

GREEN TECHNOLOGY AS AN ALTERNATIVE FUELS IN I.C. ENGINE

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ABSTRACT— The rapid depletion of petroleum fuels and their ever increasing costs by time, not as environment friendly so it have led to an intensive search for alternative fuels. The most promising substitutes for petroleum fuels are the alcohols, propane, biodiesel, electricity. Some alternative fuels are more energy efficient. Methanol (CH₃OH) can be produced from coal, a relatively abundant fossil fuel. Ethanol (C₂H₅OH) can be produced by fermentation of carbohydrates which occur naturally and abundantly in plants like sugarcane and from starchy plants like corn and potatoes. So these are easily available.

As the same way Biodiesel is renewable energy source and can be produced domestically from agricultural oils and from waste fats and oils. With its ability to be used directly in existing diesel engines, bio-diesel reduce our demand on petroleum in the engine. Bio-diesel can be used in diesel engines without modifications and can be blended with petro-diesel fuel effectively.

Propane or liquefied petroleum gas (LPG) is a popular alternative fuel choice for vehicles because there is already an infrastructure of pipelines and storage for its efficient distribution. Propane is produced as a by-product of natural gas processing and crude oil refining. The cost of a gasoline equivalent of propane is generally less, so driving a propane vehicle can save money.

Electricity have lower "fuel" and maintenance costs than gasoline-powered vehicles. Vehicles that operate only on electricity require no warm-up, run almost silently and have excellent performance up to the limit of their range. Also, electric cars are cheap to "refuel."

KEYWORDS- Renewable energy sources, Biodiesel, Blending.

1. INTRODUCTION- Standard fuels like gasoline, diesel etc. are getting depleted day by day due to increasing demand & over consumption of such fuels, their bad effect with environment etc. This reason arises the need for some other fuels which are abundant in nature & can be used as an alternate for standard fuels. So we generally use Methanol, Ethanol, Biodiesel, Electricity, Propane, and Hydrogen and more alternative fuels to minimize these problems. (Referenced by **Internal Combustion Engines** by M.L .Mathur and R.P.Sharma.)



Figure1. Alternative Fuels

2. METHODS- The following methods or types of alternative fuels are used in this era are:

2.2 ALCOHOL- Methanol & Ethanol are alcohol-based alternative fuel produced by fermenting and distilling starch crops or cellulose. Ethanol is most commonly used to increase octane number and improve the emissions quality of gasoline. Ethanol can be blended with gasoline to create E85, a blend of 85% ethanol and 15% gasoline. Ethanol can degrade quickly in water, therefore, posing less environmental harm than oil. Ethanol is an excellent, clean-burning fuel, potentially providing more horsepower than gasoline. In fact, ethanol has a higher octane number (over 100) and burns cooler than gasoline so the damage property of engine is

reduced. One acre of corn can produce 300 gal. of ethanol per growing season.

2.3 BIODIESEL- Biodiesel is a domestically produced, renewable fuel that can be manufactured from vegetable oils, animal fats, or recycled restaurant greases. Biodiesel is safe, biodegradable, and reduces serious air pollutants as particulates, carbon monoxide, hydrocarbons, and air toxics. Biodiesel can also be used in its pure form but it may require certain engine modifications to avoid maintenance and performance problems and may not be suitable for wintertime use. Pure biodiesel, B100, costs about \$3.50--roughly a dollar more per gallon than petro-diesel. Like B80, biodiesel made from blending of 80% of Biodiesel & 20% of Gasoline.

2.4 ELECTRICITY- Electricity can be used as a transportation fuel to power battery electric and fuel cell vehicles. When used to power electric vehicles, electricity is stored in an energy storage device such as a battery. EV batteries have a limited storage capacity and their electricity must be replenished by plugging the vehicle into an electrical source. EVs have lower "fuel" and maintenance costs than gasoline-powered vehicles. Vehicles that operate only on electricity require no warm-up, run almost silently and have excellent performance up to the limit of their range. Also, electric cars are cheap to "refuel." At the average price of 10 cents per kwh, it costs around 2 cents per mile. Pure electric cars still have limited range, typically no more than 100 to 120 miles.



Figure 2. Electricity as an Alternative Fuels

2.5 HYDROGEN- The most attractive features of hydrogen as an I.C. engine fuel are that it can be produced from potentially available raw material water and the main product of its combustion again is water which is not all harmful for environment. Hydrogen can be used in SI engines by 3 methods as By manifold induction, By direct introduction of hydrogen into the cylinder, By supplementing gasoline. Hydrogen can be used in CI engines by 2 methods as by introducing hydrogen with air and using a spray of diesel oil to ignite the mixture that is by the dual fuel mode, by introducing hydrogen directly into the cylinder at the end of compression. The advantages include of hydrogen fuel vehicles that, hydrogen has extremely wide ignition limits. Stoichiometric hydrogen air mixture burns seven times as fast as the corresponding gasoline air mixture. This too is a great advantage in IC engines, leading to higher engine speeds and grater thermal efficiency. Above all it is the cleanest and the most abundant source of energy.

Disadvantage of these are hydrogen has a very low density both as gas and as liquid. Hence, in spite of its high calorific value on mass basis its energy density as a liquid is only one fourth than that of gasoline. As gas it has less than one tenth the density of air and its heating value per unit volume is less than one third that of methane. Hydrogen has to be stored as compressed gas, as liquid (in cryogenic containers) or in absorbed form (as metal hydrides), none of which is as convenient as gasoline storage. Hydrogen has a high self- ignition temperature but requires very less energy to ignite it. Hence, it is highly prone to pre-ignition. (Referenced by Internal Combustion Engines by M.L.Mathur and R.P.Sharma.)

2.6 PROPANE- Propane or liquefied petroleum gas (LPG) is a popular alternative fuel choice for vehicles because there is already an infrastructure of pipelines

and storage for its efficient distribution. LPG produces fewer vehicle emissions than gasoline. Propane is produced as a by-product of natural gas processing and crude oil refining. The cost of a gasoline-gallon equivalent of propane is generally less than that of gasoline, so driving a propane vehicle can save money.

3. **RESULTS-** As the vast demand of fuels, efficiency and cost alternative fuels give right choice.

4. **CONCLUSION-** 21st century's problems are linearly incremental in fuel cost, not environment friendly and also greatest disadvantage is to give less efficiency. So to overcome all these types of difficulties we go to the right and best option i.e. an alternative fuels in I.C. Engine. So this complete paper conclude the advantages & disadvantages of alternative fuels.

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