iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 6 **Issue:** IV **Month of publication:** April 2018

DOI: http://doi.org/10.22214/ijraset.2018.4002

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887
Volume 6 Issue IV, April 2018- Available at www.ijraset.com

To Increase the Efficiency of Hybrid Engine on the basis of Green Manufacturing

Kushagra Agrawal[1], Varun Sharma[2], Mrs. Neha Verma[3]
[1, 2, 3,] *Department Of Mechanical Engineering, Shri Shankaracharya Institute Of Professional Management And Technology Mujgahan, Raipur*

Abstract: ***The studies for Hybrid Electrical Vehicle (HEV) have attracted considerable attention because of the necessity of developing alternative methods to generate energy for vehicles due to limited fuel based energy, global warming and exhaust emission limits in the last century. Hybrid Electrical Vehicle incorporates internal composition engine, electric machines and power electronic equipment. In this paper, an overview of Hybrid Electrical Vehicle is presented. In fact, we aim to introduce the Hybrid Electrical Vehicle and present their history, advantages, disadvantages, classification, vehicle types, energy management strategies and some other related information to increase the engine efficiency of the vehicle. The methodology used in this paper is descriptive, library and analytical. The descriptive aspect of this paper is based on identification and definitions and its required materials and information have been complied using related scientific papers.***

I. INTRODUCTION

A hybrid car is an automobile that has two or more major sources of propulsion power. Most hybrid cars currently marketed to consumers have both conventional gasoline and electric motors, with the ability to power the vehicle by either one independently or in tandem. These vehicles are appropriately termed gas-electric hybrids. Other power sources may include hydrogen, propane, CNG, and solar energy. The technology used depends on the goals set for the vehicle, whether they be fuel efficiency, power, driving range, or reduced greenhouse gas emissions. Consumer oriented hybrid cars, which have been on the market for about ten years, are usually tuned for reduced emissions and driving range. Additionally, owners of hybrid vehicles often enjoy social benefits such as prestige and discounted secondary services. Some Chicago hotels as well as hotels in other cities give parking discounts to people driving hybrid cars. Corporate and government fleets that have been in service for twenty years or more are usually tuned for fuel efficiency, often at the cost of driving range, power, and hydrocarbon emissions.

A gasoline-electric hybrid car has one or two auxiliary electric motors that supplement the main gasoline engine. Compared to conventional automobiles, the gasoline engine in a gas-electric hybrid is smaller, less powerful, and more efficient. Although the gasoline engine alone would be sufficient to power the vehicle under most circumstances, during maneuvers requiring unusually high power the electric motor is used as well. These conditions include passing, hill climbing, and acceleration from a standstill. Some hybrid cars, such as the Toyota Prius, shut down the gasoline engine under conditions in which the electric motor alone would suffice, such as coasting and breaking. This is made possible by the super heavy duty electric motor used in the Prius, which is capable of propelling the vehicle from a standstill without the gasoline assist. Thus, in contrast to most other hybrid vehicles, the Prius actually uses the electric motor more than the gasoline engine.

Many of the technologies found in hybrid vehicles would benefit vehicles of any type, including conventional gasoline automobiles. The fuel savings are negligible in comparison Only in tax-subsidized electric and hybrid vehicles are these technologies practical, by the government instead of the manufacturer or consumer. These technologies include regenerative braking, aerodynamic refinements, and lightweight building materials.

II. LITERATURE REVIEW

A. Environment Issues

1) Fuel consumption and emissions reductions

2) Hybrid vehicle emissions

3) Environmental impact of hybrid car battery

Fuel consumption and emissions reductions- The hybrid vehicle typically achieves greater fuel economy and lower emissions than conventional internal combustion engine vehicles (ICEVs), resulting in fewer emissions being generated. These savings are

primarily achieved by three elements of a typical hybrid design Relying on both the engine and the electric motors for peak power needs, resulting in a smaller engine size more for average usage rather than peak power usage. A smaller engine can have less internal losses and lower weight.

Having significant battery storage capacity to store and reuse recaptured energy, especially in stop-and-go traffic typical of the city driving cycle.

Recapturing significant amounts of energy during braking that are normally wasted as heat. This regenerative braking reduces vehicle speed by converting some of its kinetic energy into electricity, depending upon the power rating of the motor/generator; Other techniques that are not necessarily 'hybrid' features, but that are frequently found on hybrid vehicles include:

Atkinson cycle engines instead of Otto cycle engines for improved fuel economy.

Shutting down the engine during traffic stops or while coasting or during other idle periods.

Improving aerodynamics; (part of the reason that SUVs get such bad fuel economy is the drag on the car. A box shaped car or truck has to exert more force to move through the air causing more stress on the engine making it work harder). Improving the shape and aerodynamics of a car is a good way to help better the fuel economy and also improve vehicle handling at the same time.

Using low rolling resistance tires (tires were often made to give a quiet, smooth ride, high grip, etc., but efficiency was a lower priority). Tires cause mechanical drag, once again making the engine work harder, consuming more fuel. Hybrid cars may use special tires that are more inflated than regular tires and stiffer or by choice of carcass structure and rubber compound have lower rolling resistance while retaining acceptable grip, and so improving fuel economy whatever the power source.

Powering the a/c, power steering, and other auxiliary pumps electrically as and when needed; this reduces mechanical losses when compared with driving them continuously with traditional engine belts.

These features make a hybrid vehicle particularly efficient for city traffic where there are frequent stops, coasting and idling periods. In addition noise emissions are reduced, particularly at idling and low operating speeds, in comparison to conventional engine vehicles. For continuous high speed highway use these features are much less useful in reducing emissions.

B. Hybrid vehicle emissions

Hybrid vehicle emissions today are getting close to or even lower than the recommended level set by the EPA (Environmental Protection Agency). The recommended levels they suggest for a typical passenger vehicle should be equated to 5.5 metric tons of CO2. The three most popular hybrid vehicles, Honda Civic, Honda Insight and Toyota Prius, set the standards even higher by producing 4.1, 3.5, and 3.5 tons showing a major improvement in carbon dioxide emissions. Hybrid vehicles can reduce air emissions of smog-forming pollutants by up to 90% and cut carbon dioxide emissions in half.

More fossil fuel is needed to build hybrid vehicles than conventional cars but reduced emissions when running the vehicle more than outweigh this. Environmental impact of hybrid car battery- Though hybrid cars consume less fuel than conventional cars, there is still an issue regarding the environmental damage of the hybrid car battery. Today most hybrid car batteries are one of two types: *1)* nickel metal hydride, or 2) lithium ion; both are regarded as more environmentally friendly than lead-based batteries which constitute the bulk of petrol car starter batteries today. There are many types of batteries. Some are far more toxic than others. Lithium ion is the least toxic of the two mentioned above.

The toxicity levels and environmental impact of nickel metal hydride batteries—the type currently used in hybrids—are much lower than batteries like lead acid or nickel cadmium according to one source. Another source claims nickel metal hydride batteries are much more toxic than lead batteries, also that recycling them and disposing of them safely is difficult. In general various soluble and insoluble nickel compounds, such as nickel chloride and nickel oxide, have known carcinogenic effects in chick embryos and rats. The main nickel compound in NiMH batteries is nickel oxyhydroxide (NiOOH), which is used as the positive electrode.

The lithium-ion battery has attracted attention due to its potential for use in hybrid electric vehicles. Hitachi is a leader in its development. In addition to its smaller size and lighter weight, lithium-ion batteries deliver performance that helps to protect the environment with features such as improved charge efficiency without memory effect. The lithium-ion batteries are appealing because they have the highest energy density of any rechargeable batteries and can produce a voltage more than three times that of nickel–metal hydride battery cell while simultaneously storing large quantities of electricity as well. The batteries also produce higher output (boosting vehicle power), higher efficiency (avoiding wasteful use of electricity), and provides excellent durability, compared with the life of the battery being roughly equivalent to the life of the vehicle. Additionally, use of lithium-ion batteries reduces the overall weight of the vehicle and also achieves improved fuel economy of 30% better than petro-powered vehicles with a consequent reduction in CO2 emissions helping to prevent global warming

C. How hybrid-electric vehicles work

Hybrids-Electric vehicles (HEVs) combine the advantage of gasoline engines and electric motors. The key areas for efficiency or performance gains are regenerative braking, dual power sources, and less idling.

1) Regenerate Braking- drivetrain can be used to convert kinetic energy (from the moving car) into stored electrical energy (batteries). The same electric motor that powers the drivetrain is used to resist the motion of the drivetrain. This applied resistance from the electric motor causes the wheel to slow down and simultaneously recharge the batteries.

2) Dual Power- Power can come from either the engine, motor or both depending on driving circumstances. Additional power to assist the engine in accelerating or climbing might be provided by the electric motor. Or more commonly, a smaller electric motor provides all of the power for low-speed driving conditions and is augmented by the engine at higher speeds.

3) Automatic Start/Shutoff. It automatically shuts off the engine when the vehicle comes to a stop and restarts it when the accelerator is pressed down. This automation is much simpler with an electric motor. Also see dual power above.

D. Summary

Hybrid-Vehicles are produced by industries since many years, but the use of more than one power source for recharging the Batteries is remain untouched. So we will use more than one power source for recharging the battery so that engine efficiency would increase. So we will carry out our project recharging the power source of the hybrid vehicle to increase the efficiency of engine and to make the environment green. This Paper is based on the green manufacturing of hybrid-vehicles as they are used because of following reasons:-

1) Miles per gallo
2) Oil changes less ofte
3) Helps protect the environment
4) Hybrids are smart
5) Hybrids are safer

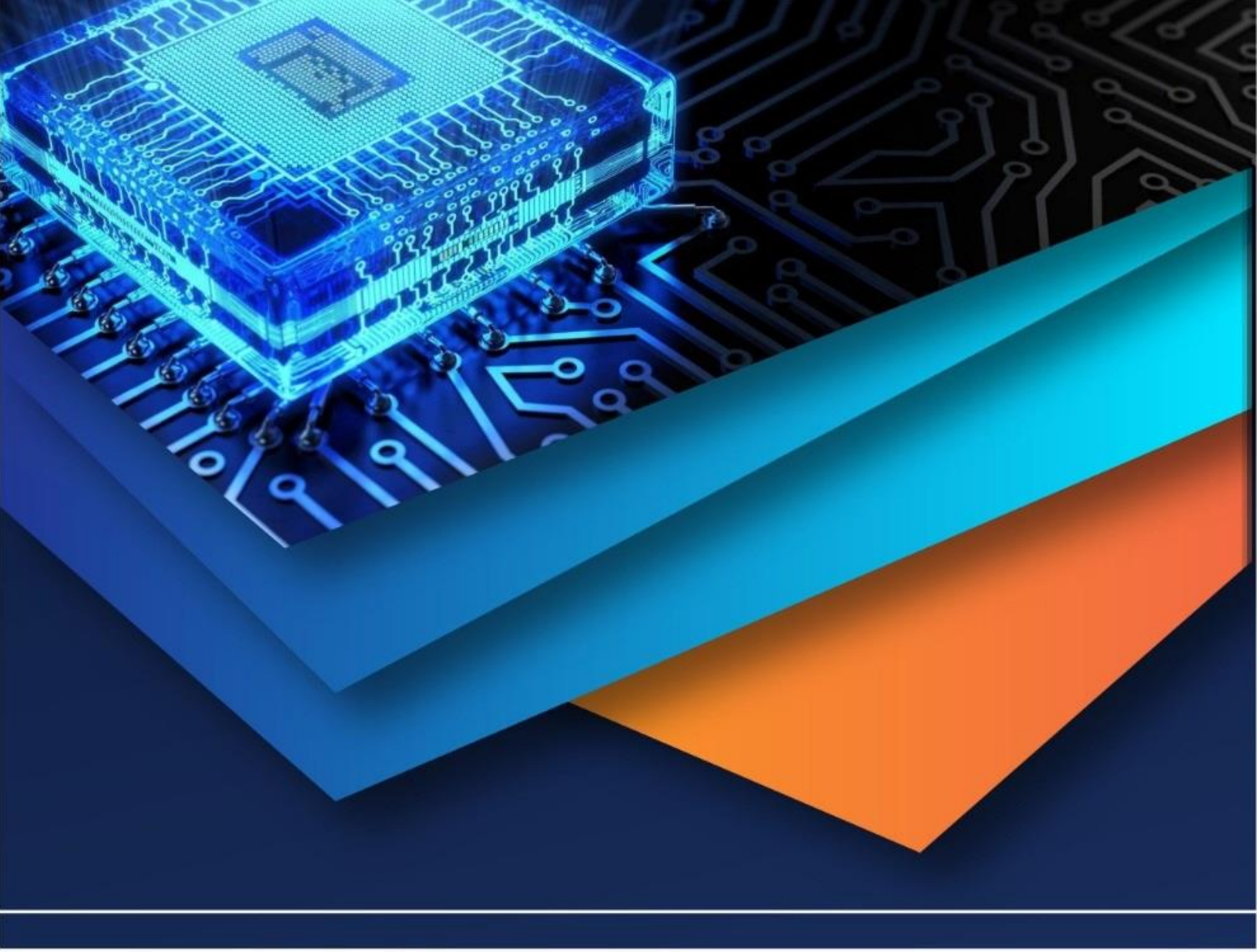
And we will make it more efficient by using multiple power source for recharging the batteries so that it can run further with less consumption of fuel so that our Environment should be green that's why.

III. CONCLUSION

In this paper an overview of Hybrid Electrical Vehicle is presented (HEV) have attracted considerable attention because of the necessity of developing alternative methods to generate energy for vehicles due to limited fuel based energy, global warming and exhaust emission limits in the last century. Hybrid Electrical Vehicle incorporates internal composition engine, electric machines and power electronic equipment. In fact, we aim to introduce the Hybrid Electrical Vehicle and present their history, advantages, disadvantages, classification, vehicle types, energy management strategies and some other related information to increase the engine efficiency of the vehicle And our motive is based on to increase the power source for recharging of batteries in hybrid-vehicles so we can increase the efficiency of the engine. This can be done by using multiple power source like solar panel, Dynamo and Active Wheel.

REFERENCES

[1] Giovanni Azzone, Giuliano Noci, (1998) "Identifying effective PMSs for the deployment of "green" manufacturing strategies", International Journal of Operations & Production Management, Vol. 18 Issue: 4
[2] N. Jalil, N.A. Kheir, M. Salman, (1997) "A rule-based energy management strategy for a series hybrid vehicle", American Control Conference
[3] Karan C. Prajapati, Ravi Patel, Rachit Sagar, (2014) "HYBRID VEHICLE :A STUDY ON TECHNOLOGY", International Journal of Engineering Research & Technology (IJERT)
[4] S. Matsumoto, (2005) "Advancement of hybrid vehicle technology", Power Electronics and Applications.
[5] Chen Zhang, Ardalan Vahid, (2010) "Real-time optimal control of plug-in hybrid vehicles with trip preview", American Control Conference (ACC
[6] https://www.google.co.i
[7] https://en.wikipedia.org



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY