

Living Energy Farm

June, July, August 2023 Newsletter

LEF in the News

Low-Tech Magazine (based in France) just did an lengthy, well-researched article, largely about LEF, entitled **Direct Solar Power: Off-Grid Without Batteries**. It's at <https://solar.lowtechmagazine.com/2023/08/direct-solar-power-off-grid-without-batteries/> That article talks a lot about optimal utilization, translate "community is the magic bullet that makes renewable energy work."

Solar Energy in Puerto Rico and Beyond

The renewable energy technologies developed at LEF include both solar thermal and solar electric systems. We can live comfortably, with modern conveniences like hot showers, refrigerated food and internet access, without support from coal, nuclear, natural gas, or industrial "renewable" energy. Our house remains habitable through the winter without firewood.

We have been trying to encourage other people to adopt our methods. Our largest project to date is in Puerto Rico. There we have several organizations working with us, and a growing base of enthusiastic supporters who want to learn about, adopt, and spread these technologies. Last winter we installed 10 demonstration sites, including several large kits, in community centers in Puerto Rico. The organizations supporting us include Monte Azul and Fundacion Bucarabon in western Puerto Rico. We are hoping to install 5 - 15 solar kits (depending on funding) for low-income families in that region this winter upcoming.

Last summer we did a couple of immersives with folks from Puerto Rico (as well as West Africa and India). This summer, Tara Rodriguez Besosa from El Departamento de la Comida in eastern Puerto Rico took the lead in fundraising and organizing to bring 14 Puerto Ricans and one person from Jamaica to LEF to train in the design, installation and use of the Direct Drive DC Microgrids (D3M) we have developed at LEF. We have just finished that training. It was a very full 10 days.



Folks from Puerto Rico, Jamaica, and the LEF Crew



Marielisa wiring a low voltage DC distribution center.

We have a relationship with Sunstar in Indiana (not Sunstar Canada), which is an Amish company making solar refrigerators. They are making very high quality solar fridges with German Secop compressors that run direct drive (and rely on thermal storage instead of batteries to stay cold). Living Energy Lights (.com) is selling this and other equipment at a modest profit on the continental U.S., and selling at cost in Puerto Rico. (There are fridges, nickel iron battery kits, insulated solar electric cookers, brushless DC fans, and other fun stuff at that site.) We have sent a second shipment of the Sunstar refrigerators to Puerto Rico. We will pack another load of equipment shortly, including battery kits, cookers, fans, and sundry useful parts. Some combination of John, Alexis, Debbie, Rosa and Nika will likely go to Puerto Rico in January to continue training and setting up demonstration sites. Debbie, Alexis, Rosa and Nika spent 8 weeks there last winter.

For D3M to spread, there are three key ingredients that have to come together. The first is public recognition and acceptance. Energy is a lot like food. There are many choices in what we do, and those choices are influenced by all manner of habits and perceptions. Gaining acceptance of direct drive solar takes time. The second piece is building skills on the ground for the installation and use of direct drive equipment. On the user end, the tools and appliances we distribute are not as “plug and play” as AC appliances, though we are moving more in that direction. Some direct drive DC tools are little different than AC tools, others are quite different. The cookers, for instance, require different timing as regards when you put food in the cooker. On the installation side, we need skilled installers to make this work. Most DC wiring is the same as AC, but designing and installing effective D3M systems requires training. The third critical ingredient is establishing supply chains. That is costly. We can keep things moving by selling equipment and re-investing in more equipment to a degree. But we need capital up front. We are certainly grateful for the support we have received thus far. We will keep moving forward as we are able.

It definitely feels like we are building momentum at this point. We hear over and over again “this is what people in Puerto Rico need.” Puerto Ricans pay three times as much for electricity as people in the continental U.S., and live with power outages on a regular basis. People struggle to refrigerate medications and prevent food from spoiling. The project in Jamaica is promising as well. (We did some work there a few years ago, but the organization we are working with now is different.)

A Simplified Combine Harvester

We have been working on a simplified combine harvester that can harvest wheat, rice, and other small grains for years. We have a functional prototype. We have been working with an attorney and have put the machine under an international patent. The Simple Harvester can be manufactured at a much lower cost than any other combine harvester on the



Millo working on a cigarette lighter plug strip for low voltage charging and appliances.

market. If we can bring some attention to the project, we are hoping we can use that to leverage funding either from manufacturers who want to produce the machine or from charitable organizations who want to see the Simple Harvester developed for humanitarian reasons.

The Simple Harvester could help make grain farming economically viable for small farmers who are currently locked out of the market by industrial farming methods. The large combines that dominate American agriculture at this point are over a half million dollars each. Even the smallest Chinese made micro-combines currently on the market are \$5,000 dollars or more. The Simple Harvester can likely be mass produced for under \$1,000. That could be a game changer for small farmers on a global scale. Speaking as someone who has farmed all of his life, farmers all over the world are struggling with increasingly extreme and unpredictable weather. Small farming is more adaptable to local conditions. The Simple Harvester may help some with securing a more reliable future supply of critical food supplies.

If we can succeed in getting funding from the development of the Simple Harvester, that could radically accelerate the spread of D3M. Some of our readers have suggested we pursue an “open” patent of some sort or other to assure the Simple Harvester is not controlled by some big corporation in the future (who might decide to suppress rather than develop the technology, or control it strictly for their own profit). We have not pursued that avenue because such agreements have little legal weight. We are not going to sell the patent to any one corporation (if any are interested). If we are fortunate, the Simple Harvester will be marketable simply because it is “a better mouse trap.” Spreading

D3M is far more complicated. D3M does not match the consumerist desires of middle class or wealthy consumers. D3M is spreading as a grassroots movement, but grassroots activists don’t tend to have a lot of money. The difference of an influx of capital into our efforts to spread D3M could make the difference of whether a global spread of D3M takes 5 years or 50. Given the pace of climate change and ecological destruction in our time, that is a big, big difference.

We are going to do a press conference and “Harvesting Technology Demonstration” in the town of Louisa, VA, in the next month or two (as we figure out logistics). That is going to kick off a campaign to bring media attention to the Simple Harvester. We know a few folks who work in various media outlets. We will send out a press release to the list soon. If you can help us promote that event, or have any media contacts who might be interested, we would appreciate your help.

Biogas Crash

We have put a lot of work over the last few years into building a biogas system, complete with a substantial solar flat plate heating system. Our intent is to produce biogas for both cooking and running small, mobile farm machinery. This spring



A workshop with our Puerto Rican friends about how to wire switches so they can handle DC electricity.

our biogas system was running well. As summer temperatures climbed, biogas production climbed magnificently.

On paper, the micro-organisms that produce biogas (archaea) can tolerate a huge range of temperatures, even above 150F. That's hot! But as our digester climbed up toward 120F, it crashed. That was unfortunate. With biogas digesters, it takes 6 weeks or so to build up an archaea population to make gas. For a number of months, you have to feed it very regularly. But once a digester has been in use of 9 months or a year, the archaea colony becomes very robust. At that point, one can be a lot less careful, and the digester still works great.

Archaea are divided into three classes depending on their tolerance of differing temperatures. The cryophilic archaea tolerate cooler temperatures, mesophilic like middle range temperatures, and thermophilic archaea can tolerate very high temperatures. Most biogas digesters operate in the mesophilic range, though some commercial systems operate in the thermophilic range. Our observations are that the digester works really well above 85F (internal digester temperature, not air temperature). We had assumed that as temperatures climbed, the thermophilic archaea would become more active. Well, that's not how it works.

Unfortunately, we were conducting an experiment changing two variables at once. We ran short of kitchen scraps mid summer (before the seed harvest began), thus feed rate was reduced at the same time as temperatures climbed. After the crash, we consulted with whoever would talk to us, including one commercial biogas consultant. We are told that thermophilic archaea are quite different from mesophilic archaea and are much more fragile. We also realized that above 110F, the mesophilic archaea die off en masse. Thus we lost the resiliency we had built up over months. Frustrating!

We disconnected the solar loop, and now Seymour the biogas digester is getting over his indigestion. Gas production is climbing very nicely again, though we don't have the resiliency we had a few months ago. We are going to install an external heat sink (just a tank of water with a coil of copper tubing) into which we can dump heat when necessary. In the coming months, we will have more control over both minimum and maximum temperatures in the digester. As we learn more about this, we will hopefully be able to help other people set up effective, community scale biogas systems. Wish us luck.



Debbie working with Eva (who wants to build and off-grid community in North Carolina) and Afia (who is building an off grid community in Jamaica).

The Farm

We are in the full swing of harvest now. If you are in our area and you are willing to come out and help, drop us a line at livingenergyfarm at gmail. We are a bit short handed this year.

This is the time of year when we try as best we can to preserve as much food as we can, though some invariably rots. We have a good watermelon crop this year. The seed crops are doing well overall. We grew a large(ish) patch of sunflowers. The Gold Finches and Cardinals were pleased, though the harvest seems okay. Brenda, Carrie and Otto have been managing the farm this year. Otto has been dealing with many daily tasks of running the farm, while Brenda heads up management and canning operations. Growing most of our food is a lot of work, and managing that along with growing seeds, conducting our renewable energy projects, and raising kids keeps us busy. The kids are playing soccer these days, which they enjoy. Our internet access is good enough to watch both the men's and women's World Cup. Nika in particular is really into it.

We are getting good use out of a new-ish electric cargo bike we got. A car has over 100 horsepower (hp), a pickup over 250. Our 1 hp ebike is pretty amazing for us, but we struggle with roads and public facilities that are spread all over and designed for cars. The American cosmology essentially ignores the existence of most of humanity. Only 10% of humanity owns a car. Electric cars are not a global solution. We have tried to calculate the amount of solar electric power available for humanity on a global per-capita basis, and came up with 40 watts per person (we are not confident of the accuracy of that number). In any case, it is clear that “renewable” energy resources are being consumed by dominantly by the wealthy, which renders the whole project moot as regards global sustainability.

For us, to maintain anything of a social life for our kids, we end up driving more than we want. That is not something we can fix with new innovations on the farm. There are some electric vehicles on the market now in the 10 hp range that function like tiny cars. But we live well below the poverty line, and even those are expensive for us (and availability is limited). And it’s uncertain at best what truly counts as sustainable. Seeing the abuse of solar energy, some environmental activists are turning against solar and wind. Certainly the massive, industrial scale projects are a mistake. But “throwing the baby out with the bathwater” as regards renewable energy isn’t smart either. It feels like an epic tragedy that our decentralized, conservationist oriented approach is not more widely known and understood. We are working as hard as we can to fix that. It seems to us that our methods, if not perfect, could be a pathway to a future that is actually sustainable. Please 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, do not go to the Virginia Organizing website, go here instead: <https://donatenow.networkforgood.org/1388125> Make sure to designate your donation for Living Energy Institute.***

Articles and videos about LEF:

Low-Tech Magazine (based in France) did an lengthy, well-researched article, largely about LEF, entitled ***Direct Solar Power: Off-Grid Without Batteries***. It’s at <https://solar.lowtechmagazine.com/2023/08/direct-solar-power-off-grid-without-batteries/> That article talks a lot about optimal utilization, translate “community is the magic bullet that makes renewable energy work.”

Matt Dhillon at Cville Weekly did one of the best brief summaries of LEF we have ever seen. The article is entitled ***Power Shift, Award-winning Living Energy Farm Makes Living Off-grid Sustainable***. It is at <https://www.c-ville.com/power-shift>

Truthdig did an article on LEF by Megan McGee, an excellent review of our work in Puerto Rico. It is entitled ***Decolonizing Puerto Rico Through Solar Power***. It’s at <https://www.truthdig.com/articles/decolonizing-puerto-rico-through-solar-power/>

We continue to post new videos on Youtube. The latest is *Solar Power Systems That Last Forever*, focused on our solar powered kitchen. See <https://youtu.be/6XiHClx8d2Q>

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>