

Living Energy Farm

February - March 2022 Newsletter

Expanded Funding for Living Energy Institute

The big news is that our nonprofit project, Living Energy Institute (formally LEF Education Fund), has received sufficient support for us to (finally) begin setting up viable supply chains for DC equipment. THANK YOU TO EVERYONE WHO HAS BEEN HELPING! We have done projects in Arizona and Jamaica. We will continue to support those projects. We are setting up a project in Puerto Rico that we hope will be able to grow quickly.

We have hired a part-time organizer. We are connecting with numerous organizations in Puerto Rico, both community groups and academic institutions. We are now ordering fans, batteries, and building solar cookers. We are building a prototype washing machine and testing two brands of DC refrigerators, (one from China, one American made). We are setting up supply chains of the sundry parts large and small to support communities who want to build DC Microgrids. This is a super exciting time for us. We will keep you posted as this work evolves.

We have been getting an increasing number of inquiries about our work. The Low-Tech Lab folks (based in France) who visited us increased our visibility. There are now several small groups in France translating our documents and working to expand knowledge of DC Microgrids. For better or worse, we have reached the point where we cannot necessarily help everybody who wants advice about a small DC kit in their personal household. If you contact us and we do not get back to you in a timely fashion, please don't take it personally. We have our hands pretty full. Feel free to email again if you get no response. The book *Empowering Communities* that we published has been updated and contains a lot of information about how to build DC Microgrids. It is at conev.org. We hope that will help people who want to make use of our ideas.

Simplified Combine Harvester

We have been working for a number of years to create a simplified combine harvester. We are all personally very dependent on the big machines that harvest our grains. There is almost nothing in the way of effective harvesting equipment in between the large combines and harvesting by hand. We remain confident our harvester will fill this gap. It could have a big impact on small farmers all over the world. The second prototype will be fully operational in a couple of weeks.

A friend of one of our new members at LEF is a National Public Radio reporter. We are working on a plan to disseminate information quickly when the time comes. Our DC Microgrid works well, but it is a complex system requiring many inputs that interlace (and change to a degree) the daily life patterns of anyone who uses it. The harvester is just a "better mouse trap," a simple machine for which there is a ready market. The simplest version could be manufactured for less than \$1,000, and could even be



Debbie making solar cookers.

homemade. It is also scalable to moderately larger machines. We need to make sure it works. We are hopeful the technology can spread quickly.

Farming Without Fossil Fuel?

LEF is fully energy independent at the residential level. We are still using some gasoline and diesel to support our farm. Last year we were able to cut our fuel use substantially, and this year we will cut it much further. There are a couple of avenues we are pursuing to see how we can run a modern farm with a minimal amount of fuel. The first is a simple equipment substitution. We are getting rid of rotary mowers (lawnmower and bushhog) and replacing them with sickle mowers. The sickle mowers use a lot less fuel. (They are also less noisy.) The second set of changes involves investigating an approach to something we might call “mulch conservation farming.” This involves an integration of no-till techniques with a device called a “heavy residue cultivator” that will allow us more effective control of planting times and weed management in a no-till oriented farming system. That is going to require some homemade equipment.

Once we reduce farming fuel needs, we hope to try running small tractors on biogas. Right now, we are far short of the biogas we need for cooking. Cooking actually uses far more fuel than farming. We are working on improving our biogas production process, and building a biogas tractor. Each project moves forward as we are able.

Know Any Mechanics/ Handy-Persons Willing to Work for LEF?

We would love to get help on the development of the LEF’s technologies. At this point, a lot of the work we are doing involves basic mechanical skills -- cutting, bending, drilling metal, electrical and plumbing work. We are looking for people who might be willing to help with some of this work for a wage. Or we might be able to offer a generous stipend along with room and board, if you want to come stay with us. Professional machinists get paid well. They deserve it, given the skills involved. A moderately skilled handy-person could be quite helpful to us. We have a good set of tools here at LEF. Certainly having someone who is geographically nearby would help, but we are willing to consider whatever arrangements are needed to get the work done. We may not be able to pay top dollar, but we are looking for help.



Prototype DC washing machine. Rotates on casters with an Archimedes Screw (spiral pipe) inside so it can drain without tilting.

Equipment and Appliances for Self Determined Communities

Following are the technologies that LEF is making available. Almost all of these technologies would benefit from further investment of time and resources. Some projects involve highly skilled work, others less so. Better documentation and outreach would benefit all of these technologies, and the project as a whole.

1) Better Solar Thermal

Over 40% of climate change emissions result from heating and cooling buildings. Traditionally, solar thermal systems have suffered from the same problem as off-grid electric systems -- they are designed to imitate fossil fuel systems. Many solar thermal systems have been built using large thermal reservoirs and expensive banks of pumps and control equipment. The intent of those complex systems is to create solar-powered buildings that maintain the same temperature consistency as occurs with fossil fuel systems. Those systems tend

to be prohibitively expensive, difficult to build, and prone to breakdown. LEF's solar thermal uses daylight drive to leverage large amounts of thermal energy with small amounts of electricity. It's a much simpler, very effective way to utilize solar energy. We consult with people about insulation, community design, and better solar thermal systems.

2) Insulated Solar Electric Cookers, ISECs

Working in conjunction with the Cal Poly project, this growing international movement promotes the best solar cookers in the world. We are making rugged, effective cookers, and trying to teach others to do likewise. See <http://sharedcurriculum.peteschwartz.net/solar-electric-cooking/> <http://conev.org/ISECmanual14.pdf> and <https://livingenergylights.com/product/roxy-solar-electric-oven/>

3) Daylight Drive of Existing Equipment

We are taking a diversified approach to promoting daylight drive -- connecting useful equipment and appliances directly to solar panels. The ISECs we are building are daylight drive. We set up a commercial daylight drive food processing facility in Jamaica, and taught the folks there how to convert equipment to DC. Going forward, we will help groups in Jamaica and Puerto Rico acquire and convert needed equipment to DC. Converting commercial equipment usually involves simply swapping motors and switches. Many kitchen and household appliances (blender, food processor, vacuum cleaner, hot plate) can run on DC, but some conversion is necessary (bypassing switches, etc).

4) Water Pumping

We have sent a couple of hundred DC water pumps to Jamaica, where we are told they are becoming popular. There are a myriad DC water pumps on the market of varying kinds and quality. We are not currently trying to supply pumps, but we may be depending on the needs of people in the areas where we are working.

5) Batteries

The sun doesn't shine at night, so not everything can be daylight drive. Our current approach to batteries is as follows. We ordered batteries from ADS in Ukraine. They have managed to export those batteries in spite of the war. (The communications with our contact there have been heart rending. We will continue to support their company. We wish we could do more.) The ADS batteries are intermediate sized nickel iron batteries that will be an excellent support for our work in the Caribbean. We should have them in June. We are also importing small battery lithium kits from a Chinese company called Sunworth. These kits fill a need for inexpensive kits for modest needs (lighting a couple of rooms, or a small house). We should have these kits in June. We are also importing some larger nickel iron batteries from another Chinese company (Changhong). We will have those in September. These different sizes and configurations of battery kits should help us meet various needs.

6) Fans

After considerable research, we found a small, good quality, inexpensive brushless DC fan that will be very welcomed in warmer climates. We should be able to deliver them for \$25 or so. They are coming from a Chinese company called Niya. We should have them in June. We also found a company



Sunstar DC fridge, made in Indiana.

called Snap Fan that makes larger DC fans for greenhouse ventilation and what not. They are made in the U.S. We will pursue those as needed.

7) Lighting

We got bulbs from numerous companies to find ones that had a good match of price and quality. We have a good stock of DC LED bulbs, standardized to the same E26 base as standard light bulbs. This lets us use existing light fixtures, lamps, and household lighting circuits.

8) Refrigerator

We were distributing Sundanzer refrigerators, but they are not selling retail any longer. We currently have a fridge from Sunstar made in Indiana (there is another Sunstar in Canada). That is a battery fridge that we are trying to adapt to daylight drive. We have ordered a fridge from a Chinese company called Braktek that supposed to run daylight drive. We should have that in May. We will stock whichever model works.

9) Washing Machine

We have considered converting AC washing machines to DC, but have not pursued that. (Looks to be too expensive.) The only washers we can find that are made to run DC are very small. We currently have a prototype of a new design. It's a hybrid between a top loader and a front loader with a tilted axis like a cement mixer. It will be quasi-automatic (fill with a hose, self draining). It will have a low-voltage DC control on it so it can oscillate back and forth, like a front loader, and then drain itself when the wash is done. It could be bundled from the same power supply that supports an ISEC, fridge, and water pump, all daylight drive.

10) Biogas

The biogas system at LEF is not staying warm enough in the cold months. We need to add some solar thermal panels. Biogas in tropical climates is much easier. We have designed a manual grinder and pump that could make biogas production easier in those areas. Biogas is much more viable at a small community level than at a household level. We need to adapt our grinder and pump to make them cheaper and easier to build. We will pursue this if there is a desire to use biogas in Puerto Rico and/ or Jamaica.

11) Biogas Tractor

We are working on building a biogas tractor to see if we can do it at modest cost, and if it can support an economically viable farming operation. We work on it when we can find the time.

12) Mulch Conservation Farming

Related to the biogas tractor, mulch conservation farming is an attempt to find highly energy efficient means of growing food with a more effective and predictable outcomes than organic no-till. This one is "on the drawing board."

The People at LEF

We have a great crew at LEF these days. Brenda manages outreach and communications, manages the kitchen garden, organizes music events, and is helping with the sweet potato business (selling sweet potato plants in spring through Southern Exposure). Ellie takes care of the animals at LEF, does schooling with the kids at LEF and at nearby communities, works and organizes in the gardens and kitchen. Nick has been helping co-manage the sweet potato business, repairs bikes and carts, and supplies us with firewood. Eric came with some electronics skills. He has helped re-design our ISECs, and has been building circuits to test electrical systems, and the controls for the new washer. John works managing the databases for international relief agencies, has helped facilitate LEF interpersonal relations, and has worked on our biogas tractor. Rosa is 10. She is our resident animal expert, keeps close track of the ducks, helps with posting art in public spaces, and helps with kitchen and farm work. Nika is 7. He engages and entertains all newcomers, and helps out in the shop some. Deb runs the farm, the sweet potato business, and Living Energy Lights. Alexis is chief designer of mechanical systems.

Support 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 Institute are tax deductible. To make tax deductible donations, go to the Virginia Organizing website at <https://virginia-organizing.org/>. Make sure to designate your donation for

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>