Biodiesel

What is biodiesel?

Biodiesel is a naturally oxygenated fuel produced from organic feed sources such as soybeans, cooking oil, and animal fats. Using a catalyst, oil is reacted with methanol to produce biodiesel. The main bi-products from this reaction are biodiesel and glycerin. In 2001, ASTM (www.astm.org) approved the full standard for biodiesel - D6751.

What types of vehicles can use biodiesel?

Buses, delivery trucks, waste disposal and recycling trucks, construction and farm equipment, heavy-duty freight hauling, boats and passenger vehicles can all use biodiesel. When blended with heating oil (Bioheat), biodiesel may also be utilized in stationary applications such as diesel generators and boilers.

Biodiesel can be used in any newer diesel vehicle without modification. In a diesel vehicle, biodiesel can be used in its pure form (B100) or blended at any ratio with petroleum diesel (the most common ratio is 20% biodiesel or B20). The vehicles cold weather performance is improved by blending biodiesel with some portion of petroleum diesel. Vehicles produced prior to 1993 should have rubber seals in fuel pumps and fuel systems replaced with non-rubber (Viton) seals. Since biodiesel acts as a solvent, it loosens sediment that builds up in the fuel tank from years of petroleum diesel use. Shortly after transitioning to biodiesel, fuel filters should be monitored and possibly replaced. In addition, a complete system cleaning is recommended when using high blends of biodiesel.

How does biodiesel perform?

Biodiesel performs like traditional diesel, though B100 may result in a minimal power loss at the high end and a slight reduction in fuel economy. B20 users generally experience no marked difference in fuel economy from petroleum diesel. Because biodiesel acts as a lubricant, it reduces wear and tear on the engine, reducing maintenance costs and extending engine life. Therefore, low blends of biodiesel can enhance the lubricity of ultra-low sulfur diesel fuel. Biodiesel remains blended with petroleum diesel so it can be easily stored and dispensed in existing facilities. Biodiesel is different from petroleum diesel and distributors should review the DOE's Biodiesel Handling and Use Guidelines (www.nrel.gov/vehiclesandfuels/npbf/pdfs/40555.pdf), and keep in mind that:

- Biodiesel thickens more in cold weather and special considerations or modifications are required for B100.
- Biodiesel, in higher blends, is not compatible with certain types of rubber compounds, metals, and plastics.
- Load diesel fuel first and add biodiesel at a similar temperature to properly splash blend.

What are the benefits of using biodiesel?

For every 1 unit of fossil fuel energy that goes into producing biodiesel, 3.2 units of energy are produced, a 1:3.2 energy balance ratio. Biodiesel also results in significantly lower emissions of particulate matter, carbon monoxide, toxic contaminants, sulfur dioxide, hydrocarbons, visible smoke and noxious odors than petroleum diesel. Biodiesel, depending on the feed source, can result in a 78% reduction in carbon dioxide emissions over its entire production. In addition to being non-toxic and biodegradable, which does not pose a threat to water and soil resources if B100 is spilled, biodiesel reduces dependence on foreign oil and provides an alternative market for farmers.

Emissions reductions achieved by biodiesel as compared to petroleum diesel ***(Source: US DOE (www.nrel.gov)***

Blend	Carbon Monoxide	Hydrocarbons	Particulates	Sulfates	Nitrogen Oxide	Air Toxics
B100	43.2%	56.3%	55.4%	100%	+ 5.8%	60-90%
B20	12.6%	11%	18%	20%	+ 1.2%	20%

Where can I get biodiesel?

The Alabama Clean Fuels Coalition is a great source of information about biofuel retailers in this area. To see a list of biodiesel retailers in Alabama, check out: www.alabamacleanfuels.org/Why_AFVs/AFV_Stations/afv_stations.cfm. The list is updated often, so check frequently for a station near you. The National Biodiesel Board (www.nbb.org) is also a great source of information about biodiesel and retail locations. If you are interested in becoming a biodiesel retailer contact Mark Bentley at the Alabama Clean Fuels Coalition (mark@alabamacleanfuels.org) for funding opportunities to help you get started.

Ethanol

What is ethanol?

Ethanol is a naturally oxygenated fuel produced by fermenting organic materials such as corn, grains, crop and forestry waste materials. Ethanol is made by using simple sugars generated from starchy feedstock in a fermenting or distilling process similar to making of alcohol.

What types of vehicles can use ethanol?

E10 is a premium high-octane gasoline for cars and can be used in any gasoline vehicle without modification. E85 (85% ethanol / 15% gasoline) is used as an alternative fuel for light-duty vehicles and offers a higher octane rating but can only be used in specific vehicles. All major domestic automakers offer E85 compatible vehicles, or flex-fuel vehicles (FFVs), at the same price as "gasoline only" models (find a list of FFVs at www.e85fuel.com). FFVs, which can run on either E85 or gasoline, allow vehicle operators the ability to obtain fuel in areas where E85 is not available. Because of the differences between ethanol and gasoline, FFVs have special fuel lines, hoses, gas tanks, valves and gaskets. The Auto Alliance (www.discoveralternatives.org) is the auto industrie's collection of information on alternative fuel vehicles currently available in the US.

How does ethanol perform?

Vehicles operating on E10 achieve the performance and range expected from a premium fuel. Vehicles running on E85 will have a shorter range than gasoline vehicles because a gallon of ethanol has 29% less energy content than a gallon of gasoline. However, ethanol has a higher octane rating than regular unleaded gasoline making E85 a premium fuel. E10 and E85 burn more completely and at a cooler temperature than gasoline, resulting in fewer combustion deposits and longer spark plug life. E85 is very different from gasoline and distributors should review the DOE's Handbook for Handling, Storing, and Dispensing E85 (www.eere.energy.gov/afdc/pdfs/40243.pdf).

What are the benefits of using ethanol?

Vehicles running on ethanol fuels emit less nitrogen oxides, carbon monoxide, and other toxic chemicals, such as benzene, than those running on gasoline. They also emit the same or lower levels of hydrocarbon and non-methane hydrocarbons. E85 has fewer highly volatile chemicals than gasoline, resulting in fewer evaporative emissions. Ethanol blended fuels derived from grain will result in lower life-cycle carbon dioxide emissions because they are derived from plant material which absorb carbon dioxide as it grows.

Where can I get ethanol?

The Alabama Clean Fuel Coalition frequently updates the list of ethanol retailers in the area. Check out www.alabamacleanfuels.org/Why_AFVs/AFV_Stations/afv_stations.cfm for a station near you. Or contact them directly for more information about becoming an ethanol retailer, they may have a grant to help you get started.

Resources:

DOE's Alternative Fuels Data Center→www.eere.energy.gov/afdc
National Biodiesel Board→www.biodiesel.org
Environmental Protection Agency→www.epa.gov/smartway/growandgo
National Ethanol Vehicle Coalition→www.e85fuel.com

If you have any questions about the incentives listed above you can contact the Renewable Energy Outreach (REO) group at BizTech at (256) 489-0058 or ruchi@biztech.org . If you are in the Shoals region, contact Giles McDaniel at (256)760-9014 or giles@shoalsec.com at the Shoals Entrepreneurial Center.