Clean Cities
Alternative Fuel Information Series

Technical Assistance
FACT SHEET

May 2001

U.S. DEPARTMENT of ENERGY,
OFFICE of ENERGY EFFICIENCY and RENEWABLE ENERGY

Biodiesel Offers Fleets a Better Alternative to Petroleum Diesel

Biodiesel is a domestically produced, renewable fuel that can be used in unmodified diesel engines with the current fueling infrastructure. It is safe, biodegradable, and reduces serious air pollutants such as soot, particulates, carbon monoxide, hydrocarbons and air toxics. Performance, storage requirements, and maintenance are similar for biodiesel blend fuels and petroleum diesel. It contains no aromatics or sulfur, has a high Cetane number (good for ignition capabilities), and is a superior lubricant. In addition, regulated fleets can earn Energy Policy Act (EPAct) credits by purchasing biodiesel fuel.

School districts often choose biodiesel because of concerns about health and air quality.

The Technology

Biodiesel is made by chemically reacting alcohol with vegetable oils, fats, or greases. It's most often used in blends of 2% (partly for lubricity) or 20% (B20) biodiesel. It may also be used as pure biodiesel (B100). It is also a very good sulfur-free lubricant. B100 and biodiesel blends are sensitive to cold weather and may require special anti-freezing precautions, as conventional No. 2 diesel does. Biodiesel acts like a detergent additive, loosening and dissolving sediments in storage tanks. Because biodiesel is a solvent, B100 may cause rubber and other components to fail in vehicles manufactured before 1994. B20 minimizes all these problems.

Making It Happen – Availability and Cost

Biodiesel can be purchased from an increasing number of manufacturers and some petroleum distribution companies. The distribution efficiency should improve with expanding market volumes. For a list of biodiesel suppliers, see the National Biodiesel Board Web site at *www.biodiesel.org*

Presently B100 costs between $1.25 and $2.25 per gallon depending on purchase volume and delivery costs. Biodiesel is taxed as a diesel fuel, so taxes are added to the purchase price. At today's prices, B20 costs 13 to 22 cents more per gallon than diesel. However, because it uses existing infrastructure and vehicles, biodiesel may be a least-cost alternative for fleets regulated by EPAct. The cost difference is expected to shrink due to rising petroleum costs, new EPA rules requiring reduced sulfur content in diesel, and improvements in the biodiesel industry such as building larger plants with more efficient production technology.

Agriculture Research Service, USDA

Soybeans ready for harvest. Most biodiesel in the U.S. is made from soybean oil.

EPAct Credit

In January 2001, DOE published the final rule for the use of biodiesel to fulfill EPAct 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 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. Biodiesel credits may not be saved or traded.

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

Success Stories

Biodiesel Fuels Fleets in New Jersey

The New Jersey Board of Public Utilities (NJBPU) has approved an agreement with the New Jersey Department of Transportation (NJDOT) to encourage broader user of biodiesel in the state. NJBPU will use Petroleum Overcharge Reimbursement Fund monies to reimburse NJDOT for the incremental costs of using biodiesel instead of petroleum diesel fuel. NJDOT follows in the footsteps of New Jersey Transit and the Medford Township School District in expanding biodiesel use statewide.

New Jersey motorists benefit from biodiesel in the form of cleared roads and cleaner air.

The school district has used B20 since 1998 in half of its fleet. Bus drivers have found that the use of B20 is transparent, requiring no engine modifications, no special infrastructure, and no fuel-related maintenance problems. DOE and the State of New Jersey provided funding to install a B20 fueling tank. "Expanding the use of biodiesel to a portion of the state's diesel-powered fleet is consistent with New Jersey's overall efforts to promote advanced fuel technology" said Transportation Commissioner and NJ Transit Chairman James Weinstein.

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 pounds 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."

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." Several states, including Minnesota, are considering legislation this year to add 2% biodiesel throughout their diesel fuel pool.

U.S. ARMY Tank Command Approves B20 Procurement

The U.S. ARMY Tank, Automotive and Armaments Command (TACOM) has approved a Purchase Description (PD) for the procurement of B20 to pave the way for biodiesel purchases. TACOM has the responsibility for developing ground fuel specifications for the military and has shared its research with the U.S. Department of Energy. B20 can be used in all non-tactical vehicles and with further research may be used throughout the military. Several U.S. bases have started using B20 in 2001.

Defense Energy Support Center Issues Nationwide Solicitation for Biodiesel

The Defense Energy Support Center (DESC) has issued a biodiesel solicitation in an effort to streamline the process through which federal agencies buy the fuel for use in diesel vehicles and equipment. The move means that federal government fleets will soon be able to obtain biodiesel just as easily as they obtain petroleum diesel through DESC services.

Initially, the solicitation will apply only to B20. The fuel will be delivered to various sites throughout the country to be used by both military and civilian fleets.

One federal agency using biodiesel is the Agricultural Research Service, part of the U.S. Department of Agriculture, in Beltsville, Maryland. "We use B20 in more than 150 diesel engines that range from farm tractors to large generators to trucks, including one bus and even one Humvee,"

U.S. Department of Defense

Military vehicles are a growing biodiesel market, partly because of the Energy Policy Act (EPAct) mandating alternative fuels in federal fleets.

said John Van de Vaarst, Director of Facilities Management and Operations. "We find biodiesel to be as reliable and dependable as regular diesel fuel."

Although the DESC is a component of the Department of Defense, it is the recognized expert in the procurement of fuels for both the civilian and military agencies of the federal government. By using the DESC to buy the fuel, all federal government agencies are able to streamline their acquisition process by simply placing orders against the contract entered into by the DESC.

Any federal agency interested in ordering biodiesel through the DESC contract should notify the contracting officer, George W. Atwood at (703) 767-9509; email: gatwood@desc.dla.mil.

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."

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 (NO_x) emissions may be slightly higher, but several recent tests of NO_x 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.

Biodiesel's Advantages

Easy to use: Biodiesel can be used with your current fueling infrastructure and in all diesel vehicles with little or no engine modification.

Flexible: Biodiesel is easy to phase in and out, so you can maintain flexibility in technology deployment.

EPAct credits: Users receive one EPAct credit for every 450 gallons of biodiesel purchased. Users of B20, which is 20% biodiesel, must use five times that volume, or 2,250 gallons, to receive one EPAct credit.

Reliable engine performance: Biodiesel's high Cetane number and flash point and increased lubricity mean excellent engine performance, safety, and fuel economy.

Cleaner and renewable: Biodiesel cuts exhaust emissions, minimizing black smoke, odor, and greenhouse gas emissions, air toxics, and particulates, and does not contribute to sulfur dioxide emissions (acid rain).

Public utility fleets, with centralized vehicle servicing and fueling, can efficiently deploy biodiesel fuel.

Resources:

- National Biodiesel Board: www.biodiesel.org; 800-841-5849
- National Alternative Fuels Hotline: www.afdc.doe.gov; 800-423-1DOE
- Department of Energy, Office of Fuels Development: www.ott.doe.gov/biofuels; Nohemi Zerbi, 202-586-1480.
- National Renewable Energy Laboratory: K. Shaine Tyson, email: shaine_tyson@nrel.gov

Sponsored by the U.S. Department of Energy
Energy Efficiency and Renewable Energy
Office of Transportation Technologies

Prepared by
the National Renewable Energy Laboratory (NREL)
NREL is a U.S. Department of Energy National Laboratory
Operated by Midwest Research Institute • Battelle • Bechtel

NREL/FS-540-30136
May 2001

Printed with a renewable-source ink on paper containing
at least 50% wastepaper, including 20% postconsumer waste

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