

AIR QUALITY BASICS:

Alternative Fuels

To the casual observer, the cars and trucks driving down the freeway in 2006 don't look much different than they did a decade ago. But under the hood, changes have begun that could radically alter the way vehicles are powered. Alternative fuels play a major role in this largely unseen revolution.

In 1992, Congress passed the Energy Policy Act of 1992, certifying seven alternative fuels, including ethanol, natural gas, propane, hydrogen, biodiesel, electricity and methanol. Below is an overview of four alternative fuels currently in use.

Ethanol

This fuel was used in vehicles as early as the 1880s. In the U.S., 90% of it is made from corn, and it is almost always blended with gasoline. One common blend is 10% ethanol, and it can be used in any gasoline vehicle. Another blend is 85% ethanol, which is mainly used in flexible fuel vehicles.

PROS: It's a renewable resource produced domestically and it provides significant reductions of many pollutants. Upcoming improvements in production methods (including using agricultural wastes) may improve its viability.

CONS: It has greater emissions of some pollutants, like acetaldehyde. With current production methods, it is less efficient, generating 70% as much energy as gasoline. Without expansion into sources besides corn, it will have a limited effect on our reliance on foreign oil.

Natural Gas

Natural gas is a widely-used form of energy, often used to heat and cool homes and businesses. It can be distributed to vehicles through modifications to the current pipeline system, but would require special fuel canisters.

PROS: Natural gas reduces emissions of many harmful pollutants. The U.S. has vast domestic reserves of natural gas, reducing dependence on foreign oil.

CONS: Natural gas is non-renewable, and methods for extracting it can be environmentally damaging. It is less efficient, generating just 25% as much energy as gasoline. It may increase emissions of hydrocarbons.

Propane

Liquefied petroleum gas, or propane, is the most widely-used and accessible alternative fuel in the U.S. It has been used in vehicles since the 1940s. It becomes a liquid under moderate pressure, and as such is easier to transport and store. It is widely used for heating, cooling, and barbecue grills.

PROS: Propane can reduce harmful emissions. It is one of the more energy efficient alternative fuels, but still produces just 74% of the energy of gasoline. It has an existing infrastructure for transportation and storage.

CONS: It is a byproduct of petroleum refining and natural gas processing. It is not renewable and may not significantly reduce our dependence on foreign oil.

Biodiesel

When the diesel engine was developed in 1895, it was designed to run on a variety of fuels, including vegetable oil. Today, biodiesel is produced from sources like canola oil, soybean oil and cooking grease. It can be used in its pure form or blended with diesel. One common blend is 20% biodiesel.

PROS: Biodiesel can be used in almost all diesel engines with little to no modification. It is a renewable resource, and it can be produced domestically. It reduces harmful diesel emissions considerably. It is easy to transport and store.

CONS: Biodiesel is cleaner than diesel, but still emits more toxic particles than gasoline. Pollution control technologies may solve that problem, but without them, increased emissions of nitrogen oxides may also result. It is slightly less efficient than regular diesel, but still more efficient than gasoline. With current production methods, it will have a limited impact on our reliance on foreign oil.



The Future of Alternative Fuels

In the end, the solution to our energy and air quality woes may be a multi-faceted approach. Combining flexible fuel vehicles, hybrid technologies and alternative fuels in a safe and efficient manner could be the key to cleaner air and less dependence on foreign oil. Hydrogen-fueled vehicles and 100% electric vehicles are also promising alternatives. For today, however, the most attainable and critical goal is to improve fuel efficiency in our vehicles. This step alone would result in significantly better air quality and a reduced dependence on foreign oil.

Sources for this article included EPA fact sheets on "Clean Alternative Fuels," the Alternative Fuels Data Center at www.eere.energy.gov/afdc, and the Union of Concerned Scientists website at www.ucsusa.org.