

Efficient Hybrid Moped



Engineering

KEYWORDS :

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ABSTRACT

In automobiles, alternative fuel as replacement of conventional fuel is used, due to its depletion and amount of emission, and has given way to Electric, CAT vehicles. The gap between current technology and zero emission vehicles can be bridged by hybrid technology. Hybrid vehicles are those which can run on two or more fuels. This technology maximise the advantages of two fuels and minimise disadvantages of the same. Best preferred hybrid is electric and fossil fuel. Here, I explored hybrid technology in two wheeler. This paper deals with an attempt to make a hybrid with electric start and petrol run.

INTRODUCTION

Hybrid technology is a need of the future which exhibits a variety of dynamical phenomena as it uses power of two fuel sources combined into one moped and it has been attracting research interest for many years. It also reduces emissions and is environmental friendly. It uses a combination of a traditional combustion engine that burns fossil fuels and an electric motor. These run in tandem, with the electric motor powering the moped when the combustion engine isn't used. The objective of this paper is to give proper justification to hybrid technology using a two wheeler. As the petrol prices are going to rise with decrease of fossil foil hence it is necessary to find some alternative fuel and until that time conservation of the fossil fuel would have to be done. That is why using hybrid technology in a two wheeler also will lead to saving of petrol and also will emit less pollution than conventional petrol vehicle.

During "Engine Off" period the moped will run by battery power using brush-less DC hub motor, and by doing so it also consumes less running cost as the battery requires recharging after a long time of constant running on motor. Not too much research has been done in this field so far. Hybrid mopeds of high costs have been prepared in the south and a research pa-per has been published on the ongoing process of a hybrid moped.

Thus I have strived to put in our best efforts in the making of this economical and efficient hybrid moped.

CONTENTS

Why does the need arise for us to develop a hybrid vehicle??

Hybrids really do make an Eco impact We can save our environment by using Hybrid Vehicles

- Hybrids are a silent, less stressful way to drive
- A Hybrid can save your money.
- Less Dependence on Fossil Fuels.
- Regenerative Braking System

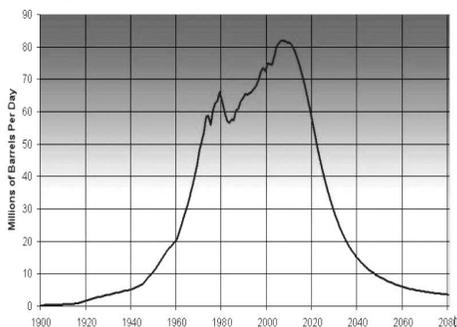
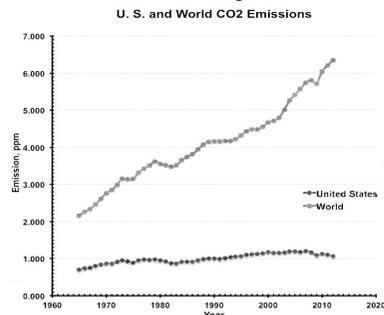


Figure 1: Oil production rate(1900-2080)*

Further answer to this question lies in the graph shown here. The depleting oil reserves in the world is a major concern and so the need arises for us to develop a hybrid moped so that we can conserve as much fuel as possible.



the electric motor to act as a generator, and the electricity from the battery is used to drive the wheels. Although it has a simple structure, the parallel hybrid system cannot drive the wheels from the electric motor while simultaneously charging the battery since the system has only one motor.

SPECIFICATIONS OF HYBRID MOPED

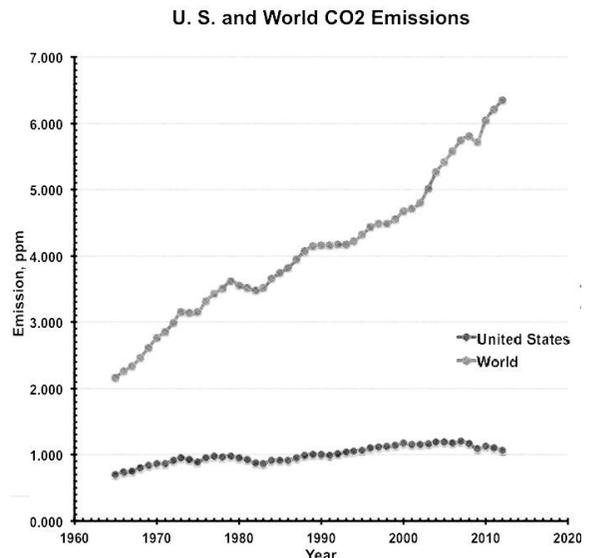


Figure 2: C_o2 emission of world and U.S (1960-2020)

The hybrid tax thus saves 60% more petroleum and 20% more CO₂, then a straight \$10/ton a year carbon tax.

TYPES OF HYBRID SYSTEM**

There are three types of hybrid system :-

- Series hybrid
- Parallel hybrid
- Series-Parallel hybrid

I have used Parallel hybrid system in my study , so first of all i will introduce you all with Parallel hybrid system.

Parallel hybrid system :-

In a parallel hybrid system, both the engine and the electric motor drive the wheels, and the drive power from these two sources can be utilised according to the prevailing conditions. This is called a parallel hybrid system because the power flows to the wheels in parallel. In this system, the battery is charged by switching

Motor	250 W Hub Motor, 48V
Engine	Petrol engine, 3.5Bhp@5500 rpm
Power (motor + engine)	2.25 kw
Engine Transmission	Centrifugally operated automatic CVT
Motor Transmission	Direct transmission
Battery	Sealed lead acid battery, 12V x 4
Kerb weight	90 kg

Figure 3: Specification of hybrid Moped used MOTOR***

The motor chosen for my HYBRID MOPED is “ Brush less Direct Current HUB motor”. In an HEV, an electric traction motor converts electrical energy from the energy storage unit to mechanical energy that drives the wheels of the vehicle. Unlike a traditional vehicle, where the engine must “ramp up” before full torque can be provided, an electric motor provides full torque at low speeds. This characteristic gives the vehicle excellent “off the line” acceleration.

BATTERY

Desirable attributes of high-power batteries for HEV applications are high peak and pulse specific power, high specific energy at pulse power, a high charge acceptance to maximise regenerative braking utilisation, and long calendar and cycle life. Lead acid batteries, used currently in many electric vehicles, are potentially usable in hybrid applications. Lead acid batteries can be designed to be high power and are inexpensive safe, and reliable. We have used 4 such batteries of 12V, 24 Ah each

WORKING OF HYBRID MOPED

- The hub motor is fixed in the front wheel, and it drives the vehicle up to a speed of 25km/h.
- Array of battery powers the motor.
- Once the vehicle crosses the 25 kmph speed, the engine can take over by manually switching it.
- The engine drives up to the max. Speed with conventional petrol engine.
- Now when driving in areas with high traffic or waiting on signals the driver can easily switch to the battery power with the help of a switch provided right above the left side accelerator.
- The batteries are charged through plug in charging. It takes max. 5-6 hrs for the battery to be fully charged. Once fully charged it can easily run for 20-25 kms without having to charge it again.
- The petrol consumption is saved a lot since we work on batteries in the starting period as during that time the fuel con-

sumed is more. Also in traffic areas and waiting on signals saves a lot of petrol by working on batteries.

CONCLUSION

- I proposed and I also confirmed the following results by using a hybrid moped:
- Reduction of noxious emissions in urban environments.
- Energy conservation.
- Reduction in audible noise in urban environments.
- Reduction consumption of petroleum.
- Increase in efficiency.
- Overcome the shortfall of alone battery and gasoline vehicles.

This paper indicates that HEV can probably be designed for both compact and economy platforms meeting performance characteristics.

Customers are familiar with Electric hybrid provide significantly improved fuel economy over CVs as well as reduction in greenhouse and smog precursor emissions and petroleum use. Use of hybrids can save 8.5 million barrels of oil per year.

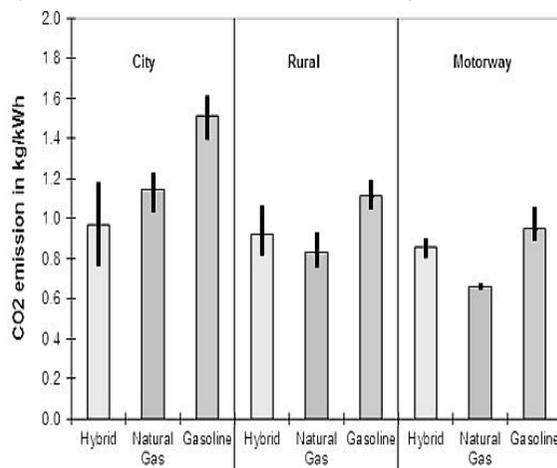


Figure 4: Reduction in C₂ emission using hybrid vehicle

It is clearly seen that hybrid economy ensures a cleaner and more economical solution to the energy crisis. The reserve of Fossil fuels is at dwindling level and this paves the way to introduce alternative fuels into the market. The alternate technologies and fuels are not sustainable and needs further advancement; hence we have to utilise the available technology. Major percentage of automobile on road is two wheelers and so we have developed this method for hybridisation of a moped. We ensure that the present and near future will search for the sustainability of fuel and that for automobile industry will choose hybrid system for its flexibility.

The demerit of hybrid moped is that while running through conventional petrol engine, the motor may get over-running due to high speed of engine than motor capacity. Hence it may lead to back current to controller which may harmful to controller.

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REFERENCE

- (1) <http://www.paulchefurka.ca/Population.html> OIL PRODUCTION RATE* (2) http://en.wikipedia.org/wiki/Hybrid_electric_vehicle TYPES OF HYBRID SYSTEM** (3) https://www.google.co.in/search?tbm=isch&q=emissions+from+cars&oq=&gs_l=MOTOR*** (4) HYBRID SYN-ERGY DRIVE, Toyota hybrid system THS II, TOYOTA.