Review On Copmarison of Hybrid Electric Vehicles Over Conventional Vehicles

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Abstract **- Conventional vehicles play an important in transportation in ancient times. As they run on fossil fuels emission of CO2 and various hazardous gases takes place which gets converted into environmental pollutants. But nowadays the cost of fossil fuels is increasing day-by-day due to limiting reserves. In such case Hybrid vehicles play an important role to improve efficiency and reduce hazardous pollutants. Hybrid vehicles are vehicles that can run on fossil fuels and batteries. This review paper focuses on the comparison characteristics between conventional and electric vehicles. The comparison characteristics include maximum fuel economy, minimum fuel emission, minimum propulsion cost.**

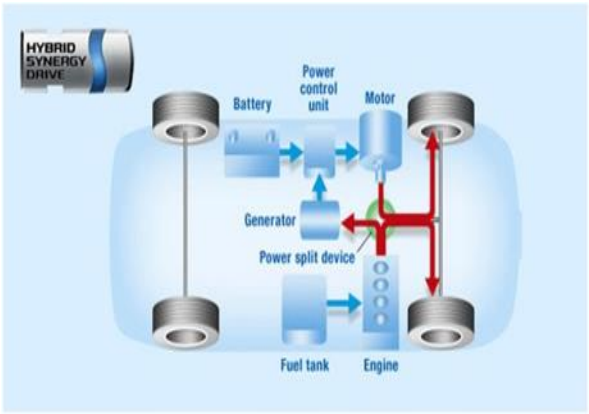
Index Terms **- Hybrid vehicle, Toyota prius, Toyota yaris, Fuel economy, conventional vehicle.**

INTRODUCTION

In this 21st century due to a decrease in reserves and increase in prices and the need of an hour is to switch to hybrid vehicles. Conventional vehicles run on fossil fuels which emit hazardous environmental pollutants. Therefore hybrid vehicles play a vital role to reduce emissions and help to improve efficiency. A hybrid vehicle is a vehicle that uses two or more propulsion. For power transmission, gasoline and electric motor are used for the most hybrid engine. There are three types of hybrid engines series, parallel, mixed types. Hybrid vehicles have some important basic components which directly affect the coil, performance, and weight, etc. These components give better performance as compared to conventional vehicles considering cost factors. The main components of hybrid vehicles are electric motors, controllers, hybrid power units, electric energy storage systems, transmission systems. All the above-mentioned components are based on electric energy. This paper reviews the current scenario and explains the advantage of hybrid over conventional vehicles.

LITERATURE REVIEW

[1] Karan C. Prajapati, Ravi Patel, Rachit Sagar investigated hybrid technology. This paper discusses various technologies used in the manufacturing of hybrid cars like "Hybrid Solar Vehicle", "Hybrid Electric Vehicle", and "Plug-In Hybrid Electric Vehicle". The authors explain the technologies and their functions, drawbacks, and the efficiency of hybrid vehicles. The author considered the case studies on the Toyota Prius series, Astrolab, etc. considering the fuels and raw materials for the Hybrid vehicles. The paper concludes by discussing the superiority and drawbacks of this Hybrid vehicle and future trends of the Hybrid vehicle and explaining the alternative solution for petrol and diesel.



[5] Diagram of Toyota Hybrid System

[6] Astrolab Car – Venturi Automobiles

[2] Diego Sanchez-Repila, John Edgar William Poxon researched on Hybrid Electric Vehicles (HEV's). The paper discusses fundamental cost and development within the area of HEV's to show the role that this technology plays in the current automotive market. The paper discusses the advantages and disadvantages of vehicle technology in detail. The paper focuses on the current scenario and future market projections of HEV's. It discusses the opinions of researchers and automotive companies that will be taken into account to predict which will be the leading technology trends in the future.

[3] F Orecchini, A. Santiangeli, F. Zuccari, F. Ortenzi, A. Genovese, G. Spazzafumo, L. Nardon researched on comparison of energy consumption for Electric Hybrid Vehicle and Conventional Vehicle in real drive condition. The authors considered the comparison between the hybrid vehicle Toyota Yaris and conventional Toyota Yaris 1.5 gasoline on a road of the urban and extra-urban area and motorway area. According to the test, the results were analyzed. All the results which were found were based on road data and consumption of fuel and according to the traffic section for this experimental comparison, they tested all the technical characteristics of both versions of the car. After comparison, they found some change in characteristics between both cases. They considered some test paths according to the presence of traffic on the road. After surveying traffics in a different area they made five sections for testing of the cars. According to the road conditions they created the result and analysis of the two vehicles considering the effect on the performance of the vehicle, driving style, and energy consumptions. They concluded on the result and analysis that the Hybrid Vehicle shows a positive and strong influence on consumption and style and speed as compared to the conventional vehicle.

[4] Imdat Taymaz, Merthan Benli researched on emission and fuel economy of Hybrid vehicles. In this paper the importance of fuel economy is highlighted to achieve this, new technologies are being introduced and this technology is discussed in this paper. Hybrid vehicles are in great demand by considering their fuel economical nature. Lots of computer software are available which can determine the performance level of hybrid vehicles in more than one area. The hybrid vehicle consists of electrical energy and fossil energy sources. Series, parallel, and mixed are the three types of hybrid systems. In a series hybrid drive system, there is no mechanical connection between the internal combustion engine and wheels. In a parallel hybrid vehicle drive system, the I.C engine and electrical engine are both connected to the wheels. The mixed hybrid system combines both the series and parallel system. In this paper, there is a comparison between conventional commercial vehicles and two separately designed hybrid vehicles. The main comparison points are the radius of the wheel, speed of the vehicle, dynamics of vehicles, torque and rpm of respective IC engines, etc. Mixed hybrid vehicles are designed with four driving modes as acceleration, normal driving, deceleration with regenerative braking, and battery charging with ICE.

CONCLUDED SUMMARY

[1] The author concluded that hybrid car does not use energy during idling state as they use less energy as compared to the petrol engines at low speeds. At lower speeds, it has the advantage that it does not emit smog. At lower speeds, the car runs on the electric motor, and at cruising speed it runs on an IC engine. They offer more mileage as compared to conventional cars. Noise pollution and CO2 emissions are reduced. But the hybrid vehicles are more expensive than conventional cars and are more complex in construction and working than IC engine cars, offer larger repair bills, the capacity of batteries is not much advanced.

[2] The author concluded that the US market is suffering due to the rise in fuel prices. Two alternatives can be the solution to the current scenario which are HEVs and diesel vehicles. Due to the growing restrictions on CO2 emissions HEVs are the dominant solution. As the diesel vehicles sales are approximately 1 to 2 % of the market share due to its historical issues of the technology. For this reason, it

was important to go for the HEVs for car manufacturers. General Motors is currently the third biggest manufacturers of HEVs in the world behind Toyota and Honda. In automotive development due to the flexibility of the technology HEVs hold a strong position in the future market. The current configuration of the Hybrid Vehicle (electric motor and ICE) is strongly influenced by the legislation, but future HEVs could deal with biodiesels or fuel cells. A good example of green energy is the generated braking energy which can be considered as an advantage while the current driving conditions are optimized regardless of the future choices of energy storage devices.

[3] In this paper author concluded that according to the comparison of (Yaris & Prius) vehicles with speed values from higher to lower concerning traffic conditions and how they give the benefits to passengers. Hence by considering all the aspects Hybrid electric vehicles having more engine efficiency concerning the conventional vehicles. Also, the author researched result analysis and experimental analysis for hybrid electric vehicles having greater efficiency of braking power, recovery system, the mass of vehicle and operation of vehicles these factors are directly or indirectly effects the performance of the vehicles. By environmental precaution, Hybrid electric vehicles emit very little CO2 than conventional vehicles. Hybrid electric vehicles give better results than conventional vehicles.

[7] Toyota Yaris Hybrid

[8] Toyota Prius Hybrid

[4] In this research paper author concluded that for the evaluation of hybrid vehicles the simulation code is used for research and design tools. By considering all the limitations and results according to simulation codes mixed hybrid vehicles having more weight than a conventional vehicles. But the fuel emission and CO2 emission are reduced by nearly 30 % of hybrid vehicles as compared to conventional vehicles. Hence if HEV impacts fuel cost then it will be convenient for the passengers. Hence by optimization of the HEV Engine design then it will be more suitable for operational parameters as well as more convenient than the conventional vehicles

CONCLUSION

Hybrid Vehicles are the best alternative for future market trends. As it reduces the CO2 emission as compared to the conventional vehicles. Therefore it has better performance characteristics as compared to conventional vehicles. From the above comparison of the Hybrid Electric vehicle and the conventional vehicle, it has been proved by the analysis and result that the Hybrid electric vehicles show good performance characteristics in fuel consumption and efficiency of the vehicle.

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