Living Energy Farm
May-June 2021 Newsletter

Springtime is a busy time on a farm. We are growing lots of seeds this year, and lots of food. We have been shipping small sweet potato plants in conjunction with Southern Exposure Seed Exchange. We have lots of interns around, and we have been trying to keep our various renewable energy projects moving. There have been some interesting developments in Jamaica.

Renewable Energy in Jamaica

In May, Debbie's sister Carrie went to Jamaica to do some work in preparation for expanding our renewable energy projects there. We taught Carrie how to make our solar cookers (see http://conev.org/ISECmanual14.pdf), and she in turn taught folks in Jamaica how to make them. We received $1000 in funding from the work group at Cal Poly and sent down enough materials to make 10 cookers. The cookers are an adaptation of Insulated Solar Electric Cookers developed at Cal Poly, and we have found them to be the most effective solar cookers on the market. Now that technology has been transplanted, and we are pleased about that! Alexis and ex-intern Onyx will be going down in July to expand that project. We will also be installing our solar powered breadfruit equipment, and helping with the nickel iron battery kits we have been sending down. This is all very exciting for us. (See previous newsletters for more details about the history of our projects in Jamaica. For information about the Cal Poly project, see http://sharedcurriculum.peteschwartz.net/solar-electric-cooking/)

Teaching folks how to build the new solar cookers in Jamaica.

We have been saying for years that a good DC Microgrid can provide modern services without any reliance on coal, nuclear, natural gas, or industrial renewable energy systems. But that's a hard sell in the U.S. where consumerism reigns and centralized renewable energy promotion dominates. The grandiose vision is that we get a project started in Jamaica than can provide energy services to working class people, and we spread that model far and wide beyond Jamaica. But it is not all clear at this time how realistic that vision might be, how long it might take, or how much money might be necessary. We hope we are improving the lives of some working class people in Jamaica by providing them with durable solar equipment. If the grandiose vision of making the global electrical grid obsolete does not work out in any timely fashion, then we will at least do some useful things along the way.

Solar cooker workshop finale.

Biogas and an Inexpensive Combine Harvester

We have been continuing research on setting up a biogas tractor and expanding our current biogas production. Our confidence has grown that it will work, but we have also come to appreciate the scale of that undertaking. Thanks to some help from various folks we have called upon for advice, we have a much clearer picture of how to make it work, and some of the tools are in hand. The two outstanding issues are making sure we can do it safely, and producing enough biogas. Pressuring small tanks to 2000 psi with a flammable gas has some inherent risks, but our knowledge and confidence have grown. It is also clear that producing enough biogas to cover all of our non-solar cooking needs and fueling a small tractor are going to require a greater input of feedstock. We are going to have to grow straw or bring in more cellulosic material, and we are likely to use human waste to boost nitrogen content. We are confident that it will work, but it will take some time and labor, particularly to harvest and move about the cellulose. The rhythm of managing biogas feedstock will have to be woven into our farming practices.

Photo taken June 20. Our organic con is up over Rosa and Nika's heads. Planted in tilled soil.

Photo taken June 20. Neighbor's chemical no-till corn. Lots of herbicide and chemical fertilizers used. Half the height of the height of the organic corn and drought stressed.

We had pushed our small combine harvester behind the biogas tractor on our list of priorities. It certainly might raise some eyebrows if and when we make the farm fully energy self-sufficient. That said, biogas is a global movement, and it is unlikely, given our meager resources, that we are going to make any unique discoveries.

Our simplified combine harvester, on the other hand, is unique. And it could be built very, very cheaply compared to any other harvesting machine. In short, the biogas tractor is probably going to take a few years of development. A prototype harvester can probably be built in a few months. We will keep both projects moving to a degree, but we are shifting priorities to make the harvester happen this winter.

We had mentioned in a prior newsletter that we intend to patent the harvester. We now have a Provisional Patent, and that allows to use the term "patent pending." A legal document has been drafted and signed and now there are six people who own the Provisional Patent, which we intend to convert to a real patent in the next year. This group of six has been selected because we trust their idealism and dedication, and we don't want the patent tied exclusively to one individual. Our intention is to make the technology available to small farmers worldwide. If there are any profits to be made from licensing the industrial production of the harvesters, we can use that money to expand LEF's technologies.

Photo taken June 20. No till corn. It will catch up, at least to some degree, with the corn planted in tilled soil, but it is far behind.

More Efficient Farming

The mainstream approach to renewable energy is that you get funding and build lots of it without questioning lifestyle choices. The LEF approach is that we adapt our lifestyle to fit within a modest renewable energy budget. At the residential level, we are fully energy self-sufficient with our DC Microgrid, and we love it. In looking at our farm, we have been thinking about what it's going to take to run the farm on biogas, or perhaps some mix of farm-grown fuel. First and foremost, we need to farm as efficiently as possible. We have switched out our regular rotary mowers, and are now running sickle bar mowers. That is already saving lots of gasoline.

In looking at our field crops, the answers to efficient farming are less clear. We are a certified organic farm. The sequence of growing crops at LEF consists of discing (or sometimes plowing), planting, and cultivating to kill weeds. We do some no-till. That involves crimping down cover crops, and planting into them. On paper, no-till looks absolutely great. In practice, we have been messing about with it for a few years, and the no-till side of our farming remains economically marginal. Some no-till operations import massive amounts of mulch, or cover acres of land with tarps. We are trying to build a model that small farmers around the world can use, and that will not work for them.

The limitations of no-till is that you really need to start with low "weed pressure." If you have a lot of weed seeds in your soil, no-till is tough. Another big issue is the timing of the rains. Too little rain leaves weed seeds dormant. Too much rain at the wrong time and the crops become choked with weeds. In Virginia, our rainfall variations can be quite substantial. Another limitation of no-till is that you have to wait for your cover crops to mature. If you crimp them too early, they don't die, but rather compete with the crop you are trying to grow for food or profit. Rye is often used as a winter cover crop that is crimped in the spring. That means that our corn planted into *tilled* soil gets planted in early May. The corn (or other crops) that are supposed to be planted no-till wait for some weeks. As we go to print, or tillage-based corn is shoulder high and quite healthy. (We are growing a variety called Blue Clarage this year, and it's our favorite. Even though is a great field corn, it's quite tasty even at the green or "sweet corn" stage.) Our no till is about six inches all. We have been through this before. The no-till will catch up, more or less.

It take a lot of mechanical power to till up the soil. Our neighbors use chemicals. I have seen studies that say that even though less tillage energy is used in chemical no -till agriculture, the total energy use is higher because of the huge amount of energy embedded in the fertilizers and herbicides. Our neighbor's corn is shorter than ours and a bit drought stressed. If we get good rains for the rest of the summer, their chemically farmed corn will out-produce our organic corn planted in tilled soil. If it stays dry(ish), then the opposite will be true. Chemical farming does not build soil, and the toxic herbicides move around the food chain. The average American has measurable levels of herbicide in their bloodstream because of how much is used on their food crops. In looking at the limitations of no-till and thinking about optimizing efficiency, we are going to try a hybrid approach. Rodale is one of the leading organizations researching no-till and organic farming practices. A few years ago, they started using something they call a "high residue cultivator." A normal cultivator has iron sweeps that scrape along at a shallow depth through tilled soil to disturb the soil and kill weeds. The high residue cultivator is a heavy machine with heavy steel sweeps that cut just below the surface of the soil in between no-till rows. Yes, a no-till cultivator is something of a contradiction in terms. But if it works, it works.

Our lima been crop this year. No hand weeding and no weeds. That's what optimal cultivation can do.

Screenshot from Rodale's youtube video about their high residue cultivator. We plan to use similar heavy steel sweeps to undercut cover crop so we can plant our no-till earlier.

Rodale describes the high residue cultivator as a rescue system for controlling weeds when no-till does not work properly. But what about the problem of no-till being planted later? We think an adaptation of the high residue cultivator might solve that problem. We are going to put together a small device based on the high residue cultivator, or two devices actually. The first will proceed the planter and undercut standing cover crop in a narrow path, about six or eight inches wide. This idea in itself is not new. There are as many different ways to farm as there are farmers. There are various "strip tillage" systems currently in use where a narrow strip is tilled and cover crop is left between the rows. But even that level of tillage opens up the soil and promotes weed growth around the crop rows. Our idea is not actually

till the strips, but rather to simply undercut the existing cover crop in a narrow strip, and plant in that strip. This would allow us to plant into cover crop at the same early date at which we plant into tilled soil. Then we have a second high residue cultivator that comes back a few weeks later and undercuts the rye, and any weeds, in between the rows, but leaves the now dying rye plants in place. If it works, it could give us the best of both worlds. Rye mulch and straw stay in place, which builds soil and prevents erosion, but we gain a lot more control over the whole process. And it should be a highly efficient method, using a lot less energy than cultivation or chemical no-till farming. We are going to call it.... something creative and concise. Mulch conservation farming? Static mulch farming...? Not quite there yet.

Our work at home and abroad relies on your support. Please help us if you can.

Living Energy Farm is a project to build a demonstration farm, community, and education center in Louisa County that uses no fossil fuels. For more information see our website www.livingenergyfarm.org, or contact us at livingenergyfarm@gmail.com or Living Energy Farm, 1022 Bibb Store Rd, Louisa VA, 23093. Donations to the Living Energy Farm Education Fund are tax deductible.

Articles and videos about LEF:

How to Never Pay an Electric Bill
https://www.youtube.com/watch?v=N5Wk7inoIxI&t=201s

This video is a walk-through of our energy systems at Living Energy Farm. It is a concise summary of how these systems work, and why they are not in common use already.

Solar Installations In The Navajo (Dine') And Hopi Reservations, March 2020
http://livingenergyfarm.org/solar-installations-2020/

This is a photo essay about our project to bring durable solar energy systems to the Dine' and Hopi Reservations, where thousands of people live without grid power involuntarily.

Support Living Energy Farm's Climate Justice Campaign, and Bring DC Microgrids to People Who Need Them
http://livingenergyfarm.org/support-our-climate-justice-campaign/

This is an updated web page describing our broader social justice ambitions.

How to Live Without Fossil Fuel (Introductory Video) https://www.youtube.com/watch?v=Ri2U6u8p65E
Powering a Community with Solar Electricity (LEF has the only DC powered community that we know of, here's how it works) https://www.youtube.com/watch?v=FvdExgvHnRI&t=23s
The Best Way to Store Off-Grid Energy https://www.youtube.com/watch?v=2wOxQ3sL9zc
Batteries that Last (almost) Forever https://www.youtube.com/watch?v=dfrgLsyFs0E

Virginia Homegrown created a program at LEF (the LEF part starts at the 29 minute mark in the program)
https://www.youtube.com/watch?v=MDGP0C9MIzU

International Permaculture has done 2 articles on LEF. One is in issue #93, Autumn 2017, and the second is in issue #94, Winter 2017. See https://www.permaculture.co.uk/
Article about LEF at the Atlantic Online Magazine
https://www.theatlantic.com/politics/archive/2017/01/anarchism-intentional-communities-trump/513086/
Article about LEF in The Central Virginian
http://www.livingenergyfarm.org/cvarticle.pdf
LEF on CNN
http://www.cnn.com/interactive/2015/09/us/communes-american-story/
Cville weekly in Charlottesville VA
http://www.c-ville.com/off-grid-model-environmentalism-made-easy/#.VcHobF054yo