



### **Optimal vs. Acceptable.**

Work in progress (with typos) by Vegenergy founder Robert Del Bueno

Ok...so you are considering running your car or truck (or generator, or ....etc) on vegetable oil, but you are not sure if it is right for you. The first step to making this decision is to clearly understand why you are interested. There are so many reasons to consider doing such a thing, some of the most common listed below:

- \* Financial - Your heard it can be done almost free, and with rising fuel costs, that sounds good.
- \* Environmental - Burning petroleum creates nasty emissions, and you hope biofuels will be better.
- \* Health Effects - Concerned over rising asthma and other ill effects of breathing pollution?
- \* Peak Oil - Petroleum is being used faster than it is being created, which means ...well, you do the math.
- \* Disgusted with BIG OIL - \$9 Billion in profits in one quarter??!?! And that's just one oil company!
- \* Foreign oil dependence - Think being dependent on foreign energy sources is not a good position for the nation?
- \* International conflict - Need to drive, but do not want to add to the already rising international tension/conflicts over oil and access to it?
- \* Add the growing list of reasons here....

Once you are sure why you are interested, you can move forward in deciding if vegoil, biodiesel, or simply buying a bike is best for you.

One thing is for sure...the modern diesel engine has been engineered and optimized for use with petroleum diesel...period. If the engine designers were told to optimize the engine for vegetable oil, the design would be different. So make sure you understand, from the outset, that running anything other than what than engine was optimized for will, by definition, produce less than optimal results. Anyone who tells you otherwise is probably trying to sell you something. Yes...Vegenergy sells conversion services, but we want you to be fully informed before we do. We have been around for a little while, and plan continue, so having a bunch of upset past customers is not in our interest.

So if you spend some time surfing the biofuel (vegoil and biodiesel) websites and forums on the internet (or a LOT of time, as it can be addictive) you will eventually run across a wide range of claims and reports. The internet is overflowing with anecdotal information, yet starving for empirical, accurate, non-biased information (not only in biofuels). There are so many variables that influence success/failure of these systems, that it becomes hard to determine what makes a good system good, a bad system bad, or a "report" a sales pitch.

Because there is no central entity (with enough financial backing) who stands to gain much by carefully testing these systems, there is little repeatable data to base a decision on. The best one can do is take in as much information as one can, try to consider the sources and possible bias, and clump it all together and try to average out the recurring results. This is what we have been doing at Vegenergy. We do not claim to know it all, or even know the BEST way to do what we do. What we do, and we think you will find this to be the case with most others doing conversions, is a complicated balancing act of compromise. We are aware that what we are doing will almost certainly, in the eyes of the automotive engineers, be less than optimal (by the engineer's metrics), the question for us becomes...can we implement a system that achieves OUR goal, and hence becomes "acceptable" to us.

OPTIMAL vs. ACCEPTABLE - this become our main question, and this is determined by how we define acceptable. Our definition of acceptable will be a function of what we are trying to achieve. This is where understanding YOUR personal motivation is critical.

Take the case of the financial motivation. If what you are trying to achieve is a more cost effective solution to your personal transportation needs, you will find it MAY be possible to achieve this goal via a vegoil conversion. What you may find while looking at this, is that some vehicles, for some users, in certain transportation situations, CAN be a more cost effective solution...but not ALL. Let's consider the use of vegoil system. First of all, because most of the systems utilize engine coolant for vegoil heating, there is a start up time on diesel (or biodiesel) needed before one can switch over to vegoil. There is also a "purge" time needed, to switch back to diesel prior to turning off the engine. What this means is that there is a minimum drive time needed to make the use of vegoil practical. In my experience, if your typical drive time is less than 20 minutes, I would suggest giving biodiesel a close look instead of vegoil. However, if you commute, or regularly drive longer than 20 minutes (and these numbers are not absolute), vegoil may be for you.

Ok, so you drive a lot...CHECK. We will assume for now that you have already investigated the financial implications of relocating to reduce your average drive time, and have concluded that this is not an option. So how busy are you? While you may be able to acquire used fryer oil from your buddy's wing joint down the street, do you really have the time (or desire) to deal with properly cleaning the oil before use. And if you do, are you ok with everything you own smelling like a deep-fat fryer, and that inevitable vegoil spill all over your garage or driveway?! This not to discourage you from doing this, but we should really be realistic. I know of very few 'greasers' out there that have not made non-negligible messes in their garages, vehicle trunks, driveways, etc, and had to suffer the corresponding wrath of the angry spouse or roommate.

Alright, so you are ok with some spills, smells, and being extra sweet to your

loved ones in return for their tolerance....CHECK. Next is to consider the implications for your vehicle. As stated many times on this site, the use of vegoil is experimental and to be honest, a bit of a system hack. It will almost certainly void any vehicle warranty you have, so carefully consider the conversion on a newer vehicle. Now what about engine life? The longevity of your WVO fueled engine will certainly be a function of the quality of the fuel you put in it. If you are doing your fueling, it will be up to you to ensure quality control concerning your fuel. What is meant by fuel quality? Good question. One issue is filtration. Most factory installed fuel systems are designed to ensure particulate filtration to about 5-10 microns. I would take this as a hint that your vegoil should be filtered at least as well.

What about water. Hmmmm. Well it seems that most feel the less water in your fuel the better. Keep in mind there is 'free' water, which is from rain, condensation, or other introductions of water to your fuel supply, and there is suspended/emulsified water. Free water usually settles to the bottom of your fuel supply and is pretty easy to drain or block. Emulsified water can be more difficult to remove. How much water is OK? Another good question. Look at emulsified water for example. One side of the spectrum says the dryer the better, meanwhile, there are companies that sell diesel/water emulsifiers designed specifically to add water to diesel fuel. Wait, what? Why? Well..the introduction of water into the combustion chamber evidently can alter oxygen content, and also vary the temperature of combustion, which can change emission characteristics. So in this case, as with most of these questions, there seems to be conflicting answers.

Let's assume then, that no matter what you do, it will have a negative effect on your engine. Does that mean you should not consider running vegoil 'acceptable'? Not necessarily.

Here is one example that can illustrate this point:

Let's assume you answered CHECK to the above issues, and that a mid-eighties Mercedes Benz engine can, with moderate maintenance, run for a solid 500K miles. This is common. Let's also say you can buy one, and get it in decent running order for \$4000.00 or so. This is also common. Let's say it has 250K miles on it...also common. Now let's assume that running 5 micron filtered, reasonable dry, properly heated vegoil reduces engine longevity to 80%..which would mean 400K miles. Wait let's make that reduction more like 60%...to play devil's advocate....meaning more like 300k. In this pretty drastic case, you will get around 50K miles on veg. (keep in mind...this is going a bit to the extreme..there are certainly folks getting far more miles on veg than this..this is just an illustration). Is this ACCEPTABLE?..well consider the following comparison, and come to your own conclusion.

2004 Toyota Prius..purchased for \$20,000

100k miles at 50mpg (being kind to the Prius here) = 2000 gallons of gasoline at \$2.25/gal = \$4500 + \$20,000 = \$24,500.00 / 100K miles = .24/mile

1985 Mercedes Benz 300D Turbo fueled with B100 Biodiesel..purchased for \$4000

100k miles at 24mpg = 4166 gallons of biodiesel

at \$3.00/gal = \$12,498 + \$4000 = \$16,498.00 / 100K miles =

.17/mile

1985 Mercedes 300D Turbo on WVO at \$4000 + \$1850 for conversion = \$5850.00

100k miles at 22mpg (lets assume a slight btu loss) = 4545 gallons at .50/gal =

\$2273 + \$5850 = \$8123.00 / 100K miles =

.08/mile

Now let's assume the above (unlikely) case, where we destroy the car on bad veg at 50K miles... In this case, we go out and buy a whole new car, spend another \$1850 converting this one too...so add another \$5850.00, or take \$13,973 / 100K miles, and you still come out to .14/mile!

So here we see that IF we were considering getting a Prius to save on gasoline costs, we could actually buy 2 mid 80's Benzs, destroy one at 50K, spend less per mile, and use about 2000 gallons less gasoline! Now I am not advocating for a disposable mentality, this is just an illustration where what may seem crazy, may still be considered "Acceptable", depending on what you are trying to achieve. I am sure there are many Mercedes engineers who's stomachs would turn at the above illustration, and yes... the illustration is not super complete, as it does not take into consideration other details like maint. costs, financing expense on the prius, etc,etc...but regardless, you could easily get your daily commute down to around 8 to 15 cents a mile...cutting the cost way down, and if that is your goal, you have then successfully created an alternative fuel approach that could be considered acceptable.

Now there are a million unique cases, and applications, and I do not have the desire to tackle them all here. That is YOUR job. Using the above way of thinking MAY help you take in all the info you will certainly come across, digest it, and decide for yourself if running your vehicle on veg (or biodiesel for that matter) is to you...acceptable.