

Solar Work in Indonesia 2015

By Richard Komp

After she watched the **Burning in the Sun** movie on PBS, Barbara got hold of me and asked if it was possible for me to go with her to Indonesia to do the same kind of solar work there, bringing power to the people. Of course I said yes, and we steered a series of meetings. Barbara was part Indonesian and had worked there so she had a lot of contacts in the country. One of them, a part of the new governmental administration, was excited about the possibilities and agreed to plan the solar course I was to teach.

After we had already bought the plane tickets from Los Angeles to the capital, Jakarta, our contact informed us that he was going off to work in Europe and left our plans in confusion. Barbara found another Indonesian group to work with us -- a rich family with holdings in Sumatra; so I flew off at the end of April to start the work. The family has six siblings and one of the brothers had a non-profit organization that runs a school for poor children where I am teaching the junior and senior high school age children. His sister owns a resort hotel right on the Indian Ocean beach nearby and Rudy (my guide and translator) and I were put up in the hotel. I got to swim in the bath-water-warm ocean water in the mornings before school.



Rudy teaching the students how to solder PV cells



Indian Ocean beach from the top floor of the hotel

Although the family is Christian, most of my students are Muslim and one of the teachers is Buddhist, but everybody seems to get along well together, a welcome change in the world. I was invited to give a seminar at the Buddhist Temple school, and they asked me to work with them as well. After the introductory lectures on the sun and how solar cells work, we started by building the small solar cell phone chargers that are so popular with young people. (I think every girl in the class wanted to take a *selfie* with me on her phone). The solar charger will recharge any phone except the Apple iPhone, but that was not a problem since nobody I work with in the 3rd World can afford the luxury of an Apple product.

I taught the students how to cut PV cells with little diamond cutting wheels, and also taught them how to calculate how many PV cells of a certain size are needed for a particular application; so after the students had built a couple of the cell phone chargers, we bought a small LED lantern. It only cost \$4.50 at the local market and could be recharged from the local 220 volt power line. We opened up the lamp and found out the battery voltage, then built a small PV module to recharge the lamp from the sun. This would make a good little light for the small grass huts so many of the rural people in Indonesia live in. We covered the design and installation of solar powered water pumps but haven't built any of those yet. We went into the design and installation of PV systems for homes, in anticipation of my next visit when we will be doing such an installation. I would usually have about an hour of instructions before we started the two hours of hands-on work.

Building a Solar Oven

We also started building the bigger 32 watt PV modules for 12 volt home systems. These cannot use the simple silicone caulk (The stuff that smells like vinegar) as the encapsulant to hold the PV cell strings in the cheap picture frames we use for the small modules. The next step was to teach the students how to build the solar ovens that are needed to heat-cure the ethylene-vinyl-acetate (EVA) plastic everybody uses in making the large commercial PV modules. I have developed a way of using large solar ovens to do this curing instead of using the half-million dollar laminating machines the commercial producers use (*see the Winter 2011 Maine Sun for details of how this is done*). I had brought several square meters of the EVA with me to Indonesia but it hasn't been used yet.

After I gave the lecture on solar thermal systems and went into the design and construction of solar cookers in great detail, Alex, the Buddhist teacher whose family owns a hardware business, took it upon himself to gather the materials and take charge of the actual building of the solar oven. The solar oven is now finished and working.



Starting the assembly of the solar oven



PV system built for the government to power a village

One Sunday they took me to a remote village that has a central PV power system. It is producing the usual 220 volt 50 Hz power used in that part of the world. We also visited a site where another of the brothers is starting to build a collection of 76 dwellings, all duplexes. He is interested in hiring me as a consultant to make a **Green Village** with all the places powered by solar energy, so that the village becomes a net supplier of electricity to the utility grid. The system will include solar air conditioning for their hot muggy climate and solar hot water as well as electricity.

The plans now are for me to go back in March and work in that part of Sumatra; then go to New Guinea to bring power to the Papua villages that are on remote islands.