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Biodiesel is focus of statewide conference

September 19, 2004

By ED BARNA *Correspondent*

Those attending an environmentally oriented conference scheduled for the State House on Wednesday will do more than chew the fat. They plan to thoroughly discuss the use of an alternative fuel.

Waste cooking fat, rendered animal fat, and oils produced from soybeans and other plants can all be processed for fuel use in diesel engines.

Biodiesel will be the main subject during a nine-hour session jointly sponsored by several state agencies and departments and the Vermont Sustainable Jobs Fund, the Northeast Regional Biomass Program and the Vermont Biofuels Association.

Though currently more expensive than petroleum-based fuels, biodiesel is viewed by a growing number of proponents as having compensating advantages. They argue that it is a renewable product that can help reduce some environmental impacts of fuel-burning and decrease the dangers of global warming. It could also help farmers, stimulate job creation and keep dollars circulating within the state if available in Vermont.

The formation of the Biofuels Association, a trade association that began to take shape last September, is another sign that a Vermont biofuels sector might be feasible, according to Netaka White, co-director with environmental book author Greg Pahl. Members include the Vermont Fuel Dealers Association and a number of new companies that see opportunities opening in the field.

Global E. Industries of Cavendish, Dog River Alternative Fuels of Berlin, the Vermont Alternative Energy Corporation of Williston and Green Technologies of Burlington are all involved, White said. Less than a month ago, he said, Vermont's first biodiesel pump began selling "B20" fuel (20 percent biodiesel, 80 percent conventional diesel), in Brattleboro, under Rick Fleming, a fuel dealer who operates in both Vermont and New Hampshire.

"We're not saying it's going to replace petroleum diesel," White said. "What we're saying, based on growth in other parts of the country, is that biodiesel is a very good, immediately available alternative to decrease our reliance on foreign oil. I think that's an issue that resonates with a lot of Vermonters."

But this is not a case where environmentally conscious Vermonters are leading the nation, White said. Other states where fields of soybeans or rapeseed (canola oil) are more common have already established the National Biodiesel Board (www.nbb.com), which hopes to see biodiesel account for 10 percent of the fuel supply by 2020.

Vermont's own biodiesel producers have yet to put their products through federal standards for transportation fuel, White said, but these can already be used in heaters or farm equipment. This year the Biofuels Association estimates that 40,000 gallons of biodiesel

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fuel will be used in Vermont, compared with 8,000 a year ago, and only 1,200 in 2002.

One of last year's best-publicized uses for biodiesel involved the Middlebury College Biobus, a converted 35-passenger school bus that took 13 students to California and back using waste vegetable oil from restaurants and other kitchens. This was a rock-climbing expedition, not a rolling teach-in, but the degree of public interest inspired the students to incorporate Project BioBus Ltd. as a nonprofit corporation and to start planning for a second trip.

On Sept. 13, there was a send-off ceremony at the campus, as eight of the original Biobus riders and five newcomers began a 90-day, coast-to-coast journey of 15,000 miles in a logo-decorated, 75-passenger bus. This time, according to spokesman Kyle Von Hasselyn, the goal is educational, and the trip will include stops at schools and colleges in and around 22 major cities.

Along with talking to these institutions about the nature and implications of biodiesel, the group "will connect them to the nearest biodiesel distributors and offer strategies for alleviating the short-term marginal cost of the fuel," said a press statement at the time of their departure. "Since, for the school year prior to our trip, BioBus members have been working with several school districts across the country to facilitate the use of biodiesel in their bus fleets, we will also be in a position to offer firsthand experience."

A little education

To fully understand what is going on here, it helps to know something about diesel engines and about the way biodiesel is produced and used.

Rudolf Diesel (1858-1913), a German engineer, in 1892 patented the idea for an engine that would use compression to make its fuel burn rather than an ignition spark. (Think of how pressure makes the earth's core hot enough to melt iron, or how squeezing a snowball helps pack it together.)

Diesel and others gradually solved the technical problems of making such engines work efficiently. Initially, the compression engine was designed to run on a variety of fuels, including heavy mineral oil and coal dust suspended in water, but the one he brought to the 1900 World Exposition in Paris ran on 100 percent peanut oil.

Something of a social visionary as well as an inventor, Diesel wrote in 1911 that "The diesel engine can be fed with vegetable oils and would help considerably in the development of agriculture of the countries which use it." In 1912, he said, "The use of vegetable oils for engine fuels may seem insignificant today. But such oils may become in course of time as important as petroleum and the coal tar products of the present time."

However, biodiesel isn't exactly the same as vegetable oil. It is processed from vegetable oil in a way that lets present-day diesel engines burn it without being modified.

Von Hasselyn said he learned about biodiesel from the book "From the Fryer to the Fuel Tank," by Joshua Tickell. His Web site, www.veggievan.org, says that chemically the process of making it is called transesterification and involves taking a triglyceride molecule, or a complex fatty acid, neutralizing the free fatty acids, removing the glycerin, and creating an alcohol ester. This is accomplished by mixing methanol (wood alcohol) with lye (sodium hydroxide) to make sodium methoxide, which is mixed with the oil and left to settle.

"Glycerin is left on the bottom and methyl esters, or biodiesel, is left on top," Tickell says. "The glycerin can be used to make soap (or any one of 1,600 other products) and the



methyl ester is washed and filtered."

Von Hasselyn said that for soapmakers, "biodiesel is their waste product." The glycerin can be composted if there is no other use for it, he said.

Tickell and others say the resulting biodiesel can be mixed with regular fuel or heating oil in any proportion. "The resulting biodiesel fuel when used directly in a diesel engine will burn up to 75 percent cleaner than petroleum diesel fuel," he stated.

The pollution issue, Tickell later makes clear, is more complex than that. Though superior to regular diesel in most respects, biodiesel does create more nitrogen oxides (NOx), a major component of smog. That might seem to have more to do with California than Vermont. But according to Gina Campoli of the Vermont Agency of Transportation Policy and Planning Division, "we're right on the edge of Clean Air Act compliance in Vermont."

Campoli is among those helping to organize the biodiesel workshop, in view of its overall, long-term potential. Several state agencies will be there, she noted, "to identify issues and try to find out the state's role in support of the industry."

Nationally, about 500,000 gallons of biodiesel were produced in 1999, and about 25 million gallons in 2000, Von Hasselyn said. "There's definitely a market for it," he said.

There's definitely a future for it, if the two presidential candidates are an indication. President Bush has been praised by a soybean growers' association for saying "I believe in biodiesel," and John Kerry's campaign bus in Ohio was powered by it.

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