U.S. Department of Energy
Energy Efficiency and Renewable Energy
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Biomass Program

Bioproducts R&D

Evaluation of Performance and Emission Benefits of Renewable Diesel Transportation Fuel

Biodiesel, a fuel made from vegetable oils such as soy oil, waste cooking oil, or from animal tallow, is currently being used as a blend with conventional fossil-based diesel in a few transportation sectors. Approximately 25 million gallons of biodiesel is consumed annually, primarily as a 20% blend (B20) by fleets wishing to comply with EPAct. Pure (neat, B100) biodiesel has yet to be fully qualified as a large-scale transportation fuel. Biodiesel and biodiesel blends provide both petroleum displacement and particulate matter reduction.

A number of issues prevent greater market penetration for biodiesel. Among the most important are concerns from the auto/engine and petroleum industries regarding biodiesel quality and oxidative stability, and the impact on long-term engine durability. Additionally, in some engines use of biodiesel or blends can cause an increase in nitrogen oxide emissions.

Ethanol-diesel blends (up to 15% ethanol, also called E-diesel) are also being evaluated because of their potential to displace petroleum while reducing emissions of particulate matter. A significant challenge to the use of E-diesel blends is their low flashpoint and potential to produce a flammable fuel-air mixture in vehicle fuel tanks.

Biodiesel produced from soybean oil can displace petroleum and reduce emissions of global warming gases.

R&D Pathway

A survey of biodiesel quality and stability is being conducted. Improved fuel quality and stability testing methods are being developed. In collaboration with auto/engine manufacturers the impact of biodiesel on long-term durability is being assessed. The magnitude of the NO_x emissions increase is being measured and methods for addressing this issue are being tested. The impact of E-diesel on pollutant emissions from various engines is being determined. Engineering solutions to the flashpoint/flammability issues are undergoing laboratory tests.

Benefits

- **Determine performance and environmental benefits of biodiesel as a blended or pure transportation fuel**

Applications

Characterizing the performance and emissions of biodiesel blends, neat biodiesel, and ethanol-diesel blends will enable more accurate estimates of the benefits of these renewable fuels and increase market acceptance.

Project Partners

National Renewable Energy Laboratory
Office of FreedomCAR and Vehicle Technologies, Fuels Technology Program

Project Period

FY 2003 – FY 2004

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Visit the Web site for the Office of the Biomass Program (OBP) at
www.eere.energy.gov/biomass.html

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