

Imaki Community Electrification Project



PowerSpout GE was installed as part of a community mini-grid project incorporating multiple hydro generators and 25 community buildings in Imaki, a remote village on Tanna Island, Vanuatu. Imaki's **health, education and communication** services all suffered from a **lack of electricity**.

The provision of reliable electricity to these community buildings was intended to enhance Imaki's basic services while facilitating income generating activities for its people

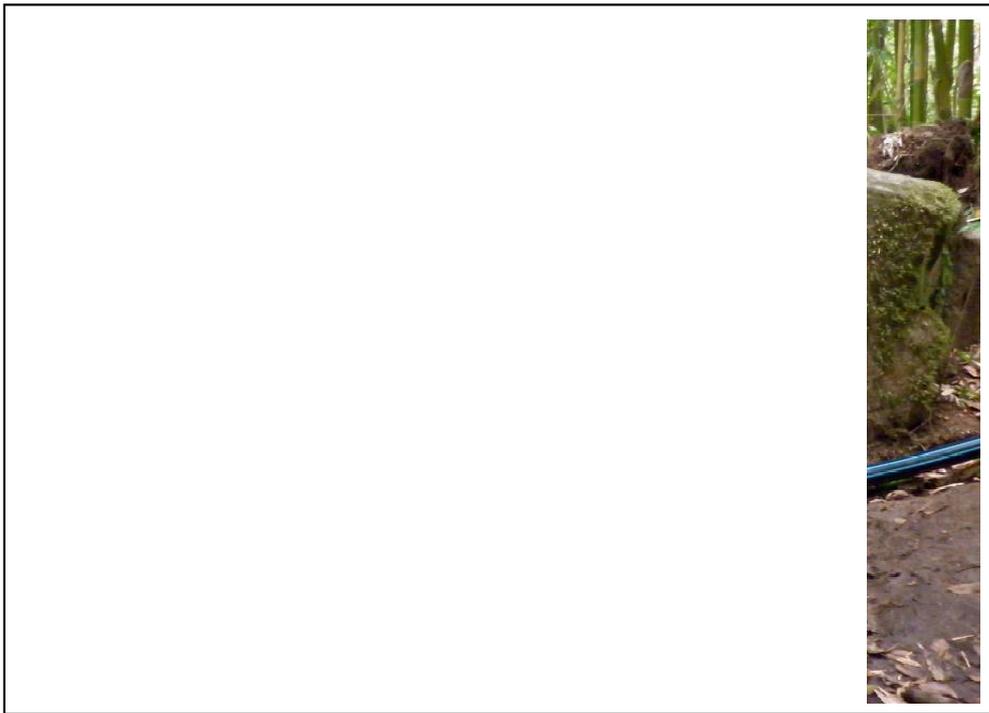
“After we investigated a number of alternate resources for the system, including solar, wind and even geothermal, **we identified hydro as the most appropriate resource to deliver a reliable and sustainable energy source to the community**. It was the most cost effective option that resulted in the greatest energy production capacity,” Chris McGrath, UNSW student.

Solution required to be:

- non-polluting,
- suited to the remote location and developing context of the village,
- able to negate the need to import fossil fuels for energy
- expandable
- robust and reliable
- simple to maintain.

The installation was completed in September 2010. System features include:

- An oversized pipeline to allow for future expansion of the system. 800 m of HDPE pipe, 90mm diameter, at a safe distance from the stream to protect it from flooding.
- Braided steel cables secure the pipe to large, young trees to inhibit movement of the penstock in the case of extreme flooding and other environmental events.
- transmission via two single cores of 16 mm² aluminium cable (most cost effective)
- The existing 412 Ah battery bank provides some energy storage at 24.
- 1100 W grid tie inverter (water flow restricted to avoid excess generation).
- 10mm diameter jets restrict flow rate to 4.58 litres/second
- Generation was measured at 1109 W (over 26 kWh/day).
- Calculated efficiency is over 50% (allowing for inverter losses).



Principal outcomes following implementation:

- The health clinic now utilises an **AC vaccine refrigerator**. The connected freezer allows the nurse the use of first-aid ice-packs.
- **AC lighting in the health clinic** enables the nurse to continue work into the evening.
- The clinic's single nurse has access to electricity in his modest home, allowing the use of a computer and lighting in the evening to pursue his **continuing studies**.
- The primary school can utilise **computer-aided teaching** materials.
- The church can hold meetings and **social gatherings** into the evenings, to the benefit of this institution and the wider community.
- Grid access points, in particular at the shop, allow any individual to charge their mobile phone and enable **communication** between Imaki and the rest of the globe. Telephone communication has significant social and developmental impact, as it enables, amongst other things, the planning of meetings, commercial agreements, travel co-ordination and organisation of projects.
- The secondary school, already accustomed to energy services, will enjoy the benefits of **fuel switching from diesel to hydro**-power. The electricity is used in the school to facilitate evening study, photocopying and use of computers.

Further information is available at

Tehan, E. 2010. The design, installation and operation of a community mini-grid: Remote implementation of renewable energy. UNSW thesis. Available at

<http://www.Powerspout.com/Case studies/Vanuatu PowerSpout thesis 2010.pdf>

Aussie project delivers remote hydro power to the people. Media article. January 2010.

<http://www.thefifthstate.com.au/archives/8855>

McGrath, C. 2009. The Design And Installation Of A Remote Area Power Supply System In Vanuatu: Pico-Hydro In A Development Application.