DEVELOPMENT OF PETRO-ELECTRIC VEHICLE

[1]Harsha B S, [2]Manjunath R, [3]Manoj S K, [4]Niranjan N, [5]Mahesh L

[1, 2, 3, 4]Student, [5]Associate Professor

School of Mechanical Engineering, REVA University, Bengaluru-560064, Karnataka, India

Abstract **-** In automobile sector, the need for alternative fuel as replacement of conventional fossil fuel. Present transportation contributes large amount of energy consumption and emission of pollutants. In our project hybrid vehicle technology, has been fabricated, with the power split configuration having internal combustion engine and battery power source. Like electric vehicle and Hybrid vehicle, are those which can run two or more power source. The performance of hybrid electric vehicle is done with battery of higher amp-hr. this technology overcome many demerits. The most preferred hybrid pairs are electric and fossil fuels. Different cases have been observed with different charging and discharging of battery. Hybrid electric vehicles are admired because of their ability to achieve related performance to a standard automobile while prominently improving fuel efficiency. In HEV's electric motor use in traffic and city conditions. Thus, the vehicle is best suited for growing in urban areas with high traffic. So, motivate us to interface the controller in hybrid electric vehicle. An improving effect can be visualized from the simulation results

Index Terms **– Battery, Complex Hybrid, Emission, Flange, Motor.**

I. INTRODUCTION

. Several economic and environmental factors are contributing to increasing interest in alternative vehicle technologies. These factors include rising global demand for oil, Concomitant increases in fuel prices and anthropogenic climate change. Rising global demand for oil has both economic and political consequences. The invention of internal combustion engine is one of the greatest inventions of mankind. The conventional vehicles with ICE provide a good performance and long operating range. However, they have caused and continue to cause serious problems for poor fuel economy, environment pollution and human life. Reducing fuel consumption and emissions is one of the most important goals of modern design. The hybridization of a convectional combustion engine vehicle with an advanced electric motor drive may greatly enhance the overall efficiency and achieve higher fuel with reduced emissions. Considering the urban status in India, a well-organized and fuel-efficient scooter has to be designed and developed. [Internal combustion engines are relatively less efficient in converting the on-board fuel energy to propulsion as most of the energy is wasted as heat. On the other hand, electric motors are efficient in converting the stored energy in driving a vehicle, and electric drive vehicles do not consume power while coasting. Some of the energy loss in braking is captured and reused by regenerative braking. With the help of regenerative braking one fifth of the energy loss can be regenerated.

II. LITERATURE SURVEY

Internal combustion engines are relatively less efficient in converting the on-board fuel energy to propulsion as most of the energy is wasted as heat [1]. On the other hand, electric motors are efficient in converting the stored energy in driving a vehicle, and electric drive vehicles do not consume power while coasting. Some of the energy loss in braking is captured and reused by regenerative braking [2]. With the help of regenerative braking one fifth of the energy loss can be regenerated. Typically; petrol engines effectively use only 15% of its fuel content to move the vehicle [3]. Whereas an electric drive vehicle has an on-board efficiency of about 80%. But due to reasons such as cost, inability to reach higher speeds electric drive vehicles failed to capture markets. Contrary to this petrol vehicles can cover longer distances with higher speed but it cannot cover shorter distance with slow speed (say in traffic) in an efficient way. By increasing the range of electric vehicles, they could easily capture the automobile industry. Hybrid technology is the most promising technology that could be implemented for increasing the EV range as current electric vehicle industries are switching towards this concept for increasing the vehicle range [4]. The concept of Electric- Electric hybrid system which incorporates two separate Brushless DC motors for its propulsion [5].The Brushless DC (BLDC) motors are fixed to the Hub of both front and rear wheel. The reason for choosing BLDC motor is its compactness, noiseless operation and motor generating principle [6-7].

III. OBJECTIVES AND METHODOLOGY

In this work, it has been proposed to increase the power transmission by coupling internal combustion engine and electric motor and improve the fuel economy of hybrid bike in comparison to conventional bike. Since petroleum is limited and will someday run out of supply. In the arbitrary year 2030-2040, an estimated one billion petroleum-fueled vehicles will be on the world's roads. Gasoline will become prohibitively expensive. The world needs to have solutions for the "400 million otherwise useless". So, year 2030-40 "Gasoline runs out year" means, petroleum will be no longer be used for personal mobility

A market may develop for solar-powered EV's of the size of a scooter or golf cart. Since hybrid technology applies to heavy vehicles, hopefully being able to push these vehicles up to 70 miles to the gallon. General Motors is already looking to develop their new hybrid to that 70-mile mark in 2010, and may be able to push that number even higher

If hybrid can use Lithium-Ion batteries, then cars or two-wheelers can accelerate faster to higher speed, be even more efficient, and would be able to lengthen the distance between fill-ups. Not only would those advantages be available, new hybrids would be much more affordable to consumers, and hopefully would solve a lot of problems. Especially since, as it stands, most of the battery pack used in current hybrid could be much more efficient, but there is always room for improvement.

90% of the hybrid cars & two-wheelers on the market today could easily be more efficient, although zero emission won't be possible, seeing as how hybrid still require gasoline. So, even though the hybrid you want may not be available yet, there is hope no matter what. As long as consumer are willing to buy hybrids now, these advances will be more affordable, as soon you could be enjoying your very own Volkswagen Beetle Hybrid with close zero emission and plenty of room for that walking stick you had to bring camping with you.

A parallel hybrid is propelled by both an internal combustion engine (ICE) and an electric motor connected to a mechanical transmission. Power distribution between the engine and the motor is varied so both run in their optimum operating region as much as possible. There is no separate generator in a parallel hybrid. Whenever the generator's operation is needed, the motor functions as generator. In a parallel mild hybrid, the vehicle can never drive in pure electric mode. The electric motor turns on only when a boost is needed.

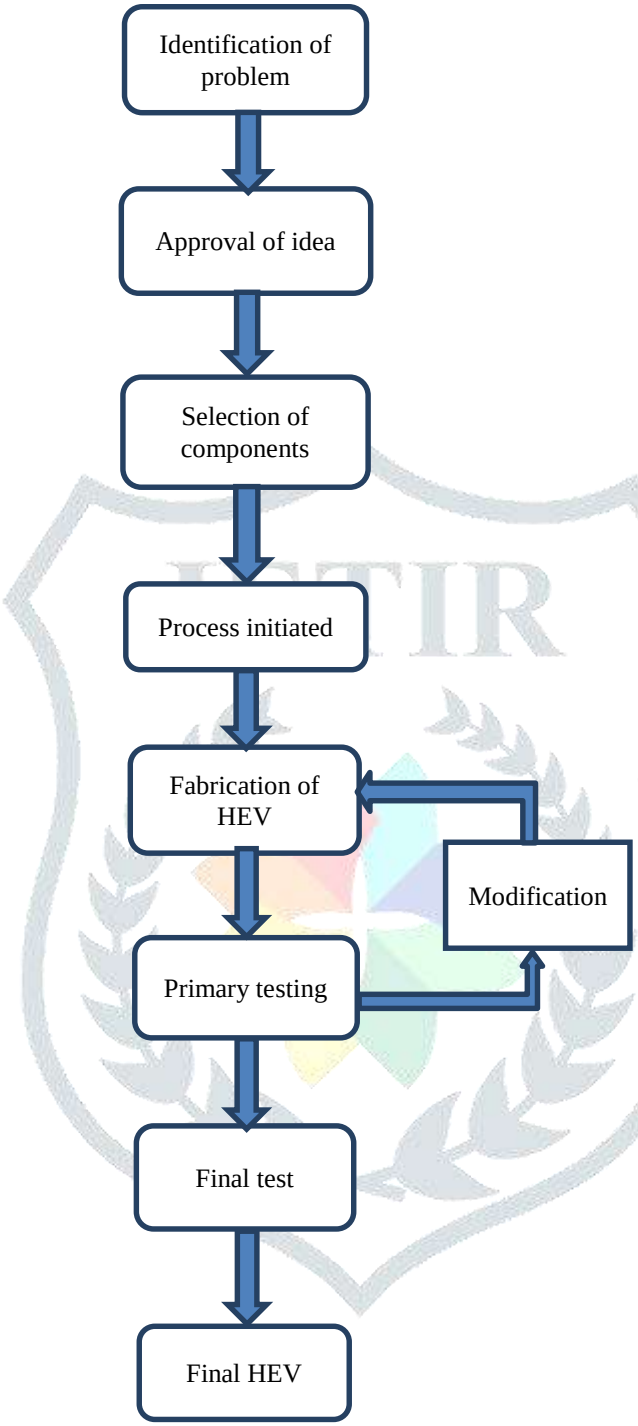

Fig.1.Block diagram showing objectives and methodology.

The objectives and methodology of the project work has been presented in the form of a block diagram as shown in Fig.1.

IV. WORKING OF HYBRID VEHICLE

Modifying of existing scooters into hybrid electric which runs on internal combustion engine and configuration of mild hybrid vehicle concept is shown in the Fig.2.

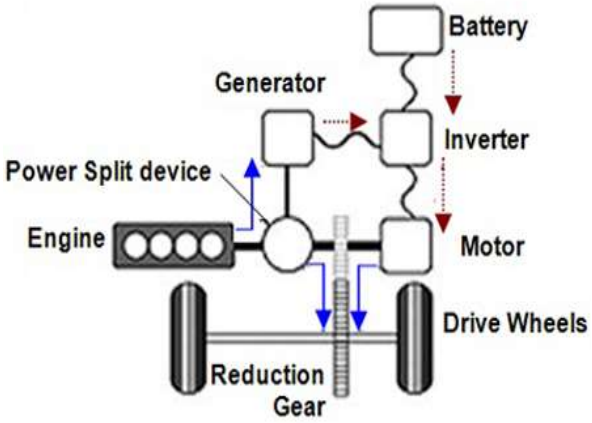

Fig.2 Parallel mild hybrid

Fig.3 shows installation of BLDC motor to scooter which has engine capacity of 110cc. Here scooter with engine capacity of 110cc petrol internal combustion engine is used. Also, the rear wheel gets an electric BLDC motor with the help of a flange plate and L-shaped angle plates. Flange plate used to connect rear wheel and the electric motor shaft which operated by electric power, the motor shaft placed as the rear wheel axis, the motor held by welding to motor collar to L-shaped angle plate to scooter chassis. It becomes a 2-wheel drive scooter with the conventional engine powering the rear wheel and electric motor driving the rear wheel. A conventional engine is pretty inefficient during start-stop traffic. The engine uses a lot of fuel during such situations and reduces the mileage significantly. By using economy mode for these in which scooter will start and run-on BLDC electric motor. Hub mounted electric motor works during crawling traffic and does not need the fuel.

Fig.3 BLDC motor installation

Electric motors are much more efficient as they do not draw any power from the battery while waiting in traffic and idling. Second mode is power drive mode. In this case, scooter will start and run-on Conventional ICE, which is coupled with the rear wheel. This mode can be used for emergency condition when batteries are completely discharged or if there is any problem in motor. The third mode is hybrid mode.

In proposed system BLDC motor with 500W capacity and 2 lead acid batteries in series are used. Each has capacity of 12 volts. For controlling acceleration of ICE as well as motor same controller is used. Here two control units are used. One is BLDC motor controller which acts as a mediator for motor, accelerator, brake system and battery. Another control unit acts as a mediator for BLDC motor controller, IC engine and battery. One MCB (Miniature Circuit Breaker) is used for protection purpose.

To obtain good average, Lithium-ion batteries are required. For cost cutting purpose we are using lead-acid batteries. To obtain good speed and torque, high wattage BLDC motors are required to be used. The main aim is to increase power and to improve performance efficiency of existing vehicles. When the battery has less charging, to increase the overall mileage is achieved by combining power of both that is IC engine and hub motor. During starting, as batteries are not used hence, life and performance of battery will improve.

IV. RESULTS AND DISCUSSION

After assembly of all the components the vehicle was tested as a whole for all the modes of the vehicle and the following results were obtained and are tabulated as follows.

Table.1.Comparisons on Vehicles

Parameters	Conventional bike	Hybrid bike	Electric bike
Fuel source	Most of them Petroleum based fuel	Electricity & Fossil fuel (Petrol & Diesel)	Electricity Through Battery Pack (DC)
Engine	Internal combustion engine (ICE)	Internal Combustion Engine (ICE) and Electric Motor(s)	Electric Motor(s)
Fuel Efficiency	cars, scooters and motorcycles being typically 24 %, 9 % and 12 % respectively	Combination of Internal Combustion Engine & Battery Range (Higher)	Depends on Battery Range (Comparatively Less)
Emission Levels	Higher	Higher Compared to Electric bike	Lower Compared to ICE and Hybrid
Price Range	Lower (compared to electric and hybrid)	Higher Than Conventional Internal Conventional Cars	High
Charging	Not needed	Not Needed	Needed

Efficiency- The motor and the engine average efficiencies of the vehicle were tested individually and were compared with their corresponding maximum efficiencies. We can see an increase in the total efficiency of 40.8% in the Hybrid system. Energy Management System-has been developed successfully which can make decisions based on speed to obtain maximum mileage and reduce fuel emissions.

Emission of CO_2 in an IC engine is maximum in the speed range of 0 kmph-20kmph, as the motor is being used in this range, the emissions are negligible. The emissions are least in the speed range of 20-40, and the vehicle majorly runs in this range, hence it significantly decreases the emissions.Cost Analysis & Distance-The Table.1 shows the comparison between petrol bike, electric bike and hybrid bike tested under normal conditions. By absorbing the table, we can clearly say that the amount of fuel consumption using the hybrid vehicles will be less

V. CONCLUSION

The technology of hybrid Petro-electric bikes is an emerging field in now a day and the total turn one on these types of vehicles very profitable for the future and also solves the issue of natural resources scarcity and is an eco-friendly bike. This type of vehicle is very cost effective for middle-class families. The mileage of the bike is increased from 60 to 90 km for 1 liter of gasoline. This hybrid bike will be a new innovation in automotive era, it is more eco-friendly because it causes less pollution. The hybrid bike is a better solution for hiking fuel cost day to day.

Hybrid-electric vehicles (HEVs) combine the benefits of gasoline engines and electric motors and can be configured to obtain different objectives, such as improved fuel economy, increased power and additional auxiliary power for electronic devices and power tools.

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