

So you want to make Biofuels in Nebraska.....

This checklist has been developed by the NeREA to assist citizens in making the first steps toward decentralized energy production. Please feel free to comment on this list so that we can improve it for the use of all who are interested.

These thoughts are focused on liquid renewable fuels production, ethanol and biodiesel. Generally speaking, the former can be quite tricky while the latter is more straightforward to produce.

First: Assess your goals:

- Are you really looking to produce these fuels yourself or have you considered finding a way to consume biofuels in a way that meets your goals without all the work? I don't mean to discourage anyone here, but one really needs to distill their goals to something that is both realistic and 'doable'.
- Are you looking at self-consumption or marketing the fuel you produce? There are big differences between these activities, and there are different requirements for each.
- What is the volume of fuel you wish to produce? One needs to clearly identify the targeted production to begin to move forward.

Second: Assess your situation and resources

- Make an honest review of your situation. This might best be done by discussing with folks in the know all the way up to ordering a full blown feasibility study. If you are living in an apartment in the city, there is really no opportunity to safely do these things in such an environment. Obviously, farm based operations have a tremendous advantage here, but that simply requires more creative thought to partnership with others. Be realistic about the financial resources you have available for the project; creativity can overcome a lot, but somewhere along the line, a check will need to be written.
- Speaking of safety, an honest risk assessment needs to be done for any process that entails working with alcohols (both do). Alcohols are extremely flammable and, in the case of methanol, toxic. These hazards must be addressed through proper operation and equipment, and safety must be considered during all aspects of project development. NFPA 30 is the book you want to get regarding fire marshal standards, for example.

Other standards relating to electrical connections need also be considered, and can be found at www.nfpacatalog.org.
- If you can't find corn in Nebraska to make ethanol, you might as well stop reading and stick to conservation and RE consumption. Corn is plentiful and cheap. About 2.5 gallons of ethanol can be produced from one 50lb bushel of corn. Small scale cost estimations are \$1.00-\$1.50/gallon depending on input costs (about \$2/bu). Some get old seed corn free and do better. Don't forget about the \$0.51/gallon tax credit....

- Oil sources for biodiesel are trickier and determine 75% of the cost of producing one gallon of B-100. While one can expect up to 300- 400 gallons per acre of ethanol, soybeans provide only 45 gallons of B-100 per acre. Other oilseeds can double this number, but the key factor here is to ensure you have satisfactory feedstock, in both quality, cost and supply.
- Small scale opportunities can greatly benefit from existing infrastructure and synergies. For example, oil could be available nearby for a good price, bins and augers sitting in the woodline could be used for seed/meal handling, scales, boilers, buildings, etc. I think you get the picture. Consider utilizing sites, equipment or markets that are around you before you buy new. These things make a tremendous impact in payback on your investment.

Step 3: Sharpen the pencil:

- Now it is time to do the math yourself, get help, or hire someone to do a feasibility study for the project. The difference between a hobby and a commercially viable project is that one pays for itself. Either way is fine, just as long as you find out up front which one your project will be.
- Input all the data into this model and see how this cranks out. Be honest and seek input whenever possible if in doubt.

Step 4: Obtain your equipment

- Once you are tired of walking through the thorn bushes and weeds for useable pieces, it is time to get your system together. There are many suppliers and you need to ensure the equipment you obtained will perform as you need it to.
- Don't try to cut too many corners. Messing up batches or spilling material from a cheap valve will cost you more in the long run. Be smart but stick to your budget!
- Install your equipment properly and obtain materials needed to supply the process. Remember you will need to put out money for inventory before you make your first sale or see a return; be ready for this. Acids, bases, alcohols, catalysts and the like, must be respected and properly handled/stored.
- Your chosen marketplace will have quality standards that must be maintained. This is a larger issue for bigger operations, but bad fuel will result in problems and can impact the broader development of these technologies. Quality is #1.

Step 5: Licensing and permitting

- Before you turn out your first gallon in the State of Nebraska, you are required by law to register with the Dept of Revenue, Motor Fuels Division. The process is actually quite simple and we are working with the Department to further streamline the process for smaller producers who self-consume. Ethanol must also be registered with the BATF using form TTB F 5110.74 (attached).
- This process is done with two form, both available at www.revenue.state.ne.us then go to Motor Fuels, then forms. You want the form 70 to get your tax bond done and the 20MF application form. Contact Motor Fuels to determine your bond amount, they have the discretion to reduce the minimum bond amount if you are 100,000 gallons per year or below. The bond is actually determined by the tax revenue over one quarter of the year at the recently hiked rate of 27.1 cents/gallon. I did mine through my homeowner's insurance company.

- Once registered, you will need to set up an internet based reporting of gallons. This will typically be done monthly and is most economically done through Husker Oil at www.huskeroil.com. Clay does a great job of supporting us little guys and has the cheapest service by far at \$200/year for the monthly reporting of the form 83. The state only takes this form electronically, but its easy.
- If you choose not to follow the law and don't register your operation, that is your decision. I do not recommend such a path and the Motor Fuel folks have been great to work with, so just get 'er done the right way.

Step 4: Making your first gallons....

- Now I know you will be chomping at the bit by now to turn out your own juice, but resist the temptation to rush the project at the critical start-up phase. Leak test your equipment, double check you start-up list and do some bench top testing. Ethanol producers will not be able to do much bench testing, but biodieselers better get used to it. Be sure you have prepared your system from feedstock to finished product storage and distribution.
- Dedicate the time to get off on the right foot, ask questions and get help when needed. People are generally very willing to share insights and facilitating this is a primary goal of the NeREA. **RUSHING HEADLONG INTO START-UP CAN RESULT IN SOMETHING UNEXPECTED AND TYPICALLY BAD, BUT SOMETIMES MOVING AHEAD AND MAKING A MISTAKE IS BETTER THAN NOT MOVING AT ALL.**
- Confirm that you are properly prepared for conversion of your vehicles to the fuel you have produced. Oftentimes things may need tweaked and natural rubber components should be changed out for either ethanol or biodiesel. Materials like HDPE or Viton will do much better.

Step 5: Pat yourself on the back and crow about it!!

- There is a great feeling associated with the consumption of energy one has produced for yourself. Enjoy this every time you fill up or wave as you drive by the pumps. Doing the right thing never felt so good! Our troops appreciate this, what better way to show support than to tell the oil gang to go scratch!
- Please contact NeREA about becoming a technical support contact to help others get started and participate in our forums to share your experiences with others. We have to overcome 100 years of oil 'addiction' in a hurry; I encourage successful producers in the state to share their time and insights with others. Together we can make a real difference!!
- I hope this helps to get things started for those who are considering such a path.