Living Energy Farm
January - February 2025 Newsletter

Now Accepting Applications for our 2025 DC Solar Training, offered in collaboration with Serenity Solidarity!

This year, we will be holding our annual DC Solar training at Serenity Community, located in Stockbridge Munsee Mohican land in eastern New York state (a half hour from Albany NY). Program dates are July 18, 19, and 20. Topics covered by the program will include green building and solar thermal systems, direct drive systems, 12VDC battery system, and biogas production. We will be installing a solar direct fridge and a 100AH lighting and charging system at Serenity Community as part of the program.

This program is offered free of charge, but we are asking that participants commit to doing 25 volunteer hours on a DC Microgrid installation in exchange for the program. We are also asking folks to donate to cover the cost of food (or donate food). On-site camping will be available. Spots are limited, and we will prioritize applicants with an intention to apply DC Microgrid technology in their communities. Applications are due May 15.
To apply, fill out the following form:
https://form.jotform.com/250646742972061

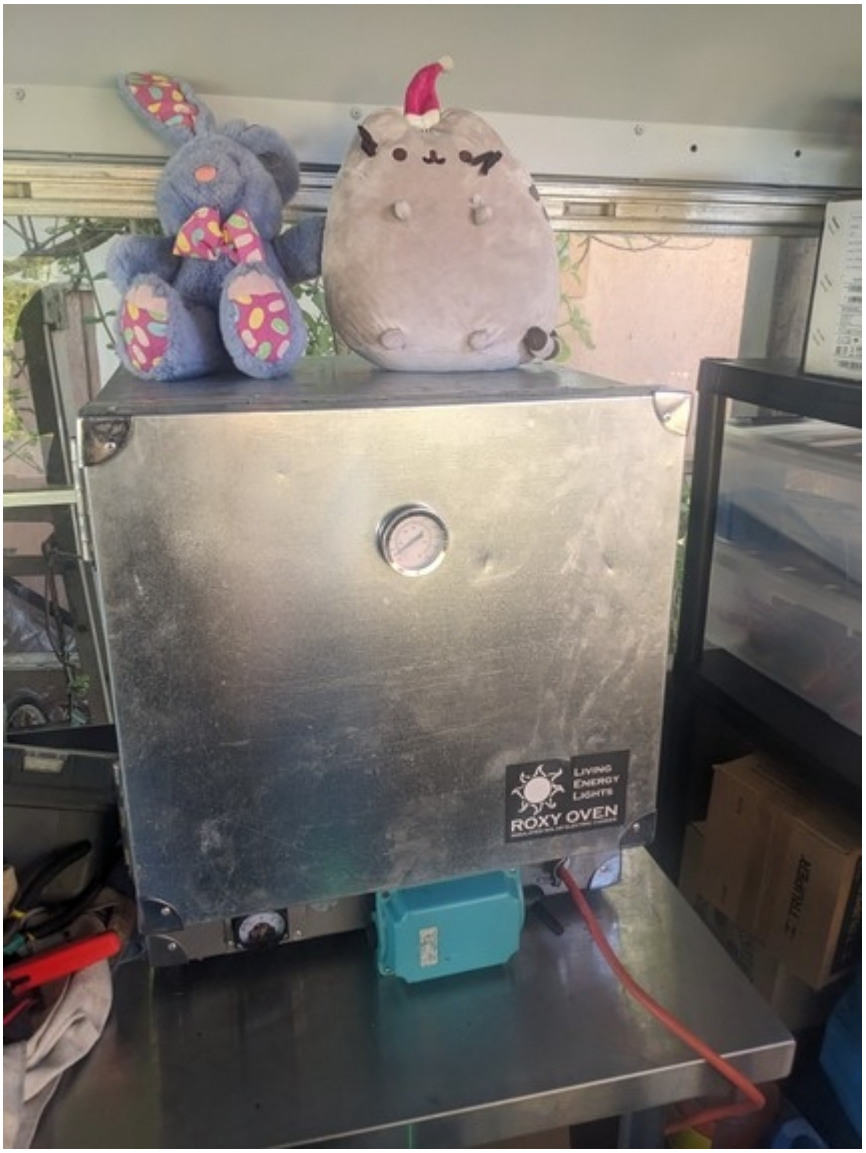
Maria, Angel, Debbie and John working on the Tenedor Social bus.

DC Microgrids in the Caribbean

John and Debbie had an enjoyable and productive trip to Puerto Rico in January. They had a great time reconnecting with old friends, and checked up on many of the DC Microgrids we installed in past years, making improvements and repairs where needed. (They didn't complain much about being away from Virginia during the coldest part of the winter, either.) For the most part they stayed at Otra Cosa, an off-the-grid farm and home of our friend Tara Rodriguez-Besosa, activist and co-founder of El Depa. In exchange for their lodging, Debbie and John installed a 100AH Iron Sun kit and lighting system at the farm. It was very gratifying to be able to immediately enjoy the benefits of the installation. Both the lights and the expanded power supply were a big improvement, and made it possible for John to do his remote job from the farm.

The other significant installation job they did on this trip was in a mobile classroom project of Tenedor Social, a non-profit that works on disaster relief and food sovereignty in northeastern Puerto Rico. The founder of Tenedor Social, Marina, lives off the grid in Luquillo, a small city right on the beach. Together with her partner Angel, Marina is fixing up an old school bus, with the goal of eventually taking the bus to schools and other venues to offer educational programming on small-scale food production and energy self-sufficiency. Since attending our training in 2023, Marina has wanted to install a DC system on the bus. This year the funding came together, and we made it happen. We installed a Roxy Oven, a few small charging kits, and a Sunstar solar direct refrigerator.

Plans are coming together for expanding DC Microgrids elsewhere in the Caribbean as well. The installation and workshop at Wa Samaki Permaculture in Trinidad is stil in the works, although it has been postponed till the summer due to complications in logistics. We're also in conversation again with Afia Walking Tree, who attended our 2023 training and is the founder of Solidarity Yaad Farm in Jamaica. With the support of El Depa, several of our trainees from Puerto Rico traveled to Solidarity Yaad in 2024 to install a solar water pump, cooker, fridge and battery kit. A year later, Afia is very happy with how the equipment is working, the water system in particular. Solidarity Yaad is now a demonstration site for the Ministry of Agriculture, and Afia says that many farmers in the area want to set up similar water systems. She wants to continue collaborating with us by expanding the systems into another building, and possibly hosting a solar training at her farm this year or next.



Insulated Solar Electric Cooker (ISEC) and traveling mascots on the Tenedor Social bus.

Simplified Combine Harvester *and* DC Microgrids in Africa (?)

Work on the Simplified Combine Harvester (Easy Reaper) is ongoing. We have been making some refinements to the machine itself -- improving the grain cleaning process, improving the sickle bar cutter.

Plans were in place to go to Zambia in May and start building Easy Reapers there while training people from all over Africa. Well, that project was funded by USAID, and it got cut. The Supreme Court blocked the executive's power to re-allocate funding from USAID to billionaire tax cuts, but the damage is done. The trip to Zambia is cancelled. The intent was to talk to African solar installers, and talk to people in rural African communities that don't have grid power, while we were there working on combines. Going forward, the plan is to go to Africa with our own resources. We may go in July, or it may wait until November.

Many, many people have suggsted that our Direct Drive DC Microgrid could have a big impact in Sub-Saharan Africa. Certainly in areas where stationary diesel engines are being used to grind grain, a direct drive solar system would be a huge benefit. We are talking to people in Ghana, Zambia, Malawi, and Ethiopia. We are likely to focus on one or two demonstration sites in one area, given the resources at our disposal.

At this point, our strongest connections are in Ghana. Ghana has pretty good electrical service compared to other Sub-Saharan African countries, but many (most?) rural villages have no grid power. We have learned that even very good renewable energy systems have a hard time competing with grid power and gas (propane or natural gas). We hope to test the theory of the broader viability and impact of our DC microgrid in Africa this year, probably in Ghana. And, while we are there, we can help some small manufacturers to start building Easy Reapers. This would be a whole lot easier with stronger funding. Wish us luck.

John, Debbie and the Otra Cosa crew basking in the glow of new solar lights.

Biogas All Winter!

As we head into spring, we are pleased that we have been able to cook food on biogas all winter! That is a very big improvement in quality of life for us. We have had some issues feeding fibrous material into the digester tank. We are in the process of building a large peristaltic pump to do that. A peristaltic pump works like a big snake swallowing one mouse after another, with rollers pushing the process along.

Ayla and India are volunteers at LEF. We taught them to weld, and they are building our peristaltic pump for the biogas digester.

If future years, we will want to stockpile some winter food for the digester, though we squeaked by this year. We had unusually persistent cold this past winter, so if we can make it through that, we should be fine in winters to come.

Biogas Tractor

We are continuing work on the biogas tractor. We successfully implemented a filtering system to remove moisture vapor and hydrogen sulfide from the biogas. (The latter can damage engines.) After some research and consultation with a friend of ours who has studied biogas academically, we have built a tower to use water to remove carbon dioxide from the biogas. This will increase the energy density of the fuel, which will help with storage. Carbon dioxide absorbs easily into water, but the water saturates fairly quickly. And any filtration system has to remain sealed so we are not introducing air to the biogas. We designed a vertical carbon dioxide filter with two pumps. One pump pushes biogas through the filter, bubbling it up a long pipe. The second pump circulates the water from the pipe, spraying and recollecting the water. Exposing the water to the atmosphere should evaporate most of the carbon dioxide. We have not tested it yet.

Biogas filtration tower. The grey pipe is the bubbler section. The water is pumped up to the showerhead over the blue barrel. CO2 is dissapated into the air, and the water recirculated.

We really wanted to get a high quality American or European scuba compressor to compress the biogas, but we finally settled in a Chinese version. Hopefully that will work. However this works out, it is clear that making a small tractor move through a field with any kind of fuel is a lot more difficult than direct drive solar. It is as inevitable as gravity that industrial output will decline in the future. What level of technological sophistication we can maintain, and who will have access to limited industrial outputs, is uncertain. If we can maintain the limited output necessary to maintain small machines, that would support a far more productive agricultural system than relying only on human labor and draft animals.

The rate of future industrial decline is highly uncertain. Our role in prototyping future sustainable technologies is also uncertain. We are trying to think through these questions as best we can. Citizens of modern industrial societies have become accustomed to having massive energy resources at their fingertips. A small car usually has 100 horsepower, a truck over 300. We have had many people talk to us in excited terms about human powered pumps and appliances. A quarter horse solar motor (a couple hundred watts) will do an order of maganitude more work in a day than a human body. A very small farm machine with only a few horsepower -- if we can maintain the infrastructure to keep such machines running -- can do as much farmwork as numerous draft animals or dozens of humans. It’s not entirely clear what the best answers for the future might be, but we are doing the best we can to figure that out.

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. ***Click here to make a*** tax deductible donation***. Make sure to designate your donation for Living Energy Institute.***

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