Giakonda Solar Schools
Charity Number 1169138 Visit Report Feb – March 2017

Synopsis

The main purpose of this visit was to install solar power in four rural schools in the Siavonga District of Southern Province, Zambia. This would provide LED lighting and an e-learning resource RACHEL (Rural Area Community Hotspot for Education and Learning), accessible from a laptop and any other wireless devices nearby.
In addition we provided 5 training days for a total of 16 schools.
We improved the networks in two larger schools by means of a Synology server containing an enhanced version of RACHEL, and a third large school by re-configuring the server setup. We also returned two British Council hubs at Siavonga Primary School and Chilanga Primary School to working order.
Funding for this came from Hub Cymru Africa and from donations to Giakonda Solar Schools.
We also supplied equipment (solar panels) donated by Solar Plants of Baglan Bay, servers donated by Synology UK and robots courtesy of MeetEdison.
Members of the public and local schools donated laptops some of which we shipped over and some we carried with us.

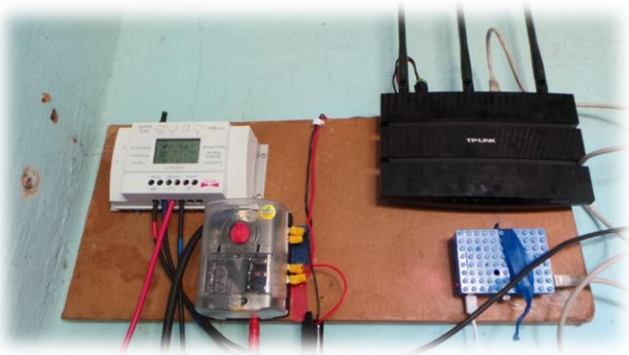
With District Education Board Secretary

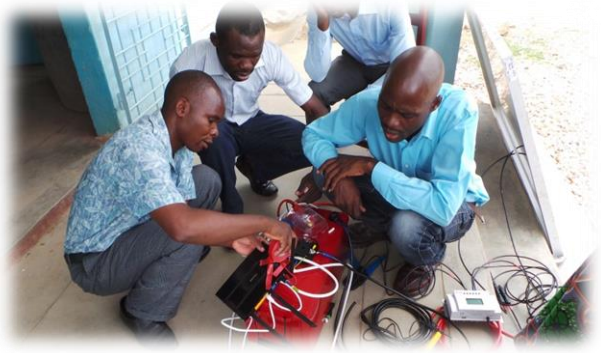
With Head Teacher and Head ICT Siavonga High School

With Project Manager and Treasurer of Siavonga Nutrition Group

Solar Installations




The schools chosen for solar power were among a list of 26 schools without power, identified by the District Education Board Secretary (DEBS). We selected two schools (Katalumba and Game) close to Siavonga town, one (Namumu) where we had worked before but knew the power supply was unaffordable and erratic; and a fourth Sianyolo more distant from Siavonga but near to another solar school. (Dambilo, which we were able to help out last year).

We were fortunate enough to be donated 8 x 235W solar panels by SolarPlants which we used with 200Ah batteries purchased from Muhunya Solar in Lusaka. Each set up also needed a solar controller and a fusebox. A step-down converter (from 12v to 2 x 5v) provided two USB connectors. More can easily be added.
The e-learning resource RACHEL (Rural Area Community Hotspot for Education and Learning) was contained on the Raspberry Pi computer on a 64GB microSD card. It can be accessed by any WiFi enabled devices. We also supplied each school with a TP-Link router which will enable the signal to be transmitted more widely and in future extended even further by way of access points.
The addition of LED lights made a great difference to teachers and pupils who can now continue working after dark and in terms of security. Headteachers were particularly pleased to have lighting in their otherwise dim offices.
For each installation we encouraged teachers and local community members to take an active part in the setup under the watchful eye of Howard. Some of these helpers showed themselves more than capable of maintaining the solar system themselves and setting up another unaided.
For security, the panels will be mounted on the roof in metal frames made from old school desks.
The whole system should work smoothly for at least twenty years, provided the battery levels are kept above 40%. The controller provides easy monitoring of this.
Challenges:
Transportation of the solar panels proved to be a nightmare, partly because this was the first time we had done this. As well as shipping fees, we had to pay clearance in Durban, and further fees for clearance across the Zambian border. Two of the panels had surface damage on arrival but were giving out full power. They will have a sheet of glass fitted over them when mounted to avoid corrosion through water ingress.

RACHEL
This vast offline learning resource was provided to solar schools via the Raspberry Pi and to schools with power via the Synology Server. It is of great benefit in a country where internet access is limited and comparatively expensive.
It was very well received by pupils and teachers alike. One pupil at Siavonga High School remarked that she used it for all her Grade 12 course work because “it’s got a lot of information that is missing in our textbooks.” Teachers liked it because “it is not so distracting for pupil as the internet. It is always available and the costs of the internet are avoided.”
It also offers great potential for educating the wider community who are often trying to improve their prospects by distance learning and the like.

Training
A vital part of the sustainability of our project is continuing professional development of teachers and the wider community. We provided five training days in all, held at Siavonga High School which has the best facilities.

Topics were:

- Computer science;
- Networking (both the theory of it and practical work on setting up routers);
- theory and calculations involved in a solar panel installation, followed by practical experience of doing this
- Coding with Scratch on the Raspberry Pi computer and PC. Setting up a Code Club
- Maintaining network and internet security by using antivirus and anti malware software, safe browsing

These courses were well attended with 16 schools sending at least one teacher. Feedback was very positive.




Other Activities
We were donated two Synology DiskStation servers by SynologyUK. We installed these in Siavonga High School and Siavonga Primary School. This enabled the sharing of resources such as RACHEL, as well as setting up user areas for teachers and pupils so that work can be monitored. If/ when there is a good internet connection, we can even monitor this ourselves from UK.

The British Council Hubs at Siavonga Primary School and Chilanga Primary School caused many issues for users because they employed several different technologies which prevented the PCs being networked together properly. We spent some time improving both networks and tidying up the vast mass of cabling involved.
We also carried out a site survey at Siavonga Primary School with the future aim of extending the wireless range by means of access points. It should also be able to enable RACHEL to be used by the community in the Resource Centre.

At Siavonga Nutrition Group we surveyed the community area for future solar installation to provide power for sewing machines and the learning resource.
We supplied robots and control kits for student teachers to work with small groups. By our next visit we hope to have more learning resources to help with these activities.

Meetings
We attended a series of minuted meetings with our African partners and local contacts: Siavonga Nutrition Group; District Education Board Secretary; British Council Digital Ambassador for Siavonga; and District Head Teachers Representative.
We also had a short meeting with the British Council Digital Project Manager; and the Board of Computers for African Schools.

General Conclusions
There are ongoing issues for us working in Siavonga, Zambia. Transport is expensive and schools can be difficult to access in rainy conditions as many of them have no mettled road. We were very fortunate on this trip that individual schools helped us by transporting equipment and ourselves to their site.

Power is a challenge. On the first of our training days there was no power and no phone network coverage for the first half of the day. The area suffered a great deal of thunder and lightning while we there and one of the schools was struck by lightning, damaging their router. Any and all of the schools would benefit from solar power.
Sustainability is vital. This includes both maintenance of equipment and training of teachers and community members to use computers, teach with computers and teach computer skills. This training includes the use of computers, how to use RACHEL across the curriculum and how to teach computer skills. Our African partners are committed to working with us to address these points by monitoring the schools on a regular basis.

For more information, please visit our website www.giakonda.org.uk
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