

Renewable Energy on the Farm

COMMUNITY ALLIANCE WITH FAMILY FARMERS

CAFF members are very interested in alternative sources of on-farm energy, and for this issue of the *Agrarian Advocate* we've added a special renewable energy section with a range of topics and perspectives.

Biodiesel is currently one of the most talked-about renewable energy sources. Some CAFF members are making their own biofuel from recycled veggie oil, while others are buying fuel through co-ops to run their farm equipment. Biofuel is a developing field, however, and the energy experts at the National Sustainable Agriculture Information Service (ATTRA) caution that the jury is still out on the economic feasibility of growing energy crops in California. We encourage you to seek out additional information in your quest to make your farm energy efficient.

Biodiesel for California Farmers?

By AL KURKI, AMANDA HILL, & MIKE MORRIS

Adapted from Biodiesel: The Sustainability Dimensions, a publication of ATTRA—The National Sustainable Agriculture Information Service.

Download the entire publication at www.attra.ncat.org

Biodiesel offers well publicized environmental, economic, and national security benefits. Biodiesel combustion generally emits fewer regulated and non-regulated pollutants than petrodiesel. It extends engine life and is a biodegradable product.

Biodiesel could benefit farmers and rural communities, depending on the ownership of production facilities and the mix and marketability of useful co-products. And biodiesel could reduce dependence on foreign oil and associated fluctuations in availability and price.

Simply put, biodiesel is the product of mixing vegetable oil or animal fat with alcohol (usually methanol or ethanol) and a catalyst, usually lye. Glycerin is the main by-product.

Biodiesel performs very similarly to low-sulfur petroleum-based diesel in terms of power, torque, and fuel efficiency, and does not require major engine modifications. No overall perceived decrease in performance is noted for most vehicles using biodiesel, even though, on average, there is five percent less torque, power, and fuel efficiency. Biodiesel is considered a safer fuel than petrodiesel. Biodiesel has a high flashpoint of over 300°F (150°C), compared to 125°F (52°C) for petrodiesel. The flashpoint is the temperature at which a fuel's vapor can be ignited. Biodiesel also has a relatively high boiling point and is generally considered safer to handle.

Biodiesel can be produced from virtually any kind of vegetable oil—new or used. The U.S. Department of Energy estimates that 26.7 million gallons of biodiesel were sold in 2003. Total U.S. diesel consumption that year was more than 39.9 billion gallons.

Getting a Fair Return for Farmers

Ownership and design of biodiesel production can also affect the feedstock price and the rate of return to farmers. Farmer ownership of at least part of the production process beyond the farm gate keeps more dollars in farmers' pockets and in the local community.

Another dimension related to farmers making a reasonable profit is the value of biodiesel co-products. For example, entrepreneurs and scientists in Montana considering biodiesel development in that state discovered that a biodiesel plant could not pay farmers a sustained fair price for their bioenergy crops (canola or industrial rape) unless the co-products could be manufactured and sold.

This means that a biorefinery is probably the most economically sustainable means of larger-scale biodiesel production. In a biorefinery, the crude vegetable oil pressed from bioenergy crops is the base for all sorts of products, ranging from relatively lower value biodiesel to biolubricants for motors. The crop pressings have potential value as biopesticides and animal feed.

Biorefineries are not a new concept. They are, in fact, similar to petroleum refineries. Their process complexities, capitalization, and permitting requirements go far beyond making biodiesel in the garage or farm shop.

Scale of Biodiesel Production is Key

In the Kansas-based Land Institute's Sunshine Farm project, researchers found that farm-scale biodiesel production might not be cost effective for farmers to pursue individually. They concluded that some level of community-scale biodiesel production with standards satisfactory to engine manufacturers would be more feasible.

To produce biodiesel on a farm, individuals would each have to spend too much energy and resources. Small community-scale biodiesel production would likely produce more biodiesel for less effort. That scale of production was not precisely defined in the Land Institute report. Far more research and documented practical experience is needed with biodiesel production in dispersed, near-farm, and community-level settings.

For more information, contact Mike Morris at ATTRA—The National Sustainable Agriculture Information Service, (800)346-9140, mikem@ncat.org, or see the ATTRA website www.attra.ncat.org. ATTRA is a project of the National Center for Appropriate Technology (NCAT) and is funded under a grant from the United States Department of Agriculture's Rural Business-Cooperative Service. The NCAT website, www.ncat.org, offers many resources about renewable energy and sustainable communities 

Biodiesel Tips for Farmers

By KENNETH OTT

I admit it. I didn't grow up on a farm. But I love cooking and eating right. I shop farmers' markets, Berkeley Bowl...and Safeway. I buy organic foods when I can to support sustainable, wholesome farming. Our company, Bay Area BioFuel, was also founded on doing right in the world. We recycle urban waste (used restaurant cooking oil) into biodiesel—a renewable fuel for diesel engines.

Biodiesel is all the rage among greenies now. And while not yet price-competitive, many of our current farm customers use it for its intangible benefits:

- Exhaust emissions that are much better for their air, soil and workers than red dye diesel #2
- Lubricating properties leading to longer engine life
- Support for American farmers and local, sustainable businesses instead of oil cartels
- Cutting America's foreign oil addiction
- Biodiesel's biodegradable, nontoxic and nonflammable properties

You don't need to do expensive conversions beyond changing rubber fuel hoses to synthetic on older equipment. Our customers use our B100 (100% biodiesel) fuel in farm tractors, heavy trucks,



Amy Siemers <http://xpress.sfsu.edu/archives/tech/005389.html>

cars, boats, and generators. You can mix biodiesel with diesel #2 in any ratio, from 5% (B5) to 100% (B100). There are tax credits for some end users of biodiesel.

Our company has been in the business for several years now. We've learned a lot from testing and feedback. Here are some general tips for biodiesel use:

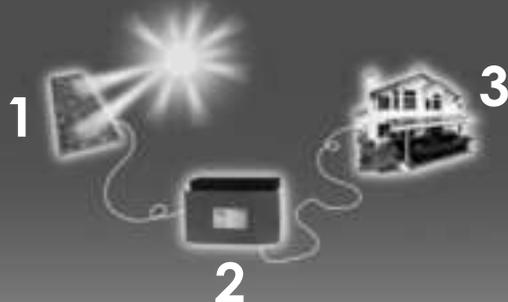
- Verify your equipment manufacturer's statements regarding biodiesel blends. You can check many of these at the National Biodiesel Board's website, www.biodiesel.org.
- Start with a 20/80 blend of biodiesel and petrol diesel and work your way up.
- Make sure your container is shut tightly to avoid rainwater or other contamination.
- Be aware that biodiesel gels between 32 and 40 degrees Fahrenheit, so run a B20 blend (20% bio) during cold months.
- Choose a vendor who will provide phone and email support for your farm's biodiesel usage with a dedicated account representative, until the industry matures.
- Although biodiesel has comparable power to diesel #2, it may have up to 5% less energy, thus slightly reduced mpg. If I had to choose between a small hit on mileage and less toxins in my food, I'd prefer the second option.
- The first few months you run 100% biodiesel, the solvent nature of B100 will clean out any petroleum deposits built up in your fuel systems. So you will need to change your fuel filter once or twice during this time.
- You can get away with not changing rubber fuel lines for a couple of months or a year, but eventually they will deteriorate. It's best to change these hoses prior to using biodiesel in older (pre-1996) equipment.

Bay Area BioFuel is a small start-up based in Richmond, California. A band of urban biodiesel farmers, we began operations with the idea of reducing asthma-inducing pollution in the SF Bay Area.

Once you fill up your tractors and trucks with biodiesel, there's no going back! Breathe in the fresh air and Go Green in 2006! If you'd like more information, contact us at (510) 236-3385, by email: sales@bayareabiofuel.com, or through our website www.bayareabiofuel.com. 



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Ecological Farming Association Brings Smart Energy Management to California

BY CREEK HULL

While watching the price of diesel climb towards \$3 a gallon, farmers and ranchers have become increasingly interested in alternatives to protect themselves from these volatile energy costs. In response to farmer concerns about energy's bite out of the bottom line and growing interest in ecologically sound alternatives, the Ecological Farming Association (EFA) has launched "Smart Energy Management in Agriculture." Through a series of on-farm trainings, the program is helping farms, ranches and wineries increase their energy independence and decrease fossil-fuel use.

"We know that renewable energy is on people's minds. This project is well timed," said Kristin Rosenow, EFA Executive Director. "The Smart Energy Management program is part of a larger discussion about defining what is truly ecologically sustainable agriculture." Many farms, even those classified as organic, are not "sustainable" because of a dependence on fossil fuels and electricity. California agriculture accounts for 14% of the state's diesel fuel consumption and 7% of the electrical consumption annually, according to the California Farm Bureau.

Many farmers have identified the two-fold benefit of minimizing energy costs while decreasing their operation's ecological footprint. Others seek energy independence. Energy use is the final frontier in the quest for ecological sustainability and an arena where pioneering farmers are breaking new ground.

The goal of Smart Energy Management is to give interested farmers a head start by showcasing what technologies are available, how to apply them on their own farms, and what financing and tax advantages are available. "Farmers are busy people," Rosenow said, "and the program saves them a lot of time doing research."

In addition to the application of new technologies, the trainings include methods for conserving energy. Farmers can increase energy efficiency by using strategies like time-of-use metering, and minimizing leaks and inefficient equipment.



Farmers learn about biodiesel and veggie oil tractor conversion with Steve O'Shea at Laguna Farm in Sebastopol.

Using EFA's workshop style, developed through 25 years of close work with farmers, Smart Energy Management draws on a fleet of experts, industry representatives, and farmers with time-tested experience to bring the most locally relevant information to farmers. In addition to system designers and industry experts, participants are meeting farmers who have already applied renewable technologies on their land. This allows for in-depth discussions of photovoltaics, biofuels, wind energy, methane digestion, and more.

Current prices for biodiesel don't exactly compete with conventional diesel, but they are getting closer. However, the goal isn't purely economic. Preston of Dry Creek Winery and Vineyards in Healdsburg runs tractors on straight vegetable oil. The farm supplements its electricity use with a photovoltaic array. Lou Preston says that the goal goes beyond profit and reaches more toward the vision of energy independence and ecological sanity—an

extension of practices like composting, cover-cropping, and integrated pest management on his organic farm and winery.

Solar, however, can already save money. David Henry—a northern California farmer and licensed contractor of solar and wind electric systems—installed a 35 kilowatt solar electric system on his orchard/store complex. Henry calculated that in 2003 he eliminated 87,000 pounds of CO² and provided 100% of his energy requirement with the installation of the photovoltaic system and energy-efficient lighting. The system should pay for itself in about one year.

The Ecological Farming Association's Smart Energy Management trainings began in March on the North Coast and will come to the Central Coast in the fall. Final trainings will take place in the Central Valley in 2007. The program is being supported in part by a grant from the Western Region Sustainable Agriculture Research and Education. For more information, contact the Ecological Farming Association in Watsonville, California, at (831) 763-2111 or www.eco-farm.org. 

Farm Energy Publications from ATTRA and the National Center for Appropriate Technology (NCAT)

These publications and many more about sustainable agriculture can be downloaded from the ATTRA website, www.attra.ncat.org, or call (800)346-9140 for a printed copy. ATTRA's website also offers numerous links to important resources about renewable energy for agriculture, including solar, biomass, biofuels, wind, and dairy. ATTRA is a project of NCAT, whose website, www.ncat.org, offers many resources about energy management.

Biodiesel: A Primer

Provides instructions for making small batches of biodiesel from both new and used vegetable oil. Includes safety considerations, information about cost and storage of materials, and resources.

Oilseed Processing for Small-Scale Producers

Also available are publications on topics such as: Energy Conservation and Efficiency; Renewable Energy Options; Reducing Nitrogen Fertilizer and Indirect Energy Usage; Reducing Food Miles & Transportation Energy

Biodiesel: The Sustainability Dimensions

Surveys many dimensions of biodiesel production and use: net energy balance, sustainable bioenergy crops, scale of production, consumer access, and the economics of biodiesel.

Ethanol Opportunities & Questions (available May 1)

Clean Air USA

Clean Air USA is an alliance of concerned citizens and organizations that share a common vision. They believe that our nation's health and well-being depend on our ability to develop an alternative fuels infrastructure today, so cleaner domestic fuels can find a permanent place in the nation's energy portfolio.

The mission of the nonprofit Clean Air USA is to improve the quality of air and health by reducing the cost of clean-burning, domestically produced biodiesel. To accomplish this, the group is raising funds for direct support of groups that provide fuel or install biodiesel pumps at truck stops around the nation.

Another goal of the nonprofit is to help farmers produce cost-competitive energy crops for local or regional markets. Biodiesel can be produced in California from recycled cooking oils or from agricultural feedstocks such as rapeseed, mustard seed, cottonseed, soy, and other farm products.

Clean Air USA works with communities around the country to identify the resources and individuals needed to make alternative fuel the first choice of our nation's truckers and the millions of others

who operate vehicles now solely dependent on toxic, imported fuels.

Clean Air USA believes that the key to achieving our goals is to think local. Today, most biodiesel feedstocks in California are trucked in from midwestern sources, adding unnecessary expense at the pump and discouraging consumption.

However, at the National Biodiesel Board Convention last month in San Diego, USDA Under Secretary for Rural Development Thomas Dorr stated that his office could help turn things around. Funding is now available from the USDA Office of Rural Development to stimulate the production of local energy crops.

In addition to favorable public policy, private sector opportunities may also exist for development of related industry infrastructure, including oil-seed processing.

Clean Air USA expects California to emerge as a leader in developing a new harvest of energy crops like mustard seed, cottonseed, and others. These crops could allow the state to bring down the cost of biodiesel, while at the same time opening new markets for California's small farmers.

Go to www.cleanairusa.org to learn more. 



Amy Siemers <http://xpress.sfsu.edu/archives/tech/005389.html>

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