Winds of change in Mozambique

Mozambique is one of the poorest countries in the world yet, with strong coastal winds and an abundance of sunshine, renewable energy could provide a promising opportunity for the country to improve its social and economic development. Industry charity Renewable World is working with one organisation to make this a reality for communities living in the north of the country.

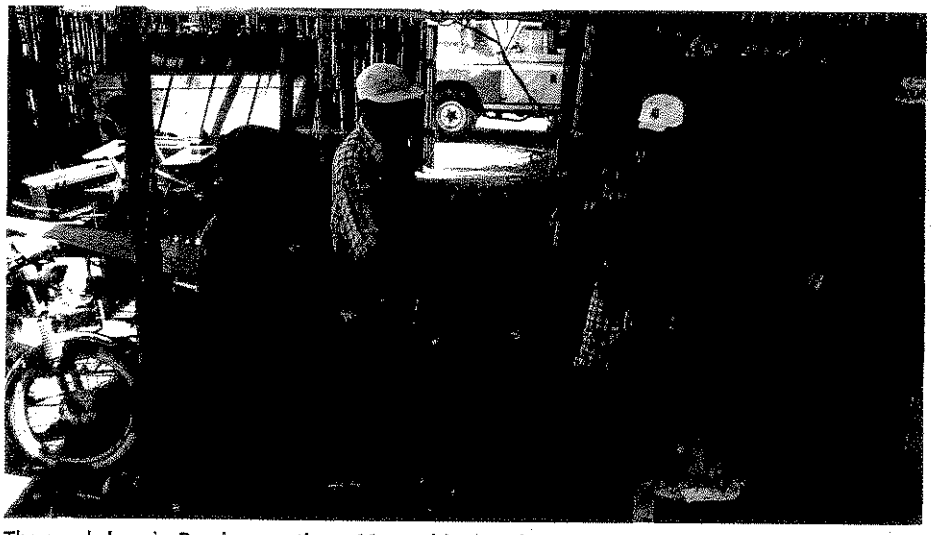
Only 5% of the population of Mozambique currently have access to electricity, and this is mainly restricted to urban areas. Almost half of the country's public health infrastructure is without power and blackouts in homes and public buildings are common. The situation is even worse in the rural areas where the vast majority of the population live and have little or no access to electricity. Those who can afford it rely on kerosene or diesel – which are not only expensive but are the cause of respiratory illnesses and fires within the home. Others that can't afford modern fuels have to resort to using traditional biomass such as firewood and charcoal, which is contributing to growing rates of deforestation in the country.

Although expansion of the national grid is underway by the national power utility Electricidade de Mocambique (EDM), electrifying remote rural locations is prohibitively expensive and poses a huge challenge. Yet thanks to its location within the 'Sunbelt' latitude of 40° north to 40° south, and with 2,800 km of coastline and robust trade winds, Mozambique is a prime choice for off-grid solar and small-scale wind power.

Appropriate technology

Renewable World is working with local partner the Clean Energy Company (TCEC) to make the goal of decentralised power generation through small-scale renewable systems a reality for rural communities in the north of Mozambique. TCEC is the brainchild product designer Jason Morenikeji, who gave up a successful career in the City of London to set up the Pemba-based social enterprise in the northern Mozambique province of Cabo Delgado.

Even though renewable energy systems offer promising solutions for decentralised power, in countries like Mozambique the cost of installing and maintaining imported technology remains prohibitively expensive for many poor regions. Renewable World is therefore supporting TCEC to promote appropriate technologies which meet the needs of the rural, coastal communities in the north of the country. This involves the production of locally-fabricated micro-scale wind systems which can be combined with other renewable energy sources to bring power to rural communities.



The workshop in Pemba, northern Mozambique, where TCEC manufactures PMG wind turbines from local materials

From its workshop in Pemba, TCEC designs and manufactures permanent magnet generator (PMG) micro wind turbines, conceived and developed for local manufacture by leading pioneer in small-scale wind turbines, Hugh Piggott, which can be installed, operated and maintained using local knowledge. The PMG turbines consist of three blades which are hand-carved from seasoned African hardwood – an excellent material due to its strength, workability, and durability – making them able to withstand the harsh conditions in Mozambique.

TCEC's local team of highly experienced 'Fundis' (woodwork professionals) produce all the turbine sub-components, including the wooden rotor blades. The blades are crafted by Twaire (a master Fundi), his four carpenters and three young apprentices. The Fundis play an essential part of TCEC's network of local suppliers and support and encourage their craftsmanship as TCEC prides itself on integrating local fabrication techniques into innovative and appropriate renewable energy technology.

The fishing community of Mapandi on the northern coast of Mozambique is one of the first places to receive the benefits of this collaboration between TCEC and Renewable World. Like most coastal communities in Mozambique, Mapandi is a traditional fishing village, yet in recent years stocks of fish off the north coast have been depleting and, as the village grows in size, local fishermen have struggled to provide both a livelihood and a source of food for the community.

Without access to energy, and in such an isolated location, the community of Mapandi have limited resources to draw upon to improve their livelihoods and provide their families with a healthy diet. Increasing agricultural production is an obvious option but, with no power for irrigation and climate change affecting rainfall patterns and soil quality, community members in Mapandi were already struggling to grow sufficient produce for their own consumption and to store during the long dry season (commonly known as the 'period of hunger'), let alone being able to grow enough food to sell commercially.

In the dry season water had to be carried from a shrinking borehole, one watering can at a time, which limited the area people were able to irrigate to usually just a few crops for their own use. If the rains failed, an increasingly common occurrence, the borehole would dry up. So the possibility of replacing fishing income by selling vegetables seemed unlikely.

New energy for Mapandi

In Mapandi, Renewable World has worked with TCEC to identify the barriers which were preventing the community from successfully diversifying their livelihoods from fishing to agriculture, and provide a solution in the form of using the renewable energy to pump water for irrigation. This will enable the 15 members of the local

farmers' association to increase overall agricultural yields and the number of harvests per year. As a result, the community will have more food for their own consumption, increasing health and nutritional status, as well as enough produce to sell in local markets.

The excess energy will also be channelled into productive uses, enabling the community to develop for the first time opportunities for micro-businesses in the form of mobile phone charging facilities and selling refrigerated produce. The planned energy services also include an illuminated community area where villagers can congregate, meet, socialise and study. A future extension of these energy services could see lighting provided to a local school and homes.

Renewable World's emphasis on shared value means that the energy users are involved in the project from the very start. Renewable World and its partners cover the upfront costs of the renewable energy system and its installation, but local people provide the labour and are trained to maintain the system following installation. Because it focuses on working with members of the community to support them to trade and build businesses, made possible by access to energy, users can afford to pay small weekly or monthly fees into a community-managed fund. This fund can then be used to pay for the maintenance and repair of the system and often also to provide micro-loans to help new enterprises get off the ground.

In Mapandi, the president and treasurer of the farmers' association manage the payments from the other farmers for the use of the irrigation system and allocate money for maintenance of the system when necessary.

The 1 kW wind turbine and 200 W solar array installed in Mapandi are now providing constant power (with battery back-up) for a pump to lift water from a new well, meaning families can grow more crops over much larger areas. With the prospect of increased income from vegetable sales and increased supplies to feed them throughout the dry season, local village chief Sulemani is hopeful: 'Now we don't have to sit and wait for rains. We can use the system to put water on the fields.' The farmers' association is also keen to use the excess power to run a fridge, as they can see the benefits of being able to extend the shelf life of their produce, thereby increasing the profit which they are able to derive from the sale of their crops. ●

Renewable World

Renewable World was set up in 2007 by individuals from the renewable energy industry with the aim of leveraging funding, skills and expertise from the renewable energy sector as well as academic and business institutions, to make a unique contribution to the sustainable development of the 1.3mn people in the world without access to energy.

The charity not only provides the funding for the capital infrastructure, but works with partners in areas of market failure in East Africa, South Asia and Central America to develop business models used in the establishment, management and sale of energy to poor consumers.

In this way, the power provided from renewable energy systems can be used productively and create an income stream for communities, transforming their social and economic development and contributing to the long-term sustainability of the system.

If you are interesting in finding out more about the work of Renewable World or helping us to bring the benefits of renewable energy to more communities in the developing world please visit: **www.renewable-world.org**

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