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Due to the limited amount of crude oil and petroleum, alternate fuels for internal combustion engines are being considered. There is also an increase in the amount of vehicles operating with these engines, so gasoline will become costly. Internal combustion engines are rarely run on fuels other than gasoline and diesel fuel, but they do exist mainly in third world countries. Not only is the cost an issue, but emissions cause pollution. Emissions harmful to the environment are being reduced per vehicle, but the amount of vehicles are still increasing. Another reason for the development of alternate fuels is the US foreign trade deficit due to the large imports of crude oil from other countries. However, for a change in fuel usage, there would have to be a massive change in fuel service stations to accommodate for vehicles operating with alternate fuels. Cost and delivery of these fuels may be problematic.

One type of alternate fuel is alcohol which can be made easily. Methanol and ethanol can be good for spark ignition internal combustion engines because they have a high octane number. This means that the spark in the cylinder will cause a flame front to move rapidly through the alcohol before it can self-ignite due to compression. This prevents engine knocking, the process by which air-fuel mixture combusts at a stage in compression that is too early for ignition which ruins the timing of the torque on the crankshaft. Another reason alcohol is considered is its overall low emissions and low sulfur content. Also, with its ignition, it gives a very high pressure resulting in a very powerful expansion stroke. However, energy input for alcohol is half of that of gasoline; this means the gas tank of a vehicle and other storage/distribution would need to be doubled. Alcohol is also corrosive to engine parts and fuel tanks, so usage would cause damage over time. Due to low vapor pressure and evaporation, alcohol-fueled engines would have trouble starting at temperatures below 10 degrees Celsius. Alcohol is also a dangerous fuel to handle.

Another fuel to be considered is hydrogen. Hydrogen fuel produces low emissions with almost no carbon monoxide or hydrocarbon. Exhaust mainly consists of water and nitrogen. Hydrogen fuel is largely available and can be made through electrolysis of water. It also has high energy per volume, and fuel leakage does not affect the environment. However, it must be stored as a compressed gas or a very low temperature liquid, and that requires a tank storage with high pressure capacity or high insulation. As hydrogen gas enters a cylinder, it displaces inlet air resulting in low volumetric efficiency. Fuel cost would also be very high, and it may also be dangerous because it can detonate.

Lastly, natural gas is a fuel made of mostly methane with some hydrocarbon, nitrogen, carbon dioxide, helium, and other gases. It is stored as compressed natural gas at 16 to 25 MPa or as liquid natural gas at 70 to 210 kPa and -160 degrees Celsius. With a high octane number of 120, spark ignition engines can use natural gas with a high cylinder compression ratio. The high speed of the flame front prevents unwanted self-ignition, so engine knocking would be avoided. Natural gas has less aldehydes than methanol, and its emissions are low. The US obtains large amounts of natural gas from drilling in large regions, and it is also abundant worldwide. With a low energy density though, natural gas would produce low engine performance. Thus, a large fuel tank with high pressure is required for a vehicle (making refueling slow), and test vehicles still only traveled about 120 miles. Fuel properties are inconsistent, and like hydrogen, it is a gas which results in low volumetric efficiency.