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## BIODIESEL OFFERS FLEETS A BETTER ALTERNATIVE

Biodiesel is a non-toxic, biodegradable, and clean burning alternative fuel produced from vegetable oils and animal fats.

Biodiesel increases lubricity which in turn leads to longer engine life, lower maintenance costs, less equipment downtime, and protection against fuel injector failure.

In addition, Biodiesel exceeds diesel in cetane number, resulting in superior ignition. In terms of horsepower, fuel economy, and torque, biodiesel is approximately equivalent to diesel. It can be blended at any level with petroleum diesel to create a biodiesel blend and used in any compression-ignition (diesel) engines with no major modifications. Biodiesel is simple to use, essentially free of sulfur and aromatics and has a higher flash point than diesel, making it significantly safer than petroleum. Over 600 fleets across the U.S are now using Biodiesel.

**Technical Definition:** *Biodiesel, n-a fuel composed of monoalkyl esters of long chain fatty acids derived from vegetable oils or animal fats, designated B100, and meeting the requirements of ASTM (American Society for Testing & Materials) D 6751.*

### FLEET VEHICLES SURVEY SHOWS BIODIESEL ON THE RISE

In the spring of 2003, the National Biodiesel Board (NBB) commissioned ASG Renaissance to conduct a commercial business survey among major diesel-powered truck fleet operators in the U.S. The purpose of the survey was to obtain qualified information on fuel preferences from fleet managers who have hands-on experience in making informed fuel choice decisions. Fleets surveyed represented 50,821 diesel-powered vehicles in operation with 550 diesel vehicles in the average fleet.

- The vast majority (91%) of fleets surveyed have a positive attitude concerning Biodiesel.
- Almost half are using Biodiesel, with B20 being the blend of choice.
- Over half (51%) said support for Biodiesel use from the OEM/engine manufacturer would “definitely” be a consideration in their future purchase decisions.

### DIESEL FUEL INJECTION FIRM SINGS PRAISES OF BIODIESEL

In recent testimony to the EPA, Paul Henderson, Quality Systems Manager of Stanadyne, a leading manufacturer of diesel fuel injection systems, supported the use of a low blend of biodiesel in all U.S. diesel fuels to ensure sufficient lubricity. “We have tested biodiesel at Stanadyne and the results indicate that the inclusion of 2% biodiesel into any conventional fuel will be sufficient to address the lubricity concerns that we have with these existing fuels.”

### BIODIESEL STANDARD

The premier standard-setting organization in the United States has issued a fuel specification for biodiesel. In March of 2002, the American Society of Testing and Materials (ASTM) issued Specification D 6751 for all biodiesel fuel bought and sold in the U.S., marking a major milestone for the biodiesel industry.

Having a full standard in place helps protect consumers from poor products and reduces the cost of buying and selling biodiesel. EPA has certified biodiesel as an Alternative Fuel that can be used in all federal fleets. This standard covers pure biodiesel (B100), for blending with petrol-diesel in levels up to 20% by volume. Community Fuels produces only the highest quality ASTM D-6751 biodiesel fuel.



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## SUMMARY OF BIODIESEL'S ADVANTAGES FOR FLEETS

- **Easy to use:** Biodiesel can be used with your current fueling infrastructure and in all diesel vehicles with little or no engine modification.
- **Adds the lubricity back into the fuel:** Low Sulfur and Ultra Low Sulfur Diesel (ULSD) require lubricity while biodiesel is a totally renewable additive for this role and complements ULSD.
- **Flexible:** Biodiesel is easy to phase in and out, so you can maintain flexibility in technology deployment. It can be blended in with existing diesel to create various mixtures like a B2, B5 or B20 blends.
- **Gives life to older diesel vehicles:** Biodiesel's solvency, higher cetane number and increased lubricity means longer engine life and excellent engine performance.
- **Cleaner and renewable, lowering GHGs:** Biodiesel cuts air toxics exhaust emissions and particulates by more than 50%, and sulfur up to 100%, depending on the blend. At the same time, it minimizes black smoke and odor, lowering greenhouse gas emissions and acid rain.
- **Easier to handle** and does not require mechanics to use barrier cream on their hands to protect the skin from cracking or redness.

## CITY OF PALO ALTO WITH 4 YEARS OF BIODIESEL EXPERIENCE

In 2001, the City of Palo Alto implemented its "Biodiesel" program on the 10 pieces of refuse and composting equipment at the City's landfill. "Biodiesel did initially clog some fuel filters, but we expected that," says John Connelly, Palo Alto Landfill Supervisor.

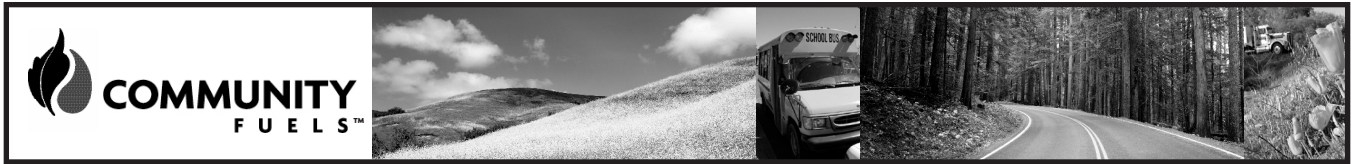
Once the initial fuel filters on this old machinery had been swapped out, they saw no additional maintenance issues. With the first successful phase, the program is expanding to include the golf course, street sweepers, and then to the fire stations.

By using fuel that is made in part from renewable resources, Palo Alto is taking steps to provide an adequate supply of cleaner burning fuel for their equipment, and is experiencing significant reductions in diesel emissions in the process. "As for the equipment, there is no difference in power," Connelly adds.

## FIRST MARYLAND COUNTY TO USE B20 FLEET WIDE

Queen Anne's County, Maryland, Department of Public Works will be the first Maryland County to use B20 fleet wide. Queen Anne's County's fleet consists of approximately 180 units, including 20 school buses. The use of B20 will significantly reduce the emissions from the 230,000 gallons of diesel fuel the fleet consumes annually.

- **Less dangerous** to put in a vehicles fuel tank as the flash point of biodiesel is ffl 150°C (300°F) as opposed to petroleum diesel which is at ffl 70°C (150°F).
- **Degrades about 4 times faster** than petroleum diesel after spillage, with most of a spill broken down after just 28 days.
- **Reduces "knocking"** noise of the classic diesel engine.
- **Fleets can keep their existing storage infrastructure:** spare part inventories, tanks, current vehicles, and fueling infrastructures do not require any changes with lower blends.



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### EPACT CREDIT

In January 2001, DOE published the final rule for the use of biodiesel to fulfill EPart requirements. This rule allows covered fleets to use biodiesel fuel to fulfill up to 50% of their alternative fuel vehicle (AFV) purchase requirements.

According to the final rule, covered fleets will be allocated one Biodiesel fuel use credit (the same as one AFV acquisition) for each 450-gallon purchase of B100.

Credits will only be awarded if the fuel used contains at least 20% Biodiesel (B20) and is used in vehicles weighing more than 8500 lb. If blends are used, only the biodiesel portion of the blend can be used to calculate the credits.

For example, 2,250 gallons of B20 contain 450 gallons of pure biodiesel and would be allocated one AFV acquisition credit. No partial credits are allowed and the credits are good only for the year the fuel was used. The rules that apply are in the Federal Register for January 11, 2001.

### SCHOOL DISTRICT MARKS 4 MILLION MILES ON BIODIESEL

School buses in Arizona's Deer Valley Unified School District fleet have driven more than 4 million miles using biodiesel. It is one of many school districts that have begun using cleaner-burning fuels

in school buses. "We were careful to select a fuel with a proven track record and with definite health and environmental benefits," said Paul Cochran, president of the School Bus Fleet Managers Association of Arizona.

"We have had a wonderful experience with the fuel, and I would recommend it highly to anyone thinking about cleaning up their school buses for the safety of our children."

### SAN JOSE REFUSE TRUCKS RUN ON B100

The Green Team, a San Jose recycling and garbage company, is modifying 95 of its garbage trucks to operate on B100. Ken Etherington, general manager, said that using the new fuel would cut 50,000 lbs. of air pollution each year.

Kerynn Gianotti, a spokesperson for the Green Team, added, "We're the first company in the country to use it fleet-side and in 100% of our vehicles. I think you'll start to see more people using 100% biodiesel, in California especially, because of the air quality laws that are coming into effect shortly." The only changes to the vehicle have been a few new filters. "We like the biodiesel and the drivers do too," she said,

"Some of the drivers who didn't know their trucks were running on Biodiesel thought their trucks had been tuned up."

### HEALTH AND ENVIRONMENT

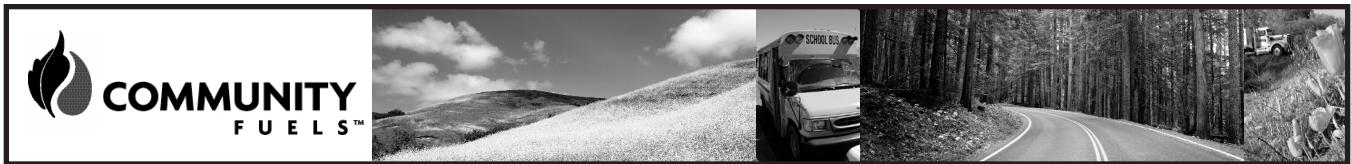
B100 has completed the Tier 1 and Tier 2 Health Effects testing requirements of the Clean Air Act. This testing concluded that emissions from biodiesel are nontoxic and pose little or no health risk to humans.

Tests have shown that the cancer-causing potential of particulate matter from pure biodiesel is about 94% less than that of regular diesel and the risk from B20 is 27% less.

Biodiesel has several environmental benefits. Vehicles that run on this fuel emit fewer heavy hydrocarbons and less particulate matter, carbon dioxide, and carbon monoxide.

Testing indicates, however, that nitrogen oxide (NOx) emissions may be slightly higher, but several recent tests of NOx reducing additives have shown promising results.

Because biodiesel does not contain sulfur, it won't contribute to sulfur dioxide emissions or poison exhaust catalysts when used in 100% form, and it actually improves the efficiency of oxidative catalysts.



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## BIODIESEL CONCERNS

**Biodiesel Costs:** While biodiesel has historically cost slightly more than petroleum diesel, biodiesel has maintained price or gone down in price as compared with petroleum diesel which saw an increase of 40% last year alone. Biodiesel diversifies our energy supply and stabilizes our fuel prices. In addition, Biodiesel's role in providing enhanced lubricity, decreased exposure to toxics and support of American farmers makes any price difference negligible at best. A study by Booz-Allen & Hamilton, Inc., found fleets using a 20 percent biodiesel blend would experience lower total annual costs than other alternative fuels. Similarly, results reported by the University of Georgia indicate biodiesel-powered buses are competitive with other alternatively fueled buses with biodiesel prices as high as \$3 per gallon.

**Depending on the feedstock for production and current incentives, biodiesel prices may in fact be lower in some parts of the country than rising petrol-diesel prices.**

**Biodiesel Maintenance:** There are three issues that any consumer of Biodiesel should be aware of before putting higher percentages (B20+) in the vehicle.

**High Biodiesel blends (B50+), over time, will soften and degrade certain types of elastomers and natural rubber compounds used in older fuel hoses and pump seal systems.** Precautions are needed when using high percent blends to ensure that the existing fueling system on older engines do not contain elastomer compounds incompatible with Biodiesel. Manufacturers recommend that natural or butyl rubbers not be allowed to come in contact with neat (B100) Biodiesel otherwise they turn sticky and fall apart. Most vehicles made after 1994 will have fully synthetic fuel lines and seals so will not suffer from this problem, but older vehicles need to be monitored. Lower blends such as B20 will likely not show any of these effects.

**There is a chance that your first tank or two of higher blend level Biodiesel could free up all the accumulated crud and clog your fuel lines.** Biodiesel will clean your injectors and fuel lines extremely well as it is such an excellent solvent. The advantages for prolonged engine life far outweigh the inconvenience of filter replacement, however, if you have an old diesel vehicle, the chance of clogging your fuel lines is higher. The release of deposits may clog filters initially and precautions should be taken as the tanks are cleaned out by the Biodiesel. Cleaning or replacing filters regularly upon switching to biodiesel eliminates any potential problems. Continuing to use biodiesel keeps fuel lines clear.

**High blend level Biodiesel has a higher gel point.** 100% Biodiesel, referred to as B100, gets slushy at 32°F. A blend of 20% Biodiesel, 80% regular diesel, B20, has a gel point of 0°F - 7°F, depending on the feedstock. Like regular diesel, the gel point can be lowered further with additives such as kerosene, which are blended into winter diesel in cold-weather areas.

**Biodiesel Warranty Issues:** The use of biodiesel can not legally "void the warranty" of engines as prohibited by the Magnuson-Moss Warranty Act. Instead, manufacturers warrant their products against defects in materials and workmanship. In general, the use of a particular fuel should have no effect on the materials and workmanship warranty as long as it meets ASTM standards.

Non-the less, manufacturers are concerned that extensive use of biodiesel will result in increased numbers of war-



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ranty claims for what are actually problems caused by the fuel. As a result, most engine manufacturers have statements specifying ASTM standard D-6751 and limiting biodiesel content to lower blends (B5-B30). Community Fuels also recommends that fleets begin at lower blends and move to higher blend levels as they become more comfortable with the fuel.

**Biodiesel Power and Fuel Economy:** No. 2 diesel fuel typically contains about 140,000 BTU's per gallon while B100 biodiesel contain about 130,000 BTU/gal. As a result, higher biodiesel blends may show a slight reduction in the numbers of miles per gallon. Keep in mind that biodiesel has a higher cetane number than standard diesel. Cetane helps to improve ignition quality, enabling quick starts for vehicles. In addition, its higher viscosity range, 1.9-6.0 centistokes vs. 1.3-5.8 centistokes for diesel, helps offset the lower energy content through reduced barrel/plunger leakage resulting in slightly improved injection efficiency. Overall fuel economy with the use of B20 or lower blends is unnoticeable for many fleet managers.

The question remains, why has real world testing of biodiesel blends left operators with the perception that vast differences in power can be expected? Using B100 or high level blends, fuel filter plugging, the gum-like accumulation in injection pumps, and injector cavitation have been blamed for these differences.

**Storage Facilities:** The standard storage and handling procedures used for petroleum diesel should be used for B20. The fuel should be stored in a clean, dry, dark environment. Acceptable storage tank materials include aluminum, steel, fluorinated polyethylene, fluorinated polypropylene and Teflon. Neat biodiesel and biodiesel blends should not be stored for longer than 6 months. If it becomes necessary to store biodiesel longer than 6 months, the acid value should be monitored or ask your fuel supplier to provide the fuel with storage enhancing additive.

## WHO CAN ANSWER MY QUESTIONS?

The following links can provide more details:

The National Renewable Energy Laboratory's *Biodiesel Handling and Use Guidelines* provides detailed information well beyond the scope of this fact sheet and can be found at:

<http://www.nrel.gov/vehiclesandfuels/npbf/pdfs/40555.pdf>

<http://>

For recommendations from the B20 Fleet Evaluation Team see:

[http://www.biodiesel.org/buyingbiodiesel/guide/B20\\_Fleet\\_Recommendations.pdf](http://www.biodiesel.org/buyingbiodiesel/guide/B20_Fleet_Recommendations.pdf)

For more detailed information on standards and copies of engine warranties, please go to:

[http://www.biodiesel.org/resources/fuelfactsheets/standards\\_and\\_warranties.shtm](http://www.biodiesel.org/resources/fuelfactsheets/standards_and_warranties.shtm)

By using the experience of other fleets on biodiesel blends, fleet managers can alleviate their concerns for compatibility. The National Park service has provided an excel spread sheet found at the following link that will help fleet managers locate most vehicles using B20 and higher blends:

<http://www.nps.gov/renew/NPSBiodiesel.xls>

Community Fuels can provide additional contacts and help to best answer your concerns. Community Fuels maintains current Biodiesel information and a variety of links at [www.communityfuels.com](http://www.communityfuels.com)

If further information is desired, you can email your questions to Community Fuels at [info@communityfuels.com](mailto:info@communityfuels.com)