Lights, power and action in East Timor

Michael Harris from the ATA International Projects Group tells us about the group's second trip to East Timor

It was 4.30 am. The powerful roar of the ferry's engine had dropped to a low rumble as we slowly approached the beach. On land all was dark except for a few spots of light from the kerosene lanterns near the ferry's arrival point. With a shudder we hit the sand and the ferry ground up onto the beach. We had arrived at Oecussi, the small isolated East Timor enclave surrounded by Indonesian territory.

Powerful winches sprang into action, lowering the ramp that would allow the hundreds of passengers with their bags of rice, chickens, canoes and motorbikes to unload onto the rough rock strip that served as a quay. We gathered up our luggage, solar panels, batteries and coils of wire and made our way to a patch of sand to wait for the dawn and the lift to the office of a local charity where we would commence our first solar power installation.

Over then next three weeks, 11 volunteers from the ATA's International Projects Group would implement 18 projects in five districts of East Timor. They included solar lighting for health clinics, power for small offices, lighting for community buildings, energy for refrigeration for an orphanage and recycling equipment for a women's craft cooperative.

The group aims to use the technical skills, industry contacts of the ATA and its members to provide sustainable technology solutions to poor communities in South East Asia. This is the second round of projects—18 on this trip— of the group. Twenty-three projects have now been implemented. This year's projects included a much greater variety of work than the first. However, small solar power systems were still the biggest slice of what was done.

A six panel solar power system with the capacity to produce 2.2kwh per day was installed at an orphanage, in the remote mountain village of Soibada.

Health clinics and community buildings

Most of the health clinics and community buildings received small solar lighting systems consisting of an 80 watt photovoltaic (PV) panel, a Plasmatronics regulator, a 120 amp-hour sealed lead-acid battery and low-voltage compact fluorescent lamps. Smaller buildings got a 50 watt panel and 65 amp-hour battery and fewer low-voltage compact fluorescent lamps.

We assumed an average peak output from the solar panels of five hours a day, leading to the availability of 400 watt-hours of energy. Using low-voltage fluorescent lamps with an average rating of 15 watts, this system is capable of running six lamps for around four hours. Panels are mounted directly on the roof using aluminum strips. A circuit breaker is used to isolate the battery and act as a fuse in case of overload. The battery and electronics were installed in a translucent sealable plastic container to protect the system from damage.

Offices and computers

We had a number of requests for power systems to help run offices with computer systems. In countries like East Timor, grid-supplied power is often intermittent. In many places power only comes on for four hours in the evening and even that can fail for months at a time due to fuel shortages and breakdowns. During the day, offices may run their own generators, but these can also fail or run out of fuel. Many users simply cannot afford the fuel and maintenance costs so a reliable solar system with no running costs is a very attractive option.

However, many of these offices use older donated computers that can consume a lot of energy. A computer using an old CRT (cathode ray tube) monitor can consume up to 200 watts. Run five computers for eight hours a day and you are consuming 8000 watt-hours per day. With container loads of old computers having been shipped to East Timor by well meaning people wanting to see their old computers put to good use, a real energy consumption problem arises.

Laptop computers use much less power, around 10 to 20 watts (depending on how they are being used), so five laptops running for eight hours a day would use only about 400 to 800 watt-hours. To power the old computers by solar would need twenty 80 watt solar panels costing $18,000. To power the same number of laptops would need just two 80 watt panels costing $1,800. This was an important message for us to get across to those who wanted power for computers and we supplied three laptops with the power systems.

Office power system

One of the office power systems we installed was for Caritas Australia. It consisted of four 80 watt PV panels, a 24 volt 212 amp-hour battery bank, regulator, 700 watt sinewave inverter and 12 amp battery charger. The battery charger increased the capacity of the system allowing the batteries to get an extra charge whenever the generator or grid power was available. If the generators and grid power were not so unreliable, the charger would have negated the need for solar panels entirely, but with panels installed the system could still operate reliably at a reduced capacity even in the event of generator or grid power failure.

The Eco Village on the island of Ataora combines local building techniques and crafts with sustainable solar technology.

This system was capable of providing 1.6kWh per day, enough to provide power for the lights (200Wh), a laptop (120Wh), and peripherals such as printers (100Wh). With extra charge from the generator and mains power, a small fridge and some energy guzzling PCs could also be catered for. The fridge can be run all day without mains power if it is turned off for a few hours at night and the lights and laptop are turned off when not in use.

Installing a solar panel on a health clinic in the isolated enclave of Oecussi. This panel was capable of running six compact fluoros for up to four hours per night.

Refrigeration and power for an orphanage

The biggest system we provided was for an orphanage housing approximately 70 children, in the remote mountain village of Soibada. Power was requested for refrigeration to preserve food, and lighting so the children could study at night.

In our original assessment for the orphanage, the only power came from an intermittently operating generator. When we arrived we found the power situation had improved slightly with four hours of grid power available in the evenings. This, plus a couple of hour's generator power at dawn, made it possible for the residents to run a freezer although this presented a real health hazard. The cycling of the freezer as power came on and off could result in the regular freezing and defrosting of food creating a perfect breeding ground for bacteria.

We installed a six panel solar power system with the capacity to produce 2.2kWh per day. We also added a 24 volt battery bank with a 420 amp-hour capacity, regulator, Selectronic 1.7kW sine-wave inverter and provided a Vestfrost 330 litre high-efficiency refrigerator with no freezer. This fridge consumes about 460Wh per day, much less than a conventional fridge, making it a good alternative for use with solar power systems. This system was designed to provide power for the Vestfrost fridge and lighting with some capacity to spare. However, the existing freezer, which we had not been informed of, put a spanner in the works. We advised the nun who managed the orphanage to make maximum use of the intermittent grid and generator power to run the fridge, freezer and lighting.

Local people were trained and assisted with the installation of all the systems.

The completed Soibada system with the installation team, the kids who act as the local 'electricians' and Sister Mary Lou who manages the orphanage.

Systems installed the previous year in Remexio were checked and the system at the police station was repaired. The wind had blown through a gap in the wall that we had used for cable entry and the cable movement had worn off the insulation. The other systems in Aileu were also checked and the only problem was a blown globe.

Where to from here?

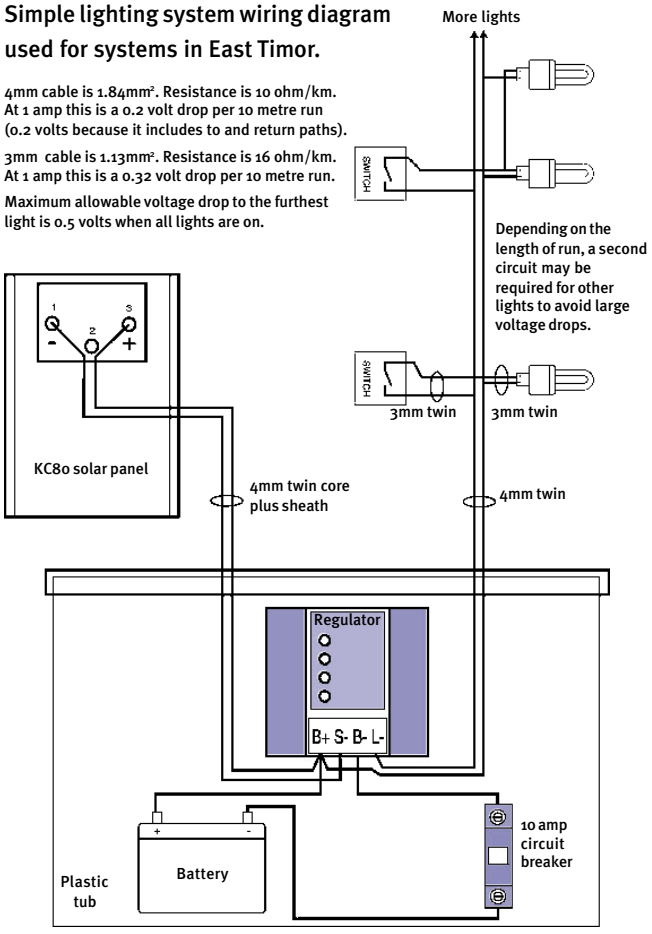
While we acknowledge we probably took on a bit too much work this year, all the projects were successfully completed and we are keen to expand our work next year. We are considering a wind power system for a village which would be reticulated to homes via the old disused town power grid. Other projects could include a small-scale hydro system, solar water pumping, generator-supported short-term battery systems (effectively uninterruptible power supplies), and some large remote PV systems. We also hope to add communications to the health clinic systems. We are developing an Expression of Interest form and will be looking for more projects in 2006 from Timor-based groups and organisations in Australia.

Getting Involved

Assisting poor communities with real tangible resources that help improve their standards on living is incredibly satisfying. However we need help to do this. We welcome volunteers who can help us plan and implement the projects, donations of equipment to be used in the installations and, of course, donations.

Donations are critical to our ability to complete most of the projects. All donations are tax deductible and we are happy to tie your contribution to a spe-

Simple lighting system wiring diagram used for systems in East Timor.



cific project. You get the satisfaction of knowing your contribution goes directly to fund a solar power system for a clinic, school or community building. We will even provide you with a photo of the facility you supported and details of the work undertaken.

Making the project possible

The projects were possible due to the hard work of our dedicated volunteers. The team consisted of myself (Mick Harris), Alan Hutchinson, Bill Bennet, Chris Moss, Emma Chessell, Duncan MacGregor, Jason Bond, James Patterson, Chris Halliwell, Jose Leong and Mike Watters.

We worked with local organisations that helped with transport, accommodation, identification of projects and other support. While installing the systems we taught local people basic maintenance and repairs as well as providing training and equipment to the Dili Institute of Technology.

Funds came from a range of sources including ATA members, Friends of Aileu, Friends of Oecussi, Friends of Liquica, Caritas Australia, the Sisters of Charity, Harvey World Travel - Sunbury and from an ATA fundraiser.

A huge thank you to the ATA members who made donations. Without your help we would not have been able to do so much.

A detailed report on the project is available at the ATA's website. If you would like to contact us send an email to michael@ata.org.au.

Donations were gratefully received from:

Selectronic Components
Assisted with inverters

M & H Power
Assisted with batteries

Plasmatronics
Assisted with equipment and funds

The Environment Shop
Assisted with paper recycling equipment and labour

Going Solar
Assisted with solar panels and labour

Green PC/Infoexchange Australia
Supplied a laptop computer for Bazatete

Computer Bank
Supplied a laptop computer for Caritas Australia

Vic O'Callaghan Transport
Free transport of crate from Melbourne to Darwin

Transhose
Warehousing facilities in Dili

Community Water and Sanitation Project
Advice and assistance in dealing with East Timorese bureaucracy

Some of the ATA team at the warehouse preparing for the installations.