

Living Energy Farm

June - July 2018 Newsletter

LEF Needs You!

We have a long newsletter -- lots going on. We also need your help. See the end of the newsletter.

Weekend Immersive: Energy Self Sufficiency and Building Your Own DC Microgrid

We have scheduled a weekend immersive for **Sept 28-30** focused on energy self sufficiency and building DC micrgrids like we have at LEF. LEF's integrated village economy uses high-voltage DC daylight drive motors. Our lighting system uses very durable nickel-iron batteries. We will teach you the basics of electricity, and show you how to wire solar electric panels, both high voltage and low voltage systems. We will show you how to put together battery banks, and explain the difference between different kinds of batteries. We will explain how nickel-iron batteries work, and how to make them last for decades. We will show you some of the basics of electrical wiring for both high voltage and low voltage electrical systems. You will work on these projects with your own hands, so you will know how to do it yourself. We will have a weekend of homegrown, tasty food, and an engaging social environment. Our immersives have been enjoyable and rewarding. With each immersive, we feel like we get a little better at what we do. We look forward to seeing you there!

For a more detailed schedule of events, visit <http://livingenergyfarm.org/workshops/2018/2018sept28.pdf>

Location: 1022 Bibb Store Rd, Louisa VA 23093. Contact Debbie at 540-205-9815, [livingenergyfarm at gmail.com](mailto:livingenergyfarm@gmail.com) The fee for the weekend is \$150, work trade options are available.

No More Pipelines Forever Video Release Party

With all the talk these days about fossil fuel divestment, stopping pipelines, and moving beyond fossil fuel, there seems to be a noticeable lack of technical awareness to back up such hopes and dreams. LEF is launching a No More Pipelines Forever education program. With the help of some dear friends, we have produced a few videos, and we will be producing more. The intent is to create numerous short videos that will be distributed through social media networks to educate environmental activists and other interested folks about the nuts and bolts of what it would take to stop new gas pipeline construction, natural gas fracking, mountaintop removal, nuclear power, and industrial solar power installations. The kickoff party for this media campaign will be **7 PM, Saturday, August 25, at 912 Woodfolk Drive, Charlottesville VA, 23093. RSVP PLEASE to [livingenergyfarm at gmail.com](mailto:livingenergyfarm@gmail.com).**

LEF Update

The farm at LEF is doing well this year. We had torrential rains in the spring, one massive storm after another, the finale nearly washing out our road. That pushed back planting some, so some crops are going to be later maturing this year. We are at the peak of glory of summer vegetable season, and enjoying it very much. We have had quite a few interns this year, including folks from Poland, UK, Siberia, and the remote wilderness of New Jersey. The flow of interns and guests makes our lives much more lively.

Rosa has been improving her swimming ability, and will sit and read books on her own now. Nika is talking like an adult, and, well, flies toy airplanes around a lot. Faith and her children are spending more time at Acorn community, and will likely be traveling in the fall.

We are largely food self-sufficient at this point. We brought in our wheat harvest this year, and it was... not as easy as we had hoped. The idea is to make LEF energy self-sufficient, so we can measure how much land and resources it takes to grow not only food, but fuel (firewood, wood for woodgas, and/ or pine pitch for turpentine). Harvesting small grains with small equipment is one of many challenges.

In a normal season, we cultivate most crops twice. Given the rains this year, we have made 5 passes through some of our crops. Even so, cultivating uses very little fuel. As we become fuel self-sufficient, it is clear that mowing is our biggest fuel user. In the long run, we may need to consider more efficient mowers, and

getting better with a scythe. (We use those quite a bit already).

Organic No-Till Farming

In the last newsletter we covered the generalities of conventional versus organic no-till farming, our less than successful experiments with no-till using rye as a cover crop, and Susana Lein's (Salamander Spring Farm, Berea KY) different approach to organic no-till agriculture.

In July we visited Susana on her farm to get a closer look at her organic no-till methods. Conventional organic no-till uses primarily rye as cover crop, uses cover part of the year, and then tillage. Susana's methods are different because she grows most of her mulch in place by planting a diverse group of cover crops (primarily a mix of cowpeas, buckwheat, clover, and small grains) and then cutting or crimping them. The diversification of cover crops allows Susana to avoid tillage year-round. She also has a certain amount of space that is dedicated to growing grass, which she mows at certain times and carries to more heavily mulch crops that need it. The "cut and carry" aspect of her method is labor intensive.

We are very interested in trying to integrate some of Susana's methods into our farming here at LEF. Although we till for weed control, its ecological problems are many and extensively documented. (Controlling erosion in years like our current season when we have one torrential storm after another is all but impossible. The likely future of climate change promises more extreme weather, and effective no-till farming may be critical for our children to feed themselves.) There are however some key differences between LEF and Salamander Springs that will affect the viability of Susana's approach at LEF. Chief among these is size. Susana's operation is very small, and very labor intensive, though also very productive.

LEF is also more mechanized. Excluding the occasional use of a weed wacker, Susana does all of her work with hand tools; seeds are broadcast by hand or planted individually with a planting stick used to punch through the mat of cover crops, cover crops are mowed with a scythe or crimped with an improvised roller crimper, and crops are harvested and processed by hand. Here at LEF, we do much of our farming by hand, but we also use tractors for mowing, cultivating, and disking, among other things.

Adapting Susana's approach to organic no-till to larger farms with more mechanization will offer some unique challenges. If we can take her diversified, year-round cover crop methods and make them commercially viable on small farms using modestly scaled equipment (running on farm-grown fuel, we hope), that could have wide applicability for farms around the world. We have several plots now that we have planted with cover crop and will be pursuing these goals in the coming months and years. Wish us luck!

Daylight Drive Machining

We continue to work on our farm grown fuel and a high-temperature solar cooking systems. The shop is the center of these activities. We have continued to "tool-out" our shop. We bought a nice, old, really solid lathe, and have been learning how to use it. It's a great machine. The amazing flexibility of DC motors means we can run power tools in the shop when it's too rainy to do farmwork. So we have been doing our machining mostly on rainy days. When it comes to all things mechanical, our friend Kris Ward continues to offer many bright

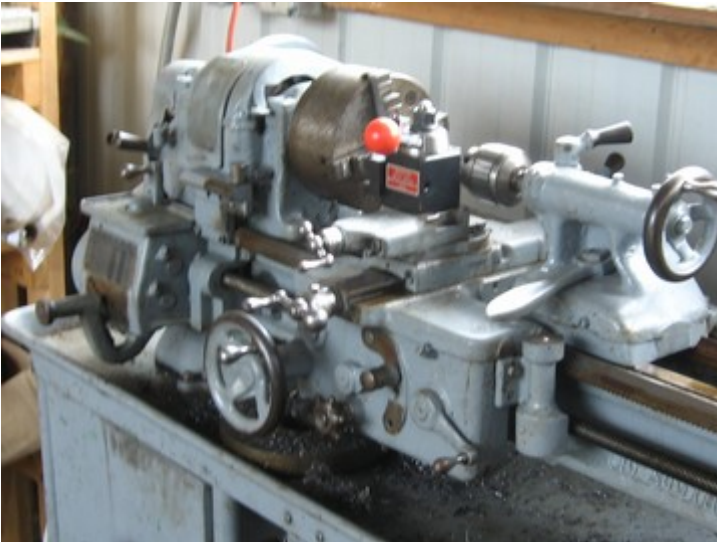


Deb and Nika standing in front of sorghum grass cover crop that smothers weeds. (Nika's pancake is made of homegrown grain.)

answers to dull questions, and is thus a big asset for our project.

At this point, we have 4 ways of running DC motors:

- 1) Our most expensive, modern equipment uses "MPPT" computer controlled DC motors. Such devices include our well pump and refrigerator. The motors are super-efficient and effective, and tolerate cloudy weather. But they are "black boxes." Once they wear out, they are not repairable.
- 2) We run DC brush motors. The design of these motors has not changed in over 100 years. They are solid, reliable, cheap, repairable, and tolerate variable power input. About 90% of our electricity is used by daylight drive MPPT controlled motors and high-voltage brush motors.
- 3) We take cordless tools, and run them with a cord for our nickel-iron battery set. Particularly for portable tools like drills, this works great, and the tools work any time.



- 4) Most conventional household power tools made to run on AC power tools have "universal" motors, and run great on DC. We run heavier portable loads this way, such as circular saws. We also run a shop vac, angle grinder, and a number of other portable tools. Interestingly, a lot of (not all) small kitchen appliances (like blenders) have universal motors as well. They would theoretically work on DC, but the switches probably would not last long. So far we have not experimented much with cheap appliances, rather preferring to invest our efforts in heavier, more durable equipment.

Given the multi-faceted approach we have developed with DC motors, we rarely want for lack of energy, even with our simplified off-grid setup.

Our solar powered, daylight drive metal lathe.

Solar Cooking

Solar cooking works great, when it's really sunny! We have been working on miniaturizing the industrial technology of high-temperature solar thermal storage using mineral oil as a heat transfer medium. We are building a new, improved trough collector. (See photo.) The big question is whether or not, or how often, we will be able to generate temperatures high enough to cook with. Wish us luck.

Nickel-Iron Batteries

We have been using nickel-iron (NiFe) batteries for 7 years now, and they work amazingly well. We have learned that the rating system for batteries is completely wrong. A NiFe with a rated electrical output will easily outperform lead-acid batteries with five times as much rated output. NiFe batteries got pushed off the market many years ago. Most people have simply never heard of them.



Carburetor venturi for an old Wisconsin engine that is designed to be durable and run on diverse fuels, machined on our lathe while it was raining.



Five cell, 6 volt NiFe set charging directly from a PV panel.

Dating at least as far back as Edison's time, the primary focus on battery research has been power density. Edison intended NiFes to be used in electric cars. NiFes were used quite a bit in the early 20th century. Why did they vanish so completely? The same reason that low-speed cast iron engines and durable, repairable appliances vanished -- the accelerating turnover of capital. Like many older machines, NiFes are heavier, bulkier, and much, much more durable. But selling machines that are smaller, lighter (thus having lower production costs), and *less* durable is far more profitable. In 1910, 3% profit was considered a good thing. Now any company making 3% would be liquidated. NiFes died in the accelerating move toward planned obsolescence. They are big, heavy, expensive, and durable. They last too long. They are not as

profitable as small batteries that die.

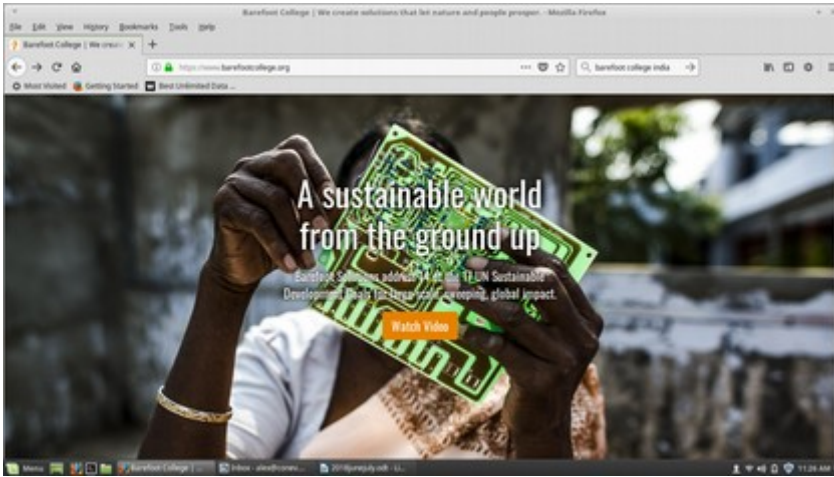
Planned obsolescence has a devastating environmental impact. In talking with numerous international development organizations, we have realized that planned obsolescence has also had a devastating intellectual impact. It has defined what constitutes "energy," and durable, sustainable energy systems have been purged from the public imagination.

We negotiated with Changhong, one of the largest battery makers in the world, and a manufacturer of NiFes, to produce and ship us some small NiFe batteries. We recently received a shipment of 200 small NiFe batteries. (They cost \$18 per 1.2 volt cell.) Check out the photos. You will see a photo a 5 cell, 6 volt NiFe set being charged. You will see another 2 cell set powering a homemade LED light bulb (with a whopping six cent material cost).

Now notice another picture, a screen shot from the webpage of Barefoot College, an organization in India. As much as we know of Barefoot College, they seem to be a great organization. They offer renewable energy support for the poorest of the poor in India, including teaching them how to build solar lanterns, solar hot water and cooking systems, etc. The screenshot of their webpage shows the (not simple) electronic circuits they use on their solar lanterns, and the weathered hand of a woman being taught how to build them. (Look closely you will see she is holding a resistor in her hand, a small electronic component to be soldered to the board.)



Two cell NiFe set, \$36 in batteries, 6 cents in LEDs, no charge or discharge regulation necessary. The "bulb" here has been burning for over a week.



Barefoot College, India, screenshot showing homemade solar charge controller, not needed for NiFe batteries.

than LEF, and as far as we know, they are doing great work. (We have tried to communicate with them....). But the reality is that, because of market trends set in place in western, consumerist societies, the best tools are being taken out of the hands of the people who need them most.

Is the LEF Approach Unique?

Our goal at LEF is to build a community that runs without fossil fuel, using durable, simple cheap tools that can be taken around the world. There are a lot of people and organizations that share our goals, at least pieces of them. There are many organizations working on expanding access to rocket stoves, small biogas systems, small and community level solar cooking systems. Those are all good things.

We recently published an article in *Home Power*, a magazine that has been around for decades and is dedicated to supporting people who live off-grid. In talking with two editors there, it was clear that one at least had mixed feelings about LEF. They accepted a short, 300 word "letter" that they edited in a fairly rough fashion. In trying to explain LEF's daylight drive/ thermal storage economy, they had never heard of such a thing.

These folks are global experts, and they had never heard of a daylight drive community? How could that be?

Back to the aforementioned issue -- consumerism. The LEF model directly challenges -- with intent -- the consumerist model. Our lights have never gone out in 7 years, something neither our grid-connected neighbors nor off-grid friends can claim. But moderation is built into our design. If you dump all the water in the storage tanks, you can't take a shower that night. If you leave the lights on all the time, you can (we've never done it) drain the batteries. We have a multi-linear community energy system, each component of which weakens slowly.

Notice what's missing from the pictures from LEF? There are no electronics controlling the charge/discharge of the batteries. None. NiFe batteries tolerate voltage swings and deep discharge that would destroy any other battery. The NiFe batteries simply do not need electronic controls to regulate charge and discharge. Durability cannot be shown in a photo, but that's the other difference here. The NiFes last decades. With EVERY other solar lighting system, the batteries die in a few years. Often, poorer people cannot afford to replace them.

We certainly don't mean to criticize Barefoot College. They are much larger



Solar trough, the next generation. We are trying to miniaturize industrial solar high temperature storage to make it possible to cook with stored solar heat anytime.

The reality, as far as we can tell, is that as much as international development organizations are trying to bring energy systems to villages around the world, they are thoroughly wedded to the western consumerist model of energy that pretends to supply limitless electricity, even though it often doesn't. A system like ours that is designed to encourage thoughtfulness is anathema. A few years ago I would not have believed it, but having talked to a lot of people now involved in international development, I think the following is probably true.

LEF probably has the only community energy system on the planet powered primarily by daylight drive and non-electric storage. We are probably (?) the only people on the planet currently pursuing very low-cost, *durable* lighting systems based on NiFe batteries.

The rest of what we are doing, other people are doing, at least in their own way. Certainly a lot of people are working on sustainable cooking systems. Concerning farm-grown fuel and small agricultural equipment, that situation is less clear. There are a lot of organizations that try to support small farmers in myriad ways, including working with draft animals and the small equipment they can use. We are not aware of any particular organization who has quite our focus (finding small, durable engines to run small farm equipment powered with farm-grown fuel), but there are certainly many people working on pieces of that. As with electricity, the infatuation with the "efficiency" of modern engines causes everyone to overlook the fact that modern engines are lighter and faster *because that makes them more profitable to manufacture and sell*, and other considerations (durability, fuel-source flexibility) are not given much thought. It could well be that we are the only ones seeking to find small, durable engines that farmers can power with their own farm-grown fuel.

LEF Needs You

As much as we want to keep a positive focus, we have to face the fact at this point that large environmental groups and international development organizations are not going to readily embrace what we are doing at LEF. We have developed a model that provides a high level of service and comfort with an extremely lean energy budget. But the consumerist model reigns.

The bottom line is that we are going to have to grow this model on a grass-roots basis. We need your help doing that. The opportunities that you might help us with could include:

- 1) Helping community organizations create long term plans for real sustainability. We are planning to do some traveling immersives this winter. These would be intensive workshops whereby we plan, in concrete terms, how to help communities become energy self-sufficient. Do you know a group who might be interested? Let us know.
- 2) Nicaragua remains politically volatile at the moment. We are open to overseas projects, but we need logistical support. (People on the ground who can help us with food, housing, and transportation.) Any connections any of you can help us make, that would be great.
- 3) A few years ago, one of the original supporters of LEF invested in a house in the town of Louisa, one mile away from LEF. We call it Magnolia because it has a huge magnolia tree in the yard. The LEF farm is a half mile down a rough dirt road. We are improving our road, but the remoteness of our farm contributes to the stigma that comes with our conservationist lifestyle in a consumer society. Magnolia is very public, and very accessible. If you want to come live in Louisa and help us fix up that house to make it a much more public demonstration of conservationist living, let us know. (It would be a rent-free arrangement.)
- 4) We are working with a Puerto Rican named Darshan. She is hoping to pull together people at LEF this fall/winter to develop a team to take the LEF model to other locales. She sent us a letter that is posted below. If you are willing to help her plan how to take LEF to Puerto Rico and beyond, let us know.
- 5) You can help us spread the word by promoting our No More Pipelines Forever social media campaign.

Letter from Darshan:

Hello, my name is Darshan Elena Campos. Are you, like me, the change we need to see in the world?

I'm looking for handy people such as mechanics, technical writers, and engineers to help me adapt the community energy grid at Living Energy Farm for free global distribution. Can you help me?

The system runs on nickle iron batteries and solar panels and is multilinear to guard against and minimize grid failure. The batteries can last decades. The battery that inspired the system is more than 100 years

old and still works! You can visit the farm's website at <http://www.livingenergyfarm.org> for more technical information.

As for me, I'm strong at writing, visioning, and building community. My training is in community education with a focus on genocide survivors. I am Boricua (Puerto Rican), and I have contacts with many networks and beloved communities who wish to test the system.

What I want to do is welcome as many volunteers as possible to join me on the farm in Fall 2018 and Winter 2019 as we prepare starter kits and develop adaptations for climates such as temperate, tropical, and desert and the urban, suburban, and rural realities of our world's diverse communities.

Room and board are provided, but not financial payment. This project is made with love and a gift of love for all the world's peoples and our global ecosystem. Can you help me recruit handy people like mechanics, technical writers, and engineers?

Peace to you, Darshan Contact livingenergyfarm@gmail.com

The Bottom Line

is that for real, globally relevant sustainability to grow, we need more people working on it. We need to de-stigmatize conservationist living, and develop a culture where the preservation of the Sacred Earth is respected. This has to grow as a grass roots movement. Talk to us about how you can get involved.

Articles and videos about LEF:

LEF in the News!

Two different local news programs have done shows on LEF recently. The first is a PBS program called Virginia Homegrown. That show can be seen, for a while (?) at (the LEF part starts at the 29 minute mark in the program): <http://ideastations.org/watch/virginia-home-grown>

A local news program, NBC 29 in Charlottesville, also did a short story on LEF recently, at:

<http://www.nbc29.com/category/175568/video-landing-page?&clipId=14245976&autostart=true> or

<http://www.nbc29.com/clip/14245976/living-energy-farm-owners-employ-eco-friendly-techniques>

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>

First video on youtube

<https://www.youtube.com/watch?v=ppTBO8d6jhY>

Second video on youtube

https://www.youtube.com/watch?v=wdSX_TIYkD4

Video on vimeo

<https://vimeo.com/128744981>

Slideshow produced by Alexis a while ago

https://www.youtube.com/watch?v=4x_C3iScoAw

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.