

State of Colorado



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State Fleet Management statement on Biodiesel use in State-owned vehicles

Summary:

State Fleet Management supports the use of biodiesel (B20) fuel in State-owned vehicles with diesel engines. A reasonable distance to consider for procurement of B20 fuel is five miles beyond the route of state travel. A reasonable price difference to consider for procurement of B20 fuel is 10 cents per gallon.

What is Biodiesel?

Biodiesel is a safe, nontoxic, and biodegradable substitute for petroleum diesel that is made from renewable vegetable oils, recycled cooking greases, or animal fats and meets American Society for Testing and Materials (ASTM) standards. The ASTM is an organization composed of technical experts from most major engine manufacturers, petroleum companies, and other interested parties. Even in blends as low as 20% biodiesel to 80% petroleum (known as B20), biodiesel can substantially reduce the emission levels and toxicity of diesel exhaust. Biodiesel is designated under federal law as an alternative fuel and is registered with the U.S. Environmental Protection Agency (EPA) as a fuel and fuel additive. It can be used in any diesel engine without need for mechanical alterations and is compatible with the existing petroleum distribution infrastructure.

The U.S. Department of Energy (DOE) has recognized biodiesel as the fastest growing alternative fuel, recently projecting almost a 2000% market increase in the next 5 years (from 25M to 470M gallons per year). The DOE's National Renewable Energy Laboratory (NREL), US EPA, and Department of Transportation (DOT) have all embraced biodiesel as a means of reducing diesel engine emissions, lowering our dependence on imported petroleum fuel, and boosting the agricultural sector for our country. With record high petroleum prices, the pending 2006-2007 diesel emissions standards, recent tax incentives, and our society's continued reliance on diesel technology and infrastructure, biodiesel offers a secure and compelling energy option.

Background

For many years energy has been taken for granted, with reliance upon nonrenewable petroleum, natural gas, coal, and other fossil-based fuel reserves as a predominant source for transportation, power, and home heating needs. Recent market conditions and energy security concerns have created awareness and demand for non-polluting, domestically produced, renewable resources to supplement our reliance upon petroleum fuels.

There are over 500 fleets in the US currently using biodiesel, including:

- The US Armed Forces, Postal Service & NASA;
- Missouri & New Jersey Depts. of Transportation;
- Yosemite, Channel Islands & Yellowstone National Parks;
- Major cities including Las Vegas, St. Louis, and Berkeley;
- Squaw Valley & Northstar Ski Resorts; and
- Commonwealth Edison and more than 50 school districts.

Biodiesel Benefits

- Biodiesel is a safe, nontoxic, renewable resource that is biodegradable and sustainable.
- Biodiesel dramatically reduces emissions compared to petroleum diesel:
 - Sulfur (Causes respiratory disease and contributes to acid rain) = 100% reduction
 - Particulate matter (Black soot and smoke exhaust) = 47% reduction
 - Cancer causing potential = 94% reduction
 - Carbon Dioxide (CO₂) (primary greenhouse gas contributing to global warming) = 78% reduction
 - Hydrocarbon (Volatile Organic Compounds (VOC), which form harmful ozone) = 85% reduction
 - Carbon Monoxide (CO) = 48% reduction
- Biodiesel is made domestically, reducing our dependence on foreign oil.
- Biodiesel use keeps our fuel dollars at home, reducing the trade deficit and creating jobs.
- Biodiesel can be produced from widely available and recyclable feedstocks such as fast-food french fry oil, mustard seed, canola, algae, and soybeans.
- Biodiesel use qualifies for government-mandated regulations of fleet vehicle emissions.
- Biodiesel can be used in existing diesel engines requiring little or no modifications. It has higher cetane, better lubricity, mixes easily with petroleum diesel, has similar power and torque, and meets ASTM (American Society for Testing and Materials) standards.
- Biodiesel can be distributed utilizing the existing fuel distribution infrastructure.
- Biodiesel dramatically reduces engine wear.
- Biodiesel is used for oil spill cleanup.

- Biodiesel is the only alternative fuel that has passed the EPA Tier I & Tier II Health Effects tests, is net-energy efficient, and is renewable. As such, it is the only immediately available choice for companies, individuals, and government agencies looking for a sustainable solution for significant emissions reduction.

Did You Know?

- The Diesel engine was invented in the 1890's and originally ran on vegetable oil.
- Biodiesel has been widely used in Europe for over 10 years.
- Children riding *inside* petroleum diesel school buses are exposed to as much as 4 times the level of toxic exhaust as people *outside* of the bus.
- It is estimated that half of all air pollution in the U.S., and up to 71% in the LA air basin, is due to petroleum diesel emissions.
- Most biodiesel today is produced from virgin soybean oil due in part to efforts by the American Soybean Association. But there are many sources of biomass oil including mustard, canola, algae, and Jatropha, which produce more oil per acre.
- Estimated Annual U.S. Biodiesel Consumption (gallons): 5 million in 2001, 30million in 2004,124 million in 2005.
- 2003 U.S. Petroleum Diesel Consumption is 70 billion gallons, more than half of that is for transportation.
- Partnership for a New Generation of Vehicles was a \$600 million dollar project sponsored by the government challenging the auto industry to create a vehicle "with twice the mileage and half the emissions." The result of the project was a diesel/electric hybrid, later modified to current gasoline specs.
- Engine efficiency determines how many miles per gallon a vehicle gets. Gasoline engines have an efficiency rating of 25, while diesel engines have an efficiency rating of 40, which means diesel gets up to 60% better fuel economy than gasoline.
- Cetane (ignition quality) ratings for diesel are similar to octane ratings for gasoline: Petroleum diesel = 40; Virgin soy biodiesel = 50; Recycled vegetable fry oil biodiesel = 55.
- Biodiesel can be reformed (converted) into hydrogen for use in fuel cells.
- Production capacity of biodiesel is currently 180 million gallons per year and was expected to increase to 350 million by the end of 2005.

Disadvantages to Biodiesel

There have been only three items proven to be disadvantages of the use of biodiesel fuel in comparison to regular diesel:

- Biodiesel is known to plug fuel filters in cold temperatures in the mid and east coast; however it has not proven to be a problem in the mild temperatures of Southern California.
- The cost of biodiesel is very competitive when compared to regular diesel #2. However, in some cases the cost has been slightly higher.
- Nitrogen oxide (NOx) emissions, potentially harmful gases that are formed when fuel is burned at high temperatures, have been shown to increase or decrease slightly in the surrounding air depending on the testing. However, NOx can be significantly reduced with currently available technologies such as catalytic converters, exhaust recovery systems, fuel additives, filters, and more technologies currently under development.

History

Dr. Rudolph Diesel invented his compression ignition engine in the 1890's in Germany. When it was demonstrated at the World's Exhibition in Paris, Dr. Diesel's engine ran on peanut oil, the original "diesel fuel." Diesel believed biomass fuel to be a viable alternative to the resource-consuming steam engine. Vegetable oils were used in diesel engines until the 1920's when an alteration was made to the engine, enabling it to use a residue of petroleum - what is now known as diesel #2. Due to the prevalence and price of petroleum products, diesel fuel soon came to be accepted as a petroleum product as well.

Although straight vegetable oil will run in a diesel engine, its viscosity is too high for most of today's diesel engines and compounds and the oil can lead to injector "coking" and eventual engine failure. By chemically reducing viscosity, removing these undesirable compounds and replacing them with oxygen, a clean burning vegetable oil based alternative to petroleum diesel is now available.

Biodiesel has been widely used in Europe for well over a decade and there have been hundreds of millions of miles successfully traveled using biodiesel. Biodiesel use in the United States started to become more prevalent in the early 1990's, and has been heavily supported and promoted by the biodiesel trade association, the National Biodiesel Board. During the last several years, millions of dollars have been spent in the testing, demonstration, and promotion of biodiesel and successful legislative effort has resulted in legislation and executive orders favorable to biodiesel and mandating the use of alternative fuels.

The ASTM has approved standards for biodiesel intended to be used as a transportation fuel (ASTM D 6751). New legislation went into effect in 2005 which includes biodiesel tax provisions that will essentially reduce the price of biodiesel by \$1.00 per gallon, effectively putting it on par with petroleum diesel, increasing market acceptance and dramatically affecting the global energy paradigm.

Legislation and Other Policy:

SB06-016 (IV) (A), and SB-03-091 Section 4 (II)

SB06-016: “Adopt a policy that all state-owned diesel vehicles and equipment shall be fueled with a fuel blend of twenty percent biodiesel and eighty percent petroleum diesel, subject to availability and so long as the price is no greater than ten cents more per gallon than the price of diesel fuel.”

SB03-091: “Adopt a policy that at least ten percent of all state-owned bi-fueled vehicles should be fueled exclusively with an alternative fuel.

To encourage compliance with this policy for one or more state fiscal years commencing before July, 1 2010, the rules promulgated pursuant to this paragraph (c) may establish progressively more stringent percentage milepost”

The Greening Government Executive Orders D011 07 and D012 07 require state government to reduce petroleum consumption by 25% by June 30, 2012 from baseline SFY 2005-06.

Using a B20 blend of biodiesel in state owned diesel vehicles will benefit the state by reducing petroleum consumption by 20 percent. An additional 20 percent of petroleum will be displaced with biodiesel, for a combined petroleum reduction benefit of 40 percent when compared to a regular unleaded fueled vehicle.

Additional Information:

The biofuels sites are posted to the SFM website and the EERE-NREL station locator can also be found at: <http://www.afdc.energy.gov/afdc/>

For mobile PDA access:

<http://www.afdc.energy.gov/afdc/locator/m/station/>

SFM updated list of biofuel stations can be found at:

<http://www.colorado.gov/cs/Satellite/DPA-DCS/PA/1200535985059>