

Regulatory Approvals and Verifications

Biodiesel

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Biodiesel Emission Benefits

	Air				
	CO	HC	PM	Toxics	NOx
B2/B5	<-5%	<-5%	<-5%	<-5%	neutral
B20* Soy	-12%	-11%	-18%	-12-20%	+1.2%
B20**	-32%	-40%	-24%		-5%
B100*	-43%	-56%	-55%	-60-90%	+5.8%

*Source: Shaine Tyson, NREL Report, March 2001 based on test averages

** Source: Dr. Robert McCormick, NREL, May 2005 bus chassis dynamometer testing of conventional city buses with Cummins ISM 2000 engines – No EGR

Biodiesel Health Effects Studies

- Biodiesel is the only alternative fuel to have successfully completed both Tier 1 and Tier 2 EPA Health Effects studies
- Tier 1: UC Davis study (1998) indicated biodiesel exhaust particles (PM) had substantially lower mutagenicity than exhaust particles from CARB diesel exhaust
- Tier 2: Lovelace Institute, New Mexico (2001): Adult albino rats exposed to increasing concentrations of biodiesel engine exhaust over months had no mortalities and displayed only minor lung pathology

Federal mandates and approvals for Biodiesel in government fleets

- B20 blend and B100 are EPA Alternative fuels
- B20 use in government vehicles will qualify them as alternative fuel vehicles just by using Biodiesel
- Executive order mandating biodiesel and biofuel use in all government fleet vehicles to displace petroleum
- When blended with petroleum diesel or burned as a pure fuel, biodiesel can significantly reduce diesel engine exhaust PM, CO, HC, S & air toxics;
- US DOE (NREL) emission testing: NO_x emissions vary with engine type; 2002-2004 HD bus engines operating on B20 blend demonstrate a 5% reduction in NO_x emissions relative to straight ULSD

New Federal Incentives

- 2004 Jobs Bill gives biodiesel distributors a \$1.00 per gallon credit on federal excise tax for biodiesel made from 1st use oil & fat; or a 50-cent per gallon tax credit for biodiesel made from recycled 2nd use cooking oil
- B20 is most common blend in US and CA for Federal EPact fleets, military, UC Davis, Counties of Alameda & Marin, city fleets

2005 Energy Bill and Biodiesel

- 2005 Energy Bill just signed into law with many incentives for biodiesel distribution
- Extended federal excise tax credits
- Defines biodiesel as an eligible renewable
- Establishes a renewable fuels standard in 2006, and, by 2012, sets a minimal level of renewable fuel in nation's fuel pool

Biodiesel mandates in other states

- Minnesota in 2004 mandated 2% biodiesel for all diesel fuel sold in the state
- Provides lubricity enhancement for ULSD
- Establishes significant, consistent demand for biodiesel in the state, encourages oil crop in Ag sector and promotes biodiesel production
- Other states are pursuing similar mandates for low 2-5% blends for entire state diesel fuel pools; following Europe's lead

Biodiesel Reluctance in CA

- CARB Public Fleet Rules currently do not encourage biodiesel use in our state
- Historically held back due to 1-2% NO_x increase by B20 blends; new data and new technologies now address NO_x issues
- Solid Refuse trucks can not use B20 as an emission control strategy despite prior successful B20 operations
- Transit buses require special variances to run on any biodiesel blend or alternative fuel other than pure ULSD

NOx Issues being addressed

- Previous EPA cited testing data in question
- Engine dynamometer vs. chassis tests give different NOx emission profiles for B20
- EPA data based on averages for older engines (pre-1991); some engines showed decreases in NOx emissions but the average of all testing indicated +2% NOx increase
- Newer 2002-2004 transit bus vehicle testing at NREL indicated a 5% reduction in NOx emissions for B20 blend with ULSD

New NOx reducing technologies promising for biodiesel

- NOx reducing additive technologies undergoing CARB verification testing with B2 and B20
- Compatibility with NOx reducing after-treatment devices, however, remains to be demonstrated
- New engine technologies to lower NOx emissions should be compatible with biodiesel as long as the biodiesel fuels absolutely meet ASTM specs

Government fleets operating on B20

- Current CA regulations make it difficult for federal fleets to comply with federal EPA Act, biofuel executive orders & other biofuel mandates
- SB 975 allows federal, state, local agency, utility, and waste hauler fleets the ability to utilize biodiesel blends up to B20 in conjunction with a retrofitted vehicle

New Opportunities for Biodiesel

- Renewed emphasis on reducing greenhouse gases using biodiesel based on carbon life cycle analysis
- Energy security and petroleum reduction strategy using biodiesel as a domestic renewable fuel
- “Fuel Retrofit” for ports, vessels, border crossings
- Opportunities to ‘grow energy’ in California: high oil-yield mustard crop to produce biodiesel
- New CEC Research & Development grants for transportation technologies and strategic planning with alternative fuels; integrate w/ CARB studies

Biodiesel as a 'fuel retrofit'

And let's never forget children riding school buses

