehicles, or HEVs. The best aspects of internal combustion are combined in HEVs. engines (ICEs) and electric motors (EMs) for high fuel economy and low emissions. Hybrid vehicles can run with much less emission and use 40 % less fuel than the average new vehicles in the same class. The modern hybrid vehicles can now store the electrical energy from the regenerative braking and also from the electrical plug-in at parking locations using renewable energy to recharge the batteries. Many HEVs now can eliminate the idle emissions by shutting down the ICEs at idle and restarting them when needed. [1] Electric vehicles are by many seen as the cars of the future as they are high efficient, produces no local pollution, are silent, and can be used for power regulation by the grid operator. However, electric vehicles still have critical issues which need to be solved. The three main challenges are limited driving range, long charging time, and high cost. The three main challenges are all related to the battery package of the car. The battery package should both contain enough energy in order to have a certain driving range and it should also have a sufficient power capability for the accelerations and decelerations. [14].The reason is the decrease in the number of resources

II. METHODOLOGY

The enhancement of fuel efficiency and the reduction of pollutants are two key issues in vehicle engineering. In order to work together on breakthrough car technology, the automotive industry and governments in the US, Europe, Japan have developed strategic initiatives.Several "nontraditional" options, including electric vehicles (EV), hybrid electric vehicles (HEV), and fuel cell vehicles (FCV), have been put forth throughout the years. Since they match strong performances in terms of both consumption and reliability, AEV appears to be the onl y potential technology capable of satisfying the market demands.In a typical vehicle, the power needed by the e ngine may be determined by knowing the loaded mass, desired maximum acceleration, and maximum climb. Consequently, maximum speed, predicted fuel consumption, and emissions while operating in various conditio ns (speed, climb, etc.)

III. BLOCKS USED FOR SIMULATION

3.1 Battery -

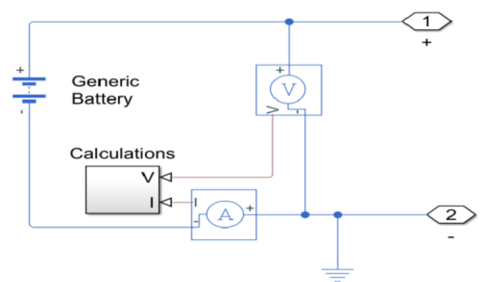

Fig.1- Battery

This block provides the necessary power needed to work to the system which then calculates the voltage and current by using the current and voltage coming through the battery.

3.2 DC-DC bidirectional converter -

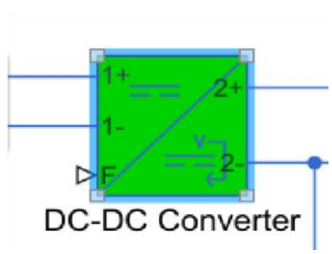

Fig.2- DC-DC bidirectional converter

The Bidirectional DC-DC Converter block represents a converter that steps up or steps down DC voltage from either side of the converter to the other as driven by an attached controller and gate-signal generator.

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Bidirectional DC-DC converters are useful for switching between energy storage and use, for example, in electric vehicles. The Bidirectional DC-DC Converter block allows you to model a non-isolated converter with two switching devices, an isolated converter with six switching devices, or a dual active bridge converter with eight switching devices.

3.3 Motor and Generator -

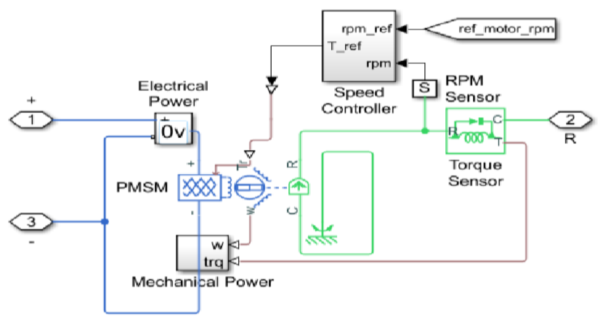
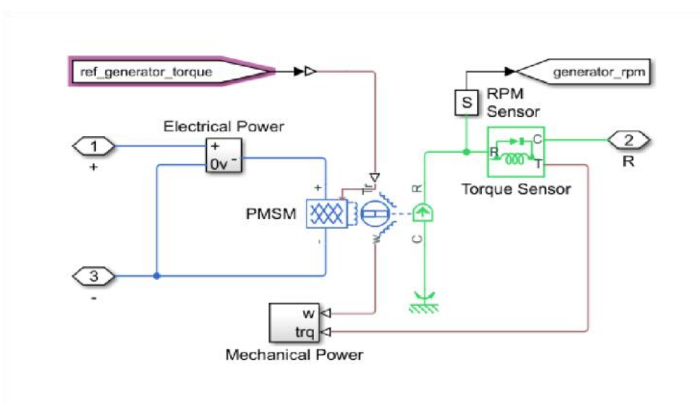


Fig.3- Motor and Generator

The block must be connected to a DC supply network. If you model losses using the Single efficiency measurement option, the electrical losses are the sum of a constant term plus two additional terms that are proportional to the square of the torque and the square of the speed respectively. For all losses modeling options, the supply series resistance is not included as part of the efficiency calculation. The block produces a positive torque acting from the mechanical C to R ports. The speed controller block uses the reference speed and rotor rpm to control the speed



The generator has a similar resemblance to the motor but just the change is that the power given to the generator is by the IC engine which provides a torque that is converted into the electrical energy and then provided to the motor and drives block which is then converted into the electrical energy which is fed to the dc-dc converter to charge the battery. A mechanical block is provided to calculate the power of a generator as well

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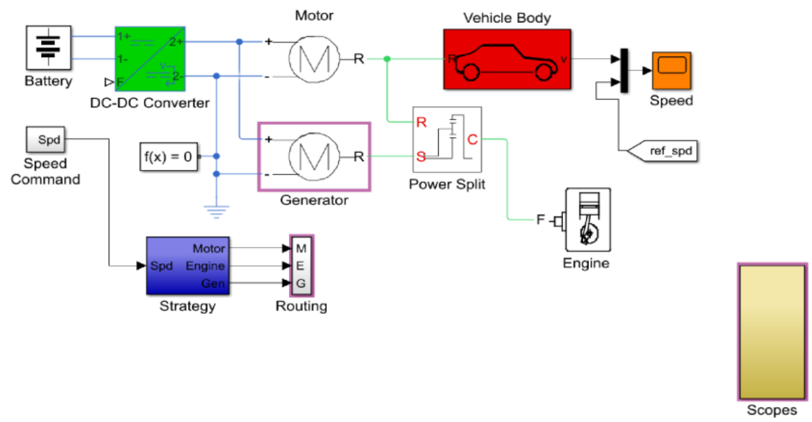
IV. SIMULATION AND WORKING PROPOSED SYSTEM



V. CONCLUSIONS

This leads us to the conclusion that we were successful in creating a hybrid electrical vehicle model in MATLAB/Simulink that may be used to minimise emissions and increase fuel efficiency.A successful design for a petrolelectric hybrid vehicle system that can cover half the distance on electricity is one that is economical and environmentally benign.This paper offers a substitute for traditional cars that preserv es the system's current architecture.It also satisfies the need for vehicle hybridization, which lessens a ve hicle's reliance on conventional fuels.Due to the IC engine's ability to charge the batteries and its smaller size compared to a normal car, the system is self-sufficient. The effectiveness of simulation

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