

My car gets about 45 MPG, and my fuel is free. What? You're dubious? Let me explain.

Biodiesel is an alternative diesel fuel that can also be used for home heating oil. It is made by taking vegetable oil such as soy or canola and putting it through a two-stage chemical process to make it lighter and more fluid. This new liquid, biodiesel, can be used in most applications that diesel fuel is used in. When the temperature drops below about 35°F, however, things get a little . . . sticky, and biodiesel needs to be mixed with regular diesel to prevent gelling. B20, the trade term for a mix of 20% biodiesel and 80% diesel, is available for general consumption at the Shell station on Canal Street in Brattleboro. A biodiesel mix may be available for home heating soon thanks to Flemming Oil.

But still, 144 MPG? How? My car's real MPG is most accurately determined by the ratio of the petroleum that it took to produce the biofuel divided into the miles traveled using that fuel. Net energy is an important concept to understand as we assess alternative energy sources - how much energy do we really get out of a source when everything is factored in? Ethanol - the 'green' gas additive, it turns out barely breaks even, and fuel cells have a negative net energy. Commercial biodiesel has a 'net energy ratio' of 3.2 -- to make 3.2 gallons of biodiesel requires one gallon of petroleum in the form of the energy used to produce the fertilizers and pesticides, till the field, process the grain, and transport the biodiesel to market. So, my wee little Volkswagon Golf, which gets an average of 45 MPG, when driving on 100% biodiesel actually gets $45 \times 3.2 = 144$ net miles per gallon.

Barry Aleshnick is a Coop member who has converted his diesel VW Jetta to run on filtered waste restaurant grease. He did this by installing a kit in his car that includes a separate fuel tank for filtered grease in the trunk and a hose that brings hot radiator fluid back to heat that tank when the car is running. He starts his car on the regular diesel (or biodiesel) in his regular fuel tank, and when the grease tank gets warm he flips a switch on his dashboard that switches over to feed his engine with grease. The warming process is necessary because diesel engines can burn many kinds of fuel, but need that fuel to flow well - like water, not like honey. My guess is that if we were to calculate Barry's car's MPG - total miles traveled in a year divided by the total amount of petroleum used that year - it would average around 500 net MPG. Then again, when he is commuting back and forth from Guilford to the Coop on his bicycle his MPG is nearly infinite, but that's another story.

Biodiesel can be a do-it-yourself operation. Other Coop members, the Bradford-Greenberg family, have been producing it in Guilford in 40 gallon batches since 2002. It started when their home-schooled son Jacob attended a biodiesel workshop at BEEC and got excited about alternative fuels. They spent about \$1,000 to scrounge together the necessary equipment using the book *From the Fryer to the Fuel Tank* as a reference. The process takes about an afternoon, not counting the relieving of some local restaurants of their waste grease, and involves a tricky two-

stage chemical reaction. The cost of the ingredients averages about 50¢ per gallon of biodiesel produced. There is a glycerin waste product that they use as a degreaser for cleaning dirty hands, car engine parts and occasionally greasy pots and pans.

Biodiesel is not going to solve the world's energy problems. We cannot grow enough oil crops to fuel our economy as it now functions, and many of the agricultural practices used to grow biodiesel grains are unsustainable. What we can do is to develop alternatives like biodiesel, in conjunction with serious conservation efforts and lifestyle changes, to dampen the effects of a tightening global petroleum supply that will be upon us all too soon. In this, Barry's bicycle leads the way.

Tad Montgomery is an Ecological Engineer who founded the Pioneer Valley Biodiesel Cooperative and is now starting an EcoFuels company in Brattleboro. He will be teaching an afternoon workshop on biofuels at the 100th Monkey store in Wilmington on April 2nd.