

Living Energy Farm

February - March 2023 Newsletter

LEF Wins Third Place at Empower a Billion Lives Competition in Orlando Florida

We had noted in a previous newsletter that LEF had made it through two rounds of eliminations to win an all-expenses-paid trip to Orlando Florida to compete in the Empower a Billion Lives final competition. The timing and location was conveniently on our way home from Puerto Rico. Though staying a hotel where the windows don't open is not the natural habitat of farmer-inventor-environmentalists like ourselves, Deb, Alexis, Rosa and Nika attended and presented lots of information about the Direct Drive DC Microgrids (D3M) that we have installed at LEF, and in Puerto Rico. There were student teams, as well as business owners and various freelance engineers from Germany, Jordan, South Africa, and a host of other locales discussing renewable energy projects from all over the world. People were certainly interested in what we are doing, though we are also clearly outside of the norm. All of the other solar projects were battery based solar kits. The configuration and interconnection of those systems has changed in modern times, and now lots of electronics are employed so all those solar electrons can talk to each other. Modern batteries are more likely to be lithium these days, though others (lead-carbon?) were mentioned.



Alexis, Debbie, Rosa and Nika at Empower a Billion Lives, Orlando FL, Third Place Prize

They gave track prizes for various subjects, and three levels of prizes for the overall competition of 25 teams (who all made it through the first two rounds). We won an "Honorable Mention" for the overall competition, which is basically third place. That came with a \$5,000 prize award, as well as covering our expenses for the trip.

The best aspect of Orlando was talking with the other folks there. We met someone who had authored an academic paper about solar refrigeration that we have studied for the last several years. Talking to people who have done extensive solar installations all over the world was interesting indeed. In that regard, our time in Orlando may have been well spent. We were told that "everything changes" if someone solves the energy storage problem. We informed the audience that D3M reduces storage needs by about 90%. We were told that it is "impossible" to meet the start current demands for electric motors (that need a lot of amperage when they first start up) without batteries and electronics. We informed the audience that the *higher voltage* DC permanent magnet motors that we use with D3M are common, cheap, and start just fine with very low power. We were told that inexpensive diaphragm water pumps are not durable and the high quality European pumps are out of reach. (It is terribly odd, but almost all of the pressurized water in the industrial world is pumped through multi-stage centrifugal pumps, and I have yet to meet an engineer who understands how those pumps work.) We informed the audience that there are plenty of pumps at various price ranges that are far more durable than cheap, diaphragm pumps, and that it is far better to design the energy source (solar panels) that power the pump to power many other tools (which makes it economical to use centrifugal pumps, which are more durable). They never thought of that. D3M is not a product in a box. In both formal and informal discussions, we found we had the attention of many people. Perhaps we have planted some seeds that can grow. Perhaps the people we have talked to can take the information we have given them and put it to use.

The LEF Team Completes Ten Solar Installations in Puerto Rico

Debbie and Alexis finished setting up solar demonstration sites in Puerto Rico in the second week of March. In the end, we did 10 installations of varying size and complexity. In our last newsletter, we mentioned our first two installations (Fundación Bucarabón and El Departamento de la Comida, aka El Depa). Since then we installed equipment at El Señorial Community Center in Cupey, Miguel and Dinorah's Farm in Arroyo, as well as a number of other locations. We helped a few people who came to LEF last summer set up solar panels and appliances. (They covered the cost of equipment.) Vidal and his wife (and two children) are setting up their house to be fully energy independent in San Juan. We helped a other folks set up solar refrigerators, battery kits, and solar cookers.

As with our first installation, setting up solar equipment at Miguel and Dinorah's farm involved as much plumbing work as electrical. As well as being farmers, Miguel and Dinorah are locally well-known environmental activists who refuse to have grid power on their farm for ideological reasons. They had been moving water with a hand pump. Now they can wash dishes in a sink, and irrigate agricultural crops. The latter should help significantly with their gardens. We also set up their shop to run DC power tools. Miguel and Dinorah had installed solar equipment previously, but that equipment didn't do much. It was a standard battery-based solar kit. It would not run their well, or their fridge. Now they have a fridge and a freezer (two Sunstar units, see prior newsletter) to store their coconut products, which is the basis of their livelihood. Miguel was very pleased to see his drill press work again. We started picking up old tools and seeing what we could run. An angle grinder worked great. Even an electric rototiller worked well with direct drive DC. Miguel kept us well hydrated with an endless supply of coconut water, which was welcomed as their farm is quite warm. Miguel and Dinorah's farm is near the beach, which kept the kids entertained. We were pleased to be able to stay nearby with a friend of Dinorah's, who has a house and a small farm in the edge of the hills. Plantains and papayas were a welcomed



Solar appliance conversion workshop, Miguel and Dinorah's Farm, Arroyo, Puerto Rico.



You know you might be in Puerto Rico if the lawnmower for the local city park has three "horsepower."

nutritional addition to our work.

Puerto Rico is a land of extremes. From the tropical rainforest of El Yunque (near San Juan) to the near desert conditions on some of the southern coasts, the climate is surprisingly diverse. We visited a wonderful community Waldorf school in the mountains. If we go back, we may try to enroll the kids there. We visited another friend near Adjuntas whose family land is a magical mountain fairyland with views all the way out to the ocean (which is about 30 miles away) and an amazing waterfall. Adjuntas is famous for a large solar project that has been developed there. They have gotten quite a bit of attention in the media, including articles in the New York Times. Unfortunately, their systems are entirely battery based, and very expensive (near \$30,000 per household).

We worked pretty hard on this trip. It has been exhausting at times, with a number of 7 day back to back workweeks. We have been working with a few of the folks who came to LEF last summer, as well as some newcomers to the project. We conducted two large, well-attended workshops about D3M while in Puerto Rico. That went well. Generally, there remains a great deal of optimism about the potential for the spread of our DC Microgrid. Grid reliability is low in Puerto Rico, and no one has anything good to say about the now privatized electrical distribution utility (Luma).

Going Forward

Since our return from our trip, we have set up a working group consisting of folks from Fundación Bucarabón and Monte Azul (both organizations are in Maricao, in the mountains of western PR), along with Puerto Rican author Aurora Levins Morales. Our group is pursuing a project to provide refrigerators and lighting kits to 10-15 families in their community who need to refrigerate medicine, or have other special needs. Living Energy Lights, our new nonprofit, will be supplying the equipment for this program, as well as offering technical training to the families receiving the systems, and other installers. Our local partners will be identifying funding and providing logistical support. Maricao is one of the poorest municipalities in Puerto Rico, but there is interest in attracting tourists by re-branding themselves as “green Maricao”, much like Adjuntas has benefited from the media attention connected to their solar projects. The folks involved in our project have already seen the shortcomings of battery-based solar systems. Monte Azul was involved in a project installing solar kits for numerous families about ten years ago, and today only one of these systems is still running.

We started 2022 with about \$85,000 in donated funds for our work. With that money, we purchased three shipments of batteries (two nickel iron, one lithium), fans, and a host of parts to build solar kits (cabling, charge controllers, etc). By the fall of 2022, we realized we were not going to be able to buy solar refrigerators and take them to Puerto Rico without more funding. We told the folks in Puerto Rico that they would have to cover the cost of the fridges. Fourteen people and organizations did that, and none backed out. All of our labor has been volunteer. At this point, we don't have a lot of money left. But we are optimistic that the new Puerto Rican working group can keep that project going.

Going forward, this technology really belongs in Sub-Saharan Africa. That is the region of the world where grid power is the weakest. As much as we love our energy systems, it is similar to food. Offering someone a new diet when they are well fed does not usually go over so well, even if the food being offered is healthier. But someone who is hungry will welcome a new kind of food. Quite a few organizations are aware of this issue, and everyone at EBL was trying to make a profit marketing electronics to poorer communities in the non-industrial world. (To whose benefit is a more complicated question.) In our efforts to spread D3M, we have interacted with a number of people and organizations in Africa. We are going to try to develop those contacts further with the hope of seeding a project there when time and resources allow. We are also hoping to be able to return to the Navajo and Hopi Nations, though that is not going to happen this summer. We are going to do more training this summer (immersion, as we call them) with folks from Puerto Rico, and perhaps other locales. This round will be more focused on technical training for people wishing to sell and install D3M equipment.

During our time in Puerto Rico, we spoke with several solar installers. By and large they found our approach very intriguing, but they have to make a living, and the truth is that there is no consumer demand for DC Microgrids... yet. Hopefully, the demonstration centers we set up this winter will build recognition and legitimacy for these systems over time. Ideally, we will also put in place a plan to bring small businesses on board that can then continue to build this movement without ongoing technical or financial support. We think

that is achievable, but the timeline for that is not entirely clear. We will certainly keep you posted as we continue this work. Our energy systems are not on the consumer wish-list of wealthy people. Rather, D3M needs to be integrated into the fabric of working class communities. As such, this is not a consumer item that can be put in a box and financed by venture capitalists seeking quick profits. This needs to develop as a social movement. The goal of supplying energy systems that are accessible to working class people while not relying on coal, natural gas, nuclear power, or industrial “renewable” energy systems remains our vision. We are making progress. 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 (formerly the Living Energy Education Fund).***

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 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>