

Living Energy Farm

March - April 2019 Newsletter

Living Energy Farm Needs Your Help

In the last few weeks, Alexis from Living Energy Farm has been working with volunteers in Arizona to bring Living Energy Lighting and Charging Systems (LELCS) to 7 homes on the Navajo Nation. The venture has been heart-wrenching, challenging, and successful. **If you want to bring light to a Navajo or Hopi family and help spread better solar technology, please go to our website. Click on "Support LEF." Designate the funds for the LEF Education Program. Donations are tax deductible.**

Though many Navajo (Dine') have integrated with modern society, there are also thousands of people still living in remote areas on the land where their people have been living for many centuries. These are people who want to live where their people have always lived, but the process of dispossessing Native Americans of their land and resources did not end a century ago -- it is ongoing. As a result of various dubious business arrangements and political manipulations, coal mines, uranium mines, and power plants have been brought into the Navajo Nation. The ordinary people have suffered from the pollution and forced displacement, while the profits go elsewhere. The Dine' and Hopi peoples over the centuries developed sophisticated means of living in their arid land. They showed me the plants that could be eaten. They have long kept sheep and other livestock in the area.

We installed our lighting systems in the areas of Big Mountain and Black Mesa. These are the areas that have suffered the most from forced relocations in modern times. We were working with Dine' families, but going forward, we will be offering our system to Dine', Hopi, or anyone else who needs our help.

The land of the Dine' and Hopi is vast and much of it pristine, with weather that can be dangerously volatile. You can drive all day and never see asphalt. Every time I asked about water, they told me about springs that used to flow before the coal mines came. For one large mine, a slurry pipe was built. The mining company tapped the deep aquifer water, and, so I am told, pumped 3000 gallons a minute of that water mixed with coal to power plants hundreds of miles away. Now the spring are dry. The animals that evolved over millions of years in the western arid country knew where those spring were, no doubt. The Dine' and Hopi knew where those springs were. The ecological impacts are far reaching. For the people, now they have to haul water, as best they can, in a constant struggle to live where they have always lived.

With each of these solar lighting installations, I was accompanied by a Dine' speaker, though some of the Dine' speak fluent English. In each of these homes, I spoke, sometimes at length, with the people living there. The Dine' still living on the land lack the support of a culture of people around them that they had in previous centuries. They also have meager access to modern conveniences. Of the 7 homes to which we brought our lighting and charging systems, none had grid power, operational off-grid electrical systems, running water, or



The Navajo (Dine') and Hopi lands are arid with patchy vegetation. It's a beautiful landscape with Grand Canyon vistas around every corner.



The Dine' people have raised sheep on this arid land for many decades.

modern appliances. Though none of these people are living in traditionally built hogans, only one lived in a house that would be recognizable as a modern American house. Some had dirt floors. To my knowledge, none of these people have bank accounts, credit cards, or a driver's license. Some do not have birth certificates. Many speak only their native language. Interestingly, everyone we met had a cell phone. This situation is similar (so we are told) to what one sees in non-industrial countries in the southern hemisphere. Interestingly, at least one of these families lives close enough to power lines that they have been offered grid power, but seeing the damage of the coal mines on their ancestral land, they have refused it.



The Dine' traditionally live in small groups. One finds clusters of houses or hogans. These two houses were at site 1. They have defunct solar electric systems installed by an indigenous government agency. They cost \$5,000 and now have zero electrical output.



The reason the solar systems at site 1 have no output is because the batteries are corroded and dead, not to mention toxic. They lasted less than 10 years, cost thousands of dollars, and no one can afford to replace them.

I had been told that I would see derelict solar equipment, but what I saw was shocking. There were many thousands of dollars of dead solar equipment and toxic lead batteries. For the last few years, LEF has been trying to export our model of energy conservation and wise solar design. To date, our model has not been embraced by the non-profit organizations that presume to bring energy resources to people in areas where people do not have grid power. What we saw among the Dine' is emblematic of a huge global problem. Conventional solar design has been completely dominated by an American consumerist model that is having devastating effects on the poorest of the poor all over the world. American homesteaders try to imitate grid power systems by purchasing powerful but short-lived solar electric systems based on lead-acid batteries and AC power inverters. This model has become "the way" one does solar power worldwide. But these systems collapse within a few years. Of the sites we visited, all had previous solar installations, many of them quite sizable. All of them were dead. Unused solar panels and toxic lead acid batteries were strewn all over. Americans demand limitless energy, and the less wealthy are left with toxic junk. LEF's model is different. You can look at our website to see an explanation in detail. (See <http://livingenergyfarm.org/wp-content/uploads/2019/03/LELCS6.pdf>) The most critical difference is that the batteries used in LELCS will last 40 years or more. We use nickel-iron (NiFe) batteries. The NiFe batteries do need some care. If they are badly abused and neglected, they will lose some capacity, but they simply do not fail. Any other battery form -- any kind of lead-acid or lithium -- fails completely if cycled deeply and repeatedly. They render no electrical output whatsoever. Our 72 year old NiFe set at LEF (not our main power source) has been completely



LELCS installation complete on site 1.



Site 2. The solar system with panels on the roof is non-operational, as is the one in the foreground. There are several sets of dead batteries. We utilized the solar panels and existing wiring, and tied our LELCS system into it.

neglected and kicked around for many years, and it still puts out about 50% of its original capacity. The LELCS systems we have installed on the Navajo Nation are small systems. They provide lighting and charging for cell phones, laptops, and devices that can run from automotive cigarette lighter plugs. They are repairable, and will last for a long, long time.

Climate Justice

We hold no illusions that our small gesture of support for each Dine' family is anything more than that. But it is something we can do, and we would like to do more of it. A lack of light inhibits what people without grid electricity can accomplish. In talking with people who have worked in other parts of the world, we hear stories of people spending a third of their cash income on kerosene for lighting, or running a gas generator or a car engine just to charge a cell phone (which is massively inefficient).

The LELCS systems we installed on this trip cost about \$350 in parts. Travel and support expenses for this pilot project cost a lot more than that. We have found some sources for materials that will allow us to build LELCS systems that are both cheaper and better. If you can help us, we would like to deliver 100 LELCS systems to homes that need them this fall. We estimate that we can build the new LELCS systems for about \$200 each in materials. We intend to train and pay local people on site how to install and repair LELCS systems. One of the LELCS recipients is very enthusiastic about learning about solar technology and installing more LELCS. We are going to bring him to Virginia to teach him how to do that. We will be searching for other people we can train on site in Arizona.



This house is the newest we saw on our journey. It is part of the family cluster at site 2, the beloved grandmother of the family. On the left side of the photo is a modern, very robust solar power system purchased by family members who have jobs and want to take care of their elders. It cost a few tens of thousands of dollars. The batteries already have 5 years on them. In a few more years, they will be dead, and over \$10,000 will be required to bring the system back to functioning. If the money is not available, the occupants will be left in the dark.



Site 3, family hogan.

We want to expanding the LEF model in phases.

Phase I -- Develop small nickel-iron based lighting and charging systems and deploy them in the U.S. The questions we needed to answer were: How much does it cost, how do we make it work well from an electrical perspective, would these systems meet a need, and would they be welcome? Phase one is complete, and we have answered these questions. Our systems work, they fill a need, and they are welcome.

Phase II -- Expand our project in the U.S. We want to raise enough money to install 100 LELCS systems this fall in northern Arizona. This will require working with other organizations in the area. We are working on that. We will train people how to build and repair our systems, which are far more durable, scalable, and simple than all the derelict solar equipment currently decaying around people's homes in that area. The process of installing, using, and training people about our systems will build recognition of the value of scalable DC electrical systems.

Phase III -- Make the Arizona project self-sustaining. Once we have trained people to build and maintain these systems, we will establish the capacity on site to import materials, build and maintain systems on site. While it is true that nickel-iron batteries are more costly per unit of electrical output, that is not the reason for their lack of adoption. The parts for our current design of our LELCS system cost far less than most of the failed solar hardware we see in the area.

With the failed systems we saw on site, the batteries are short-lived. The systems are very complex and rely on electronics that no one understands or can repair. The systems are not scalable. To make them larger or smaller requires a whole new system. None of these things are true for LELCS.

We have new Chinese supplier who is now offering us batteries at a much lower cost. (We have two entities working on homemade batteries, though the timing of outcomes in that project is uncertain.) LELCS systems are much, much simpler than the broken systems we saw. Once we establish a knowledge base on site, people will be able to build and maintain these systems without much support from us. There are other aspects of LEF's work that may be applicable in Arizona. We are not in a position to advise people on dry land agriculture, but we may be able to offer support in improving home insulation. Our daylight drive systems would



Site 4, family hogan with defunct \$5,000 solar installation and dead batteries. We utilized the solar rack and internal electrical system, and swapped in our LELCS system to bypass the dead and corroded batteries.



Site 5, another hogan in the same family cluster. We used an on-site panel, set up our LELCS, and put overhead lighting inside.

work well in Arizona. They have lots of sunshine. A LELCS assembly shop (it need not be large) could run on daylight drive. In doing so, it would serve as a demonstration project to educate people about LEF's technologies.

Phase IV -- Take LELCS to Sub-Saharan Africa. We tried a few years ago to develop a project in Kenya. That didn't go far. Now we have found a much better partner. Kwame Ansah Baffour is the Africa representative of the Global Ecovillage Network (GEN), and he is excited to work with us. He was educated in Germany, and has extensive experience developing and writing about agricultural projects in Ghana. GEN works with projects in numerous African countries. We met Kwame recently while he was visiting in the U.S. We hope to lay the groundwork for phase 4 while we are working in Arizona. Our information is that there is a similar demand for lighting and charging systems. **LEF's DC Microgrid will spread based on demand once established in Sub-Saharan Africa.**

The dominance of American consumerism in current solar design has prevented its widespread use thus far. But all the ingredients are in Africa -- good sunshine, solar panels, and demand. A good DC Microgrid means you don't need an AC grid, and AC grids come at only at huge financial and ecological expense.

As we spread LELCS in areas where people need basic services, we will be spreading knowledge about scalable, durable electrical systems and LEF's philosophy and designs. Seeing the calamity of bad solar design in Arizona affirms our conviction that good solar design matters. The solutions to the modern confluence of social, economic, political and ecological problems all point toward sustainable, self-determined communities. Those communities will need food, water, and durable tools. The Native Americans for whom we provided light and charging systems have many struggles we cannot resolve. But now they are a little more self-sufficient. The tools we have developed at LEF do not inexorably lead the users of those tools to an ecologically benign future. But they do make that future possible.



We are in the process of sending out press releases and seeking other means of raising funds.

Durable Battery Company

We have found a Chinese battery company that has reconfigured nickel iron batteries to make them more usable in the modern consumer market. They are also offering their batteries at about half the cost of our other supplier. We are negotiating with this new company about distributing their batteries in the U.S. If you feel like you might be interested in investing in this venture, please contact us.

Dead, corroded batteries at site 4.



Site 6, dead lead-acid batteries on the ground (lower right) from the residents' solar energy attempts.



Site 6, solar panel and more dead batteries from another solar power attempt.



Site 6. We installed all new equipment.



Site 7. There are several attempts at setting up solar electricity at this site. The beige box in the foreground is full of dead and corroded batteries. We were able to use the panel on the roof, and installed all new components from there.



The grassy expanse in the middle of this photo is where a mountain range once stood. The coal companies removed it to get to coal.



Private airstrip at the coal mines so the mine owners can get in and out without experiencing any of the local transportation inconveniences. The local people have to haul water. Their survival is based on a mutual aid network of people with badly worn vehicles.





