

# Supporting Community Energy Development in Malawi

A scoping study for the Scottish Government

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# 1 Introduction

The **Scotland and Malawi Co-operation Agreement** sets out the ways in which the respective country's governments engage and work with each other. Key elements of the Co-operation Agreement include regular discussion, learning and expertise exchange between the countries, and a Scottish Government (SG) financed International Development Fund, which supports discrete projects within Malawi.

Under the auspices of the Co-operation Agreement, Ministerial discussion during the UN Climate Change Summit in Cancun in December 2010 highlighted the Government of Malawi's target of increasing electricity access in Malawi from 8% to 15% of the population by 2015. It was agreed that the SG would consider how best it could contribute to this ambition through the Co-operation Agreement's existing mechanisms.

Against this background, the following scoping study was commissioned by the SG. The study commences with an overview of the broad energy and electricity sectors in Malawi, but its specific purpose is **to understand how off-grid, community-level renewable energy technology can contribute towards meeting Malawi's energy needs**.

To an extent, the scoping study also has its roots in one of the first projects to be supported through the SG's International Development Fund. The University of Strathclyde-led Community Rural Electrification and Development (CRED) project aimed to improve the sustainability of rural solar panel deployments in Malawi by focussing on community engagement and empowerment, local responsibility and income generation. Learning captured through the project indicated that, aside from the obvious energy provision, community-level generation had the potential to bring considerable socio-economic benefits to rurally isolated Malawians. Given this grounding and experience, the SG invited the University of Strathclyde to lead this scoping study.

## 1.1 Methodology

The study has been undertaken by four partner organisations:

- **University of Strathclyde, Department of Electronic & Electrical Engineering:** Specialists in renewable energy technologies, with 4 years experience of applying renewables in the Malawian context
- **Community Energy Scotland:** Deliver comprehensive support, capacity building and representation for communities throughout Scotland that are deploying and managing renewables
- **IOD PARC:** Scotland-based consultancy firm with extensive experience of international development, aid effectiveness and the monitoring & evaluation of development interventions
- **University of Malawi Polytechnic, Electrical Engineering Department:** Participants and ongoing project managers for the CRED project.

An initial **workshop** looking at energy within the context of the Scotland-Malawi Cooperation Agreement was held in Lilongwe in April 2011. Supported and attended by the University of Strathclyde and Community Energy Scotland, this workshop brought together key actors from the Malawian energy sector and served as a useful starting point for defining the boundaries of the scoping study, and of course for making initial contacts with key stakeholders in Malawi and gaining valuable background information. Notes from the workshop are provided in Appendix 1.

The study progressed with an extensive **literature review** during June and July 2011, which helped the study team develop their understanding of the Malawian sector, and served to identify key questions and knowledge gaps.

A one-week **study visit** to Lilongwe was then undertaken by the study team in early August 2011. During the visit discussions were held with key government institutions, donors, academics and community based organisations working in the Malawian energy sector. Notes from these meetings are provided in Appendix 2.

A preliminary set of **conclusions and recommendations** were then presented to the Scottish Government at a meeting in late August 2011. These conclusions and recommendations were then refined and incorporated into this final report.

## **1.2 Definition of ‘renewable energy’**

It is important to note that, within the context of this study, ‘renewable energy’ does not just encompass electricity generation since biomass for cooking and heating (particularly the direct burning of wood-fuel but also the indirect use of wood in the form of charcoal) accounts for 97% of Malawi’s energy consumption. Given the relative importance of biomass within the Malawian context, the study has also taken this energy source into account.

## 2 Overview of Malawi energy institutional and policy framework

A basic understanding of Malawi's energy context and policy environment is a prerequisite for identifying the gaps and needs around community energy provision in the country. The following section outlines the main institutions, policies, programmes and donors that relate to energy provision broadly, and community energy provision specifically.

### 2.1 Institutions

The oversight, development and delivery of energy policy in Malawi falls within the remit of the **Department of Energy Affairs (DoEA)**, which sits within the **Ministry of Natural Resources, Energy and Environment (MNREE)**. While *electricity* policy is largely the sole domain of the DoEA, it should be noted that 97% of Malawi's overall *energy* usage is actually derived from biomass. For example the burning of wood-fuel for heating water and homes. As such, broader energy policy is also a major concern for other departments within MNREE, and indeed other Ministries.

With regards to electricity though, other key institutions include the **Malawi Electricity Regulatory Authority (MERA)**, which regulates the sector in coordination with DoEA, although reports directly to MNREE. MERA's work is predominantly focussed on oversight of generation, transmission and retail of electricity within the national grid, but its regulatory powers do extend to off-grid generation, including the licensing of micro-generation and the certification of renewable energy technology (RET) installation and maintenance engineers.

The **Electricity Supply Corporation of Malawi (ESCOM)** is effectively a government-owned institution and is by far the main generator, distributor and retailer of electricity and it currently owns all the main Malawian power plants and the national transmission grid. However, it is broadly and openly accepted that ESCOM as an institution is inefficient and in need of significant development. ESCOM has little involvement in off-grid generation, restricted at this stage to the piloting of 6 'solar villages' in remote locations across the country.

There are a number of **private sector companies** and **community based organisations** that are developing electricity generation initiatives within the country. In particular, the hydropower potential in Malawi (particularly Mulanje but also the north of the country) appears to be attracting a number of actors, but it is also increasingly common for NGOs to incorporate very small-scale RET installations into the individual projects that they are delivering. Given the variety of technologies available and the diversity of organisations that are 'adding on' RETs to their projects, the off-grid micro-generation sector is somewhat fragmented. Although MERA does have regulatory powers to oversee the sector, there is no comprehensive map or inventory that describes the extent or capacity of micro-generation in Malawi.

Other bodies of particular relevance to off-grid generation include national research centres such as Mzuzu University's **Test & Training Centre in Renewable Energy Technologies (TCRET)**, and the University of Malawi Polytechnic also undertake research into RETs. The **Malawi Bureau of Standards (MBS)** is the national certification body for industry and commerce, whose remit includes electrical standards and equipment. Many relevant standards have been developed, including several specifically for renewable energy technologies, particularly solar photovoltaics. Finally, the **Renewable Energy Industries Association of Malawi (REIAMA)** is a national membership association comprised of private companies, initially formed through the National Sustainable and Renewable Energy Programme (see below). REIAMA is effectively dormant now, although some believe that with restructuring, the Association could provide a useful industry platform in the future.

## 2.2 Policies

The **Malawi Growth and Development Strategy (MGDS)** is the overarching framework that guides development interventions within the country. Energy generation and supply is one of six key priority areas within the MGDS:

*“The provision of energy in Malawi is inadequate, unreliable and inaccessible to all who need it largely on account of lack of competition in the sector, non-functioning power plants and inability to generate sufficient amounts of energy. The objective of the MGDS is to reduce the number and duration of blackouts, increase access to reliable, affordable electricity in rural areas and other targeted areas, improve coordination and the balance between the needs for energy and those of other high growth sectors such as tourism and mining”*

**Malawi Growth and Development Strategy, 2006-2011**

Although the second MGDS 2 (2011-2016) was not published at the time of writing this report, it has been confirmed that energy generation and supply will continue to be a priority area. Moreover, it has been indicated that MGDS 2 will have an *increased* emphasis on energy, given the current tendency towards high fuel prices, continuing problems with electricity supply across Malawi, and the increasing international emphasis on climate change.

In addition to the MGDS, a **National Energy Policy (NEP)** was approved in 2003 and is the responsibility of the DoEA. The policy resulted in the formation of MERA, was influential in a recent restructuring of ESCOM, and continues to guide energy development within the country.

As part of the NEP, a **Renewable Energy Framework** has been in development for some time. This will also be the responsibility of the DoEA and will bring more coherence to renewable energy developments particularly at the national (grid-level) scale, but with some focus also on the local (off-grid) scale.

At the international level, Malawi is a signatory to the **United Nations Framework Convention to Climate Change (UNFCCC)**, which requires the government to report on greenhouse gas emissions and other vulnerabilities. As part of their involvement with the UNFCCC, the Malawian Government developed a Technology Needs Assessment report in 2003. In the absence of other formally approved government policies, strategies or plans for renewable development, this document provides a reasonable overview of the government’s strategies and requirements with regards to renewables.

## 2.3 Programmes and Donors

A number of large scale programmes have been proposed to improve, expand and maintain the national electrical generating capacity, transmission grid and distribution network. Potential initiatives include the upgrading of existing generation stations, the development of new generating stations, the improvement and extension of the transmission and distribution networks, support to increase private sector participation, and the development of capacity within the three key institutions (DoEA, MERA and ESCOM). These large-scale, national initiatives were to be primarily supported through more than \$300m of investment from the **Millennium Challenge Account (MCA)** and the **World Bank**. However, recent political instability within Malawi has resulted in the MCA’s funding being frozen and the programme being put on hold indefinitely.

The technical focus of these large programmes – and by extension of the MCA and World Bank – was squarely (and perhaps understandably) on the ongoing upgrading and development of the national grid, along with the institutions and investment environments that are necessary to support such development.

One ongoing programme that was to be only partially supported through the MCA investment is the **Malawi Rural Electrification Programme (MAREP)**, a long standing initiative that extends the grid to more isolated administrative and trading centres. MAREP is managed by the DoEA, was predominantly supported by JICA (the Japanese government's development agency), but is now wholly supported by the Malawian government itself. The progress of MAREP is inextricably linked to the progress and development of the broader national grid – MAREP can only proceed as and when national generation capacity is increased, and as and when the transmission network is improved.

The DoEA also hosts the **National Sustainable and Renewable Energy Programme (NSREP)**, which over the years has acted as an 'umbrella' programme for other renewable and off-grid initiatives such as the UNDP-supported **Barrier Removal to Renewable Energy in Malawi (BARREM)** and the **Programme for Biomass Energy Conservation (ProBEC)**. Overall though, the current direction of NSREP is unclear and there appears to be markedly less strategic coherence and coordinated support for these 'lower level', off-grid renewable energy generation projects.

Finally, work relating to Malawi's UNFCCC commitments has resulted in a **National Adaptation Programme of Action (NAPA)**. Oversight of this plan and the broader UNFCCC commitments sit within the Department of Environmental Affairs (also part of MNREE). The Department of Environmental Affairs also has responsibility – and dedicated human resources supported by UNDP capacity building – for managing Malawian efforts to access international climate change financing mechanisms such as the **Global Environment Facility (GEF)** and the **Clean Development Mechanism (CDM)**.

## 2.4 Priorities and targets

Under the MGDS key priority area of 'energy generation and supply' the long term goals and expected outcomes are defined as follows:

### Long and medium term goals

- To reduce the number and duration of blackouts, increase access to reliable, affordable electricity in rural areas and other targeted areas (such as social facilities)
- Improve coordination and balance between the needs for energy and the needs of other high growth sectors (such as tourism)

### Expected outcomes

- Reliable and sustainable energy supply and increased access
- Increased access from the current 6% to 10% by 2010 and 30% by 2020
- Traditional biomass- commercially supplied energy mix target of 75% - 25% is set for 2010
- Power supply is connected to South African Power Pool (SAPP)

In terms of the actual strategies and resource allocations arising from these aims, the clear national priority is the **upgrading and extension of the grid**, with the **MAREP** programme being the main vehicle for rural electrification. The MGDS does reference the need to "create awareness of the use of renewable energy" within rural communities, but beyond the 6 pilot solar villages, little work is being conducted by Government in this area.

Given the centrality of biomass as an energy source for Malawian communities, it is also worth highlighting that the MGDS emphasises the need for a major change in the biomass-commercial energy ratio. However, in reality there are very limited Government resources actually being allocated to the area of biomass, partly as a result of the resource-intensive requirements of the national grid development.

### 3 Review of community energy development in Malawi

The previous section described the energy context and policy framework in Malawi and this section assesses the off-grid and community energy situation that has emerged beneath that framework.

Only 8% of the Malawian population currently benefit from a grid-connected electricity supply. Moreover, the national grid almost exclusively serves urban and peri-urban areas – around 25% of urban households have electricity, compared to 1% of rural households. As such, the 85% of Malawians that live in rural areas are largely unserved by grid-connected electricity and – even with national grid extension programmes such as MAREP – the great majority of the rural population is unlikely to be grid-connected in the near future. Energy sources other than electricity are therefore dominant in the country: 97% of Malawi's *entire* energy consumption is based on biomass – primarily the burning of wood-fuel, charcoal and waste for cooking and heating.

An initial survey of off-grid energy deployments points to a relatively wide variety of actors utilising RETs in Malawi. Some high profile projects are specifically community energy focussed, however there is clearly a large (although not fully quantified) installed base of RET (primarily solar photovoltaic) deployed by Government or Non Government Agencies (NGAs) to electrify health and education buildings in remote locations.

Within this context, the following section explores some of the current initiatives being implemented to improve community-level energy provision and management. Case studies outline some of the learning that has been captured through recent projects, and the section concludes by highlighting some potential strategies and approaches for community-level energy development in the future.

#### 3.1 Current approaches

As indicated in Section 2, the Government's main energy priority is the development and extension of the national grid. However, there is also a recognition and acceptance that this work will not bring electricity to the majority of Malawians in the near future. The DoEA has taken initial steps to explore the potential for serving rurally isolated communities via off-grid electricity generation using RETs. Six pilot 'solar villages' have been developed, serving around 150 households each. The villages were constructed and were intended to be maintained by ESCOM, but the indications are that ESCOM did not have the resources or capacity to deliver an ongoing maintenance function for the villages. Regardless, the great majority of off-grid piloting and generation is being conducted independently of Government: universities, community based organisations and the private sector are currently allocating far more resources towards off-grid generation.

Although it is still a 'young' sector, individual programmes and projects show great potential. The case studies in this section on MuREA, CRED, Concern Universal, SolarAid and Mzuzu University demonstrate some of the ways through which RETs are being successfully tested and deployed, and some of the learning and experience that will be valuable for informing and improving similar initiatives in the future. Further details and quasi-independent evaluation of the CRED project is provided in Appendix 3 and a table of all the community, off-grid energy projects identified in Malawi is presented in Appendix 4.



### **CASE STUDY 1: MuREA (Mulanje Renewable Energy Association)**

MuREA has several projects underway with the most significant being a 75kW micro-hydro scheme at Mulanje, funded with support from the EU. MuREA aim to construct, operate and manage the facility for 3 years, then hand over to the community it serves. Training is given, the community participate in construction (contributors gain proportionate credit for free energy provision), and guidance is provided on the management of finances. Income is planned to cover maintenance with a surplus planned to fund a scheme extension in future. MuREA are also looking into alternative tariff collection mechanisms, and have a live proposal to establish a separate company that will manage tariff collection for their micro hydro schemes, freeing up MuREA's resources to focus on development of new projects.

MuREA identified the cost of licensing micro-generation facilities through MERA as a significant barrier to ongoing development. They were also concerned about the requirement to link their tariffs to the ESCOM national tariff (which does not incorporate full development costs). MuREA also felt that, in non-government circles, there is a lack of sharing information or continuity between independent RET-based projects. Collectively, independent projects and organisations could get together to work for a more streamlined process in dealing with government e.g. clarifying tax issues, clarifying registration and regulation procedures etc.

### **CASE STUDY 2: CRED (Community Rural Electrification and Development)**

The CRED project deployed solar photovoltaic (PV) systems in off-grid rural villages. The systems were installed as a community resource, providing lighting, power and refrigeration in schools and health posts. Sustainability issues were a key focus and community participation, ownership and responsibility were promoted through community workshops and establishing and training local energy committees. Village Energy Committees were backed up by an appropriate support chain of a local field coordinator, local suppliers and project management from the University of Malawi Polytechnic in Blantyre) and The University of Strathclyde. The role of the Energy Committee includes managing community access, undertaking income generation activities plus maintaining logbooks of technical and socio-economic data. The socio-economic data reported to date shows high levels of use by a diverse range of community groups, students for evening study and by health and education staff for a range of tasks. Income generation from mobile phone charging has provided a regular income stream.

The process of community engagement, training and transfer of ownership has achieved positive indications for improved sustainability of community PV installations. Ownership and responsibility for security, management and maintenance of the system has been successfully handled by village Energy Committees. The energy resource has been widely used by several groups from the community and income generation via battery charging indicates a level that can support ongoing system maintenance.

An assessment of CRED indicates that the successful approach of community participation could be further enhanced via the use of an appropriate development framework (Sustainable Livelihoods Framework has been considered) along with additional investment in the support of communities to identify their own energy priorities and take full ownership of the scheme. The use of such a framework would also enhance the monitoring of an energy project's impact on wider development goals.

### **CASE STUDY 3: Concern Universal / SolarAid**

Concern Universal manages an EU funded project that aims to improve energy efficiency through a combination of technology (e.g. efficient stoves), natural resource management, and awareness raising. A key component of the work is the introduction of 'Marketers' into each of the 312 villages covered by the scheme. The Marketers' primary function is to demonstrate and sell the stoves (and promote microcredit opportunities), but a link with the SolarAid charity was also made through the project. This link has allowed the Marketers to increase their product portfolio, and they are now able to also sell basic domestic-scale micro PV systems within the villages, raising further awareness of and access to RETs. This demonstrates one way in which a national supply chain for small scale RETs could potentially be initiated, strengthened and commercially sustained.

### **CASE STUDY 4: Mzuzu University**

The University's Test and Training Centre in Renewable Energy Technologies (TCRET) provide short and long term training in renewables and undertake extensive projects and research into RET deployment.

A significant ongoing focus is their research into sustainable models for energy development and supply in communities. Alongside technical deployments, this work has explored community engagement mechanisms and community financing mechanisms. The process for developing the community projects started with a project team applying participatory processes, which enables communities to identify their own needs and solutions rather than having a set of 'needs' and 'solutions' imposed on them. There is then consultation on the project through the existing local structures: Village Development Committee, Area Development Committee and up to District Assembly. A key finding has been around community financing whereby communities provide a significant proportion of the investment themselves (i.e. as opposed to a fully-funded capital grant), the sustainability and ownership of the RET facilities are greatly improved.

## **3.2 Community Participation**

It is generally agreed that 'participatory approaches' in development work are required to foster community ownership, enhance the capabilities of local people and ensure properly targeted, sustainable projects. In many cases, energy interventions do not apply the best practice methods built up over many years in other sectors such as water and health, instead an 'install and gift' approach is often taken with little or no community consultation and participation.

It appears that a large number of installed RET systems in Malawi have been deployed as an improvement to remote community service infrastructure (health, education, agriculture) with little community involvement or on-going sustainability plan. There is an oft quoted anecdote that '50% of the installed PV systems in Malawi no longer work'.

However, there are some excellent examples of recent energy initiatives that have a strong participatory focus and promote community ownership and responsibility. Several community-level RET actors have adopted approaches such as the Sustainable Livelihoods Framework, Community Based Planning, the 'Build Own, Operate and Transfer' ownership model and have initiated local representation/management structures via new energy committees/clubs or via existing village development committees.

These efforts have been uncoordinated and whilst each have their own merits, there is no single example of best practice that demonstrates a community supported to develop, deliver and manage an energy solution from the needs assessment stage through to full community ownership and successful operation.

### **3.3 Impact assessment**

The focus of off-grid RET deployments is varied and ranges from supporting entrepreneurs to sell efficient cook stoves and solar lanterns to electrifying community services infrastructure to larger schemes for generation and distribution of electricity. Entrepreneur orientated schemes are focussed on economic indicators and number of units sold, however some have also quantified the carbon benefit of a solar lantern and are able to claim gold standard carbon credits based on units sold. It could be expected that larger schemes based on generation and distribution of electricity (micro-grids) would seek to operate on a commercial basis with metering and associated tariffs for supply. The micro-hydro scheme in Mulanje does in fact operate on a tariff model, however the Government of Malawi (GoM) PV/wind micro-grids are not metered and supply is free.

Other community-level RET deployments generally have a supporting role with assumed benefits in the areas of health, education, water and economic development. In some cases, an attempt has been made to measure the impact in these areas of specific RET deployments, however a clear methodology/framework for measuring the wider development impacts of off-grid RET deployment (or indeed rural electrification in general) has not been established.

### **3.4 Finances**

A wide range of financial models have been utilised in conjunction with RET deployments with schemes at various scales aiming towards a self-sustaining commercial model. After initial external investment either networks of local entrepreneurs become self reliant in micro RET sales or a larger installation establishes tariff based revenue streams for self-sufficiency. The implementation of successful tariff schemes for off-grid electricity distribution has been highlighted as a problematic issue for the existing schemes. The majority of medium-sized, community-level RET deployments have been deployed with the upfront installation costs provided by GoM or donors. The indications are that on-going maintenance costs are often not considered.

Some recent initiatives have encouraged income generation activities aimed at financially sustaining RET installations. In general, for a rural Malawian community, the main areas of energy expenditure are cooking and lighting. Schemes such as efficient cook-stoves and solar lanterns have demonstrated financial viability by replacing existing spend on charcoal, wood-fuel, paraffin and candles. Other areas of energy expenditure within rural Malawian communities are mobile phone battery charging and 12V battery charging (car battery). 12V batteries are commonly used to power lighting, radio and TVs in off-grid communities. Recent initiatives have demonstrated that the ability and willingness to pay for battery charging services has the potential to provide substantial revenue streams capable of sustaining on-going energy installation maintenance costs and contributing surplus funds to community initiatives. The use of 12V battery charging stations has been shown in other countries to promote entrepreneurial activity, however no schemes of this type appear to have been tested in Malawi. The income generation schemes

mentioned here are not generic and suitability for individual communities would need to be assessed on a case-by-case basis with the finances tailored to the circumstances of any scheme or community. In addition, the management and accountability of these schemes requires serious attention to establish the appropriate structures and processes.

### 3.5 Coordination and communication

There is some communication and learning shared between community-level RET actors at present, but this communication is limited, is not formalised and there are no functioning platforms through which the various actors can share their experience with each other or, crucially, through which they can collectively represent their experience to Government. Arguably, as the number of innovative approaches and solutions increases, there will be a corresponding increase in the need for greater communication and coordination amongst all the actors that are developing and managing RETs.

The lack of such platforms perhaps increases the risk of a fragmented, inefficient and less effective sector. Pooling knowledge and developing more coordinated interventions will help to increase the effectiveness of RETs, will reduce the risk of duplication and on a purely practical level, it should contribute to building a stronger 'sector' (supply chain, technical skills etc.).

Moreover, such platforms could offer an 'easy' route through which Government can increase their involvement in and understanding of off-grid generation. This involvement need not be 'hands on', rather the development of off-grid generation could continue to be led by independent actors. Through a national 'off-grid coordination platform' Government would be able to build a clearer understanding of what works where and why, and could ensure their policies and strategies are designed in such a way that off-grid generation clearly complements and adds value to the broader efforts to build national generation capacity and to extend the national grid.

### 3.6 Community energy approaches in other developing countries

Clearly a substantial number of renewable energy initiatives have been undertaken in developing country communities with varying degrees of reported impact and success. These initiatives are often based around the 'gift' of renewable energy technology by government or NGOs and the associated sustainability issues are often well documented. Some 'stand out' examples of energy projects that incorporate strong sustainability principles based on community participation are provided here. It is also worth noting the growth and success of 'bottom pyramid' commercial models in recent years. Examples are provided by the World Bank's Lighting Africa project<sup>1</sup>, Solar Aid's Sunny Money<sup>2</sup> and the Rural Energy Foundation<sup>3</sup>. All have achieved significant levels of commercially sustainable business via supporting local entrepreneurs in the supply of basic small solar lighting devices.

The RERL/REDP programme in NEPAL<sup>4</sup> has grown from a few micro hydro pilots to a nationwide project influencing a national rural energy policy and institutional arrangements from central to community level. Community mobilization is a key element of the project, involving district and village development committees with the objective of supporting communities to initiate, own and manage their own energy scheme.

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<sup>1</sup> [www.lightingafrica.org](http://www.lightingafrica.org)

<sup>2</sup> <http://solar-aid.org>

<sup>3</sup> [www.ruralenergy.nl](http://www.ruralenergy.nl)

<sup>4</sup> [www.redp.org.np](http://www.redp.org.np)

The Community micro hydro scheme in Kenya<sup>5</sup> is an example of the various community energy projects undertaken worldwide by Practical Action (previously ITDG). Practical action place participatory approaches, the sustainable livelihoods framework and the concept of community based planning at the heart of these projects. The local communities are involved in the projects from the earliest stages and provide building materials, land for the turbine house, labour and financing towards the scheme in addition to paying monthly charges. The communities have been supported to manage, operate and maintain the schemes on their own. This project has been financially self-sustaining for the past three years.

The Electricity Co-operative in Tanzania<sup>6</sup> was initiated to rehabilitate an ageing off-grid diesel generation system and distribution network. Although not a renewable based energy project it was the first case of co-operative management of electric power supply in Tanzania where the community were supported to manage and maintain an electricity supply system 'by the consumers for the consumers'.

A recent initiative in India focuses on Community Solar Power Plants<sup>7</sup>. Two pilot systems tested a centralised battery charging model and a central generation plant with distribution network model. Community mobilization and capacity building featured strongly in the early stages of the project and the installations are managed on behalf of the community by a Village Energy Committee. Based on this pilot, a further 30 village scheme is being supported by the Government's Ministry for New and Renewable Energy.

Further projects in Rwanda and the Barefoot College are noted in section 4 and have similar credentials of sustainability as those reviewed above.

### 3.7 Conclusions

The following points summarise the main learning from the review of community energy projects in Malawi:

- Various technologies have been demonstrated successfully with renewable electricity generation primarily from PV but also including micro-hydro, biomass and wind.
- PV solutions are relatively mature and widespread and there are associated standards and supplier accreditation.
- Technical development and enhanced local expertise on other RET solutions is still required along with the development of remote monitoring technology.
- Biomass burning has been targeted by multiple projects via efficient stove technology and sustainable wood fuel sources. Widespread adoption of these methods has yet to be achieved although the associated impact for energy and the environment in Malawi is clear.
- Projects are either deployed by GoM or by NGO's, often as a 'gift' to the community.
- The most successful projects with strong sustainability credentials are those with a focus on community participation. Community ownership and responsibility has been best achieved where the community makes a contribution and has a 'stake' in the project.

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<sup>5</sup> [http://practicalaction.org/powering\\_poverty\\_reduction\\_2](http://practicalaction.org/powering_poverty_reduction_2)

<sup>6</sup> [www.sciencedirect.com/science/article/pii/S0301421503003744](http://www.sciencedirect.com/science/article/pii/S0301421503003744)

<sup>7</sup> <http://indiagovernance.gov.in/bestpractices.php?id=592>

- Where socio-economic impact has been assessed, benefits to education and health facilities have been noted and income generation via mobile phone charging proved successful.
- Although successful energy projects have had impact on the immediate community beneficiaries, these are dispersed and localised. The long term support for these projects is uncertain and their cumulative impact on Malawi's energy and wider development goals is unmeasured.
- Impact assessment and monitoring and evaluation are only sometimes included and have no standard approach or link to GoM targets.
- Full community participation has yet to be achieved and in all case studies the idea for an energy project has come from outside the community.
- Resources to empower and support communities and supporting NGOs to identify, pursue and deploy community energy solutions are lacking.
- Scalable models of deploying community energy that feature appropriate levels of community participation, training and support need to be developed. This should include further development of financial models that can maximise and manage the proven significant income generation streams and that are open and transparent to the whole community. This should also include the good practice that is evident in trials already deployed in Malawi.
- Sectors such as health and education have significant renewable deployments via GoM or NGOs that are not linked to a wider energy strategy. Optimising the impact of energy interventions within these development initiatives and the incorporation of energy into the institutional support of these initiatives should be considered (e.g. including energy within the responsibilities of existing water/health committees, village development committees, district development committees, etc.).
- Few projects address the agricultural sector (e.g. irrigation, crop processing).

## 4 Supporting community energy development in Malawi

The previous section reviewed the programmes and projects in community energy in Malawi. Issues around communication, co-ordination and the socio-economic sustainability of these initiatives illustrate some of the challenges to be overcome if community energy is to make a more substantial impact on Malawi's energy sector. The development of appropriate Support Mechanisms will be critical to the efficiency and effectiveness of community renewable energy development in Malawi. In this section the support mechanism for community energy used in Scotland is analysed, compared with the present support provided in Malawi, and then the support requirements in Malawi are prioritised according to the requirements for supporting community renewable energy development.

### 4.1 Community energy support mechanism used in Scotland

The support mechanisms used in Scotland to support the development of community renewable energy projects is well established. The majority of support is provided by a dedicated organisation, Community Energy Scotland (CES). This formal and coordinated support has been developing since 2001 to address the needs of the community groups as they have arisen.

There are three types of renewable energy projects that CES provides support to:

1. Renewable energy installations generating revenue for the community to use in developing other services and facilities.
2. Renewable energy installations supplying energy directly to community facilities to make them more sustainable.
3. Renewable energy installations supplying electricity to the local community, separate to the National Grid, increasing the community's sustainability.

Appendix 5 (5.1 - 5.3) presents case studies of community energy projects which have been supported in Scotland.

The CES model for supporting community energy development will be used as a benchmark for comparing support mechanisms used elsewhere. For the purposes of this report a Support Mechanism is the method or means through which support is provided to community groups to enable them to deliver and operate their renewable energy project. In Scotland CES acts as the Support Mechanism; it identifies the Support Provision required and then designs and delivers Support Tools to match requirements. To identify the required Support Provisions and design appropriate Support Tools, a level of engagement with the recipients of the service is necessary.

The Support Provision delivered to community groups has been separated into two distinct levels:

1. **Primary Support** (support provided directly to a community group)

2. **Secondary support** (higher level support which indirectly benefits community groups - Identifying, engaging & informing external influences)

The following table lists the Support Provisions and Tools that comprise the Support Mechanism in Scotland. A fuller description is provided in appendix 5.

	SUPPORT PROVISION	SUPPORT TOOL
PRIMARY SUPPORT	Knowledge & Skills Transfer	1:1 Mentoring
		Written Resources
		Networking / exchange visits
		Training Events
	Financial (distribution)	Grant
		Loans
	Monitoring, Evaluation, Servicing & Troubleshooting	Monitoring
		Servicing
SECONDARY SUPPORT	Financial (Creation)	Engage financiers
		Fundraising
		Funding applications
	Public Sector	Lobbying
		Networking
		Legislation and policy
		Planning
	Communication	Media
	Exploit technical Innovation & opportunities	Review / trial innovations
		Technical networking

The support tools used in Scotland are not all directly transferrable to Malawi due to differences in government structures and policy, literacy and available resources (finance and technology). Many of the principles, however, can still apply. The Support Provisions can be prioritised according to needs in Malawi and appropriate Support Tools developed accordingly.



A key element of the success of delivery of community renewable energy projects in Scotland has been consistency of access to financial support on two levels; finance for the capital installations and finance for the provision of the Support Mechanism. A key principle that has been applied is the way support has been applied to build a community group's capacity to develop and manage a project themselves, rather than to do it for them.

Consistent funding of support has enabled the development of strong community support networks in Scotland which facilitate efficient transfer of knowledge and learning. This has been a critical component of the delivery of support. A network of local Development Officers spread across Scotland network with each other and directly with community groups to ensure Scotland-wide sharing of best practice and ideas. Strong communication links are continued up through the Public Sector to the Scottish Government to ensure the needs and concerns of community groups are communicated upwards to inform legislation and policy, and information from the public bodies is quickly disseminated back to community groups.

## **4.2 Community energy support provision trialled in CRED and other community energy projects in Malawi**

There are good examples of community renewable energy projects completed and in development across Malawi. Unlike Scotland, there is no one body to provide both Primary and Secondary Support to community energy projects. Primary Support is well developed in most projects and supplied by the different NGOs leading on the projects. However, there is little or no Secondary Support available to community renewable energy projects in Malawi due to a lack of resources available to deliver it.

Many of the projects are using the same technologies to tackle the same local needs but the lessons learnt and best practice are not being communicated between projects. There is also a lack of cohesive communication between the government departments and NGOs which are delivering projects. For example, several energy projects in Malawi were separately struggling to ascertain the same information on licensing. Time could also be saved if projects accessed funds together.

## **4.3 Existing Community Development structures in Malawi**

Villages within Malawi have community structures in place which support development. Project committees are commonplace in delivering a specific project and are nominated by the village development committee (VDC). The VDC in turn communicates with the local Area District Committee who feeds into the District Assembly (DA). The DA comprises of NGO'S, civil servants, local leaders and, when in place, local Councillors. They are the route by which policies and strategies are handed down by the Government for implementation on a local level and are the body that needs to be approached in gaining permission to carry out area based projects. Several GoM Departments have set up Technical Working Groups which are the method by which NGOs and community representatives are able to feed back to Government, however this does not appear to be in place for Energy.

#### **4.4 Community support approaches in other developing countries and relevance to Malawi**

Section 3.6 highlighted examples of community centred RET initiatives in other developing countries. Of these, only the Nepalese and Rwandan examples include secondary support. These initiatives have either been led by Government or incorporated by Government after successful pilots and therefore there is less need for Secondary Support Mechanisms to be provided by a separate specific organisation. In Rwanda the Government organisation is involved in delivering pilot projects which they hope will then be used as a replicable model. There is no one organisation responsible for the roll out of community renewable energy projects Rwanda or a package of finance evident for future projects to access.

#### **4.5 Approaches for community development in other sectors and links to energy from these sectors**

Support provision to community based projects in other sectors, such as water and education, is more established than in the energy sector in Malawi. Local government has accountability for delivery of community projects in their area and therefore there are strong communication links back to the GoM and within their own districts. Technical working groups used in the health sector are a good example of a Support Tool used to ensure knowledge exchange. Local people are employed to support the delivery of community projects to ensure the capacity is built up to drive and sustain projects locally.

#### **4.6 Community Support requirements in Malawi**

Community energy development in Malawi would be supported by a single organisation or coherent set of interactions between organisations with sole or joint responsibilities and accountability for this. It would be beneficial to use existing structures in Malawi, potentially in local Government, which have been tried and tested in other sectors.

The universities are relatively well placed to improve the access that community groups have to technical information on RETs.

The main requirements for Support Provision are in delivery of Secondary Support and coordinating the development and delivery of best practice in Primary Support as follows:

- Coordination of networking between local projects, the Malawian Government, Universities and Colleges, and NGOs
- Accessing and supporting project finance packages across Malawi
- Identifying, developing and delivering the most appropriate Support Tools for providing Primary Support in Malawi
- Implementation and coordination of Monitoring & Evaluation of projects and sharing good practice

## 5 Monitoring and evaluation of community energy outcomes

Previous sections have set out issues in the policy framework, existing projects and community support mechanisms but sound, verifiable information to support policy, strategy and investment decision making is rather limited. Monitoring and evaluation (M&E) is essential for understanding the results and targets that any community energy initiatives aim to achieve, for assessing performance against those results and targets, and for developing an understanding of the strengths and weaknesses of the various approaches to community energy. M&E therefore plays a central role in informing and developing strategy and decisions around community energy.

The following section firstly provides an overview of the current M&E frameworks that are in place within Malawi, along with their relevance to the energy sector broadly and the community sector specifically. Some potential areas for development of stronger frameworks are then identified, both in terms of community-level monitoring and sector-wide monitoring.

### 5.1 Existing frameworks and indicators

The Ministry of Development Planning & Cooperation (MDPC) host a Department of Monitoring and Evaluation that has overall responsibility for tracking progress against the highest level indicators within the country, namely those indicators within the MGDS. MDPC gather data directly from Governmental Ministries and Departments, and also draw on data provided through a broad set of recurrent surveys undertaken by the National Statistical Office (e.g. Integrated Household Survey, Demographic and Health Survey, etc.). Budget allocation is ultimately performance-based, so it is clearly within the interests of all Departments and Ministries to have effective monitoring frameworks in place. To this end, a comprehensive programme of support for building M&E systems and capacity has been provided over recent years from the EU and UNDP.

However, only a handful of MGDS indicators take account of the national energy sector. Moreover, the MGDS (and indeed the DoEA's own monitoring frameworks and indicators) only look to track energy / electricity generation *directly*, with no attempt to delve deeper into energy's contribution to broader socio-economic outcomes. Encouragingly though, the conceptual case has already been made by the GoM of the link between energy, social outcomes and development results: the GoM's submission to the UNFCCC on technology transfer needs outlines this completely.

There have been very limited, early discussions within the GoM and the donor community around the possibility of a Sector Wide Approach (SWAp) for energy. While it is unlikely that an energy SWAp will be developed soon, this at least indicates that energy is rising up the development agenda, that there is a growing willingness for a more coherent approach and, perhaps that there is an increasing recognition that improved energy management can deliver a significant contribution to non-energy outcomes.

As such, the groundwork and 'acceptance' of energy's potential contribution to other outcomes and sectors is in place, but would benefit from strengthened monitoring systems that could be used to track and understand precisely *how* energy contributes to the broader national development effort. Individual, project-level efforts have and continue to be made to develop such monitoring frameworks and to demonstrate and quantify energy's broader contribution, including through the University of Strathclyde's own CRED project and via research work within both Mzuzu University and the University of Malawi Polytechnic. Importantly, this and other similar work appears to be happening predominantly at the level of community, off-grid energy generation.

## 5.2 Community energy monitoring frameworks

Given the nature of RET interventions, it is perhaps unsurprising to note that the monitoring of **technical performance** – even within remote communities – is an area of interest with prototype schemes successfully piloted.

The CRED project successfully monitored installation performance through the use of energy committees and basic logbooks: committee members were asked to record technical data, but also ‘softer’ data such as the number of students making use of solar-powered facilities and the number of additional study hours attained. Even more encouragingly from a technical perspective, research students in the University of Malawi Polytechnic are finalising a basic, easily replicable system that *automatically* monitors and gathers all aspects of technical data remotely via mobile phone networks.

A combination of these two approaches suggests one potential way forward for community RET monitoring. Basic, cheap automated monitoring systems could be developed and where viable, installed alongside the main RET equipment, allowing technical data (and alerts / problems) to be monitored centrally. In turn, the reduced need for technical monitoring would free up resources to focus purely on monitoring of the non-technical, socio-economic outcomes. This would clearly allow for richer datasets to be gathered, but a shift in monitoring emphasis would also serve as a ‘signal’ to all stakeholders that RETs are not ultimately just about the technology – rather, they are a means for bringing about positive development results and outcomes.

Moreover, a focus on socio-economic results would allow for a clearer analysis of how RETs contribute to development results, where they fit into the broader development context, and how they compare with and complement other technical approaches. By monitoring the same kind of data and outcomes as would be monitored through (e.g.) a project to improve water supply, it should be possible to develop a clearer understanding around the most appropriate contexts and most important factors to consider when deploying RETs. This will all help to build up the ‘case’ for the role of RETs within the broader development effort.

Finally, by shifting the community-level monitoring emphasis from technical data towards socio-economic outcomes and development results, it will be easier for stakeholders to tap into the incredibly rich set of well established monitoring tools and processes that *already exist* for such monitoring. The CRED project has already trialled monitoring and analysis using the sustainable livelihoods framework, but there are numerous alternative monitoring and analysis methods. To a large extent, the specific circumstances of each intervention will dictate which method is most appropriate.

## 5.3 Developing an energy sector framework

Monitoring at a project and/or community level is of course important for understanding the contribution that energy is making towards reducing poverty within a given community’s specific circumstances. However, there is also a strong case to be made for a broader monitoring framework that aggregates data from many (or even *all*) community-level RET installations. At present, data is only collected (and realistically can only be analysed) on a case-by-case, project-by-project basis. While this is useful in its own right, the approach does not lend itself well to broader analysis. In turn, it is extremely difficult (if not impossible) to quantify and understand how the various community-level RET installations are adding up and contributing to **national energy targets**.

The MGDS does include a handful of energy sector indicators, and the DoEA have a reasonably robust monitoring system in place that tracks national grid level energy generation, transmission and consumption. But off-grid, community-level generation is not currently reflected in these indicators or frameworks. This is understandable since by their very nature, off-grid RETs are dispersed, the sector is

fragmented, installations are managed by a very broad range of independent organisations, and there is no central inventory that itemises the many individual installations around the country. Yet it is not unrealistic to assume that the aggregate of many individual RET installations would make a reasonable contribution towards Malawi's national energy targets. This contribution will only increase as more and more RETs are deployed.

As such, it may be worth exploring whether a national monitoring framework for off-grid generation would be a worthwhile investment. It would require a degree of standardisation of monitoring techniques, a national inventory of RET installations would be desirable, and of course additional monitoring requirements would be demanded of the relevant national departments and ministries. However, the aggregated view that such a framework would provide could contribute to Malawi's UNFCCC monitoring requirements (particularly around carbon emission savings), it would directly contribute to the national MGDS indicators (and hence national energy targets), and the framework could feasibly form the basis of a future GEF or CDM application. Perhaps even more importantly, it could also inform new strategic and policy approaches around energy: for example, are off-grid RETs a more cost effective solution for rural electrification, in comparison to grid extension? Integration into a national M&E framework might be one criteria on which support for new RET projects are assessed. Potential indicators for energy development are proposed in Appendix 6.

## 6 Conclusions

1. A **number of drivers are raising energy up the development agenda** in Malawi:
  - Fuel costs
  - Pressures and incentives around climate change
  - A full, cross-government recognition that the current electricity generation capacity and infrastructure is insufficient and actually is a major constraint on economic growth and development
2. The primary, overriding energy priority for government is **development of the national grid** – planning and strategies for off-grid generation are limited. The need to control and manage biomass burning is also not seen as strategically or economically important as grid development. In addition, little tangible support for off-grid power development is provided through government mechanisms.
3. However, any support to the Malawian ‘energy’ sector cannot ignore the huge proportion of energy consumption that is tied to **biomass burning for cooking and heating** (97% of all energy usage in Malawi), and the accompanying significant negative impacts this has on air quality and deforestation within the country. There are projects in efficient use of biomass but the level of sustainability of the fuel source is still an issue.
4. A **reasonable institutional framework** for energy supply is in place and the necessary bodies, regulations, standards, policies and plans are reasonably well developed. However, **resource constraints (e.g. capacity, people, finance, lack of coordination) limit the effectiveness of the work that can actually be carried out**. Moreover, some actors are concerned about the legislative problems and barriers, which are seen to limit significant private sector involvement. Concerns were also raised around the lack of cross-departmental working around energy. Although energy is recognised as a cross-cutting issue, the reality is that and cross-departmental and multi-stakeholder work could be greatly strengthened.
5. Community-level energy projects comprising a **variety of RET technology and community participation initiatives have been undertaken across Malawi in a disparate and uncoordinated manner**. The most extensively used RETs have been efficient cook-stoves and solar PV. For off-grid electricity supply, the only mature and readily available technology is solar PV with a selection of accredited suppliers and installers available. As a result there are many examples of substantial PV deployments to electrify remote health and education facilities via GoM and NGO programmes. Good examples are available of attempts to deploy sustainable community based models but these are not widespread and there has been limited knowledge sharing or structured evaluation. Efforts on sustainability and community support is not effective or coordinated
6. The **lack of coordination amongst energy actors extends to non-governmental circles**. There are numerous small-scale energy focussed projects being undertaken, but little co-ordination or learning between projects and community level initiatives. This lack of coordination reduces the ability of community-level and non-governmental actors to represent their collective energy experience and needs within existing government structures. Moreover, while numerous off-grid installations are already deployed within Malawi, there is no overarching framework for developing or monitoring these systems. As a result, the community level generation ‘sector’ is somewhat fragmented, with no formal platform in place to share ideas, for learning or for working in partnership.

7. A Malawian **climate change policy** is in the early stages of development, and there is a small team within MNREE leading this. However, a **renewable energy policy** has been in development for some time, and does not have a similar level of momentum behind it. The capacity to access international **climate change finance mechanisms** is not well developed, but some initiatives are in place, most significantly there is a position within MNREE to coordinate CDM and GEF applications.

## 7 Recommendations

1. In line with Paris Declaration principles, any energy-related support provided by the SG – whether direct or ‘indirect’ (e.g. via NGOs) – **should fit in with Malawian government plans and priorities**, specifically:
  - MGDS
  - Climate Change Investment Plan
  - Ministry of Development Cooperation Infrastructure Service Projects
  - MAREP development plans
  - Individual departmental plans (e.g. health and education), particularly where formal plans to deploy RETs already exist
2. As far as possible, **any SG interventions should be based on and/or facilitate cross-departmental and multi-stakeholder working** within Malawi. While there is a broadly appropriate institutional framework in place for the energy sector, the individual energy actors and institutions could clearly benefit from more joint planning and working. Any SG interventions should be designed encourage and build momentum for joint planning and working.
3. Considering the energy sector as a whole, **reducing biomass burning** has clear potential to bring about the highest impact and the most pro-poor outcomes. While the poorest stand to gain the most, the direct linkages between biomass burning and the quality of major ‘public goods’ (such as air quality and deforestation), everyone in Malawi stands to gain from reduced burning. Although electrical generation is a government energy priority, a huge reduction in biomass burning is also central to the delivery of the MGDS. As such, it is recommended that any package of SG support to the energy sector **should** take into account biomass burning, and not just electricity generation.
4. It is recommended that the **SG do not support one-off investments that have a primary focus on simply deploying RET technologies** for individual communities or institutions. Developing and deploying one-off installations risks further fragmentation of an already fragmented approach to off-grid generation within the country. There is a clear need for a more consolidated, strategic approach to off-grid RET deployment: a piecemeal approach to rolling out RETs could make it even more difficult for government to monitor and regulate. Moreover, it will be considerably easier to demonstrate the impact, value and viability of off-grid community-level generation if a more coherent, ‘standard’ approach to RET deployment is used. In turn, this should demonstrate to government the value and role that off-grid generation can play (in tandem with national grid development) in achieving national energy targets, and for contributing to the achievement of other national targets in other sectors.

Instead, consideration should be given to establishing some form of **grant/loan facility for RETs**, managed within Malawi and accessible by Malawian communities. Some of the important criteria for the grant/loan fund are:

- Any potential SG grantees should access this fund through Malawian led initiatives.
- The facility would require applicants to fulfil a set of criteria designed to encourage sustainability, community ownership and the strengthening of the domestic RET sector:
  - Any decision to install RETs should be driven by the ‘target’ community / enterprise / institution: communities themselves must have identified RETs as a necessary requirement.
  - Applications for RET financing must be supported by a business plan that demonstrates how any RET loan will be repaid (e.g. via income generation realised through RET installation). The grant / loan facility should offer capacity building and financial literacy training in order to support the development of such business plans.



- RET installations must use MERA-certified technicians: both as a safety measure, but also to support the legitimacy and development of the existing regulatory frameworks
- Structures and mechanisms should be put in place to support communities to access and use the fund.
- Other criteria might include: national M&E participation, income generation, equitable participation and benefit.

Establishing this facility and the associated support structures will ensure funded RET projects are utilising best-practice sustainable approaches and that the necessary networking, knowledge sharing and coordination mechanisms evolve to support the growth of a vibrant community energy sector. The growth in capacity and resource will improve the opportunities for communities and the NGAs working with them to utilise RETs for community development and assist Millennium Development Goals progress. It also provides a structured channel for Scottish Government funding of well targeted and appropriate energy projects.

There is of course a need to continue testing and developing off-grid RET solutions through pilot schemes, but support for such activity should be **restricted to the existing Malawian academic and government institutions that are specifically focused on RETs** (i.e. as opposed to supporting unproven RETs being piloted by organisations whose primary expertise lies elsewhere – e.g. education, health). Several opportunities exist for collaboration between these Malawian institutions and Scottish partners (particularly academia) to further the technical capacity for RET deployment in Malawi.

5. While the above broad recommendations should be considered when defining the SG’s *overall* strategy and approach to energy, the following table identifies *specific* gaps – and hence potential investments – that the SG could consider supporting.

Potential investments are categorised according to stakeholder groups, namely **institutional** (government; ministries; national and local authorities), **academic** (universities; vocational training), **community** (civil society; NGOs) and **cross-cutting** investments that closely involve all these stakeholder groups. Additionally, potential investments are identified according to whether they are more appropriately addressed through **project inputs** via existing grant structures and/or solicited tenders, or whether support via **expert inputs and direct technical assistance** is more appropriate (detailed descriptions and rationales for each potential investment are provided in Appendix 7):

STAKEHOLDER GROUP	POTENTIAL ‘PROJECT’ INPUTS	POTENTIAL ‘TECHNICAL ASSISTANCE’ INPUTS
INSTITUTIONAL	-	<ul style="list-style-type: none"> <li>• Support for developing Climate Change policy</li> <li>• Support for developing Renewable Energy Policy</li> <li>• Expert inputs on grid-level wind installations (e.g. feasibility study, tech transfer, etc.)</li> <li>• Support on carbon trading and international climate financing mechanisms</li> </ul>

<b>ACADEMIC</b>	<ul style="list-style-type: none"> <li>• Development of remote monitoring systems for RETs and linking to similar Scottish initiatives</li> </ul>	<ul style="list-style-type: none"> <li>• Development of research, academic and collaborative research partnerships (perhaps linking to Scottish Energy Technology Partnership (ETP))</li> <li>• Training/education programme support</li> </ul>
<b>COMMUNITY</b>	<ul style="list-style-type: none"> <li>• Establishment of Malawi-wide RET-specific grant/loan facility</li> <li>• Development of community / NGO toolkit for RET deployment</li> </ul>	<ul style="list-style-type: none"> <li>• Establish community support organisation/structure/network leading on to civil society platforms/representation</li> </ul>
<b>CROSS-CUTTING</b>	<ul style="list-style-type: none"> <li>• Independent, external evaluation of off-grid RET schemes</li> <li>• Energy technology entrepreneurship fund</li> </ul>	<ul style="list-style-type: none"> <li>• Support for wind resource mapping initiative</li> </ul>