

Living Energy Farm January - February 2024 Newsletter

DC Microgrids Continue to Spread in the Caribbean

John and Debbie just returned home from three weeks in Puerto Rico. The trip was a whirlwind of installations, events, checkins with previous installations, and continuing to deepen our relationship with people and movements on the island.



Nathania, who attended our training in the summer of 2023, wires the new lights at El Depa.

therefore weak connections can be hazardous. Badly made electrical connections, like wires twisted together with no wire nut, are disturbingly common in PR.) Depa wanted to be able to run their lights off of their battery, so the first project of the trip consisted of building a parallel 12VDC lighting system in their Agroteca (agricultural resource center) and community kitchen.

El Depa organized the DC solar training at LEF last summer, and offered the training free of charge to participants, but required that trainees volunteer for 30 hours on an installation project. Most of our trainees did their hours during this trip.

It was great fun for us to reconnect with the folks we hosted at LEF last summer, and work on projects together. Nathania, Marielisa, Tara, Ricardo and Millo all helped with the Depa lighting system. At our next installation at Huerto Feliz, Anacaona lent her construction skills (building a roof for the water pump), Avia took the lead with glueing PVC, and Erid, the Huerto Feliz garden manager, organized volunteers and did organizational support.

We started our visit staying at Otra Cosa, a queer-friendly farm and homestead in San Salvador, home to Tara Rodriguez Besosa and Millo Huertas, two friends and organizers. Otra Cosa is off the grid and transitioning to a DC system. Tara is the co-founder of food sovereignty non-profit El Departamento de la Comida (the food department, or El Depa), which has its headquarters right down the hill from Otra Cosa, and has been our biggest organizational supporter on the island.

We installed DC equipment at El Depa a year ago, but the battery system was being underused, as the building was wired for AC florescent lighting. We could have switched out the fixtures, but the existing wiring in the walls was deemed to be unsafe for use with low voltage DC. (12VDC can build up more heat in the connections than high voltage AC,



A water pump for Huerto Feliz, with Anacaona's roof.

Huerto Feliz is a community garden managed by Urbe Apie, a nonprofit that occupies and revitalizes abandoned spaces in downtown Caguas for housing, food production, and community enrichment. The water system we built uses rainwater collected from surrounding buildings, and will be essential for watering the garden and providing services for the community during an emergency. We also installed a direct drive fridge,



Erid, Sunflower, John and Debbie celebrate a job well done at Huerto Feliz.

and a lighting/charging system for the plaza next to the garden. As an occupied space, Huerto Feliz does not have access to grid power or city water in any reliable fashion. Our work helped create a welcoming and comfortable space for people in the community to be able to enjoy the garden, charge their phones, get water, and store food. Extra thanks to Sunflower, a Twin Oaks member who traveled with us and was a huge help with the installation.

In addition to the new installations at El Depa and Huerto Feliz, we were able to check in with a few of the installations from last year. We made some upgrades to the system at Miguel and Dinorah's, the elder coconut farmers in Arroyo. We added a vacuum breaker to improve the performance of their pump, and

added a bathroom light to their 12V battery system. We visited Finca la Lluvia, a farm in Maricao that is home to writer and activist Aurora Levins Morales. We installed a direct drive fridge last year, and this year we added a 100AH battery kit to the system, to power a CPAP machine.

One of the goals of the trip was to set up an equipment distribution site so our trainees on the island could continue to do installations after we left. We bought a storage container, and parked it at the farm of Ricardo Martinez, who owns and operates a solar company, Energiza PR. Going forward, Ricardo will be distributing and installing for Living Energy Lights, along with Millo Huertas, Eva Campbell and our other trainees.

Our next visit to Puerto Rico is tentatively scheduled for this November, when we'll do our third annual DC solar training/immersion. This year, instead of hosting the training at LEF, the training will be held at El Departamento de la Comida.

The goal is to make the training more accessible for Puerto Ricans who are not able to take two weeks off from work to be able to attend a program in the US. Now that Depa has a very developed DC Microgrid, we believe that the "immersion" part of training (allowing participants to spend time surrounded by and using the DC equipment) can be done as effectively in PR as in Virginia. It's exciting progress. The recognition of the effectiveness of direct drive is growing in Puerto Rico. For individual users, it's simply a cheaper, more durable form of solar. If we can get the use of direct drive



John, Sunflower, Debbie, Ricardo, and Ricardo's wife Karla at LEL's storage container in Caguas.

to grow to a larger scale, then there would be no need for coal, natural gas, nuclear, or industrial “renewable” energy systems to support grid power.

Simple Harvester

Prototype 3 of the Simple Harvester is complete. We put prototype 2 in the field last year and achieved “proof of concept.” That said, prototype 3 is a huge improvement. It is a combine harvester that can harvest many different kinds of grain. It has one belt and eight turning shafts. It could probably be mass produced for around \$1,000 USD. It’s very simple to operate and maintain.

There is a dire need for the Simple Harvester all over the world. And our machine *works*. It’s not just a theory or an idea. Small farmers in the U.S. can use old harvesters. But that’s not a solution for small farmers in Latin America, Africa, or Asia. BCS is an Italian company that makes two wheeled tractor tractors that are used by many small farmers.

Their harvesting setup is \$32,000 retail in the U.S. The Chinese make small combines, but they are complex and expensive. They are around \$10,000 USD by the time you deal with import fees and what not.

We have a contract with the University of Missouri and the Soybean Innovation Lab to help small shops start producing Simple Harvesters in Africa. We are moving forward with that.

We have no interest in squeezing money out of African farmers. But if someone in the U.S. or Europe is going to make

Simple Harvesters, or mass producers are going to make them, we want a share of the proceeds so we can fund the expansion of the conservationist design we have developed at LEF. Right now that means struggling with a pile of petty legalisms surrounding the patent. Wish us luck.



Simple Harvester, Prototype 3. With only one belt, it is by far the simplest combine harvester ever built as far as we know.

Simple Washer

David has been hard at work for a few months designing and building a control system for our Simple Washer. And now it’s working! We have used a cement mixer for years to wash clothes. It is not a lot of fun to use and not popular. The Simple Washer uses a rotating drum (like a cement mixer), but has a circuit that controls rotation. It drains through an Archimedes Screw. The Simple Washer is DC, direct drive powered. It does have a small rechargeable battery to run the electronic timing circuit. It’s not fully automated. You have to add the water from a hose. But beyond that, it runs through its wash cycle, and then drains. Then you can refill and run it again, and then it’s done.

It’s a very simple, elegant machine. It needs a bit of tweaking, but we have started using it to wash clothes, and it is certainly an improvement over the cement mixer. While there are many washing machines in the world, the DC models made in China are not very durable (as far as we know). The AC models are not easily converted, and many of those are not durable or repairable. The Simple Washer so far is a homestead model, something you would use outdoors probably. But it’s great to be making progress. We have an excellent crew at LEF these days. We are pleased David has made this work!

Biogas

We do most of our cooking at LEF with Insulated Solar Electric Cookers (ISECs). While simple solar thermal cookers (like Sun Ovens) seem like a good idea, they are very limited. The ISECs work great, and biogas is an excellent compliment to ISECs. We cook breakfast every morning with biogas. Two years ago we put a large, 2000 gallon digester into operation. We couldn't keep it warm enough, so we added more solar thermal panels. Then last winter (over a year ago) rats got into the straw and messed up some pipes. We put the digester back on its feet. Then last summer we overheated it. We put in a thermal sink and got it going again. Then this winter we realized we had a leak in our solar heating system. We used stainless heat exchange coils



David designed and built a control circuit, and has made the new Simple Washer work. It's an improvement for us! It runs off the solar panels right behind it (which also power an ISEC cooker).

inside the digester. It is an acidic environment in there. Copper coils would not hold up. One of the compression fittings we used on the stainless failed. So we tunneled under the straw and put in expensive "swagelok" fittings, and restarted yet again. With each one of these restarts, the archae culture in the tank dies back. At best it takes weeks to get it back to a healthy state.

Cooking year round in a temperate climate with 100% renewable energy is challenging. Rocket stoves are efficient, but annoying to start. And they smoke and leave soot all over everything. Before ISECs, we did maybe 5% of our cooking solar on a year-round basis. Now its over 70% with the ISECs. We are hoping that we can cover the other 30% with

biogas and not use rocket stoves any more. But temperate climate biogas is no small project. In the future, industrial output is going to decline. That is as inevitable as gravity. Based on our lessons at LEF, if you don't want to cook over a smoky fire, future generations are going to have to manage cooking fuel on a community scale. Even at LEF, after years of trying to find a not-smoky way to cook, we are still working on it. The digester is -- hopefully -- in a state where we can manage it, keep it warm enough but not too warm, year round. But we do not as yet have a year-round feed supply for it. That is going to involve taking leaves, straw, or whatever we can get our hands on, and pre-digesting it in compost piles to a half digested state, and then feeding it into the digester. It's coming along, but cooking with clean, renewable energy has proven challenging.

Farming

We are preparing for farming season this year. We got a large pile of leaves from a local landscaper over the winter, so we will be doing some sheet mulch gardening. We will be growing a familiar variety of seed and food crops. Otto is managing the kitchen gardens. (He also takes care of Seymour, the biogas digester.) So far this year the late winter/ spring weather has been closer to "normal," a word which has largely lost its meaning in the age of climate change. We will see how the spring progresses.

The kids have been getting a bit more involved in farm, shop, and kitchen work, though as with all kids they like their electronic (solar powered) gizmos. We do a shop class with the kids once a week. They have been reviving a woodgas system for use on a small tractor. Our hope is to be able to start a tractor on biogas, and then run it on woodgas. We may start trying to integrate that into our farming this season as time allows. Currently, we are fully energy independent apart from a modest amount of fossil fuel (about 30 gallons) that we use for a season of farming. We are hoping that in the next couple of years we can be done using fossil fuel for the

tractors as well as firewood for cooking.

We remain amused the extent to which others seem to see our life as some kind of deprivation, or something they could never do, or something they do not know how to start doing. We have a good life, and we feel like our model is a huge improvement over spending huge amounts of money bulldozing forests to build industrial solar fields. 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 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>