Living Energy Farm
April-May 2026 Newsletter

Upcoming Work in Malawi

Working in conjunction with Pete Schwartz from Cal Poly, as well as a handful of academics, solar installers, etc, in Malawi, we applied for a grant to install Direct Drive DC Microgrids (D3M) there. This was a by-invitation grant, and we were hopeful, but sadly, we did not get that grant. We are, however, moving forward. Pete remains in Malawi until the end of this year. He is building and installing modest prototype D3M kits that can provide energy to rural households and villages. Pete's work has focused largely on Insulated Solar Electric Cookers (ISECs). He is supporting numerous projects in various locations in Africa.

This fall, LEL's focus is going to be installing solar grain grinders in Malawi (working in cooperation with Pete's network). We are taking that route because grain is often ground using stationary diesel engines in Malawi. Using solar power and simple burr mills we can put together mills that will be very cheap to operate compared to diesel units. We are hoping this will facilitate the spread of D3M for financial reasons (which often get more traction than ideology).

Technology Development at LEF

We are doing an in-house design and build program for several weeks in July to move several technologies forward related to D3M in Malawi and beyond. Ryan Marienthal is the electrical engineering grad student who works with Pete and who will be spending several months this fall in Malawi installing D3M. He will be at LEF for the month of July. We are also getting support from Greg Nelson, a veteran electronic engineer who is part of the upcoming Vermont training in late July. David (who lives at LEF) and Nick (friend of Ryan's from California) will be working to: 1) build and de-bug solar optimizer circuits first developed by Pete and Ryan that provide better power supply for DC motors in a D3M installation in cloudy weather. Greg has designed a second kind of optimizer which we will be building and testing. 2) We have purchased some Chinese solar powered Variable Frequency Drives (VFDs). We will be testing those and moving toward building our own. The VFDs will hopefully allow us to run AC three phase motors from direct DC power as we currently do with permanent magnet DC (PMDC) motors. This is useful because AC three phase motors are much easier to find in non-industrial countries than PMDC motors. This could be a big help for the grain grinding project.

Chrissy (the person) driving Sally (the tractor). This mowing rig takes about 1/4 as much fuel as a bush hog.

Biogas

We have a great biogas system at LEF, and it has a huge impact on our quality of life. Our digester is named Seymour. He's a big fella, with about 1600 gallons of digester capacity. After four years of providing us with year-round, around the clock cooking gas, Seymour needs to be cleaned out. Biogas sludge is good fertilizer. But we don't want to live without gas while we do that work. So we are going to build a smaller digester, and name it something cute.

We are going to upgrade Seymour some in the process. We are adding gas recirculation pipes that will allow us to blow gas back into the digester to stir it while in operation. That helps the digestion process. We are also going to add pipes that will make future clean-outs easier.

We are excited as well about running a biogas tractor this year. We have set up a filtration system to improve the quality of the biogas. Our filters will remove carbon dioxide and hydrogen sulfide, and thus make the biogas better suited for tractors.

Disc tiller/ poly disc behind Sally. Much more fuel efficient than a plow. (Milkweed on the left to support Monarch butterflies.)

Energy Efficient Farming

The long-term accessibility of different technologies is quite uncertain. Centuries in the future, will we be able to make solar electric panels, rubber tractor tires, plastic water pipes, or gasoline engines? We don't know. Whatever the technologies available, farming in an energy efficient manner that enhances soil health is a good idea.

Organic no-till farming is a practice that, on paper at least, enhances soil health and uses less energy. At LEF, we have experimented with no-till farming, and found it did not meet our needs. It seems like a good idea to not plow the soil, but spring cover crops keep the soil too cool and restrain the growth of food crops. To improve on that idea, we have assembled the tools for strip tillage. That is a modified approach to no-till. See the photo below of a patch of clover on our farm. Notice how the red clover is just clover, not much at all in the way of weeds. Clover is a great plant. It fixes nitrogen, chokes weeds, but isn't a vine (like vetch) or an aggressive competitor (like rye). The plan is to use a strip till setup to open up strips in clover and plant in that. We are excited to try it.

The biggest step we have taken to make our farming more efficient is to get rid of lawnmowers and bush hogs. Those have been replaced by sickle bar mowers, which use about 1/4 as much fuel. Last year we spent an embarrassing amount of time trying to make a small Simplicity sickle mower work. It's just too small to handle heavy grass in a neglected field. This year, we have a full sized sickle mower running on a Satoh tractor named Sally. (Yes, we name almost everything around here.) Sally is fairly unique in that she is a small but very tough little tractor that can handle real, full-sized farm implements, but with a highly efficient, moderate RPM, 14 horsepower engine. Compare that to

modern farms where tractors and trucks well in excess of 300 horsepower are often used to do even small tasks. Sally and the sickle mower can cut heavy grass and moderate brush so thick you couldn't walk through it. It's a super-efficient method for mowing. Such heavy brush would choke a much larger tractor with a bush hog, but the sickle slices low to the ground, and doesn't have to chew up material like a regular mower.

Another useful tool for fuel efficient farming is an old-fashioned device that goes by various names such as disc tiller, one-way, or poly disc. It rolls over heavy vegetation like a plow, but does not dig so deep, and thus uses a lot less fuel. See the photo of Sally pulling a four blade disc tiller that covers about twice as much ground as a two bottom plow (that would be pulled by a 30 horsepower tractor in our heavy soil). There are no manufacturers of poly discs in the USA, but there are European and Chinese companies who make them. They are advertised at 'environmentally friendly' because they are less disruptive and more fuel efficient than a plow.

We are confident that we can run our farm, using our energy efficient farming methods, with a modest supply of biogas using 14 or so horsepower. We are making test runs now. Perhaps next summer we will pull the plug on farm tractor gasoline and see how that goes.

Grain Goblin, 5th Generation Simplified Harvester

We had mentioned in prior newsletters that we have been working on the next generation simplified combine harvester. We put it in the field for a preliminary test run. The results were disappointing. We have worked hard, but it is just not ready for this year's wheat harvest. That project now moves to a back burner while we focus on other issues.

The Mission of Living Energy Farm

We have had a lot of new people join our newsletter in recent months. So the next few paragraphs are a summary of who we are and what we are doing.

Red clover fixes nitrogen and builds soil. Notice there are almost no weeds. The clover chokes them out. We are planning experiments with strip tillage in red clover.

LEF is an fully off-grid (NOT "carbon neutral") community in central Virginia. Our mission is to use, develop, and deploy low-cost, durable renewable energy technologies that make it possible for low-income communities to have access to the tools necessary for real sustainability. In order of magnitude of importance, we (firstly) focus on good design -- doing the right thing in cooperation with other people so all the pieces fit together. In a temperate climate, that means shared wall housing and shared use of thermal systems. Secondly, we focus on good insulation (we like strawbale). After these first two steps are taken, we (thirdly) deploy durable renewable energy systems.

We made a unique discovery at LEF, and that is the Direct Drive DC Microgrid, or D3M. D3M provides a modern lifestyle at about 20% of the cost of a traditional, battery-based off-grid solar kit.

And it provides a *lifetime* energy supply with little maintenance. At LEF, 90% of our solar electric power never goes through a battery, but rather is used during daylight hours. D3M has a dramatically lower ecological footprint that any other energy system of which we are aware.

We work with resiliency groups in the U.S. to promote and install D3M. We have initiated projects to install D3M in Jamaica, Puerto Rico, and Trinidad. Starting this fall, we will be supporting projects in Sub-Saharan Africa.

Although we did not intend for LEF to be a technology development center when we first started, we now work on improving D3M, biogas (for cooking and farm tractors), and sustainable/ regenerative farming methods. LEF itself is a cooperatively managed small community. We have spun off a non-profit called Living Energy Lights (livingenergylights.com) that supports our work to spread D3M and related sustainable technologies. LEL can accept tax deductible donations.

At LEF, we grow most of our own food, and we earn our living growing open pollinated seeds. The community of 6 - 10 people living year-round on our modest energy systems provides an important testing ground. There are many technologies that work in a lab but do not work so well in the real world. With solar cooking for instance, box cookers (sun ovens) seem like a great idea, but they just don't work all that well in a temperate, partly cloudy climate. Insulated Solar Electric Cookers (ISECs) on the other hand, work far better. There is a perhaps somewhat racist assumption in how "development" is pursued in low income countries. In the U.S., we expect to have convenient, timely, effective energy sources. Many of the "solutions" that are proposed for low income countries are technologies that no self-respecting American would want to use. That's why living with these technologies is so important. We live with their strengths and weaknesses every day. We try to install for others what has worked for us.

Farming in the Age of Climate Change

The most painful aspect of climate change for farmers in the eastern USA has been the de-stabilization of the jet stream and the resulting oscillation of temperatures. This spring has been brutal. Late freezes that used to happen once in a generation happen often now. This year, we had sustained temperatures well into the 90s F, and then a late, hard freeze that wiped out almost all the fruit. Our persimmon crop is a major food source. They bloom late and usually don't usually get frosted, but this year is a wipe out. We have also had lingering drought conditions, which has left us with more work stringing drip irrigation lines (powered by our direct drive DC pump). We are planting more watermelons to compensate for the lack of tree fruit. Dried watermelon? Watermelon syrup? We do what we have to.

We have a great group at LEF, and we are growing our regular seeds crops this year. Summer is always an exciting time, with more going on, lots of fresh vegetables, and more people visiting. We have a list of tour dates at livingenergyfarm.org Come see us if you like.

And please donate to Living Energy Lights if you can. No one is getting paid to do that work, and we squeeze a lot of value out of a modest amount of money. Thanks for your help.

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.
Living Energy Lights is the nonprofit outreach arm of our project. Donations to LEL are tax deductible.
NOTE, THE PROCESS OF DONATING TO OUR WORK HAS CHANGED. Click** here **to make a tax deductible donation to support our work. (That's the Living Energy Lights website, livingenergylights.com)

Articles, Videos, and Podcasts about LEF are here. https://livingenergyfarm.org/articles-and-videos/