

Natural Gas (CNG/LNG)

Domestically produced and readily available to end-users, natural gas has become increasingly popular as an alternative transportation fuel. Natural gas is consumed in the residential, commercial, industrial, and utility markets.

Natural gas is also clean burning and produces significantly fewer harmful emissions than reformulated gasoline.

Natural gas can either be stored on board a vehicle in tanks as compressed natural gas (CNG) or cryogenically cooled to a liquid state, liquefied natural gas (LNG).

Propane (LPG)

Propane or liquefied petroleum gas (LPG) is a popular alternative fuel choice because an infrastructure of pipelines, processing facilities, and storage already exists for its efficient distribution.

LPG produces fewer vehicle emissions than reformulated gasoline. It is produced as a by-product of natural gas processing and petroleum refining.

Propane-powered vehicles have less carbon build-up compared to gasoline and diesel-powered vehicles.

Solar Energy

Solar energy technologies use sunlight to produce heat and electricity. Electricity produced by solar energy through photovoltaic technologies is stored in photovoltaic cells and can be used in conventional electric vehicles.

Websites to visit:

www.afdc.doe.gov/altfuels.html
www.ott.doe.gov/hev
www.fueleconomy.gov
www.ngvc.org
www.ott.doe.gov/biofuels

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Biodiesel

Electricity

Ethanol

Fuel Cells

Hybrid Electric

Hydrogen

Methanol

Natural Gas

Propane

Solar Energy

Biodiesel

Biodiesel is a cleaner-burning diesel replacement fuel made from natural, renewable sources such as new and used vegetable oils and animal fats.

Using biodiesel in a conventional diesel engine substantially reduces serious air pollutants such as particulates, carbon monoxide, hydrocarbons and air toxics.

Biodiesel fuel can be made from new or used vegetable oils and animal fats, which are non-toxic, biodegradable, renewable resources.

Approximately 55% of the biodiesel industry can use any fat or oil feedstock, including recycled cooking grease. The other half of the industry is limited to vegetable oils, the least expensive of which is soy oil.

Electricity

Electricity can be used as a transportation fuel to power battery electric and fuel cell vehicles. When used to power electric vehicles or EVs, electricity is stored in an energy storage device such as a battery.

EV batteries have a limited storage capacity and must be replenished by plugging the vehicle into a recharging unit. The electricity for recharging the batteries can come from the existing power grid, or from distributed renewable sources such as solar or wind energy.

Fuel cell vehicles use electricity produced from an electrochemical reaction that takes place when hydrogen and oxygen are combined in the fuel cell "stack." The production of electricity using fuel cells takes place

without combustion or pollution and leaves only two by products, heat and water.

Ethanol

Ethanol is an alcohol-based alternative fuel produced by fermenting and distilling starch crops that have been converted into simple sugars.

Feedstocks for this fuel include corn, barley and wheat. Ethanol can also be produced from "cellulosic biomass" such as trees and grasses and is called bioethanol.

Ethanol is most commonly used to increase octane and improve the emissions quality of gasoline.

Fuel Cells

Fuel cells can power cars, trucks, and buses without emitting harmful tailpipe emissions. Such vehicles will be cleaner and more energy efficient than those powered by an internal combustion engine.

Fuel cells also may provide energy to factories and homes without creating smokestack pollution.

Fuel cells are very efficient. They can capture 40%-60% or more of a fuel's energy to power a car with low or zero emissions. A fuel-cell vehicle running on pure hydrogen emits only water vapor.

Hybrid Electric

Hybrid electric vehicles (HEVs) combine the internal combustion engine of a conventional vehicle with the battery and electric motor of an electric vehicle, resulting in twice the fuel economy of conventional vehicles.

The practical benefits of HEVs include improved fuel economy and lower emissions compared to conventional vehicles.

The inherent flexibility of HEVs will allow them to be used in a wide range of applications, from personal transportation to commercial hauling.

Hydrogen

Hydrogen gas (H₂) is being explored for use in combustion engines and fuel-cell electric vehicles. It is a gas at normal temperatures and pressures, which present greater transportation and storage hurdles than exist for the liquid fuels.

Storage systems being developed include compressed hydrogen, liquid hydrogen, and chemical bonding between hydrogen and a storage material.

While no transportation distribution system currently exists, for hydrogen transportation use, the ability to create the fuel from a variety of resources and its clean-burning properties make it a desirable alternative fuel.

Methanol

Methanol (CH₃OH) is an alcohol fuel. Today most of the world's methanol is produced by a process using natural gas as a feedstock.

Methanol also known as wood alcohol, has been used as an alternative fuel in flexible fuel vehicles that run on M85.

In the future, methanol could possibly be the fuel of choice for providing the hydrogen necessary to power fuel cell vehicles.