

Note: This report was written in 2006 for a green networking site I was co-developing with a colleague; the project ended abruptly, without launching, due to his unexpected passing.

Tired of Diesel Fumes Around Your Heating Oil Tank?

*How the “French Fry Fuel” is Giving Homeowners
An Eco-Friendly Answer to Oil vs. Gas*

By Phila Hoopes

Talk about heating an old house, and your friends will nod their heads in sympathy. Talk about heating an old house sustainably, phasing out your fossil fuel usage, and you're likelier to get empathetic groans.

This was the challenge that faced me as I read the Farmer's Almanac prediction of a cold and snowy winter, 2006. I practically shivered in the August heat, thinking of my 1950s-era monster-sized steam boiler, the diesel fumes around the oil tank in summer, the thousands I'd shelled out to clean and repair my clogged-up chimney.

Was it possible to set up a clean, eco-friendly heating system on my modest budget, without taking out a second mortgage for major retrofits to my house?

I didn't expect that my search would lead me to the soybean fields of Maryland's Eastern Shore and back again to northern Baltimore City, with the smell of French fries floating in the air...

The fuel options that I started with were pretty simple. Kevin Frazier, the representative for my current distributor, Carroll Independent Oil, told me both oil and natural gas boilers are far more efficient today than formerly, whereas the Monster was losing up to 45% of the heat it generated (ouch!).

Surprisingly, oil seemed to have an advantage: the U.S. Department of Energy has found that new oil heat systems were 16% more efficient than natural gas systems and 30% more efficient than electric systems.

But I still wasn't happy about it.

Sure, from an energy-efficiency standard, it looked good. But the American oil addiction, to my mind, is the direct cause of death for – how many? – servicemen and women in the Middle East. It is the ongoing cause of environmental destruction around the world, bringing air and water pollution, deforestation, loss of wildlife habitat, floods and landslides wherever drills break ground. It's one of the direct causes of global warming. It's one of the weakest links in U.S. national security. And the list goes on.

What about natural gas – Isn't that supposed to burn cleaner?" I asked.

"Not so," said Frazier. "With the new burners, one BTU of low-sulfur oil releases less pollutants into the atmosphere than one BTU of piped gas. The extraction process is only marginally less destructive than the process for oil."

Further, I knew from my own reading that natural gas extraction projects are devastating pristine rainforest regions and bringing cultural genocide to isolated South American tribes.¹

¹ www.amazonwatch.org/amazon/PE/camisea/

Bottom line: Whether I used oil or natural gas, my boiler's emissions might be clean, but my conscience wouldn't be. There had to be another answer.

So I went digging, looking for another fuel that was 1) renewable, 2) usable with minimal changes to my system, and 3) affordable. I'd heard about the "French-fry fuel" called biodiesel...might this be an option?

Amazingly enough, I discovered, it is.

As Brian Warren of Maryland Biodiesel said, "Biodiesel is a domestic, renewable, fuel for diesel engines, derived from natural vegetable oils such as soybean, sunflower, rapeseed, corn, or cottonseed...or even discarded oil from fast-food restaurants! It can be blended at any level with petroleum diesel; it is less toxic than table salt, and dilutes faster than sugar. It is biodegradable and decreases petroleum exhaust emissions by 50%, while it also dissolves accumulated sediments, cleaning the engine and improving efficiency. Rather than the choking black smoke that's the trademark of petrodiesel, biodiesel leaves behind clear air and the smell of French fries."

It's amazing to me, that, evidently, no fast-food companies appear to have invested heavily in biodiesel as part of their advertising budget...at least so far.

Biodiesel is famous in grassroots legend as an alternative fuel for creative and committed fuel-it-yourself drivers who brew up batches from leftover restaurant cooking oils. Singer Willie "Bio-Willie" Nelson has made it a popular byword, with biodiesel stations across the southern U.S. and California. However, it's gained significant recognition in the halls of government and in corporate fleets as well.

The Department of Energy² calls biodiesel the "fastest growing alternative fuel in the nation," with over 250 major fleets using it, including all four branches of the United States military, NASA, Yellowstone National Park, and many state transportation departments, city fleets and municipal bus systems. In June 2006, the White House presented the Closing the Circle award to the Department of Defense, Naval Station Great Lakes; the Department of Energy Green Fleet Team and the U.S. Postal Service for their use of B20 biodiesel in their fleets.

Cultural light-years away from the backyard breweries, even Corporate America is waking up to the potential of biodiesel. In January 2005, World Energy, the nation's leading producer and distributor of biodiesel fuel, announced an exclusive production agreement with Dow Haltermann Custom Processing (DHCP), a partnership between The Dow Chemical Company and Johann Haltermann, Ltd.

What isn't quite so prominent is the use of biodiesel as a heating fuel. This, however, is beginning to change.

"After all the work I did to promote biodiesel, I'm actually having to put the cat back in the bag," said Paul Nazarro, founder of the National Biodiesel Board, when I asked him about this use. The increased public interest in biodiesel has led to many requests about its home heating potential, and at this stage he feels some caveats are still in order.

"To begin with, I recommend that homeowners start with a B5 blend (5% biodiesel, 95% petroleum diesel) or lower," he said. "We have seen technical issues that compromise blends

² <http://www.federalsustainability.org/initiatives/biodiesel/biodieseltrg.htm>

greater than B20. There's an interaction with yellow metals, especially copper, in which the metal acts as a catalyst to oxidize the biodiesel, leading to a propensity for sediment to block the pipes."

To compensate for this, experts advise that homeowners add a stabilizing agent and a monitor in the burner to shut the system down if the pipes become clogged with sediment. Before receiving their first delivery of biodiesel heating oil – called BioHeat – they should ask their oil distributor to clean their oil tanks, piping, filtration and burner head. By starting with a low percentage of biodiesel (B2 or B3, for example), they can safely work up to a higher ratio.

While the National Biodiesel Board says that the fuel is safe in blends below B20, they warn of issues with higher percentage blends:

- Because biodiesel has solvent properties, it can degrade rubber seals, causing fuel-pump seal failures. This is only the case with blends that have high percentages of biodiesel, used in older systems with genuine rubber. Newer heating equipment is usually built with Teflon or Viton (synthetic rubber), and is not affected. It's important for homeowners to check and be sure.
- Storage tanks made of brass, bronze, copper, lead, tin or zinc may respond to biodiesel – or petrodiesel, for that matter – with increased sedimentation, leading to clogged filters. Premium heating oil packages include metal deactivators in premium heating oil packages to bind the yellow metals and limit the corrosion inside the storage tanks. As a preventive measure, homeowners can change their oil lines from copper to stainless steel. With B5 to B20 biodiesel blends, this is less of an issue.
- Unlike petroleum diesel, biodiesel burns clean. Where the electronic eye in a burner may shut down the system to prevent "puffback" or explosion if the fire is obscured by atomized petrodiesel, blends with a high percentage of biodiesel may cause the eye not to "see" the fire, and shut the burner down.
- As with petroleum diesel, blends with high percentages of biodiesel can gel at low temperatures. For this reason, experts advise homeowners to store it underground or in insulated or heated tanks, or to add kerosene to maintain liquidity. Blends below B20, however, should have no difficulty with gelling.

The National Biodiesel Board, in fact, discourages the use of blends over B20. The Underwriters Laboratory specifies the type of fuel that may safely be used in household furnaces and boilers, said Nazarro, and the agency has not yet reviewed or approved any blend of biodiesel. "Even if you are using a blend with 5% biodiesel, you are using a nonconforming fuel, and you could find yourself in a very difficult position if there were a fire in your house. Your insurance company may not be willing to pay the claim." The National Biodiesel Board is "working aggressively" with UL, he said, and expects to see their testing demonstrate the safety and effectiveness of B5 biodiesel within the coming months. Getting their approval for higher-percentage blends could take "up to 10 years," he added.

Stan Sersen, CEO of the EnviroCenter in Jessup, Maryland, however, is one of the enthusiasts who hasn't let insurance worries stop his company from using biodiesel. "We heated our building for the past year with B100, and had no difficulty," he said. "The only issue was that the burner manufacturer's warranty doesn't cover use of biodiesel. We looked at getting a burner that is covered for biodiesel, and found one in Germany – they use biodiesel much more commonly there. However, the cost was five times as much as the burners we could get here. So we chose to get the less expensive type and replace it every two years."

Another factor in the NBB's B20 recommendation is, simply, limited supplies. While farmers are getting government grants to grow soybeans for fuel, at present there are 60 existing biodiesel processing plants in the U.S., with 60 more under construction, reaching a 700-million gallon production capacity in the next few years. If demand increases at its current rate, however, it could well exceed, or double, the billion-gallon mark. "There are only so many soybeans to meet the demand," said Nazarro. Other feedstock crops, plus recycled restaurant oil, may take up the slack: according to the Energy Information Administration³, roughly 50% of today's processing plants can make biodiesel from recycled grease.

For homeowners looking to switch to biodiesel, distribution and price are a key issue right now – and this is likely to change in the not-too-distant future. While only three Maryland distributors (Tri-Gas & Oil, Tevis Oil, and Cropper Oil) currently offer biodiesel blends for home heating, a groundswell is growing in this direction.

On September 15, 2006, the Chesapeake Sustainable Business Alliance launched the Baltimore Biodiesel cooperative in northern Baltimore City to advocate, research, promote and sell the biofuel at affordable prices. Will the co-op be selling fuel for heating purposes? "Members can purchase the biodiesel for whatever purpose they choose – their car, their boat, their home," said CSBA Executive Director Keith Losoya. Buying its fuel in bulk through Taylor Oil, the co-op will sell to members at rates only slightly higher than petrodiesel, and considerably lower than the price for individuals.

Plans are maturing for even more Baltimore-area biodiesel providers: In 2007: Mid-Atlantic Biodiesel will be constructing a processing plant at the EnviroCenter facility in Jessup, MD. Using recycled restaurant oil as its feedstock, this plant may reach a 500,000-gallon capacity, with blends appropriate both for vehicles and home heating use.

And thanks to the Maryland Soybean Board⁴, oil distributors have even more incentive to offer biodiesel for home heating. Starting in October 2006, the MSB is providing an incentive of \$1000 toward marketing expenses for distributors to offer the NBB-approved B5 blend called BioHeat™.

Is biodiesel the answer to efficient and affordable home heating without fossil fuels, and with minimal to no retrofitting? A small but growing number of enthusiasts answer "Yes!" -- though it remains to be seen whether insurers will cover the use of high percentages of biodiesel for home heating. But it is becoming possible for homeowners to begin reducing our dependence on fossil fuels, and high demand is moving suppliers quickly in the right direction.

Stay in touch with the biodiesel conversation – visit www.greensitesunited.com and find out more about this and other "green" subjects of interest.

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³ <http://www.eia.doe.gov/kids/energyfacts/sources/renewable/biodiesel.html>

⁴ <http://www.mdsoy.org/consumer/promotebiodiesel.htm>