

# SOGERV Policy Briefing: 2015-16

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## Abstract

The Sustainable Off-grid Electrification for Rural Villages (SOGERV) offers an approach for community energy provision in rural Malawi. The project is designed to create an evidence base for decision makers to consider the approach for scale-up. SOGERV targets village energy needs with appropriate solutions; households, businesses, and public (health and educational) facilities will be matched to sustainable energy products and services. In the first year, preparation activities were underway to learn more about the target location and determine the exact mix of products to be deployed. Since implementation is yet to occur, this policy briefing is focused instead on the positioning of SOGERV within overall context of energy access in Malawi as well as on the process that has been undertaken thus far. This Policy Briefing covers the following areas:

- SOGERV Background
- Electrification in Malawi
- Current Efforts Underway
- Rationale of design against the status-quo community energy model
- Learning by SOGERV in 2015
- Policy Implications

## 1 Sustainable Off-grid Electrification for Rural Villages - Background

The Sustainable Off-Grid Electrification of Rural Villages (SOGERV) Project is funded by the Scottish Government and runs from 2015 – 2018. The project is led by the University of Strathclyde and partnered by Concern Universal – Malawi and WASHTED – Polytechnic. The project aims to deploy sustainable off-grid energy projects in Chikhwawa district, Southern Malawi, that provide communities with affordable energy access.

Four locations were selected by the project to implement renewable energy projects: Kandeu, Gola, Thendo and Mandrade. These sites are labeled on the map of the Chikhwawa district in Figure 1.

While the project aims to make a direct impact to the communities involved, through energy access, it is also designed to provide critical data and analysis on the performance of these systems – a poorly documented area in the past .

The motivation of this project is to change the status-quo; we posit that it is impossible to improve results of community energy projects unless sufficient data and evidence is gathered and analyzed so that decision makers can properly gauge whether the solution is scalable. In SOGERV, a combination of detailed data sets which track economic, social, organizational, and technical performance of the installed projects will create the groundwork requisite for such an analysis.

The scale of systems targeted are in SOGERV are entirely “off-grid” and consist of 2 kilo-watt charging stations, small business solar PV systems, solar PV at schools and health centres for basic services, as well as a mix of pico-solar-products. While only a modest level of access, it is envisioned that the service will be appropriate and affordable for the communities involved.

The planned business model combines local entrepreneurs owning and operating the equipment with community and district engaged throughout the development process. Several variants are planned including a franchise model which is hoped to improve the supply chain issues experienced in the past.

From March 2015 to April 2016 the project has successfully completed its pre-installation plans which included:

1. Project sensitization



Figure 1: Chikhwawa Sites

2. Initial engagement with district and community
3. Baseline report
4. Community Needs Assessment
5. Business plan development
6. Market Assessment
7. Technical Designs
8. Development of contractual arrangements between entrepreneur, community and district
9. Recruitment of entrepreneurs to own and operate the installed systems

Equipment and businesses will now be established at two locations, Kandeu and Mandrade over the next several months.

## 2 Electrification in Malawi

According to the most recent estimates, only 10% of Malawi's 16 million are connected to the main grid. In rural areas, this is roughly 2% . Overall energy consumption is dominated by the use of traditional biomass at 89% of the total .

Current efforts to reach under-served locales with electricity access consists primarily of grid extension by the Malawi Rural Electrification Programme (MAREP) which is implemented in phases. By early 2016 MAREP had connected 137 trading centers throughout the country under Phase 7 . MAREP Phase 8 will start towards the end of 2016 targeting 81 trading centers. It is expected that at least 50 trading centers will also benefit by dropping down transformers along routes to the targeted centers. Major institutional reform efforts are also underway with ESCOM, the national utility, to build capacity and restructure the industry to allow for external energy investments . Despite these encouraging steps,

overall progress of grid extension has been slow and coincided with grass roots approaches that promise a more immediate solution for the energy impoverished.

Currently low electrification rates at rural public facilities such as primary schools and health centers, are unsurprising due to the limited approach to electrification by the government. Grid extension naturally prioritizes urban facilities which exacerbates a differential of qualities of services provided. Furthermore, there is a standing institutional gap where no energy-related offices exist at the district level that could promote and support alternatives.

### 3 Current Efforts Underway

Major alternative off-grid electrification at rural public facilities have been led by international donors and NGOs with the point of entry assuming local community management of the projects. Significant investments continue for projects aimed at electrification but mostly at the household level with pico-solar-products and solar home systems.

With the Sustainable Energy For All (SE4ALL) initiative, leadership in Malawi is in a position to coordinate investments into the off-grid market but needs to ensure these investments achieve the intended effects. The consultative process starts by building an “action agenda” and later an “investment prospectus” for project which achieve the SE4ALL objectives, but also have a degree of economic viability.

The National Energy Policy has been under development since early-2015 and by all accounts will enhance the provision of off-grid solutions for electricity access. The Government of Malawi also aims to produce a Renewable Energy Strategy in 2016/17, with support from the Scottish Government. These plans incorporate diverse approaches which include both grid extension and support of all viable off-grid options. Despite these positive steps, detailed implementation plans around how future off-grid projects will be developed and operated will be needed for these approaches to find success.

The current off-grid efforts require sufficient knowledge, experience, and case studies in order to create lasting access to electricity. It is here that SOGERV’s insistence on building up a strong evidence base can genuinely support the overall sector strategy.

### 4 Rationale of design against the status-quo community energy model

A community energy model is common for rural energy projects in Malawi. Two standout features of this model typically include community ownership and operation and involving a public facility such as a primary school or health centre. Despite the high impact, many of these projects have fallen short of sustainability expectations. A recent survey of Solar PV Project Sustainability found that less than 50% of installed projects were meeting technical performance expectations and only 15% of all projects had both a bank account and were generating an income.

Due to the organisational setup of projects depending heavily on communities and the relatively high capacity required; the ability to responsibly and effectively manage projects at the community level is a major challenge. A major reason for the prevalence of this project design approach is because of lack of systems, infrastructure and support mechanisms that would otherwise take on ownership and operational roles; in effect projects are designed to be self-sufficient at the community level. Consequently, more investment is needed to prepare and support communities to step up to this challenge – in the form of longer development cycles, additional training, and setup of technical and organizational support mechanisms. The positive results from MREAP supports further exploration of this approach – currently led by Community Energy Malawi.

SOGERV approaches the challenge from another angle. To bolster the financial performance and improve the local technical capacity, an entrepreneur will be recruited to manage the day-to-day operations. A local operator, embedded and aware of community energy needs, can be incentivized to provide a market based energy solution.

In addition, several ownership models will be tested. First, a franchise model will place the ownership of assets at two locations in the hands of a franchiser who will enter into an income sharing agreement with the local operators. Second, a local entrepreneur will have both ownership and operational responsibilities at one location. And third, the community will own the project but an entrepreneur/operator will enter into an income sharing agreement. So how is the community involved? The community is consulted throughout the development process. This begins by sensitization and formal agreement with

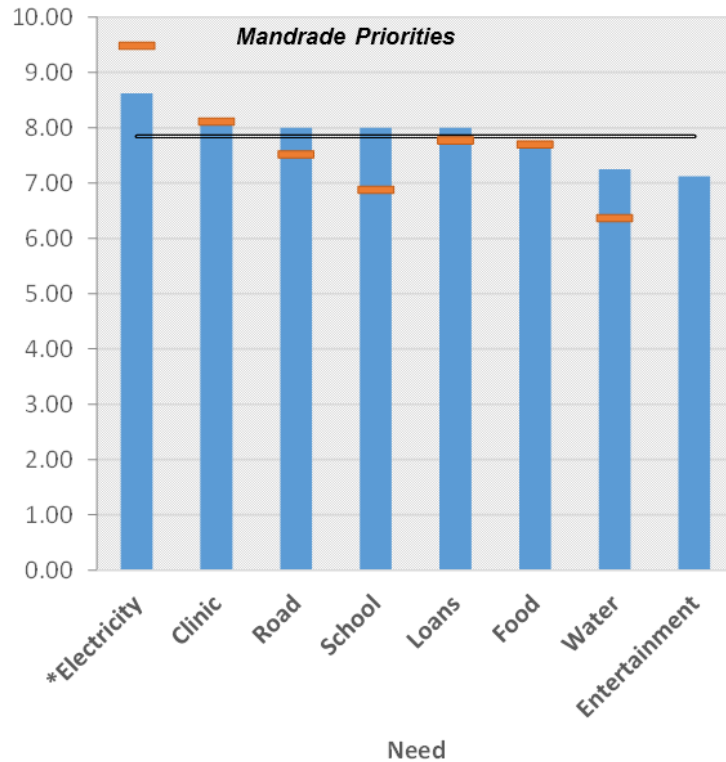


Figure 2: Ranking of needs in the Mandrade Community from the Needs Assessment Activity. 10 = highest need, 0 = lowest need.

the community to develop the project. The exact implementation is dependent on both a needs assessment, where community stakeholders express all of their needs (see Figure 2), and a market assessment where the project explored potential energy-using activities that could be economically viable. The project depends on the community to support the project, help in conflict resolution, and are ultimately backstopping the project should anything go awry.

Finally, the involvement of the Chikhwawa District is an innovation that deserves special note. Through the long-standing work in the district, the project partners and District Council have formed a strong relationship which continues to this project. In SOGERV it is recognized that the energy assets installed on the public facilities are valuable to the achievement of district educational and health outcomes; yet in the past the lack of long-term ownership and financial support of this infrastructure has led to what is sometimes called a ‘graveyard of solar panels’ on these facilities.

SOGERV has therefore linked the level of energy service provision on public facilities to the level of district financial support which can be committed. This will be the first well document instance where a community or commercial energy provider has powered rural health and education infrastructure in Malawi utilising district budgets. Since there is a great need for further electrification of rural public facilities, success here is an exciting prospect.

## 5 Learning from SOGERV in 2015

Having completed the first year of activities SOGERV learning stems from the experiences in preparation of the target locations, business model development and technical designing. While there is no learning on the actual project implementation as of yet, it is equally valuable to consider the process and thinking behind the design of the projects.

From the needs assessment we learned that there are many challenges that all the villages face, outside of provision of electricity. Electricity itself featured quite high in our results, but due to our own involvement (and potential bias as the community wanted to appeal to our project plans), few specific conclusions can be drawn from this. However, needs expressed for other development areas could be improved through an electricity service, such as improved health services, educational services, power at businesses, etc. As a result of the expressed needs, the implementation plan has confirmed its intention

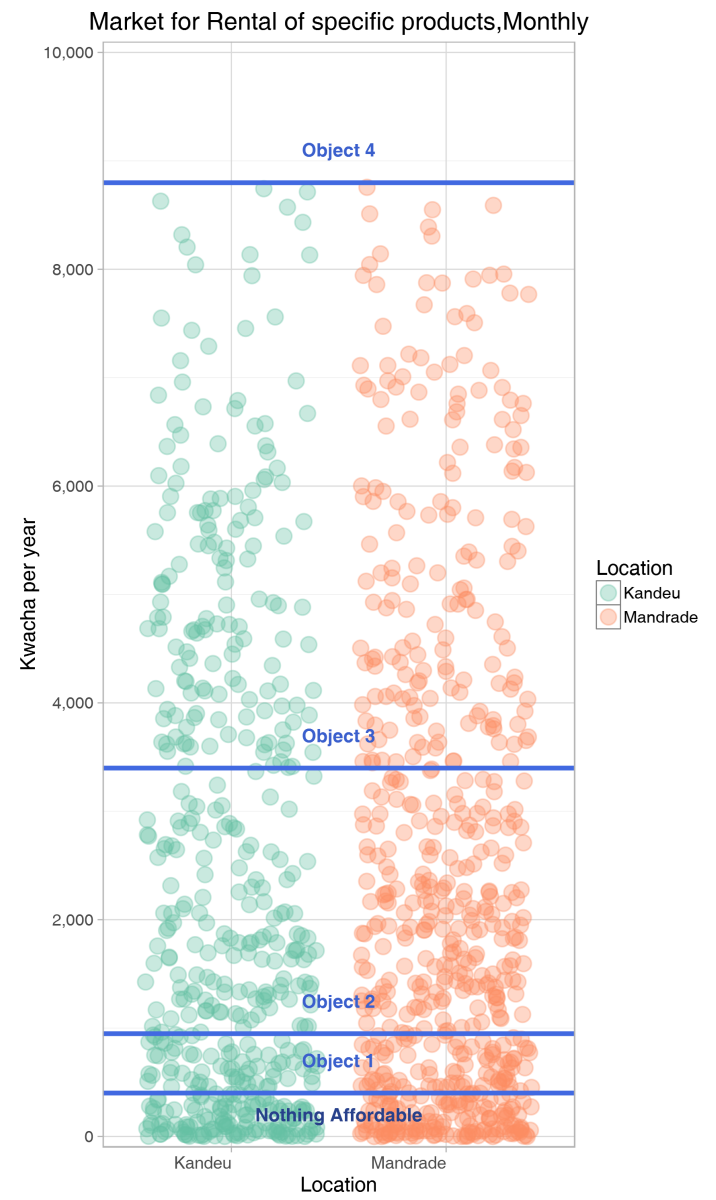


Figure 3: Distribution of energy expenses in each community compared against different (PSP) product cost thresh-olds

to provide power at schools and health facilities, and explored new marketable opportunities (i.e. power at businesses for productive uses).

Data gathered from the baseline and market assessment were pooled to better understand of the income and energy expenditure situation in the target communities. Both incomes and energy expenditures were exceedingly low, median annual incomes for households in Kandeu and Mandrade, were reported as USD \$61 and \$199 respectively. This reflects the level of poverty in Chikhwawa, which in the last census had the highest proportion of ‘ultra-poverty-gap’ in the country. Median energy expense was similarly low: \$43/year at each location.

Income information and the current ability to pay for energy was used to inform the choice of products and services which will be offered (see Figure3). Including financing within the business model is critical to lower the entry point of energy access; the valuations provided by most households of specific products were significantly lower than their actual cost. The distribution of household incomes within the community suggests that multiple products and purchasing schemes were possible to maximize the revenue for the business as the plot below shows (each point represents a household).

## 6 Policy Implications

Drawing conclusions at this stage in the project requires caution; there is much to learn yet once implementation is underway. Nonetheless the key policy implications thus far for key stakeholders are summarised below:

### **For Community Energy Projects**

- A comprehensive needs assessment is a valuable resource for targeting specific energy-using applications. Village Development Committees should be involved to take forward areas which cannot be addressed by the energy project.
- SOGERV may offer an alternative to the self-sufficiency model of community energy.

### **For Energy Entrepreneurs**

- Local market assessments to identify ability to pay is needed to ensure the scale of product/service is appropriate.
- SOGERV will test a franchise model and fully entrepreneur owned model; with success it could be replicated in other rural villages offering economic gain.

### **For District Energy Policy Makers**

- Off-grid energy provision at rural public facilities has not proven sustainable in past iterations.
- SOGERV will test the level of energy access possible with current District budget sources. District Energy Policy Makers should consider the case for revising budgets to support larger rural infrastructure investments using off-grid energy options.
- An off-grid, entrepreneurial approach to rural facility access could be an important part of overall district energy access planning. District Development plans should be reviewed to include a realistic plan to address the low public facility electricity access rates currently.

### **For National Energy Policy Makers**

- Rural electricity access remains a problem in which national coordination can serve an instrumental role in addressing through the current efforts of national energy policy reform and SE4ALL.
- District level support mechanism for energy projects (of all sorts but including community energy) remain a massive gap in development.
- The outcomes from the SOGERV partnership with the District Office should be reviewed by central government to inform thinking about future district level support for energy.
- National funds for development are needed to support the donor dominated efforts in addition to a clearly defined exit strategy, i.e. post donor involvement