

# Alternative Fuels

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**Abstract**— Due to increase in pollution and increase in price of fuel whole world is facing problems. Its affect the environment through changes in climates of earth which directly affect on human beings. So alternative fuel is a future need to Control the pollution. This paper describes about the different types of alternative fuels, their uses and how they are affecting the Atmosphere. Referring this paper we can easily find out the effective alternative fuel of uses as per application.

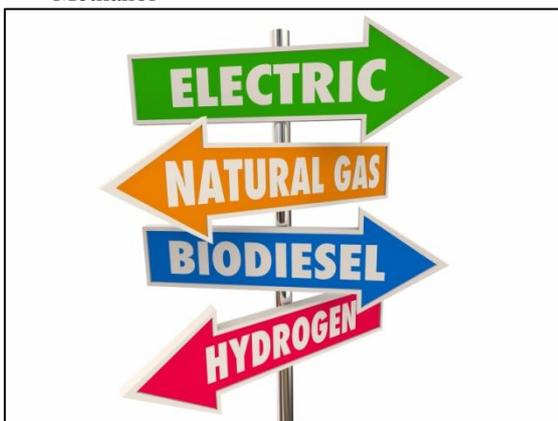
**Keywords:** Fuels, Pollution

## I. INTRODUCTION

Alternative fuel is nothing but fuel other than petroleum products and which less noxious for the environment compare to traditional fuels. WHO says outdoor air pollution is large and increasing as a consequence of the inefficient combustion of fuels for transport, power generation. Taking consideration of combustion processes produce a complex mixture of pollutants that comprises of both primary emissions, such as diesel soot particles and lead, and the products of atmospheric transformation, such as ozone and sulphate particles. Urban outdoor air pollution is estimated to cause 1.3 million deaths worldwide per year. Thus, it is very necessary to reduce the pollution and harmful exhaust emissions (such as carbon dioxide, carbon monoxide, and sulfur dioxide) from atmosphere and alternate fuels plays vital role in it. In this paper we are discussing how alternative fuels going to alleviate the harmful gases form combustion engines.

### A. Types of alternative fuels:

- Natural Gas
- Methanol



- Hydrogen
- Electricity
- Ethanol
- Propane
- Bio-diesel
- P- Series Fuels

#### 1) Natural gas:

Methane is the main constituent of Natural gas and accounting for about 95% of the total volume. Other

components are: Ethane, Propane, Butane, Pentane, Nitrogen, Carbon Dioxide, and traces of other gases. Very small amounts of sulphur compounds are also present. Since methane is the largest component of natural gas, generally properties of methane are used when comparing the properties of natural gas to other fuels.

Natural gas is a high calorific value fuel requiring no storage facilities. It mixes with air readily and does not produce smoke or soot. It has no sulphur content. It is lighter than air and disperses into air easily in case of leak.

Uses: Vehicles, Space Heating, Water Heating, Electric Power Industry.

#### 2) Methanol:

Methanol is a liquid chemical with the formula CH<sub>3</sub>OH (often abbreviated MeOH). It is colorless, volatile, flammable, and poisonous. Methanol is made from the destructive distillation of wood and is chiefly synthesized from carbon monoxide and hydrogen. Its principal uses are in organic synthesis, as a fuel, solvent, and antifreeze.

Methanol is a polar liquid at room temperature. It is used as antifreeze, solvent, fuel, and as a denaturant for ethanol. The chemical is also used to produce biodiesel via transesterification reaction. Because methanol has toxic properties, it is frequently used as a denaturant additive for ethanol manufactured for industrial purposes. Methanol is frequently called wood alcohol because it was once produced primarily as a byproduct of the destructive distillation of wood.

Uses: As a fuel, solvent, and antifreeze, it is also use for produce bio-diesel.

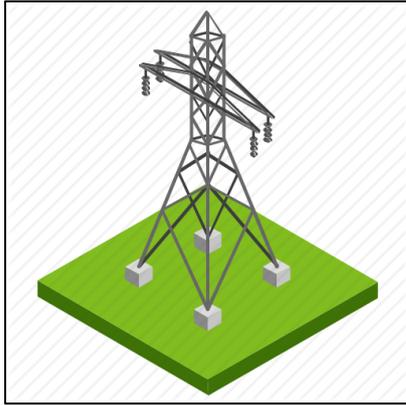
#### 3) Hydrogen

Hydrogen is also found in many organic compounds, notably the Hydrocarbon make up many of our fuels, such as gasoline, natural gas, methanol, and propane. Hydrogen can be separated from hydrocarbons through the application of heat (a process known as reforming). Currently, most hydrogen is made this way from natural gas. An electrical current can also be used to separate water into its components of oxygen and hydrogen. This process is known as electrolysis. Hydrogen is a zero emission fuel burned with oxygen.

Uses: In commercial vehicle as fuel cell, fuel for spacecraft propulsion.

#### 4) Electricity:

It is the most available fuel source of zero % emission. Electricity is considered an alternative fuel under the Energy Policy Act of 1992. Electricity can be produced from a variety of energy sources, including oil, coal, nuclear energy, hydropower, natural gas, wind energy, solar energy, and stored hydrogen. It is most clean, effective and affordable source of fuel.



Uses: Electric vehicle, Industries, home appliances.

5) *Ethanol:*

Ethanol fuel is ethyl alcohol, the same type of alcohol found in alcoholic beverages, used as fuel. It is most often used as a motor fuel, mainly as a bio-fuel additive for gasoline. Bio-ethanol is a form of renewable energy that can be produced from agricultural feed-stocks. It can be made from very common crops such

as hemp, sugarcane, potato, cassava and corn.

Uses: As a motor fuel, as an oxygenate additive for standard petrol, used to power fuel cells and to produce bio diesel.

6) *Propane:*

Propane is a three-carbon alkane with the molecular formula  $C_3H_8$ . It is a gas at standard temperature and pressure, but compressible to a transportable liquid. A by-product of natural gas processing and petroleum refining,

Propane is commonly used for space and water heating, for cooking, and as fuel for engine applications such as forklifts, farm irrigation engines, fleet vehicles, and buses; however, its applications are rapidly growing due to new technology developments. When used as vehicle fuel, propane is known as propane auto gas.

Uses: cooking, and as fuel for engine applications such as forklifts, farm irrigation engines, fleet vehicles, and buses.

7) *Bio-diesel:*



Biodiesel is a renewable, biodegradable fuel manufactured domestically from vegetable oils, animal fats, or recycled restaurant grease. Like petroleum diesel, biodiesel is used to fuel compression-ignition engines.

Biodiesel is a fuel made from vegetable oils, fats, or greases—such as recycled restaurant grease. Biodiesel fuel can be used in diesel engines without changing the engine. Pure biodiesel is non-toxic and biodegradable. Burning biodiesel produces lower levels of most air pollutants than petroleum-based diesel fuel.

Biodiesel is a form of diesel fuel derived from plants or animals and consisting of long-chain fatty acid esters. It is typically made by chemically reacting lipids such as animal fat (tallow), soybean oil, or some other vegetable oil with an alcohol, producing a methyl, ethyl or propyl ester.

Uses: Charging electronics, Provide Heat, Clean Oil spills, Cooking, Lubricate.

8) *P-Series Fuels:*

P-Series fuels are a new type of bio-fuel that uses up an overabundant resource: garbage. P-Series fuel is a blend of 35 percent natural gas liquids, 45 percent ethanol, and 20 percent methyltetrahydrofuan (MeTHF). The natural gas liquid is a substance called pentanes-plus, a liquid left over from the processing of natural gas, with butane added in winter months. Methyltetrahydrofuan is made from biomass such as paper sludge, food wastes, agricultural waste, or yard waste, and serves as a co-solvent (substance that turns another into liquid). The fuel is a colorless clear blend with octane between 89 and 93, the same octane as gasoline. It can be formulated for winter or summer use. It can be used alone or mixed with gasoline in a flexible fuel vehicle (FFV).

Uses: for the production of furfuryl alcohol (resin production), linking foundry sand, and lubrication oil extraction.

II. LITERATURE SURVEY:

A. *Primary Source*

Mr. Srinivasnaik and Sudhakar T.V. and Balunaik B. are the authors of the paper, in this paper author worked on the bio-diesel as a fuel for internal combustion engine. They prepare process for production of bio-diesel compatible for internal combustion engine.

Sahil Guleria and Harshit Singh Chandel are the authors of the paper, in which they stated about the present technology of automobile is need to be change for alternative fuels, except for electric cars. They introduced wind energy which is also alternative source of energy to propel automobile engines.

B. *Secondary Source*

General aspect of energy management and energy audit: It is guide book published by bureau of energy efficiency. In which the information about different properties of fuels, its contents are mentioned.

C. *Tertiary Source*

Not relevant Source Found

D. *Web Based Source*

[https://en.wikipedia.org/wiki/Alternative\\_fuel](https://en.wikipedia.org/wiki/Alternative_fuel) : In these website emphases the some well knew alternative fuels, their sources and their importance regarding pollutions on the earth

Alternative Fuels	Fuel Storage	Source	Specific energy (MJ/kg)	Octane Number	Emission (CO <sub>2</sub> /tonnes)
Natural Gas	Gas	Underground of earth.	53.6	130 appox	0.000915

Methanol	Liquid	Natural gas, coal and Renewable source.	19.9 – 22.7	129-134	0.54
Hydrogen	Liquid	Natural gas, oil, coal, and electrolysis.	120-142	>130	10.5
Electricity	N/A	Fossil fuels, nuclear energy.	N/A	N/A	0
Ethanol	Liquid	Fermented from corn, wheat, grain sorghum, barley, and potatoes,	23.4 – 26.8	88-108	0.0057
Bio-diesel	Liquid	From natural crops such as soybean, mustard, sunflower, palm oil, and waste vegetable oils.	37.8	56-60	282.45

### III. CONCLUSION

Air Index is gradually increasing due to pollution in the air due to uses of fossil fuels or conventional fuels. Total 76 % of CO<sub>2</sub> emission releases from fossil fuels and this affect the atmosphere badly, so alternative fuel is future need. Also, it is important to compare all types of fuels, in order to determine the best ones, economically and environmentally, short term and long term.

Here we compared all types of alternative fuels and we concluded Ethanol and natural gas are less harmful to nature and usable as well.

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