

**Living Energy Farm**  
October - November 2022 Newsletter

**Support LEF's Work to Create Decentralized DC Microgrids in Puerto Rico**

Living Energy Farm has created an energy system that can support a modern lifestyle without support from coal, nuclear, natural gas, or industrial “renewable” energy systems. We can't sell the idea of climate justice if we don't have the necessary DC equipment to offer folks who need it. Nearly a year ago, LEF received sufficient donations to begin purchasing DC solar equipment. Our focus is on Puerto Rico. We are in need of continuing funds to keep our project going, and have started a “go fund me” with Serenity Solidarity, which is one of our partners in this project. In Puerto Rico, grid power is so unreliable that many people throw out food regularly because their refrigerators lose power. Some people struggle to refrigerate medicines. This fundraiser is focused particularly on purchasing a couple of highly efficient DC refrigerators (that are repairable indefinitely) for demonstration projects in Puerto Rico. Please help if you can.

<https://www.gofundme.com/f/solar-refrigeration-for-puerto-rico>

**LEF Succeeds at the Second Round of the Institute of Electronic and Electrical Engineer's (IEEE) “Empower a Billion Lives” Competition**

Over a year ago, LEF entered a competition sponsored by the IEEE to develop models for providing energy services to in low-income countries. We made it through the first round some months ago, and more recently we made it through the second round. The Empower a Billion Lives competition focuses primarily on very low income areas such as Sub-Saharan Africa. We are focused on the Caribbean as that is where we have the strongest support on the ground. The third round of the competition is a field test, where the proposed energy solution is tested in the context of an energy insecure community, and results are measured by three rubrics: technological, social, and business model. Our proposed solution is Direct Drive DC Microgrids, and we will be conducting a field test at one of our demonstration sites in Puerto Rico, probably Fundación Bucarabón. We are pleased that our approach has gotten some recognition from electrical engineers and hopeful that the demonstration sites we are setting up in Puerto Rico will facilitate a broader awareness of our approach.

**Spreading the LEF Model**

We are making good progress on establishing solar projects in Puerto Rico on the LEF model. Debbie went there in November accompanied by Ericka (from Serenity Solidarity) and her uncle John (who is Puerto Rican). They had a very productive trip, and talked to a number of different people and organizations. Debbie, Alexis, Rosa and Nika are planning on going to Puerto Rico after Christmas and spending one or two months there building solar demonstration sites.

Our demonstration sites will include **El Departamento de la Comida** in Caguas Puerto Rico. “El Depa,” as it is called, has been around over 10 years working primarily to promote food sovereignty. They run a community



*Miguel, long-time, off-grid farmer in Puerto Rico. He can't run his shop equipment. We are going to fix that with daylight drive DC motors.*

kitchen, tool lending library, seed exchange, and other services out of their headquarters in Caguas. We are hoping to set them up with nickel iron batteries (NiFes), Insulated Solar Electric Cookers (ISECs), a solar refrigerator, as well as a commercial scale food dehydrator in their community kitchen.

Our second project is a community center in **Fundación Bucarabón** in Maricao. In the aftermath of hurricane Maria, social spending in Puerto Rico was slashed, and many schools were closed. (A lot of Puerto Rican families left after the chaos of Maria, and brought their children to the U.S. mainland.) Most of these schools were abandoned, but many have been “rescued” by local folks who want to see these resources put to better use. Fundación Bucarabón is an organization that was founded out of one of these schools. It is a well-established organization with about 20 employees. It is fully off-grid with a rainwater catchment and filtration system, and a well-built, fairly expensive solar kit that includes some substantial lithium battery sets. Given the weak design of conventional off grid systems in which low-efficiency AC equipment is plugged into batteries, they struggle to run their water pump and other equipment. Our systems are more effective and dramatically cheaper, but they do require some re-tooling, and a different approach. Fundación Bucarabón is very pleased, as are we, about our involvement. We will be setting them up with a water pump (a high quality DC booster pump from Sun Pumps), ISECs, NiFes, and possibly other equipment. We will be conducting workshops while we are there.

Our third project will be the **Señorial Community Center** in Cupey. As with the schools in Puerto Rico, public funding has been removed from caretaking of public parks. Some parks are now cared for by the local neighborhood. Señorial is one such park. They have provided food distribution and other community services after storms and other times of need. We will be setting them up with NiFes, ISECs, and possibly other equipment.

Our fourth project will be **Miguel and Dinora’s farm** in Arroyo. They already live off grid, but as with every person of modest income who tries to live off grid, they cannot do a lot of what they want to do. Their water pump does not work. Miguel has woodworking equipment that hasn’t run in years because he does not have access to the kind of technology we are bringing. While they are not a formal organization as with the other projects, these folks have been on their land a long time. They are not youngsters, and they are well known. We will be setting them up with a water pump, NiFes, and powering their woodworking equipment.

We are pleased to have these projects on which to focus. Our technology will grow once more people understand how it works. With the water pumps, many people who try to live off grid try to use AC shallow well pumps. They are single stage impeller pumps with abysmal efficiency and very little pressure capacity. Multi-stage DC pumps are a dramatic improvement, and can share a power source (a few solar electric PV panels) with a high voltage ISEC and other tools (like the woodworking tools at Miguel and Dinora’s farm, or the blower for the food dehydrator at El Depa).

We are bringing in very high efficiency refrigerators from Sunstar to Puerto Rico. These can share a power source with a low voltage ISEC, and are durable and repairable forever. We are setting up all of these sites with a combination of NiFe batteries (that will last the rest of your life) and smaller lithium kits (that are cheaper and portable, and use the best of the lithium batteries currently available). Everybody also will be getting inexpensive household fans with highly durable brushless DC motors. We are working hard to produce ISECs of various sizes and power levels, sourcing equipment, and setting up shipping for materials for each



*Left to right, Elena, activist in Puerto Rico, Debbie, Jacqueline, the director of Fundación Bucarabón, and Ericka.*

project in Puerto Rico. We have a lot on our hands. We are also running out of money. Please help if you can (see below).

### **Living Energy Lights Re-Organized as a Nonstock Corporation**

We mentioned in the last newsletter that we were planning on spinning off a new organization to focus more clearly on spreading DC Microgrids. That is moving forward. We had formed Living Energy Lights as an LLC. We like the name, so we are discontinuing the LLC and forming a “nonstock” corporation with the same name. (In Virginia, any time someone forms a civic organization -- 4-H clubs, church group, etc. -- they use a nonstock corporation as the legal entity.) Most Virginia nonprofits are non-stocks, and we may make LEL an independent nonprofit in the future. In the near term, we can continue working under a Joint Plan of Work with Virginia Organizing.

The board for the nonstock version of Living Energy Lights will consist of Debbie and John from LEF, as well as Ericka and Tara. Ericka and Tara are both dynamic, effective organizers. Ericka is local, and has been working for months on outreach and communications with folks in Puerto Rico to further LEF’s efforts there. She is also forming Serenity, a people of color led community that will focus on social service. She has an extensive track record doing social service for people in need. Tara is Puerto Rican and is the primary organizer behind El Depa. Tara wants to focus more on renewable energy in the Caribbean, and that is a great fit for us. She lives off-grid herself, and plans to sail to other locales in the Caribbean in the coming months to



*On the ground in Puerto Rico, left to right: Tara, Ericka, Millo, Debbie, Vidal, Tito, and Elena*

help spread the knowledge of DC Microgrids. She has been instrumental to our work in Puerto Rico. We also have working with us (see photo above): Vidal, an enthusiastic, mechanically talented volunteer who came to LEF this summer, Tito Kayak, a professional electrician and famous Puerto Rican activist, Millo, an activist who works with Depa to support farmers, and Elena, an activist working in Puerto Rico who has been to LEF a couple of times. We are very pleased with the team we have built to work on these projects.

### **Biogas**

We completed the installation of the solar thermal heating system on our new biogas system. The whole system is entirely homemade, including a homemade grinder and pump setup that makes daily feeding easy. We know from our records of previous biogas systems that one need temperatures inside the digester to be above 83 or 84 degrees F for good gas production. Our digester is named Seymost. (Our old digester was Seymour, and Seymost is bigger.) Seymost was at a sleepy 70 F when we started up the new thermal system. The temperature inside the tank climbed up over a few weeks to a peak of 95 F. Gas production has steadily increased. We have adjusted the feed rate as we watch the gas production climb. If you feed too fast, the gas quality starts to decline, and you get more carbon dioxide. We now have enough gas to cook breakfast every day, and to cook evening snacks (our kids seem to eat a lot in the evening....). We do not yet have enough gas to get us all the way through cloudy days when our ISECs are producing little heat. (The ISECs are more effective at producing heat than any other solar cooker in cold and/ or cloudy weather, but with heavy clouds, they don’t do much.) The temperature inside the digester changes slowly, so gas production remains steady through cloudy periods, at least so far. Seymost has many (millions, billions, trillions?) of micro-organisms inside. It takes time to build up

the population. We are hopeful that in the months to come Seymost's herd of methane-producing archaea will increase and make lots more gas. The amazing thing about these digesters is that once you have a robust herd of archaea, you don't have to worry about consistent feeding, or otherwise fussing over the digester. Once the archaea are well established, they are tough little bugs.

At this point, we are making plans for expanding Seymost's diet. He's not a picky eater. We have been feeding him kitchen compost mostly so far. We are also trying to assess the practicality, financially and otherwise, of helping other communities develop biogas systems. There are many organizations pursuing biogas development in many countries in the Global South. We want biogas for our own use, and for testing a biogas tractor. Discussions with folks in Puerto Rico and Jamaica have indicated a strong enthusiasm for the idea. Given that biogas is a long-established technology, we have to figure out how, or if, this technology fits in with people's lives in the real world. We have to ask ourselves, why they haven't done it already? It is not clear at this time to what extent this might be a technology we can export as we have the DC Microgrid, but we are intending to examine that option carefully.



*Left to right, Elena, Aidelise, park volunteer, Zenaida, Community Association President at Seniorial Park, and Debbie.*

### **Would You Buy an Off-Grid Condo?**

LEF's energy systems work well. This year, we have had a cool November, with nighttime temperatures in the low teens F and daytime temperatures some days barely reaching 40 F. With our solar heating systems at LEF, we have burned no fuel of any kind to heat our buildings. We take hot showers, and fiddle on the internet (which is almost certainly not sustainable in its current form). So why doesn't the whole world live this way?

The BBC has commented, as regards the war in Ukraine, with the Russians attacking the power grid, this winter has become a matter of "survival." But if homes in Ukraine were made of straw bales (which have been in use as a construction material for over 400 years and cost no more than a wooden house), the homes might get chilly, but they would certainly be tolerable.

So why not? Why doesn't the temperate world already have conservationist oriented buildings? LEF's culture is focused on sustainability and self-determination above all else. The rest of the world is dominated by industrial growth that focuses on uniformity and rapid economic expansion. A tree in the forest, if left alone, may be a beautiful expression of the divine and sacred forces of nature, but economically it's worthless until you cut it down and burn it. Then it is an economic stimulus. That is the baseline reason why our economy passes through energy and resources instead of having a conservationist focus.

Another key factor can be expressed by asking a question: Would you want to walk down the street wearing torn and dirty rags for clothing? Notwithstanding the legality of it, would you go around naked in warm weather? Of course not. We are very sensitive to our social standing. In a class-based society, we are very sensitive to our class status, to what people think of us. To live in buildings with lumpy, local materials (instead of uniform, mass produced materials), digging in the dirt to grow your food -- these are not the choices of most self-respecting people in any class-based society. Adopting a conservationist culture -- for people all over the world to live as we do at LEF -- could bring carbon emissions growth to a screeching halt. But clearly people

are not lining up to do so (though we are having fun...).

So.... what do we do about it? How about off-grid condos? One big problem with LEF from a “marketing perspective” is that living cooperatively is just *not* what most people are interested in. Imagine something laid out a bit like an old fashioned motel, but with lovely gardens and extensive solar features like LEF. Each unit has its own plumbing, and an independent electrical system. The whole facility is wrapped in straw bales. Thermal facilities are shared, employing both active and passive solar features. Each unit does not have a kitchen. Each occupant pays a fee, perhaps about as much as one would pay for energy bills in a “normal” house. That money funds a caretaker who manages the energy systems on a daily basis. The caretaker would even wash your clothes and cook food (some at least) for you. There would be a community living room, and a separate kitchen. If you work a regular job, you could come home in the evening, and eat dinner with other folks, or retire to your own space. If you are a heavy computer user, you would run out of energy for your computer some nights in the middle of winter. The temperatures in the building would vary some, but it would never be bitter cold or blazing hot. You would own your own condo privately and could sell it.

Assuming some cooperation on the part of the authorities and some “sweat equity” from the occupants, such a facility could be built for far less than the cost of current housing. If you are interested in investing in such an idea, let us know. We would like to start that discussion.

### **Supporting LEF**

*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](http://www.livingenergyfarm.org), or contact us at [livingenergyfarm@gmail.com](mailto: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 (formerly the Living Energy Education Fund).*

### **Articles and videos about LEF:**

Alexis conducted a presentation as part of a program sponsored by a division of the French government. The links are here

<https://www.youtube.com/watch?v=mdtyfEfy90Y>

and here

<https://www.youtube.com/watch?v=P1CMwChC3vE>

### **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>