

Solar Work with Nomads in Niger

First Trip - A Difficult Start in Niger

By Richard Komp

When we arrived in Niger I assumed that the planned cottage solar module workshop course would be the same as I have been doing in nearby Mali, Rwanda and many other places around the world. We had the work all planned and expected to drive off to a remote oasis in the Sahara Desert in a few days to meet up with the Tuareg and Wodaabe nomad tribes to begin the assembly of photovoltaic (PV) modules and the instructions on how to install them and use them. We spent the first day after I arrived in Niamey shopping for the glass, aluminum frames and the other locally available materials to build the PV modules.

However, when we went to a dinner out in the edge of town, given by nomad leaders who spend time in Niamey, we were told about the plans of a group of nomad bandits to kidnap 1st World people. These bandits (who call themselves Al Qaida but are not actually affiliated with the regular al Kida groups) were supposedly doing this because the idiot in Florida was going to burn Qurans; but the Touareg nomads told us they were doing it mostly for the ransom money. We changed our plans and arranged for the nomads to come down to an “undisclosed location” near Niamey. Three days after we got the warning, the bandits did kidnap 7 French workers from one of the uranium mines in the desert area where we were to be working (There is a lot of Nigerian politics involved in this event).



Nomad group learning how to solder PV cells to make a module for a water pump.

Because all this arrangement and traveling took so much time, we had only seven days for the actual workshop. I started the workshop by having everybody build small solar battery chargers and learn how to sort

and cut the PV cells. We next built solar cell phone chargers and the special 52 watt PV modules designed to solar power the pump we were supposed to put in the well at the oasis.



The nomad group showing all the PV modules we made in 6 days of the workshop.



Tasting the water being pumped by the just completed PV water pump system.

Before the week was over, we had also made 32 and 65 watt modules and took the pump and two modules to a well near Niamey to show how to install the pump. Everybody was thrilled to see the water gushing out of the delivery pipe and they had sort of a ceremony of the production of the solar pumped water. I actually lived

directly with the nomads for more than a week and got to know them quite well. Some of them are very excited about creating a worker owned company to manufacture the PV equipment and promise to make sure I am protected.

We finished the workshop with a ceremony where everybody signed the first PV module made in Niger. While some signed in French, most of the participants signed their name in the extremely ancient alphabet that has been used in the Sahara Desert for 10,000 years (they claimed). We had made four of the little solar battery chargers and four cell phone chargers; and since there were eight different nomad groups at the workshop, they drew numbers to see who got each charger to bring back to the desert with them. The workshop ended earlier than I would have wished because everybody was anxious to get back to their homeland to take part in the big celebrations and meetings of tribes that take place every year at the end of September.

I will be going back to Niger in February and will have to go up to the desert to continue this work, but we are going to make sure that everybody understands that I am not to be kidnapped. Since the bandits belong to the Tuareg tribe, the leaders say they have enough control and there is enough interest on everybody's part to invite me back to safely work with the groups. I suggested that some of the bandits might wish to attend the solar workshops and learn a different profession. I'll keep you informed about the progress of this work.

The Second trip to Niger

I am writing this in my Left Bank garret room in Paris. We had to leave the Sahara Desert region early, with army escort (insisted on by the American Embassy and the central government) because of the African unrest and the election which was held yesterday. The Nomad Foundation put me on an earlier plane to Paris so I have 3 more days here before I fly back to Nicaragua on Friday as planned. I'll enjoy my time here, the owners of the tiny hotel are from Peru and they gave me a special rate for this garret room. No heat at night but a great view of the Seine and Notre Dame and I am finally writing the second Niger report as well as walking around Paris.



The view from my garret room in Paris

This second trip almost didn't come about. Just before I was to fly to Niger from Nicaragua, the Al Qaida decided to kidnap two Frenchmen from a fancy bar in Niamey, the capitol of Niger; and the French special forces tried to rescue the men. In the firefight, the captives were killed and all the foreign people in Niger got very upset. The Nigerian Government finally let us go up to Agadez if we had a complete army escort, which the Nomad foundation had to pay for. Finally - before dawn three days late, we started the long 14 hour drive up into the Sahara Desert with an escort Toyota pickup mounting a big machine gun filled with soldiers. I think this must be a standard option from Toyota: "The *Warlord Special*" you see all over Africa. About ten hours into the trip we were finally met with the second *Warlord Special* filled with still more troops and a second commander. This pair of trucks would follow us everywhere we went and I got to know both the commanders and the troops very well, since they were always around and were very interested in our solar work.



A meeting with the Wodaabe nomads about an upcoming cattle sale with a face to face military confrontation in the background.

Since this was the second workshop I had with the same Touareg and Wodaabe nomads, the students remembered almost every step needed to build photovoltaic modules and we could get right to work building two more of the special 30 cell PV modules needed to power the submersible well pump needed for our microdrip installation in a nearby oasis. I had brought 1000 more Evergreen Solar cells in my luggage and Leslie from the Nomad Foundation brought another kit of the special liquid silicone encapsulant so the nomads have enough material for many more PV modules. Even though the trip was cut short, we managed to build three 65 watt modules for powering 12 volt home systems, five small cell phone chargers and a special 55 watt 8 volt module to run a "swamp cooler" type solar air conditioner.

After three days making PV modules, we set off into the desert north of Agadez to the oasis where we installed the 24 volt Sunpump in an existing hand dug well. The well is right next to a dry waady that actually flooded the gardens a couple of months ago, so the water level is only 10 feet down. We assembled a tower I designed and we had had built in Agadez and quickly assembled the electrical and plumbing system to deliver

the water. The army commander was extremely interested in this project and all the soldiers helped install the tower with him organizing the project. The next step in the project is the construction of a 3 cubic meter (~700 gallon) water storage tank. Since the solar pump works hardest in the middle of the day and irrigation is normally done in the early morning and the evening, you have to store at least one day's worth of water. The system has no batteries or controls except an on-off switch; when the sun shines, the pump runs.



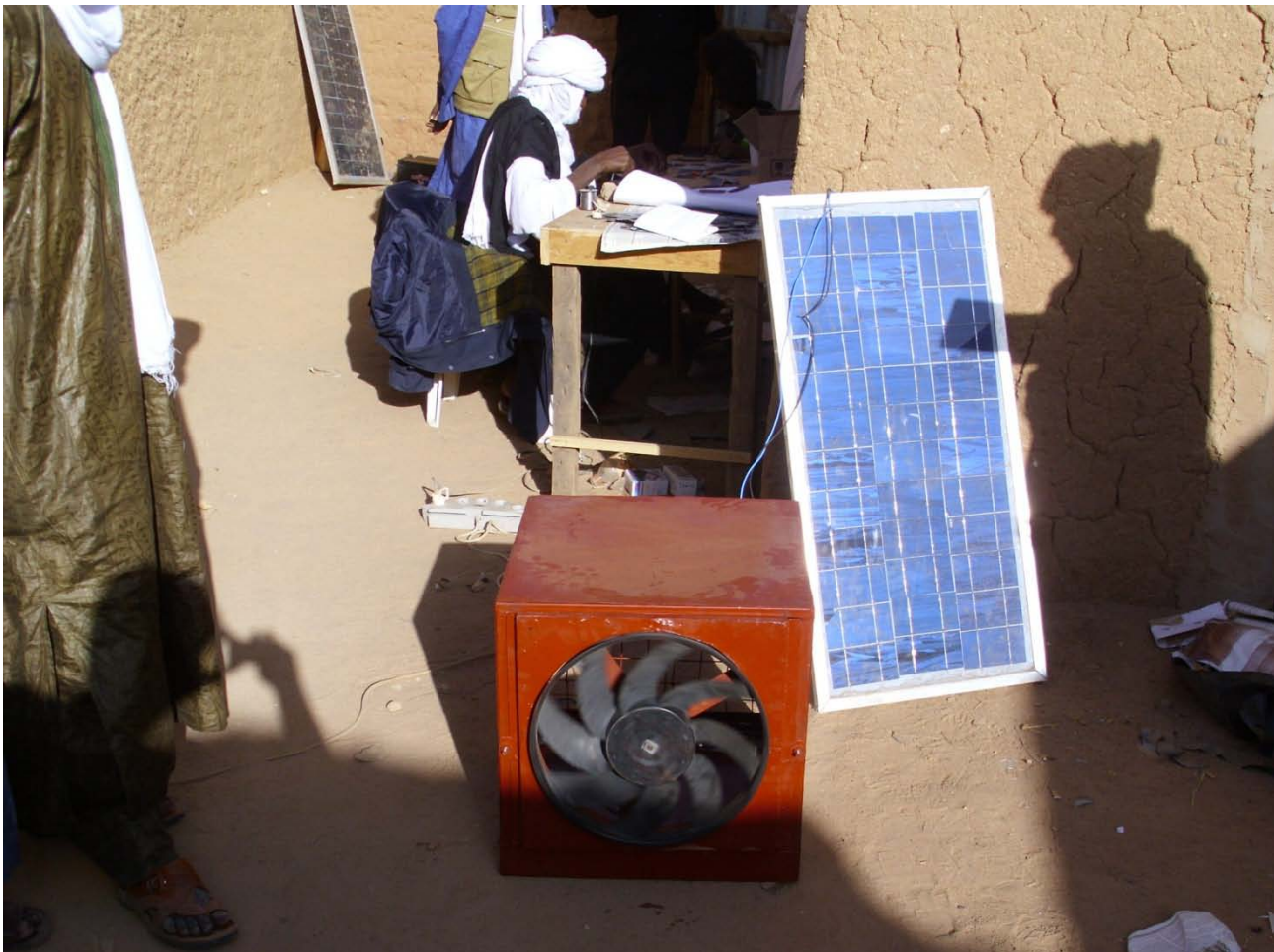
Erecting the tower with the PV modules to power the solar water pump for the well in the background.



Everybody trying out the water being pumped by the solar water pump.

The next day, we installed a small solar lighting system in the Nomad Foundation office in downtown Agadez. This went very smoothly with the nomads learning how to hook up PV charge controllers and light switches to the 12 volt storage battery and PV module. With about a dozen people working at any one time, we had manpower enough to keep building the very popular solar cell phone chargers, utilizing the broken scraps of cracked PV cells. The nomads even sold one of the solar cell phone chargers to the army commander, who took part in the workshop to finish his own charger.

The final project we had time for before we had to leave early, was making an evaporative type “swamp cooler” solar air conditioner. One of the soldiers cut a deal with a used parts supplier to buy an electric radiator cooling fan from an old SUV. The negotiators asked me to stay away so the shopkeeper wouldn’t charge the “white man’s price” for the item. The air coolers, which used to be very popular in places like Arizona only work well in places where it is always very dry. The Sahara Desert certainly fits that description but the local people were pretty much unaware of this piece of technology. I measured the current draw of the fan and we decided that at 12 volts, it was too noisy so we went with an 8 volt system that gave a good air flow with a quiet fan. The same metal working shop that had built the irrigation system tower agreed to build the box I designed as the swamp cooler body and had the device finished the next day after I gave them the fan to mount on the front. We found an old burlap bag to use as the water soaked screen the incoming air is drawn through to get the evaporative cooling. The solar powered fan worked perfectly but the burlap was too tightly woven so that after it wicked up the water from the tray at the bottom of the cooler box, it blocked too much of the air flow, cutting the cooling effect. We need to pull some threads from the burlap sheet to make the weave more open, to get the maximum cooling effect.



The solar air conditioner running from a special 8 volt, 5 amp PV module we built for the device.

The reason for all the soldiers was to “protect” us from the nomads, who were considered dangerous, but in reality the soldiers and nomads worked together in the workshop and one of the commanders spent a good deal of time talking with the nomad leaders about a joint venture.



Some of the soldiers taking part in the workshop, cutting frames for the cell phone chargers.

I am now back in Nicaragua finishing up the report. The election was held in Niger on schedule the day after I left and the opposition party candidate Mahamdou Issoufou got more votes than the ruling party candidate Seini Oumarou. The election seems to be pretty fair with few complaints about vote rigging and such tricks. Since nobody got a majority (Mahamdou got 36%) there will be a run-off election in March. One of the Touareg leaders, (and one of the people helping us organize the solar workshops) was running as the local representative to the national assembly and was expected to win; but I haven't been able to hear how he actually did. Having the nomads involved in politics will go a long way to reining in their discontent.

One of the difficulties of working in a really poor countries is that of finding the proper materials. The only aluminum we could find in Niamey was a rather thick angle channel, which we used successfully, but for further production, the company being formed by the nomads will have to import a more suitable (and probably cheaper) aluminum. I will also have to get them better, more suitable soldering irons. The electric current in Agadez was only 203 volts ac (The utility is supposed to deliver 240 volts ac) and the two irons I brought to use in series really need at least 230 volts to operate properly. I will get two Weller professional grade soldering irons (The kind the sweat shops use) and modify them so that they will run on either 200 to 240 volts ac or 24 volts dc. These are the kind of irons the Grupo Fenix uses here in Nicaragua for their PV module production and have the advantage that they can be set up to operate directly from an off-grid solar power system.

I don't know when I will get to go back to Niger but I hope that next time, we don't need a military escort. To follow this story and read others, go to our www.mainesolar.org website, the *International Work* page.