

Malawi Renewable Energy Strategy

Draft for Regional Consultation Workshops

Table of Contents

1. Introduction	3
1.1 Foreward	3
1.2 Background and Scope	3
1.2.1 Purpose, Methodology and Audience	3
1.2.2 Timeframes	5
1.2.3 Layout	5
2. Overview	7
2.1 Malawi's Energy System Today	7
2.1 The Case for Renewables in Malawi	8
2.2 A Vision for Renewables in Malawi	10
2.2.1 Electricity Access for All	10
2.2.2 Making Bioenergy Sustainable	12
3. Renewable Electricity	14
3.1 Grid-Scale Power	14
3.1.1 Actions	14
3.1.2 Current Status and Potential	15
3.1.3 Upgrading the Network	16
3.1.4 Energy Market Reform	17
3.1.5 Fiscal Incentives	19
3.1.6 Interconnection	20
3.2 Clean Energy Mini-Grids	20
3.2.1 Actions	20
3.2.2 Current Status and Potential	21
3.2.3 Ongoing Projects	22
3.2.4 Policy and Regulation	23
3.2.5 Business and Industrial Use	24
3.3 Off-Grid Power	25
3.3.1 Actions	25
3.3.2 Current Status and Potential	26
3.3.3 Ongoing Projects	27
3.3.4 PSP Standards and Enforcement	27
3.3.5 PSP Licensing	28
3.3.6 Fiscal Support for PSPs	28
3.3.7 Finance	29
4. Sustainable Bioenergy	31
4.1 Sustainable Cookstoves	31
4.1.1 Actions	31
4.1.2 Current Status and Potential	31
4.1.3 National Cookstoves Steering Committee and Ongoing Programmes	32
4.1.4 Progress to Date	32
4.1.5 Next Steps	33
4.2 Solid Biofuels	34
4.2.1 Actions	34
4.2.2 Current Status and Potential	35
4.2.3 Next Steps	36

4.3	Biogas	37
4.3.1	Actions	37
4.3.2	Current Status and Potential.....	38
4.3.3	Current programmes.....	39
4.3.4	Next Steps	39
4.4	Biofuels in Transport	39
4.4.1	Actions	39
4.4.2	Current Status and Potential.....	40
4.4.3	Next Steps	41
5.	Cross Cutting Issues	43
5.1	The Rural Electrification Fund and Energy Agency	43
5.1.1	Actions	43
5.1.2	Current Status and Potential.....	43
5.1.3	Next Steps	44
5.2	District Energy Officers	44
5.2.1	Actions	44
5.2.2	Current Status and Potential.....	45
5.2.3	Blueprinting the Role	45
5.2.4	Funding and Integration with District Governments	46
5.1	Education	46
5.1.1	Actions	46
5.1.2	Current Status and Potential.....	47
5.1.3	Higher Education	48
5.1.4	Institutional Capacity Building	48
5.1.5	Local Capacity Building	49
5.1.6	Future Leaders in Renewables.....	49
5.2	Information, Transparency and Statistics	50
5.2.1	Actions	50
5.2.2	Public Data	50
5.2.3	Tracking Progress.....	51
5.2.4	Mapping	51
6.	Coordination, Leadership and Next Steps	53
6.1.1	Actions	53
6.1.2	Overview.....	53
6.1.3	Malawi Renewable Energy Taskforce (MRET)	54
6.1.4	Industry, Donor and NGO coordination	54
6.1.5	The International Community.....	55
	Works Cited	57

1. Introduction

1.1 Foreward

At the United Nations Sustainable Development Summit on 25 September 2015, world leaders adopted the 2030 Agenda for Sustainable Development which included a set of 17 Sustainable Development Goals (SDGs) to end poverty, fight inequality and injustice, and tackle climate change by 2030.

One of these goals, SGD 7, aims to secure access to modern, affordable and sustainable energy for all.

Achieving this goal is important for all nations in the shared fight against climate change and for Malawi it is critical for the country's economic, social and environmental future.

In terms of the country's prosperity, the use of renewable energy technologies has the potential to increase the productivity of industries and businesses which in turn attracts further investment and economic growth.

There are also profound social benefits of increasing renewables uptake. Clean electricity access has the potential to improve essential services locally across the country. In areas without access to electricity from the grid, renewables can offer access to lights during medical operations or can improve a child's education by allowing for study at night. Furthermore, replacing household fossil fuel-based technologies can avoid excess smoke inhalation and prevent serious diseases and deaths from respiratory problems.

In terms of the environment, modern energy services can drastically reduce reliance on wood fuel and begin to tackle the widespread deforestation which is causing massive environmental damage across the country and contributing to climate change. Renewables are the only solution which offer this transition without emitting fossil fuels which will in the long run exacerbate the negative impacts of climate change.

Given these benefits, and the cost and impacts of continuing to source energy from environmentally and socially damaging sources, the time to act to increase renewable energy across the country is now.

By delivering the actions outlined in this document, Malawi's first ever Renewable Energy Strategy, the country will be able to deliver renewables at all scales and across all parts of the the country, allowing industry, businesses, families and ultimately people to take full advantage of this potentially transformative industry.

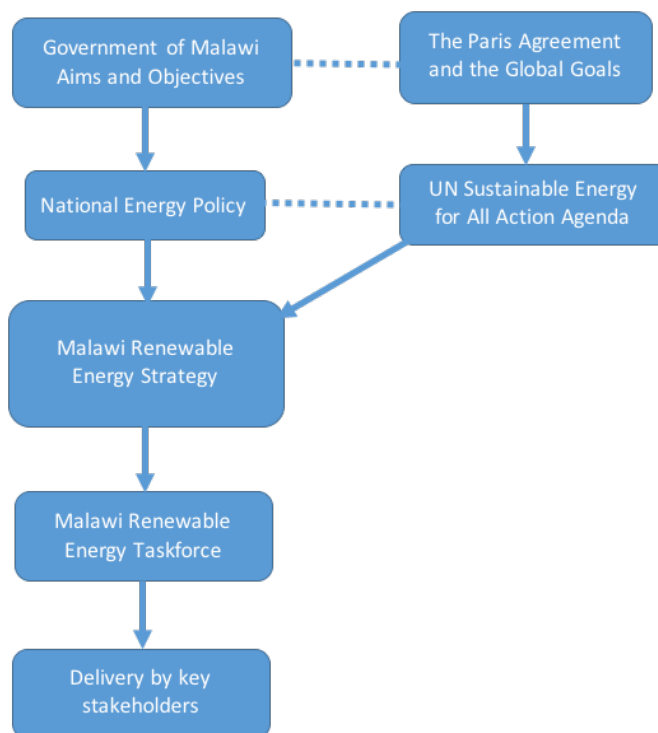
1.2 Background and Scope

1.2.1 Purpose, Methodology and Audience

The MRES follows on from the development and publication of our new National Energy Policy (NEP), the first we have had since 2003. The MRES will aim to work towards practical delivery of our ambitions in renewable energy as highlighted by the NEP.

The document is also closely linked to Malawi’s involvement in the UN’s Sustainable Energy for All (SE4All) programme and the Government’s commitment to the UN Global Goals. Although the SE4All Action Agenda covers a broader spectrum of issues in relation to sustainability, the MRES will be able to act as a working document for delivery of the high level aims and objectives of the SE4All Action Agenda specifically in relation to renewable energy.

The following diagram highlights what where the MRES fits in the policy landscape and highlights how it will be used by a Government of Malawi-led Malawi Renewable Energy Taskforce (MRET) of key stakeholders in the industry. The MRES will set the agenda for the MRET to deliver identified action. Full details of the set-up of the taskforce are found in the Chapter 6 of this document.



As well as taking note of the Government’s priorities in the NEP and the work of the SE4All programme the strategy draws upon a huge amount of recent and on-going research across the renewables sector in Malawi and further afield. Some reports which have been reviewed as part of the development of this strategy include but are not limited to:

- Malawi Policy and Regulatory Review, Oxfam
- Malawi Grid Capacity Study, Mott MacDonald
- Bioenergy Strategy, The Government of Malawi
- A Framework for Independent Power Producers in Malawi, Government of Malawi
- Cookstoves Roadmap, The Government of Malawi
- Mini Integrated Resource Plan, The Government of Malawi
- Malawi Energy Africa Compact, DFID/Government of Malawi
- Wind Resource Studies, Sgurr Energy
- Off-grid Lighting and Phone Charging Study, Business Innovation Facility
- Malawi Renewable Energy Acceleration Programme, Strathclyde University

Alongside written reports, the Government of Malawi has communicated extensively with renewables stakeholders across the country including donors, NGOs and industry. Ongoing communication and interaction throughout the development of this strategy has meant that the

work and ambition of those in the sector today has been captured linked to the content of the MRES.

The MRES is intended to serve a number of purposes for different stakeholders. For the Government of Malawi, the MRES will be the document which is used to set the immediate agenda for action to promote renewables and improve the regulatory, fiscal and legal framework for the sector. Key stakeholders such as industry, donors and NGOs will also be involved in the delivery of this work as part of the MRET. Such stakeholders may also use the MRES to look for where their resources and expertise could assist with the delivery of specific actions, noting that the document also identifies key actions which are not yet underway and which may still require assistance and funding.

For other interested stakeholders and those in our wider society for whom renewable energy could be a critically important sector in terms of for jobs, income, equality, health or welfare, the content of the MRES and work of the MRET should be seen as a way to sense-check the Government's agenda in this critical area. A more open approach to delivering the action in the strategy with a wide range of stakeholders will be encouraged so as many interested parties as possible can influence this agenda and make the case for changes and new actions as we move forward.

1.2.2 Timeframes

The MRES will present a long future vision for renewables in the country up to 2030, working towards the long term policy objectives of the NEP as well as being in line with the UN's Sustainable Development Goals (SDGs) and the SE4All programme.

Although we are looking into the longer term to set our overall goals and the vision, the MRES aims to prioritise the practical actions and targets which we can take now and in the short term. This will ensure that initial progress is made across all key areas while allowing for flexibility to change, adapt and add to what will be required to continue to make progress in future.

With that in mind, and in line with plans for a similar approach with the NEP, it is advised that the renewable energy strategy is revised at least every 5 years. Therefore, although no actions in this document will be planned beyond 5 years we expect that revised versions will continue to strive towards the same vision and outcomes but will have a different suite of actions as the sector and any number of external factors changes and develops.

The Malawi Renewable Energy Taskforce (MRET) who will be responsible for overseeing delivering the actions within the MRES will ensure that appropriate actions are set on an ongoing basis as well as being ultimately responsible for revising the MRES more comprehensively at least every 5 years.

1.2.3 Layout

The MRES will begin by presenting a brief overview of the energy sector in Malawi followed by a quick overview of the case for renewable energy and why it is so important to many of the Government's key objectives.

We will then present a vision for what our renewable energy sector could look like in the lead up to 2030. The vision section will highlight the overarching themes of the MRES and identify what the benefits and outcomes could be for the country. It will also identify a series of targets which we are

confident we can meet if we deliver the actions as identified in the MRES in the chapters which follow.

Following the vision, the MRES will focus on a series of chapters detailing how different aspects of the industry can contribute towards the overall vision, split into renewable electricity, sustainable bioenergy and a series of cross-cutting areas. Each of these chapters will be split again into specific areas of focus and will include a table of key actions with information about timescales, responsibility for delivery, and an overview of current progress and funding.

The rest of each area of focus will contain detailed background information highlighting why that particular area is important to Malawi's overall progress in renewables, introducing work which is already ongoing in the sector and providing reasoning for why the actions relating to that area have been chosen.

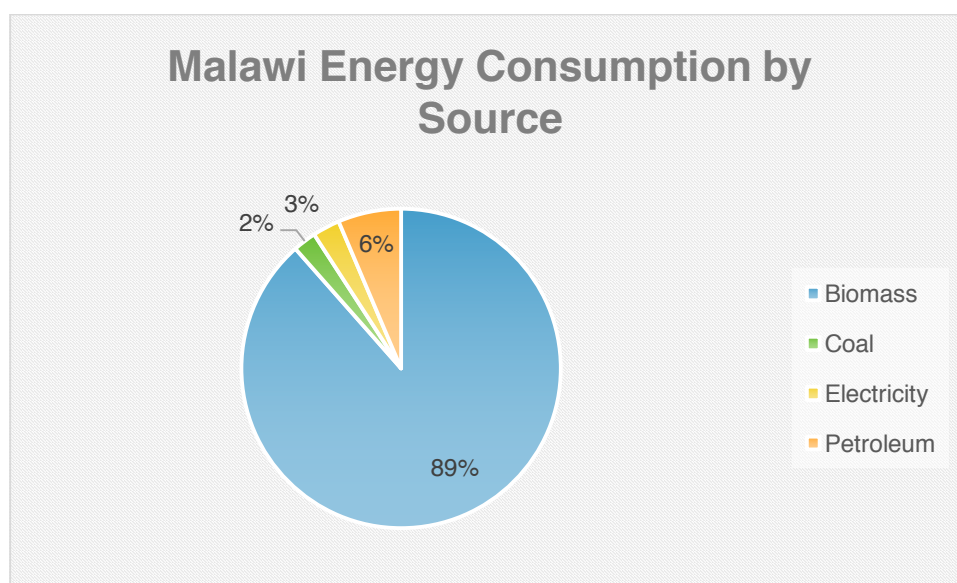
The MRES closes with a final chapter on coordination, leadership and next steps which highlights what role various stakeholders have in implementing the strategy and also suggests how a Government and stakeholder led group, the Malawi Renewable Energy Taskforce (MRET), will be formed to bring people together to implement the actions and set new goals as progress is achieved in line with the timeframes mentioned above.

2. Overview

2.1 Malawi's Energy System Today

89% of Malawi's total energy supply sourced from biomass while electricity accounts for only around 3% of the total (Government of Malawi, 2009). Around 90% of Malawi's 17.75 million people (United Nations, 2016) are not connected to the national electricity grid (ESCOM, 2016) and rely on firewood for the vast majority of their energy needs while many who are connected to grid still use firewood or charcoal for cooking as power supplies are unreliable.

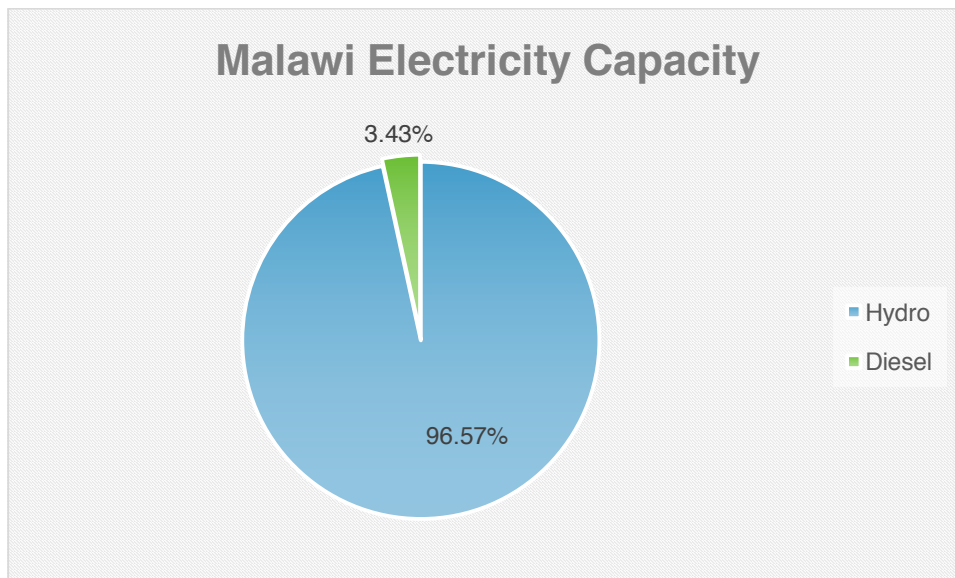
As Malawi's population continues to rise at around 3% every year (United Nations, 2016) the country is facing increasing demand for energy resulting in widespread deforestation.



Source: (Government of Malawi, 2009)

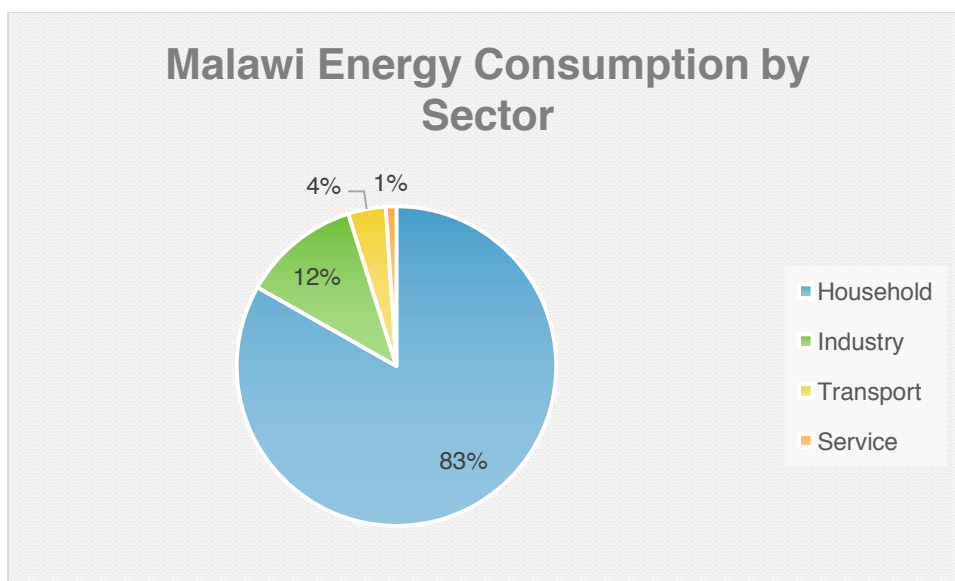
The electricity grid in Malawi only reaches only around 10% of the population (ESCOM, 2016) and has a total installed capacity of just over 360MW (Table 1, Chapter 3). Supply is already well short of demand (Zalengera, 2014) leading to widespread power outages.

Over 96% of the current capacity which fuels the grid is sourced from hydro schemes on just one river, the Shire. This leads to seasonal variability in power supplies during the dry season resulting in more severe outages for homes, businesses and industry.



Source: (Table 1, Chapter 3)

Malawi's energy use is also weighted towards one sector, households, which represent 83% of consumption. Industry represents 12% of energy consumption and transport only 4% (Government of Malawi, 2009). This is a clear indicator that modern, productive industries and businesses are not yet present in Malawi on a large scale, in no small part due to the lack of available, secure and reliable energy services. These figures also highlight the huge pressure on biomass stocks from domestic use.



Source: (Government of Malawi, 2009)

Despite these difficulties, Malawi starts from a position where almost all energy in the country, namely biomass and hydro, could potentially be sustainable and renewable if managed properly.

2.1 The Case for Renewables in Malawi

Malawi clearly needs to make the transition away from current practices into a modern, sustainable, energy sector which meets the needs of the people, helps to boost the economy, and safeguards the country's environment. Only energy from renewable sources can achieve all of these aims simultaneously.

The NEP has set an overall goal of providing, “*access to affordable, reliable, sustainable, efficient and modern energy for all Malawians by 2030*” and sets out five policy outcomes which the Government of Malawi hopes to achieve in reaching this goal.

The MRES makes the case for renewables as an essential to the delivery of every outcome, as detailed below:

1. An energy sector that is based on diversified energy sources;

Malawi has an urgent need to develop a more diverse energy supply and the potential for a wide range of renewables technologies in the country means that is possible. Resource assessments which have been carried out show high potential for hydro, solar and wind at every scale and ongoing studies will continue to increase the knowledge of our potential.

We are equally aware of the need for research and development of a range of other areas to support a diversified sector including novel energy generation technologies, new off-grid solutions, energy storage, interconnection and grid management.

Although fossil fuels are still likely to play a part for some years to come, perhaps even as baseload power in the near future, the long term prospects for renewable are bright given falling global costs and new means of making them more effective. Malawi should be at the forefront of this industry and showing how development can be achieved today without the need for the pollution of the current industrialised nations.

2. A well developed and efficiently managed energy sector;

We are aware that in order to develop such an array of technologies and to deliver them to so many different parts of our society, good management is key. We are confident that the MRES will highlight how the renewables industry can benefit from reforms across the sector, a focus on the long-term and creating of new industries and opportunities, and a more collective approach between key stakeholders.

The MRET, set up to deliver the actions within the MRES, will be the initial test of good management of the sector going forward.

3. An energy sector that promotes and supplies modern and sustainable energy services for driving the country’s economic growth;

Businesses will inevitably be more attracted to invest in Malawi if power supplies can be reliable. Given the country’s low economic growth rate (World Bank, 2016) in comparison to many neighbouring countries, the need for more power to help support our businesses and attract new investment is clear.

From rural sole-traders utilising a small solar panels and batteries to industrial processes utilising large scale power plants, renewable energy can help to create jobs and achieve prosperity. There is also potential for a thriving renewables industry to create jobs in the development of the sector such as in assembly or manufacturing of renewables products or in joining the efforts to extend and upgrade our power network and generation capacity.

4. An energy sector that promotes and results in a high standard of living for all men and women in Malawi; and

A thriving renewables sector could significantly enhance the welfare for our citizens and provide a range of societal and social benefits.

Provision of basic lighting needs from renewables devices to local health centres can drastically improve services, making basic medical procedures and giving birth safer. Electricity access from renewables also allows for remote areas to benefit from refrigeration, allowing for essential medicines and vaccines to be stored safely.

In response to emergencies, lighting and basic healthcare can be provided as a rapid response by modern off-grid devices and providing medical care at short notice to remote areas.

In education, lights in rural homes and schools can give children an opportunity to study after dark to increase their chances of achieving their full potential and help to continue to improve Malawi's development prospects in the long term.

Renewable energy can also create a more equal society and reduce the current discriminations women face in Malawi face when it comes to accessing energy. The benefits of reduced illness and death from smoke inhalation will mainly benefit women who cook in the home using open biomass fires. Modern and efficient cooking methods also mean women and girls spend less time collecting fuel and school attendance by girls would increase.

As well as the inherent benefit to equality offered by renewable energy, as we give the industry our support and intervene where needed we will strive to ensure that when we do, we do so in a way in which promotes equal opportunities to the benefits of renewable energy for men and women of all ages.

5. Access to clean and sustainable energy for all people.

As well as diversification in terms of the types of renewable energy we employ, there will also be a diversification in the scale, cost and ultimately accessibility of renewables as a result of the MRES. We want to promote renewable energy and the benefits it brings to all Malawians regardless of gender, income levels, age or any other factor. Energy access is the the cornerstone of our vision for renewable energy in Malawi.

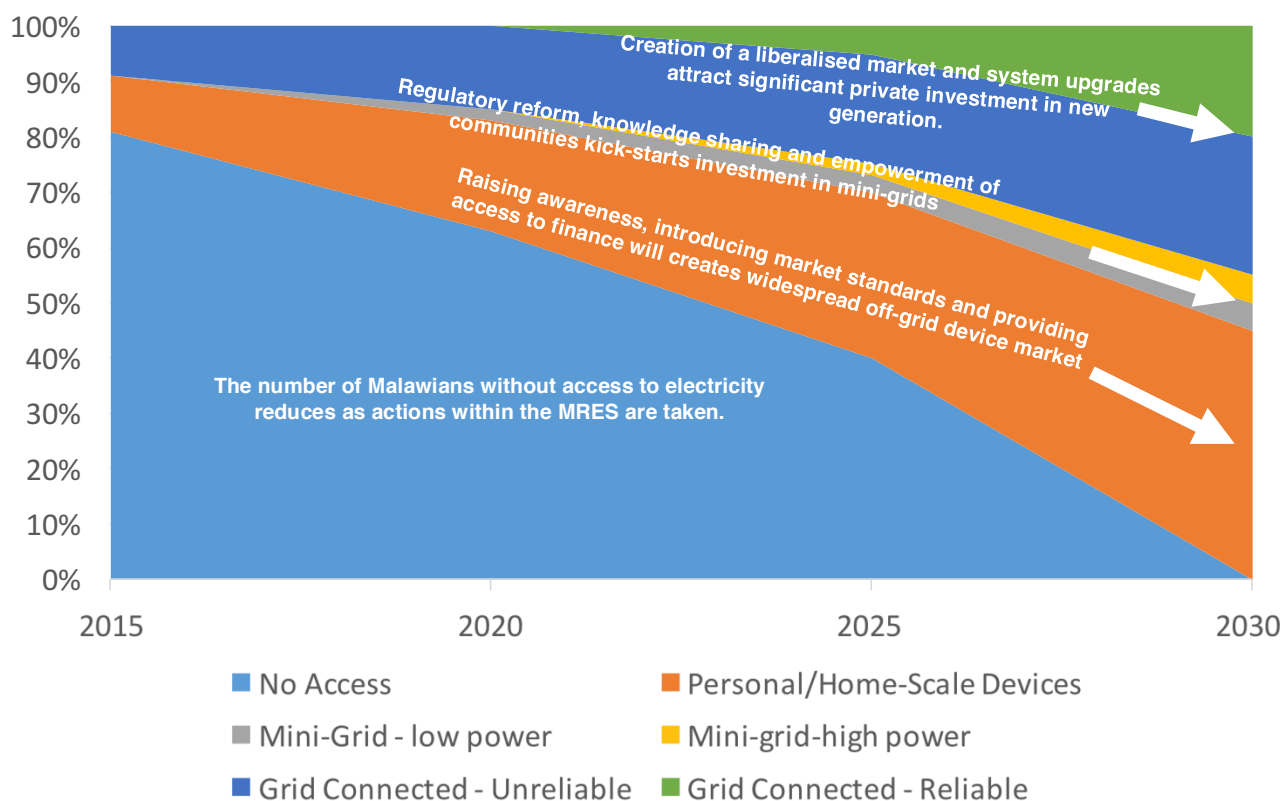
2.2 A Vision for Renewables in Malawi

This vision articulates a potential route forward for the renewables sector up to 2030. This route starts with effective delivery of the actions identified within the MRES. In summary, the vision focusses on two very broad themes: creating access to renewable electricity for all while substantially improving the sustainability of the country's biomass energy consumption.

2.2.1 Electricity Access for All

The MRES aims to set in course actions which will ultimately lead to access to electricity for every citizen in the country by the year 2030 in line with the UN Sustainable Development Goals and SE4All programme.

Vision of Electricity Access Rates in Malawi Until 2030



Rapid changes in the rates of access to modern, sustainable electricity sources can be achieved through a number of actions and interventions in priority areas, coupled with continued cost reductions due to the global growth in renewables. The chart above tracks what progress could look like from current the current status whereby around 23% of citizens have electricity access of some form to universal access by 2030. This 23% figure is made up of those connected to the national grid, 10% (ESCOM, 2016) and those with access to an off-grid solar device, 13% (Business Innovation Facility, 2016). The projections going forward are estimates based on the following descriptions of each sector. The projections track improvements in the quality of that access in a similar fashion to the way in which the UN now measure this indicator.

It is hoped that the off-grid solar sector could play a hugely important role in achieving this goal through the spread on very small scale personal solar devices to larger home systems. Initially, in the run up to 2020, with off-grid solar devices currently owned by only 13% (Business Innovation Facility, 2016) of households the industry will still rely on support from social enterprises and NGOs in order to develop the supply chain and subsidise costs for those who are most in need. By 2020, with costs falling and greater consumer awareness as the market develops, many sections of society will already be able to afford these products and make the switch to off-grid solar. By 2025 the market should almost be fully commercial as prices continue to fall and finance models are available for the poorest in society. By 2030 it is hoped that the market will have already reached full penetration and mini-grid and grid scale power will begin to displace those who initially purchased off-grid solar products.

Mini-grids will also play an increasingly important role with the economics of such schemes becoming more attractive and Malawi learning from experience of a number of pilot schemes in the run up to 2020. By 2025 we hope at least 50 mini-grids will be operational, including the first fully commercial schemes. Businesses and industry will also begin to develop renewable power sources for their own use and either selling excess power to local off-grid communities or back on to the national grid. By 2030, mini-grids will increase in scale as independent suppliers become

more ambitious. Productive and large scale mini-grids will replace the need for connections to the national grid in some areas and could even integrate with the national grid in the long term.

As for the large-scale power sector, we are hopeful that the first PPA will be signed with an independent investor in 2017 and that the first new renewables development will be operational by 2020. Grid extensions and upgrades will continue to reach more of Malawi's population and as the market is liberalised more interest in investing in large scale renewables will occur. By 2025 we hope to have around 500MW of new renewables generation capacity on the system. By 2030, the grid will be more reliable as upgrades continue. Industry and businesses will begin to generate significant demand for power which will continue to see the generation capacity expand.

Although 100% electricity access is our aim for 2030, it is hoped that essential services receive power as a priority and we are therefore aiming for all schools and health centres to have electricity access by 2025.

2.2.2 Making Bioenergy Sustainable

It is estimated that over 3 billion people globally and 700 million people in Africa rely on biomass fuel as their main source of domestic energy (PWC, 2016). Much of Malawi's population in urban as well as rural areas still rely on firewood and charcoal, with 86% of the country's total energy use coming from biomass and 96% of households using firewood or charcoal for cooking (Zalengera, 2014).

The overall consumption of wood exceeds sustainable supply to such an extent that the net loss of forest reserves in Malawi each year is over 50,000 hectares (REEEP, 2012). Deforestation not only harms natural habitats and destroys a natural store of carbon, it also removes the structure from the soil which leads to erosion and increased flood risk as well as the knock on effect of increased siltation in rivers during the rainy season. Siltation frequently interrupts water supplies and affects power generation in the hydro schemes on the Shire river.

Even by achieving 100% electricity access as detailed in the table above, many millions of Malawian's are still likely to rely on biomass for energy intensive activities, especially cooking. Therefore, in tandem with increasing access to modern and renewable electricity, the Government of Malawi recognises that huge efforts must be made to ensure that use of biomass energy becomes far more sustainable than it currently is. If managed correctly, biomass energy can be a renewable resource. The MRES will work towards this goal.

With this in mind, Malawi has set an ambitious target to sell 2 million sustainable cookstoves by 2020. If this target is reached the country will be well on track for all households off the grid to be using sustainable cookstoves by 2030 meaning the country as a whole will be burning fuel at a much slower rate than is currently the case.

Alongside sustainability issues, indoor air pollution from biomass fuel is increasingly recognised as a major health concern in the developing world; it ranks tenth among preventable risk factors contributing to the global burden of disease, and is responsible for an estimated 36% of mortality due to respiratory disease (PWC, 2016). Sustainable cookstoves can drastically reduce the health risks of domestic cooking with biomass.

As well as more efficient cookstoves, the fuel used in the cooking process or indeed any other activity is equally if not more important to consider. Without fuel sourced from sustainable stocks or produced in a sustainable manner, burning biomass or biofuel for any purpose cannot be considered renewable. The MRES highlights the need to protect Malawi's remaining forestry by properly recognising its economic and environmental value. Without intervention to correct what is a long term market failure, these reserves will quickly disappear.

In the run up to 2030, new regulations and better enforcement should mean sustainable production of fuels and sustainable industrial processes using fuels will become more competitive and further increase the efficiency of our biomass stocks.

The transport sector is also likely to increase in size as Malawi's economic growth increases. For this reason and in line with the SE4All Action Agenda we have identified targets for the percentage of bioethanol in petrol to reach 20% by 2025 and percentage of biodiesel in total diesel supply to equal 30% by 2030 (Econoler, 2016).

Bioenergy has an important role as Malawi's main energy source. We want to ensure that as we continue to use our domestic supplies of this valuable commodity we do so in a progressively more sustainable manner until we can finally call our bioenergy sector a renewable energy sector.

3. Renewable Electricity

3.1 Grid-Scale Power

3.1.1 Actions

Year of completion	Action	Implementers	Status	Funding Status
2017	Deliver MAREP phase 8 grid extensions to benefit over 170 trading centres	GoM	Underway	Funded
	Develop new Integrated Resource Plan to plan for future renewables developments and attract further funding	GoM, World Bank and consultants	Underway	Funded
	Assess the need for and viability of a renewable energy Feed-in Tariff in Malawi.	Not identified – GoM seeking partners	Not started	Funding required
2018	Complete MCA Compact Infrastructure Development Project (IDP) grid extensions to allow room for at least 300MW of new generation capacity	GoM, MCA	Underway	Funded
	Ensure legal and financial experts are in place in key institutions to assist with development of initial IPP framework and PPA process	GoM, ESCOM, MERA and MCA	Underway but only for the short term, long term additional support needed	Longer term funding and support required
2020	Fully-developed IPP framework to allow for solicited, competitive bids for new	GoM, ESCOM, IPP experts, international finance community	Process underway but additional, long term support and expertise required	Partly funded, long term support needed.

	renewables generation projects			
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3.1.2 Current Status and Potential

As the MRES highlights, the case for investing in the new renewable electricity generation is clear. The current capacity (shown in detail in Table 1 below) is not sufficient to meet the needs of even those few who are already connected to the electricity grid in Malawi as well as the rest of our population and the business and industry we hope to attract.

Table 1 - Current Installed Capacity

Power Station	Installed Capacity	Year Commissioned
Nula Falls A (Shire River)	24	1966
Nkula Falls B (Shire River)	60	1980
	20	1986
	20	1992
Tedzani Falls I (Shire River)	20	1973
Tedzani Falls II (Shire River)	20	1977
Tedzani Falls III (Shire River)	52.7	1996
Wovwe Mini Hydro (Wovwe River)	4.35	1995
Kapichira Falls Phase I (Shire River)	64.8	2000
Kapichira Falls Phase II (Shire River)	64.8	2013
Mzuzu Diesel	1.1	1980
Likoma Island Diesels	1.05	2003
Kanengo Diesel Plant	10	2016
Chizumulu Island Diesels	0.3	2003
Total Installed Capacity in 2016	363.1	

Sources: (ESCOM, 2016) (Econoler, 2016) (ESCOM, 2016)

Immediate priorities for grid scale power is therefore to upgrade and extend the existing network, and to introduce new generation to meet demand.

GoM has already prepared feasibility studies for additional renewables generation in the form of new hydro schemes and expanding existing hydro schemes. There are also plans for fossil fuel stations including an additional diesel peaking plant and the potential for a large-scale coal power station. The Government is also exploring the potential for more novel technologies such as geothermal energy. What is clear is that to meet future demand, and to attract a more diverse renewables generation portfolio, the country will also require investment from independent power producers alongside Government-backed developments. Given the falling global costs and the vast potential in Malawi, the majority of interested investors are backing renewable energy generation, particularly solar energy.

There have already been over 40 Independent Power Producers (IPPs) who have formally expressed an interest in the market in Malawi by signing a memorandums of agreement with the

Government of Malawi. Although non-binding, these agreements highlight the scale of interest and give further impetus to complete grid upgrades and reform the market to unlock new generation potential.

This interest in renewables is understandable given the outstanding resources Malawi has on offer. In large-scale hydro, feasibility studies show potential for many new schemes. In solar, a report on radiation confirms strong levels across the country (World Bank, 2015) and in large-scale wind monitoring at some sites is already complete (Strathclyde University, 2015) with more underway.

Although large-scale base-load power from fossil fuels may be developed in future, Malawi has grid capacity now to accommodate new renewables developments. A recent study on grid capacity indicated that renewables developments of 15 to 17MW (dependent on location) could be accommodated across the network up to a maximum total capacity of 70MW (Mott MacDonald, 2016).

Despite this potential, and the continued interest of IPPs, there are still no independently owned grid-connected developments in the country. GoM recognises it is important to pursue these initial IPP developments now to begin to bridge the gap between demand and supply and also to begin to develop the appropriate legal and institutional reforms as Malawi looks towards introducing a fully functioning IPP framework for future developments when more capacity is available on the grid.

3.1.3 Upgrading the Network

There are various ongoing initiatives to upgrade Malawi's electricity grid, including donor supported schemes as well as Government backed plans.

Millennium Challenge Corporation Compact

The US Government is working with GoM to deliver a \$350.7 million Millennium Challenge Corporation (MCC) Compact, part of which is aimed at the most urgent rehabilitation, upgrade and modernization needs of Malawi's power system. This part of the MCC project is composed of three activities aimed at preserving and stabilizing existing generation capacity, improving capacity of the transmission and distribution network, and increasing the efficiency and sustainability of hydropower generation. The project aims to increase the capacity the grid can take by 300MW by its conclusion. Work is ongoing and progress can be found online (<https://www.mcc.gov/where-we-work/program/malawi-compact>).

The World Bank's Energy Sector Support Project

An \$84.7 million World Bank programme is also helping to improve the capacity of the network. The Energy Sector Support Project, which is due for completion in early 2017, aims to strengthen and expand the electricity network, create feasibility studies for new generation projects, introduce demand side management and energy efficiency measures and finally, to build capacity and technical knowledge within the Ministry of Natural Resources, Energy and Environment as well as ESCOM.

Quality and reliability of supply will be improved through installation of increased transformer capacity, and construction of new distribution substations to take the load off those substations that are currently overloaded. Four new substations will be constructed, together with new 33kV and 11 kV distribution lines. In addition to new substations, existing ones will be upgraded.

Malawi Rural Electrification Programme

The Government of Malawi is committed to extending the grid through the Malawi Rural Electrification Programme (MAREP), allowing connections to be made to more homes and businesses every year. MAREP is funded by the Rural Electrification Fund which in turn is funded through a levy on retail energy sales. The Government of Malawi will continue this initiative in order to deliver more modern energy services to new parts of the country.

The last stage of the project, Phase 7, was completed in August 2015 and benefited a total of 136 trading centres. This brings the total connected through the programme to over 376 trading centres across Malawi. Phase 8 of MAREP is now underway and will seek to reach 173 more trading centres utilising a budget of MK12 billion.

All of the above programmes will work to strengthen and extend the grid and make way for renewables developments in the short, medium and long term.

3.1.4 Energy Market Reform

The Government of Malawi's ambition is that new renewables developments could be developed by independent power producers in an open, competitive market. To do this, the Government is taking a number of important steps to create that market and to attract investment into the country and create a route to market for private renewables developments.

Breaking-Up ESCOM

In August 2016 Malawi's Parliament passed legislation which allows for the break-up of ESCOM into two separate entities creating two independent, state-owned business in energy supply and in energy generation.

In addition to operating the distribution network and selling power to consumers, the new supply company will own and maintain the transmission lines and carry out the function of system operator. In the longer term it will function as the single buyer of electricity from generators in the country, purchasing power from independent or state-owned power plants. The new generation company will own and operate existing and future GoM-built owned stations and also enter into a competitive market with independent generators to develop new projects.

Given the level of interest in renewable energy developments these reforms could unlock new generation in wind, hydro and solar development in the next few years as grid upgrades allow for more capacity to be developed.

As well as the grid project outlined above, the MCC are also supporting this reform agenda while also strengthening institutions and enhancing regulation and governance of the power sector that includes rebuilding the ESCOM into a financially sustainable, gender equitable and operationally well-managed utility. This work should foster an environment across ESCOM, the Malawi Energy Regulatory Authority (MERA) and GoM that is consistent with the best practice in independent power utility regulation in the energy sector.

Independent Power Producer Framework

Following the break-up of ESCOM, the reform agenda will focus on taking the steps to establish a competitive framework for investment in new generation and transactions between a state-owned buyer of electricity and the those looking to invest in building new generation.

In realisation of the need for inward investment by IPPs in Malawi, efforts were initiated to begin to develop such a framework in 2013 by GoM in conjunction with project partners ESCOM, MERA, and MCA. Together, a report (MCA, 2016) was published in April 2016 which outlines the steps that GoM and agencies should take to develop a functioning, successful IPP framework. GoM are considering the findings of the report with a view to implementing the following actions:

1. **Identifying what generation Malawi needs and when:** a new Integrated Resource Plan is currently being undertaken and is due for publication in 2017. This will be an essential document to clarify GoM policy on what type of generation is needed in Malawi, when it can be developed and what infrastructure upgrades are required. However, it is already clear from recent studies that there is room for investment in some new renewables generation now and that this should be pursued as soon as possible.
2. **Establishing a single buyer for electricity:** As detailed above, Malawi's Parliament has now passed legislation to break-up ESCOM and for a new state-owned supplier to become the single buyer of electricity from IPPs or other Government funded generation projects. GoM are now working to consider the next steps to build on the legislation and finalise this transition. Options will be explored as to whether or not to establish an interim single buyer before ESCOM reforms are complete in order to fast-track some projects.
3. **Ensuring financial viability of an IPP market:** GoM will fully consider the guarantees it can offer IPPs when agreeing power contracts to minimise the risk of investing in new developments. Issues such as exchange rate volatility and credit worthiness of the single buyer will have to be analysed as part of this process. GoM will also liaise with international financiers such as the International Monetary Fund (IMF) to look at how to de-risk a new Malawian power market. GoM will facilitate discussions as soon as possible with these institutions, as well as potential investors, to work towards establishing what guarantees a new single buyer can offer investors. This process will also consider how best to protect the revenues from Malawi's power consumers which could serve to de-risk the investment market for IPPs.
4. **Energy Pricing:** GoM will work with MERA to evaluate energy pricing in Malawi. In order to allow for new investments, consumer energy tariffs must be reflective of the both the costs incurred to run the current system as well as the cost for new developments and infrastructure upgrades across the country. If energy prices are not reflective of this, the Government of Malawi will be unable to invest in purchasing power from independent producers and therefore new developments will not be constructed the country will remain under-supplied.
5. **Capacity and Expertise:** GoM and agencies like ESCOM and MERA will need staff in place with sufficient legal and financial expertise develop and deliver a fully-functioning IPP framework and to negotiate power purchase agreements (PPAs).

GoM recognize the steps above are far reaching and complex and therefore discussions with policy experts, investors, international development financiers and others should start now to ensure that the country takes the necessary steps to ensure Malawi has a modern IPP framework in place as soon as possible. It is possible that GoM will accept unsolicited bids for new generation outside such a framework in the short term, but for the long term sustainability and affordability of the sector it is important that we work towards these aims.

It is clear that this framework may not be solely reserved for renewables generation but as the interest in new solar and wind developments is so high, it is a crucial part of our overall renewables strategy.

Case Study: Access Power

Access Power are one of a number of independent power producers who recognise Malawi's potential for new renewables developments in the country.

A pre-feasibility study which includes a review of wind speeds from the Scottish Government-funded Malawi Renewable Energy Acceleration Programme have identified an area in northern Malawi, near Mzimba, which could be suitable for a 50MW wind farm.

This could potentially increase generation capacity in the country by almost 14%. The scheme would also be situated in an area of the country that currently has no power stations and relies on transmission of power from hydro schemes in the south of the country.

Access have signed an MoU with GoM to carry out more detailed assessments including more wind measurements as well as assessments of the environmental and social impacts of the scheme. It has been estimated that the development could generate investment of Malawi of around \$86 million.

Access Power, as with many independent generators, are now in discussion with GoM and ESCOM to agree to terms and ultimately sign a power purchase agreement. These first IPP developments will help to develop a robust framework for future schemes with the intention that a market is then created for further investment to satisfy the urgent demand for new generation capacity.

Although a majority of companies investing in Malawi are interested in solar developments, wind has an important role in developing a diversified, sustainable energy mix for Malawi. The Government of Malawi, in collaboration with the World Bank, currently investing in more wind monitoring in the country to attract similar investments.

3.1.5 Fiscal Incentives

Although there is already a strong interest, GoM recognises that in order to encourage more renewables developments in the future or to ensure that renewables are sufficiently competitive against investments in fossil fuel generation, consideration of further incentives such as a renewable energy feed-in tariff (RE:FiT) is sensible.

GoM has already developed a RE:FiT framework in conjunction with MERA in 2012. Given global reductions in the cost of some renewables technologies, especially in solar, if a RE:FiT is going to be introduced there will be a need to update this framework to ensure it is reflective of current prices.

As well as the changes to prices, given the time elapsed since the framework was initially developed, it is important that GoM, with partners, look again at the feasibility of introducing a RE:FiT policy in Malawi.

There is now clear evidence from other countries in the region that a RE:FiT scheme can be an effective way to attract more generation on to the grid. A full exploration of what has and hasn't worked would therefore be valuable as well as consideration of the scale of technology Malawi wants to support and how it will be funded. For the latter there are a number of options available such as levies on consumer bills, donor support and carbon finance.

If a study can be funded which then highlights that a RE:FiT is feasible and useful for Malawi, GoM will be looking to work with partners to fund a full report on how to implement and fund such a scheme by developing of a fully-updated and cost-reflective framework.

3.1.6 Interconnection

Malawi is a landlocked country and works with our neighbours on a number of key issues, including strong trade links. In future, there is no reason why we can't continue this spirit in the electricity sector.

This has a number of advantages and could be mutually beneficial to nearby countries who are able to buy and sell power at times of excess demand or supply.

We are already working with countries as a member of the Southern African Development Community (SADC) on a cooperative Renewable Energy and Energy Efficiency Strategy and Action Plan (REEESAP). It is hoped that eventually this shared vision will lead to greater potential for trading of energy between countries in the region and in the long run a regional trading pool.

This strategy and action plan should be closely aligned to the policies and regulations adhered to by the The Southern African Power Pool (SAPP), an organisation created with the primary aim to assist in trading power between SADC states. As things stand Malawi hasn't entered into any interconnection arrangements and no energy trading agreements with other nations have been finalised.

To ensure that long term trading is an option, Malawi will continue a dialogue with countries in the SASDC, especially those who we share borders with, to try to standardise regulations for the grid and for new power stations to ensure that in future, power that we produce can be traded on an international market.

3.2 Clean Energy Mini-Grids

3.2.1 Actions

Year of completion	Action	Implementers	Progress	Funding Status
2017	Expansion of MEGA mini-grid scheme in Mulanje continues	UNDP, GoM, MEGA	Underway	Funded for next phase
	Roll out funding for new pilot schemes across the country	UNDP, GoM, successful applicants	Underway	Initial pilots funded
2018	Web portal on GoM website containing information on mini-grid development in Malawi and accompanying toolkit made available	UNDP, GoM	Underway	Funded

2019	Implementation of streamlined regulations which are proportionate to the scale of mini-grid developments	GoM, MERA	Early discussions	Funded
	Finalise mini-grid standards in the country to ensure quality better regulation.	GoM, MERA	Not started, potential to conduct study into appropriate standards	Could require funding for studies in to standards
2021	Technical capabilities in place for national grid to easily integrate mini-grids and excess power generated by businesses	ESCOM	Not started	No funding identified

3.2.2 Current Status and Potential

A mini-grid is an isolated system separate from the main electricity grid network that consists of generation and distribution of electricity to consumers located in the vicinity.

The UN have highlighted that clean energy mini-grids are a ‘high-impact opportunity’ for sustainable development and can be a viable and cost effective route to electrification where communities are far from the national grid or where population isn’t dense enough to justify a grid connection before other communities.

Clean energy mini-grids can be powered by a variety of renewable sources (solar, hydro, wind or biomass) and provide more productive power and enhanced services compared to smaller, household or personal solutions. In some instances, mini-grid systems offer services comparable with those provided by a national power grid. Therefore, mini-grids can help local enterprises reliant on a secure, productive power supply to become established and generate income from business which are in demand in the community while allowing for greatly improved local services such as education and healthcare.

In Malawi, research suggests that mini-grids are the most economically viable technology solution in areas with a population which has a density above 250 inhabitants per square kilometre and is situated more than 5km from the medium-voltage grid line. This represents more than 4.5 million Malawians or 27% of the people currently living without electricity in the country (Strathclye University, MEGA, Practical Action, 2015). Malawi is therefore considered one of the more suitable countries for a dedicated mini-grid programme.

Despite the benefits and the potential in Malawi, there are very few examples of fully-operational mini-grids in Malawi, with a small scale hydro plant at Bondo village in the Mulanje district by a number of donors and some in the Mulanje district and other very small scale schemes operated by enterprising communities in in Nkhata Bay and Mzimba districts using local materials and labour.

The major hurdles for mini-grid implementation and operation at present are related to socio-economics, policy, regulatory, economics and financing issues, as well as the expertise to develop, operate and maintain the systems.

GoM is committed to working with partners to overcome these issues and catalyse the mini-grid sector to promote rural development and rural livelihoods. If the current projects prove successful, the regulatory framework for mini grids improves and costs for these technologies continue to fall globally, we are hopeful that Malawi could have 50 operating mini-grid systems by 2025.

3.2.3 Ongoing Projects

Increasing Access to Clean and Affordable Decentralised Energy Services in Selected Vulnerable Areas of Malawi

GoM are working in conjunction with the UNDP and a range of other donors on a 3-year project to create opportunities for investment in further mini-grids and to recommend changes to policy and regulations to remove barriers to development in the sector. The project has three components as follows:

- **Expansion of the Mulanje Electricity Generation Agency (MEGA) Micro Hydro Power Plant and mini-grid scheme:** the project will support the implementation of a second 80 kW micro-hydro powered mini-grid operated by MEGA in the Mulanje district and provide institutional support for the development of several other MEGA micro-hydro schemes to bring the installed capacity of their power production up to 216kW. The project will also support the institutional capacity of MEGA to help work towards establishing it as a self-sustaining entity;
- **Replication of MEGA model via piloting of new mini-grid schemes in other areas of Malawi:** the project will aim to initiate an open competitive-based mechanism (Request for Proposals – RfP) to select and support the establishment of Public-Private-Partnerships (PPP) for clean energy mini-grids with an emphasis on business models such as Build-Own-Operate (BOO). It is envisaged that a number of mini-grids utilising renewable energy will be supported.
- **Institutional strengthening and capacity building for promotion of decentralized mini-grid applications across the country:** training and capacity building at sub-national and national levels on clean energy mini-grids will be undertaken while a national information clearing house will be established to facilitate mini-grid based rural electrification. An analysis of the policy and regulatory changes should take place to make mini-grids part of the mainstream GoM rural electrification policy. Furthermore, there will be support for the development of a toolkit for communities and potential developers to show-case the lessons learned and experiences gained in Malawi so far. More detail on the changes to policy and regulations which the programme is working on with GoM and partners are found below.

Sustainable Energy for Rural Communities (SE4RC)

The EU-funded SE4RC will give 20,000 in Malawian citizens from poor isolated rural communities access to clean electricity for productive use. SE4RC will anchor off-grid energy service delivery to underlying agriculture and socio-economic development. the mini-grids will serve irrigation schemes, clinics, schools and small agro and other businesses. Energy kiosks will enable service delivery to low energy users.

The project aims to establish three Community Energy Service Companies (CESCOs) in Malawi comprising of energy kiosks and solar mini-grids, thus providing access to energy services for small-scale farmers, households, clinics, schools and small business.

Sustainable Off-grid Electrification for Rural Villages (SOGERV)

SOGERV, funded by the Scottish Government, will target 4 mini-grids in villages in Chikwawa that currently lack access to electricity at homes, schools, health centres and businesses. The projects will provide services such as lighting, mobile phone charging, and supply for refrigeration that are the first step of the energy ladder.

The project will consider new business models and approaches to ownership of community schemes to try to encourage greater uptake in rural areas and will be implemented by University of Strathclyde, Concern Universal and WASHTED. It is hoped that these models could be replicated across Malawi.

Case Study: MEGA and Bondo Hydro

The Bondo Micro Hydro Scheme is an 80kW development situated in Bondo Village on Mulanje Mountain. The scheme has taken a number of years to develop with funding from partners such as the UNDP, the European Commission and the Scottish Government. Many residents at Bondo have been connected and have been purchasing metered power from the scheme since January of 2016. while the local schools and health centre are given power free of charge.

The Mulanje Electricity Generating Authority (MEGA) is a social enterprise which was established in 2013 and is wholly owned by the Mulanje Mountain Conservation Trust (MMCT). MEGA is the first entity in Malawi other than ESCOM to receive generation and supply licences for electricity.

The extension of Bondo Micro Hydro Scheme will mean the scheme will serve 1000 households, 6 schools, 1 health clinic and 2 maize mills as well as a variety of business enterprises within the communities surrounding the three Group Village Headmen of Bondo, Nessa and Namainja.

Ultimately, MEGA want to develop and operate a number of schemes in the area to provide power to:

- *4 health centres serving a population of over 29,000 people*
- *6 schools serving 1,400 students as well as enabling evening classes for adult learning*
- *3 business centres (1 in each community), serving at least 11 businesses*
- *4,000 people in 810 households with direct connections to the mini-grids*
- *13,000 people in 2,600 households with access to battery-charging facilities*

The revenues from cumulative schemes will be crucial if MEGA is to reach its ultimate goal of being a self-sustaining social enterprise. The model that MEGA is using is being studied by the UNDP to learn how the positive aspects of the scheme can be replicated across Malawi, where further funding for mini-grids should be targeted and where GoM should make appropriate policy and regulatory changes.

3.2.4 Policy and Regulation

GoM are already considering a number of regulations and policies which will facilitate the development of more mini-grids across the country. The current regulatory framework requires

mini-grid operators to comply with largely the same regulations as a large grid-connected development which results in costs which are often insurmountably high. GoM want to ensure that principles of sustainability, safety and affordability remain a priority for licence holders, but that the costs and burdens are equitable with the scale and profitability of new mini-grid schemes.

Other specific areas with the potential to have distinct regulation include the level of technical detail and environmental regulations in license applications, the regulations governing power availability, tariffs, customer communications and reporting. GoM and MERA, working in collaboration with the UNDP, will consider these aspects in producing new licences and regulations.

Cost Recovery and Tariff Flexibility

One way in which GoM has already assisted existing and potential mini-grid developers is to allow for cost-recovery for suppliers of electricity, thus reflecting that in remote areas with challenging construction costs, the price of electricity may be higher than the national grid.

GoM will continue to work with MERA to ensure that mini-grid developers are allowed to set prices which allow for cost recovery and flexible tariffs in order to start the roll out of mini-grids across the country.

Quality Standards

GoM will explore the possibility of specific mini-grid quality standards which would provide appropriate guidance for developers, regulators and customers. We understand that the Powering Africa and SE4All initiatives are developing a quality assurance framework based upon levels of customer service and common accountability that may offer a framework that could be useful in the Malawian context and easily adopted and transcribed by our regulators.

Licensing

As noted above, we recognise the licensing process for mini grids in Malawi may not always be an ideal fit in terms of the amount of work required and the costs involved. Generation and supply licenses for mini-grids at all scales currently come under the same licensing arrangements as large scale grid connected power schemes while supply licensing was so far untested prior to the MEGA mini-grid development. The Government of Malawi will now work with counterparts in MERA and UNDP and others in industry to make changes to create a licensing process which retains an appropriate level of rigour and high standards but which is more financially viable for smaller developments.

An overview of principles for each licence is currently being discussed between MERA and GoM with a view to finalising new licences by 2018.

3.2.5 Business and Industrial Use

As well as developing mini-grids to meet the demand of local communities, the schemes can be developed to serve industrial and commercial ventures which require large quantities of power. This serves to enable businesses to own and generate their own secure power from renewable energy as well as having the potential to sell excess power to local communities and other businesses or the national grid. Usually businesses develop mini-grids to secure a reliable source of power for commercial reasons. If renewables can be incorporated into a business model it will act as an effective way to finance new schemes.

To enable this, further policy and guidelines should be adopted for businesses in activities such as mining and agriculture to encourage self-generation. To that end, GoM will seek to apply the same

streamlined generation licensing rules for businesses looking to install renewables as for clean energy mini-grids as mentioned above.

We will work with high energy users and donors who have already developed their own renewable power systems such as Kamuzu International Airport, Illovo Sugar and Lujeri Tea Estate to establish what lessons can be learned from these schemes, what processes they went through to build and install the systems and how those processes could be improved and streamlined.

As Malawi upgrades the grid network and develops a fully functioning IPP framework, there should be more flexibility in place to allow companies to sell power to the national grid.

Case Study : Illovo Sugar Bagasse Plant

There is already evidence of businesses generating electricity for their own use in Malawi. Illovo sugar utilise waste bagasse to fuel a plant of 19.6MW in capacity to use as part of the production process.

If this plant were connected to the national grid it would represent an increase in total generating capacity of over 5%, from one business alone. Furthermore, Illovo have also stated that the generating capacity at the site could be doubled if there were additional uses for the power or customers who could access it.

Establishing more simple licences and regulations to allow for the generation and supply of electricity to customers could open the door for more investment in this kind of generation from businesses and industry. These businesses should also benefit from the establishment of a state-owned single buyer for electricity in that any excess generation could compete with other potential generators to meet the demand of Malawi's consumers.

3.3 Off-Grid Power

3.3.1 Actions

Year of completion	Action	Implementers	Progress	Funding Status
2017	Complete study into impacts of additional fiscal incentives (such as VAT relief)	Donors, NGOs and industry	Not started	Requires funding
	Deliver programmes under DFID Energy Africa Agreement	GoM and DFID	Underway	Agreement signed, funding available on determination of projects
2018	Adopt and enforce international standards for solar products	GoM, MERA, MBS	Underway	Funding possibly required for enforcement measures

	Review import licence application	GoM, MERA	Not started	No further funding required
	Ensure all importers are licenced	GoM, MERA	Ongoing	No funding required
2020	Extend business rates relief until at least this point	GoM	In place	No funding required.

3.3.2 Current Status and Potential

Over 15 million people in Malawi live out of reach of the main electricity grid, with the vast majority having no access to electricity at all. Despite the efforts outlined above to extend and modernise the grid it is clear that for some time to come new generation and grid extensions will not reach the entire population of Malawi, while mini-grids are still in their infancy and will not be an option for most Malawian's in the short term. Despite this, renewable energy can still play a role in these off-grid locations, providing safe, secure and effective energy access to meet the needs of some of the most vulnerable in Malawi's society.

Off-grid solar products such as Pico Solar Products (PSP) or Solar Home Systems (SHS) generally use a combination of solar panels linked to chargeable batteries to deliver electricity for a range of uses. Most commonly these devices are used for lighting and phone charging with some of the more powerful products able to generate power for a range of uses such as refrigeration, radios and televisions for entertainment, or even for small businesses like barber shops.

Distribution and use of these products will result in significant benefits for the population of Malawi, such as:

- Health benefits by reducing inhalation of harmful gases from fossil fuel based lighting.
- Education improvements by allowing children to study at night.
- Better healthcare provision, particularly allowing for safe delivery of babies at night.
- Enhanced communications by allowing people to charge their own mobile phones locally.
- The potential to generate income by starting small businesses which utilise solar electricity.
- Long term financial benefits by avoiding regular expenditure on candles, kerosene or batteries.

There was a 300% growth in sales of quality-assured solar lighting products across Africa in 2013 and over 7.7 million people in Africa now enjoy access to clean, safe lighting using quality solar products from as little as 8 USD for a single device (Business Innovation Facility, 2016). A recent survey undertaken by the UK Department for International Development (DFID) and the Business Innovation Facility (BIF) suggests that around 13% of households now have access to off-grid lighting in the form of solar products in Malawi, more than are connected to the national grid.

Figures from that survey also highlight that those with solar lights compared to other sources like torches or kerosene lamps used their products on more days, for more hours and were generally more satisfied with the products.

Although these signs are very encouraging, the market is still in its infancy and off-grid solar hasn't reached its full potential in Malawi yet. The BIF study highlights that Malawi spends nearly 50 million USD (MK 34 billion) on bad quality and harmful lighting every year, with the average annual spend per household at \$14. When you also consider that the average household spends also

around \$9 on mobile phone charging, this makes a convincing case that a competitive market for PSPs will emerge soon.

Technological advances and innovative business models will also continue to boost the chances of commerciality in Malawi while we will look to lessons learned in other countries in the region such as Kenya, Tanzania and Rwanda to note how they have achieved even greater success through supportive policies and an effective regulatory environment.

3.3.3 Ongoing Projects

There are a number of initiatives in Malawi aimed at reaching the rural population with PSPs. These range from fully funded donor programmes, to fully commercial ventures aiming to find the market for products which could lead to their widespread distribution and use in Malawi.

There is a broad network of stakeholders in the PSP market in Malawi including a range of donors, NGOs, private sector enterprises and even designers of products.

The approach to marketing and distribution of solar PSP products across Malawi is diverse. There are some products available in retail outlets in urban settings and at agricultural wholesalers in many trading centres. These products are sold on a commercial basis. However, to reach those in more rural areas still require support from social enterprises, donors and NGO backed programmes.

Programmes include EnDev, which is funded by a number of major international donors and coordinated by the German Government's development agency, GIZ. EnDev is working with a number of NGOs and distributors to educate people on the benefits of household solar products and to promote and market the technology to people in Malawi, especially those in more rural and hard to reach areas.

Similarly, Sunny Money, a charity and social enterprise and the biggest PSP seller in Malawi works to create the channels and markets which will eventually enable the sector to take-off commercially. Their business model generally uses a vendor system in which local entrepreneurs buy stock from Sunny Money and then sell lights to local communities, along with providing aftercare.

Looking to the future, DFID and the Government of Malawi have recently signed the Energy Africa Compact which sets out agreed actions both parties will take to deliver more funding and expertise to the off-grid electricity access sector and to deliver key policy and regulatory changes in the solar PSP market.

USAID Power Africa's Beyond the Grid (BTG) is also in the early stages but is committed to supporting finance, regulatory reform and technical assistance in the off-grid market in Malawi. It is hoped that this strategy will act as more evidence for the kind of areas which such programmes could support.

There are many more innovative NGO and donor programmes currently being delivered and it is hoped that through their work, awareness and accessibility to the solar PSP market will be strengthened and eventually a widespread commercial market will exist in Malawi.

3.3.4 PSP Standards and Enforcement

Regulation of PSPs is governed by the Malawi Energy Regulatory Authority (MERA), the Malawi Bureau of Standards (MBS) and to a lesser extent the Malawi Revenue Authority (MRA). MERA

issues licences for the importation and selling as well as the installation and maintenance of solar products while MBS is responsible for issuing import certificates for products adhering to a set of national standards. The MRA has a strong presence at the borders and can assist in enforcement of standards at this point.

New Standards

MBS, in collaboration with MERA must introduce new international standards for PSPs. MBS does have standards in place for solar products but given advancements in the technology these are now considered to be out of date and in need of revision. This revision doesn't need to be a lengthy process and Malawi does not need to develop a new standard from scratch. Instead, GoM will work with MERA and MBS to adapt and adopt the Lighting Global Standards, which have already been developed by the World Bank and IFC and adopted by many countries throughout the world as a robust, international industry standard.

Enforcement

A further benefit of adopting globally recognised standards is that products are already tested and monitored internationally by the World Bank and IFC and a list of devices which has met the standards is published online (<https://www.lightingglobal.org/products/>). This list could be used as the basis for MBS to assess imports; only requiring in-country verification. This would reduce the time and cost of testing, minimising the burden and cost for MBS and importers.

Enforcement can also be led by increased awareness in the market from other manufacturers, donors, NGOs, distributors, vendors, financiers and consumers. By joining the global community for standards, a clear definition of products which are acceptable can emerge. A self-regulated industry which doesn't support products which are not registered and which do not meet these standards will quickly side-line counterfeit goods. Over time, this process could be supported by the presence of District Energy Officers, discussed later in this strategy, who should have good awareness of what products are legitimate.

GoM will also work with MERA to establish what other methods they can use as an enforcement agency to ensure products up and down the country adhere to these standards, and also what punishments are appropriate for businesses who fail to meet these standards and operate without a licence.

3.3.5 PSP Licensing

To ensure that importers are reputable, they must be required to be licensed by MERA. A requirement of the licence will be to offer a 12 month guarantee for products should they prove to be faulty. At the same time, MERA must work to ensure that those who are seeking the licence can do so in a timely manner and will work to streamline the process.

3.3.6 Fiscal Support for PSPs

GoM recognizes that a fully functioning PSP market will not only benefit those in rural areas but also create jobs and income across a broad supply chain from international importers to local distributors. In recognition of this, GoM has provided business rates relief in an effort to kick start the market for PSPs. We intend to extend this relief for the foreseeable future while the market is still developing.

We recognise the calls from industry to remove VAT but in order to take decisions about more fiscal relief for the industry we require evidence to be presented on the benefits, or otherwise, for Malawi and call on donors, NGOs and the solar market to work together to make the case to Government if there is one. Such a study needs to take into account the long term benefits for the industry as well as the overall impact on the economy. After this evidence has been presented, GoM be able to better consider the merits of further fiscal stimuli for the pico solar market.

3.3.7 Finance

GoM recognises that the target groups for off-grid solar are often those who have the the lowest incomes and therefore the most difficulty in raising finance to buy the products. GoM is keen to work with financiers, donors and NGOs to try to establish what the best models are for financing these products in the short to medium term, before a widespread commercial market becomes apparent.

Research suggests that over its lifetime a PSP product comfortably works out as among the method for bringing light, and certainly for bringing electricity, into a home without power. However, the products do require a large capital outlay in comparison to alternatives, for example battery powered torches or candles. For this reason, we are encouraged by the models which offer pay as you go options. Sunny Money, who are using such a method, have reported repayment rates are as high as 99%.

Innovative pay as you go models include solar kiosks where portable batteries charged by solar panels can be hired. This can be used as a good way to implement a pay as you go system whereby when someone leases the battery pack while they also pay towards purchasing the system. After a certain number of leases, they can own the battery pack and solar panel. A number of programmes are testing these and other innovative methods.

Although signs for the market are encouraging we recognise this is a difficult task, especially given the current high rates of inflation. Despite the price of solar products coming down four fold in the last 4 years (Business Innovation Facility, 2016), the rate of inflation in Malawi, at over 20% (World Bank, 2015), is such that prices in Malawian Kwacha have still risen significantly. We are hopeful that as our economic situation stabilises, the off-grid renewables market will benefit greatly, making interest rates low enough for people to take take out and repay small loans.

Mobile money is another way in which the transaction costs of loans and payments could be reduced. Unfortunately, Malawi is still behind neighbouring countries in this area. Mobile money would make pay as you go systems far simpler and could reduce the cost of finance for off-grid solar, making pay as you go systems cheaper and more accessible. Given Malawi's mobile money market is still in its infancy and is expected to grow, we hope this will make a positive impact soon.

We urge all financial institutions to continue to work with suppliers of solar lights to work out the best way to provide financing to allow the lights to reach those in the most remote communities and are encouraged that many are already engaged with NGOs and donors who are working in this area.

Case Study: Fistula Care Centre and Rehabilitation through Solar

The Fistula Care Centre in Lilongwe treats women who have had a fistula injury, generally sustained during an obstructed labour. In Malawi a problematic labour like this can last up to 6 or 7 days before medical treatment is found, if it is found at all. The injury results in permanent damage without surgery, leading to leakage of urine or stools as a daily complaint. This in turn leads to

many women being ostracised by their communities, often leading to isolation and depression. Not only is this a devastating problem, it's one that isn't widely discussed in communities in Malawi and often goes untreated.

As well as providing physical healing, the clinic offers constant support and care from nurses who have had a fistula in the past and who can act as proof of what a positive recovery can be like. In addition, the women receive a range of classes every day, from basic literacy to various craft and business skills - and for a few, in renewable energy. A programme to give women from the clinic solar devices means that on recovery they can take electricity back to their villages.

The solar devices can be used to create an income for the women on recovery, often through phone charging for the whole community. This has the secondary benefit of making the beneficiary the focal point of her village and leading them back into society in a positive way. They are also armed with their experience of the advice given at the clinic and can educate others in the community about fistula and about how others can be helped. Amazingly, this is how the clinic gets most of their patients, creating a positive cycle where recovery is achieved through openness and inclusiveness within communities.

In societies as poor as this, the solar panels provided were generating a huge percentage of income for the beneficiaries as well as helping the wider community, especially children who were now able to study at night. The clinic is now looking for more funding to continue the solar programme.

4. Sustainable Bioenergy

4.1 Sustainable Cookstoves

4.1.1 Actions

Year of completion	Action	Implementers	Progress	Funding Status
Ongoing Commitment	Support and lead the National Cookstoves Steering Committee (NCSC) to work towards targets for 2020 and beyond.	GoM and NCSC members	Ongoing	Long term funding to support the group in future may be required
2017	Host a cleaner cookstoves camp	NCSC members	Early planning stages	Potential for more partners to fund the event
	Efficiency standards for stoves developed	NCSC members and potentially a consultant	Not started	Funding required for a full study
	Complete study into impacts of additional fiscal incentives (such as VAT relief)	NCSC members and consultant	Not started	Funding required for a study
2018	Certification based on efficiency standards	NCSC, MERA and MBS	Not started	Funding not likely to be needed

4.1.2 Current Status and Potential

The vast majority of Malawi's homes rely on firewood and biomass provide energy while the most energy intensive activity in the home is cooking. Therefore, one way to improve the sustainability of the available biomass fuel stock is to find ways to make the cooking process far more efficient than it currently is. Traditional cooking practices are engrained into society in Malawi but there are alternatives in the form of sustainable cookstoves which can be more effective and can offer a range of advantages over traditional firewood and stoves, such as:

- Drastic reduction in the amount of fuel needed leading to less deforestation across Malawi.
- Reduced pollution in and around the home leading to a reduction in respiratory diseases.
- Reduction in the hours spent by those in rural areas collecting firewood; mainly benefitting women and girls.
- Cost savings in terms of having to purchase less firewood, charcoal or briquettes.
- Job and wealth creation from production of stoves, which can take place in rural areas with few start-up costs.

In light of these clear benefits, GoM has set a challenging yet attainable target for the uptake of two million sustainable cookstoves by 2020. At this stage, over 340,000 sustainable cookstoves have been produced across the country (National Cookstoves Steering Committee, Malawi, 2016).

4.1.3 National Cookstoves Steering Committee and Ongoing Programmes

Through the leadership of GoM in collaboration with key donors and NGOs, a National Cookstoves Steering Committee (NCSC) has been established to bring stakeholders together to try to reach our 2020. The \$400,000 Irish Aid-funded National Cookstoves Programme, which runs from January 2015 to December 2017, is intended to catalyse the uptake of stoves to help to reach the two million target. This programme also assisted in developing the 'Cookstoves Roadmap' in 2014, which provides a full background to the cookstoves market in Malawi and the aims and objectives of the NCSC.

In short, the roadmap advocates that GoM and NCSC work in collaboration to take a lead role in planning and implementing a cookstoves strategy that this includes a number of initiatives to reach the target.

GoM are now also developing a National Charcoal Strategy which along with the MRES will include a further update to policy and progress towards our shared aims for cookstoves and bioenergy.

4.1.4 Progress to Date

There have already been a number of outstanding achievements by the group and real progress towards the 2020 target. Some of the group's successes are as follows:

- To monitor progress towards the 2 million target and to provide industry insights geographically to avoid duplication of effort and promote sales, the NCSC have mapped sustainable cookstove activities (production, retailer, projects). The online map and database can be found at the following link:

https://energypedia.info/wiki/Malawi_Cookstove_DB

- The NCSC, in collaboration with the Government of Malawi, hosted the Cleaner Cooking Camp Workshop and Open Day in 2016 with an appearance and speech by Hon. Bright Msaka, SC, Minister of Natural Resources, Energy and Mining. The event's agenda was set by the NCSC members and following the event a declaration was written to provide direction to the group's further work.
- A stove testing team has been trained to test the efficiency of the existing cookstoves in the Malawian market to ensure quality standards are met. The NCSC do not support or recognise stoves as sustainable if they have a fuel efficiency of less than 20%.
- Ongoing capacity building is part of many programmes NCSC members carry out, sharing knowledge on how to use the stoves and also on how to make them, creating local employment and entrepreneurial activities.

These activities and the ongoing programmes which NCSC members are involved in have resulted in over 340,000 stoves being produced in Malawi while the cookstove market now supports 280 production groups and employs 4,500 people, 89% of whom are women.

4.1.5 Next Steps

The NCSC now needs to continue this positive momentum up to and beyond 2020 and have set a number of key objectives for the year ahead.

Promotion and Awareness Raising

The NCSC will seek to repeat the success of the 2016 Cleaner Cookstoves Camp by holding another event in 2017. GoM will commit to providing Ministerial support to the event to raise its profile and to get as many people as possible involved in the programme.

Alongside the standalone event the NCSC and GoM are looking into developing an ongoing promotional campaigning for cookstoves and to ensure that the benefits are communicated clearly and widely to the Malawians who stand to benefit the most, often those in rural and hard to reach areas.

Capacity Building

A number of donor and NGO programmes in Malawi have an element of training and capacity building at their heart. These training programmes can have a long-lasting impact on local economies in Malawi, often meaning that a local producer is taught how to make stoves which can be sold to the surrounding area, creating economic activity and the chance to benefit from stove technologies simultaneously.

Fiscal Incentives

The NCSC and other stakeholders have long campaigned for the removal of VAT and other charges such as import duty on sustainable stove components. However, without clear evidence as to the costs and benefits to Malawi's economy and society from such actions it is difficult to properly assess whether or not it would be advisable for GoM to implement such an initiative. As with solar products it is important that a more detailed case is developed for VAT removal and as such we urge partners including donors and NGOs to help fund a study led by the NCSC to look into the impact of VAT removal on consumers and the uptake of cookstoves, as well as the wider benefits and losses to Malawi in the short, medium and long term.

In terms of import duty, we recognise that some components for more advanced and innovative cookstoves such as the rocket stoves are not produced in Malawi and the uptake of even more innovative technologies might increase if VAT were reduced. However, we again need to be wary about the impact on GoM finances as well as on local producer groups who are beginning to take off around the country. We want to ensure new products can enter the market but also encourage production in Malawi, even for more advanced stoves in future. Given that we are open to making changes if they benefit the industry and Malawi as a whole these issues should be part of an industry-led study into the impacts of removing or reducing VAT or import duties.

GoM understands there may be wider societal benefits to removing VAT but this evidence is so far only anecdotal. Only with full evidence in place will GoM be able to fully understand and evaluate what further fiscal incentives can be applied to sustainable cookstoves in the country.

Efficiency Standards

The NCSC already have a fuel efficiency standard for measuring what passes as a sustainable cookstove in Malawi. In 2017 this standard, along with any other relevant standards regarding the design and production of stoves, should be benchmarked and formalised in order to create proper standards for the production and sale of cookstoves in the country. Lessons learned from the solar

PSP market show that if standards are not in place or up to date, counterfeit and poor-quality products could flood the market.

When the NCSC has developed a robust standard the group should work with wider GoM officials, MERA and MBS to implement an official certification standard for cookstoves in the country by 2018.

Case Study – Dziwani Enterprises and EnDev

After visiting a production facility of ‘Chitetezo Mbaula’ sustainable cookstoves in 2011, 33 year-old Alfred Chisale decided to quit his job as a building supervisor and pursue a new career. After purchasing a plot of land at Chadza, close to a source of clay, Alfred established his own sustainable cookstoves production business, Dziwani Enterprises.

Although the production facility proved to be a success, Alfred struggled to find a route to market for the stoves. His team were able to produce stoves very quickly but he found he was only able to sell around 300 over a two-month period – well below the number required for his venture to be profitable.

This is where EnDev stepped in and assisted with finding a market for the business through the NGO, Maeve. Upon production of fuel-efficient stoves, Maeve assist people in promoting their goods.

Maeve also partakes in the marketing of fuel efficient technologies as well as promotion of clean technologies with the aim of mitigating climate change and promoting sustainable energy for all.

The supply of stoves to Maeve’s programs has bolstered the demand for Alfred’s stoves and he’s been able to employ many local people who have in turn been able to invest in their own businesses, spreading the entrepreneurial spirit throughout the community. One employee who had to survive as a subsistence farmer now helps out at Dzwani Enterprises and has used his savings to buy land to utilise his skills as a farmer to sell crops commercially.

Of course, as well as the economic benefits to Alfred, his employees and the community, the production facility benefits everyone who receives a stove in terms of saving money, protecting forests and improving the health of those who use the Chitetezo Mbaula stoves every day.

4.2 Solid Biofuels

4.2.1 Actions

Year of completion	Action	Implementers	Progress	Funding Status
2017	Publish a National Charcoal Strategy	GoM and steering committee	Draft report complete, further consultation needed	Funders should engage in consultation process to consider where gaps remain.
2019	Industry standard established for sustainable charcoal and	GoM and MERA	Details for undertaking this activity to be outlined in the	Funding may be required for setting standards and

	briquette production, as well as outlining methods of enforcement		National Charcoal Strategy	for enforcement
	Explore impacts of rates relief and subsidies into supporting equipment which produces sustainable solid biofuels	Government of Malawi with willing partners	Not started	Funding required for a study
	Government, donor and NGO-backed projects will only use sustainable sourced solid fuels and materials produced using sustainable fuels	GoM, Donors and NGOs	No discussions yet, National Charcoal Strategy committee could begin talks and coordinate key stakeholders	This could mean increased short term costs but long term benefits should be clear

4.2.2 Current Status and Potential

Malawi is one of the most heavily dependent countries on solid biomass fuels in the world. Although much of the fuel is used in its natural form it is also often converted into a briquette or charcoal which are themselves produced in an unsustainable manner. 86% of the country's total energy consumed is biomass and 96% of fuel used for cooking is Malawi is solid biomass. Solid fuels are used across Malawi, even in urban areas where charcoal is the primary source of cooking energy, with 54% of households depending on it (Zalengera, 2014).

As well as households, many businesses and industrial processes in Malawi also rely on solid biofuels including prominent and growing areas of the economy such as at tea plantations and brick-making businesses.

Given the high demand and our economy's dependence on these fuels, the Government of Malawi recognises the importance them as sustainable as possible, trying to minimise the potentially devastating environmental impacts of widespread deforestation in the country.

The Government of Malawi will complete a comprehensive National Charcoal Strategy (NCS) to address many of the issues faced by using unsustainable fuels in 2017. The NCS will be a coordinated, government-wide plan that addresses both supply and demand dynamics across the entire solid fuel value chain. Although only currently in draft, the NCS is likely to include actions such as enhancing enforcement, regulating production, raising awareness, communication and education.

The MRES presents a combination of important factors to consider in fuel production and sets out some key principles the forthcoming National Charcoal strategy should adhere to.

4.2.3 Next Steps

Addressing Deforestation

It is clear that the demand for firewood in Malawi is such that current levels of deforestation are extremely high and illegal and regulated tree-felling is commonplace. The NCS will begin to address these issues in more detail and try to make sure that a combination of continued enforcement of regulations takes place where resources allow and that this is coupled with incentives to support tree planting and management.

Solid Fuel Production

As well as increased regulations, there should also be more positive steps to encourage sustainable production of wood fuel, charcoal and briquettes, with exploration of fiscal incentives to kick-start sustainable production facilities. There are already excellent examples of these types of businesses in Malawi, however, most are currently donor funded and GoM will continue to seek outside support as well as considering what aspects of these businesses make them successful to ensure they are replicated across the country.

As more businesses are established which utilise wood fuel there should also be an element of self-regulation whereby there will be an interest on the part of business owners to safeguard our biomass stocks for the long term. In order to make people and businesses owners realise this, there needs to be a campaign to highlight that there will be no future for any producers and no benefits to consumers if current unsustainable practices continue.

Case Study – Karonga Rice Husks Briquettes

In Korong, an initiative to produce heating and cooking fuel from rice husks is a fantastic example of how reliance on firewood can be reduced while creating local economic opportunities and high quality products. In Malawi, about 45,000 tons of rice are milled every season but only a small proportion of the remaining husks is used by some of the large industrial customers, with most usually discarded as a waste product.

Over 1000 local youths have been trained at the facility which uses these husks and turns them into high-quality briquettes which can be used for cooking and heating in the home. The profit from sales are partially re-invested in the enterprise, with remaining funds shared among the group.

The business also provides excellent economic opportunities, with some able to earn up to K150,000 per month, well above the average salary.

Although this project was established with UN-backed SEED funding, which assists growth in small and medium term enterprises, the number of trained youths now working on the project means it is likely that this knowledge and expertise could be replicated throughout Malawi.

Industrial Processes

As well as the production of the fuels, GoM promotes the use of all modern, efficient technologies which can reduce the volume of firewood used in any manufacturing or production process. We also recognise the value in these technologies in creating jobs and income across Malawi.

It will be important that the NCS reviews the support offered to these businesses to invest in purchasing sustainably produced solid biomass fuels and also to invest in infrastructure or staff training which increases the sustainability of the fuels used.

Case Study – ECO Brick Facility

Malawi's population has created the demand for around 120,000 new houses every year. Almost all of these homes are built using locally produced materials, with bricks which are made from soil and intensively fired in small batches with local firewood and charcoal.

In 2013, Eco-Matters, a Malawian-based company with support from GIZ (the German donor agency) constructed a facility on the outskirts of Lilongwe to make and fire building bricks in a more environmentally sustainable manner.

The bricks themselves are produced using waste materials, with soils taken from local landscaping projects mixed with tobacco and coal residues as well as combustible waste such as rice husks to allow them to be fired with very little need for additional fuel.

The bricks are then sun-dried before being fed into vertical kilns which are housed in the main building at the site. These kilns can efficiently fire 5000 bricks at once using no firewood and only a small amount of coal residue to keep the combustion going.

The production process not only utilises far more waste materials but also uses 80% less fuel than traditional methods, while producing a more consistent, high quality product.

Those involved with the Eco-Bricks project can see the potential for local brick makers to come together in cooperatives, much like rural farmers have done in Malawi, to try to establish centralised, good quality, efficient and environmentally friendly kilns like this. Investment in the technology starts at only around K60 million but still there's only one plant in the country.

Consumers

Finally, as well as the production and the use of the fuels, the consumer also has a responsibility to ensure that illegally produced fuels are not purchased and that sustainable, locally produced products should be favoured. In order to lead the way GoM will review procurement practices to ensure that sustainable products are given priority in government backed projects, for example, exploring whether we can commit to only using sustainably produced bricks for some Government building programmes. We also encourage donors and NGOs to investigate the potential to adopt similar sustainable procurement practices to bolster those who are abiding by regulations and good practice.

4.3 Biogas

4.3.1 Actions

Year of completion	Action	Implementers	Progress	Funding Status
2017	Roll out 60 mini-grid pilot schemes in 9 districts and provide training for	GoM and UNDP	Underway	Fully funded

	local communities on operations and maintenance.			
2020	Study into impacts of the biogas mini-grid pilot after 3 years of use.	Government of Malawi with willing partners.	Not started.	Funding may be required.
	Information sharing and good practice study based on lessons learned from pilot study.	Government of Malawi with willing partners.	Not started	Funding may be required.

4.3.2 Current Status and Potential

Biogas produced from organic materials and waste can be used as fuel for cooking. Biogas can be produced from different sources such as agricultural materials (crop residues, liquid manure and energy crops), animal waste, vegetable waste, municipal and sewage waste.

There are no large scale gas networks in Malawi but there is a large potential market for biogas which could help replace fossil fuel based canisters which are used for cooking in homes, while greater uptake of biogas could also lead to a switch from firewood-based fuels in cooking. There are also many opportunities to establish smaller biogas networks, utilising local waste products in rural and urban areas.

Biogas is one way of promoting more efficient and sustainable use of biomass compared to the use of fuel wood. The technology has all of the advantages of cookstoves as outlined earlier, and some additional ones as well, including:

- Far less smoke inhalation, even compared to sustainable cookstoves.
- Improvement of local sanitation and waste recycling.
- Production of bio-fertiliser from the residue of the biogas process.
- Creation of local jobs in the operation and maintenance of the system.
- Simple, on/off valve makes it very convenient and avoids waste.

There are some fundamental challenges that are hindering the uptake of the technology in Malawi. Unlike the relatively simple and adaptable cookstove technology, biogas production and use requires a higher degree of technical knowledge in order to set up and maintain a system as well as a higher level of up front capital investment.

Operating the system without proper training is also unsafe and could result in serious accidents and fires. Further robust training and awareness programmes are necessary to ensure safe transportation and use of such systems.

In addition, if biogas is produced for sale in canisters, there isn't a large distribution network or system for exchanging of gas cylinders in Malawi, with charcoal still the more popular fuel even in urban areas. It is therefore perhaps more likely, and more sustainable, for people to develop their own biogas mini grids while a market emerges for gas in canisters. Those who already have livestock in rural areas have an ideal opportunity to create a biogas plant and use animal waste as the fuel.

4.3.3 Current programmes

The Government of Malawi, through the UN's Sustainable Energy Management program are piloting 60 biogas systems in nine districts across Malawi.

The biogas sites have been selected where local communities have a reliance on firewood and charcoal but where there are also significant waste streams which could support a switch to a biogas cooking.

The programme will also endeavour to train local people in how to maintain systems and how to use them safely. It is hoped that this pilot will demonstrate best practice in how to establish and maintain mini-grids in rural areas and highlight the opportunity to other communities across the country, especially those neighbouring the pilot projects.

There are also a number of similar projects being implemented in Malawi, independently of Government. We hope that these projects, generally carried out by NGOs, will have a similarly positive impact on the host communities.

4.3.4 Next Steps

GoM will ensure the results of studies are publicised to allow others to learn from good practice examples, as well as attracting investment to develop more mini-grids if the pilots prove successful.

We hope this will encourage further programmes to be supported in the country as the technology reaches full commercial availability.

We will also look to work with companies in neighbouring states who are already benefitting from fully commercial markets and try to understand what Malawi will need to do to allow our own market to grow and to attract these kinds of businesses into the country.

4.4 Biofuels in Transport

4.4.1 Actions

Year of completion	Action	Implementers	Progress	Funding Status
Ongoing	Biofuels which use resources which would otherwise be utilised for food production will not be promoted.	GoM, donors, NGOs and industry	Ongoing	No funding required.
2018	Introduce regulations to set mandatory levels of bioethanol and biodiesel to be sold in fuel,	GoM and MERA	Although blending does occur, there is a need to agree on tighter regulations. Discussions not	No funding need yet identified.

	increasing the levels year on year from 2018.		yet started.	
	Uncouple the price of bioethanol and petrol following the introduction of regulations to set mandatory biofuel levels	GoM and MERA	Requires regulations to be first enforced.	No funding required.
2020	Pilot dedicated fleet of biofuel vehicles.	Government of Malawi seeking industry partners.	Not started.	Funding may be required.

4.4.2 Current Status and Potential

Transport currently only makes up around 4% of Malawi's energy demand (Zalengera, 2014). However, we recognise that as our economy grows the demand for vehicles to fuel trade and industry, as well as for personal use, will increase. It is therefore important that we begin to think about how we can make the growing number of vehicles on the roads in Malawi as environmentally friendly and sustainable as possible.

The most impact Malawi can have over the next decade in this area is likely to be increasing the level of biofuel that is found in petrol and diesel blends across the nation's fuelling stations. This requires little to no change in infrastructure at the pumps and no costly conversion of vehicles.

Over the longer term, research and demonstration projects of vehicles which can run on 100% biofuel should be implemented, given the potential to produce these fuels domestically which might ease our reliance on imported fuels.

The use of locally produced ethanol and biodiesel could have a number of advantages, such as:

- savings in foreign exchange transactions as a result of importing less petrol
- utilising energy from waste and reducing greenhouse gas emissions,
- helping to support the growth of agriculture sector and create local jobs,
- creating the long long term potential for exportation of biofuels if production is high enough.

Bioethanol

The bioethanol consumed in Malawi is produced locally with no importations nor exportations permitted. The average annual production is currently 26 million litres, split between two production companies. Each of these companies already have the potential to produce 17 to 18 million litres per year (Econoler, 2016).

Locally produced ethanol is blended with petrol at a limit of up to 20%. However, it has been estimated that currently production levels in Malawi mean the average blend is probably more likely to be at around 10% (Econoler, 2016).

In 2006 the National Commission for Science and Technology (NCST) developed the Ethanol Driven Vehicle Project (EDVP) to trial of motor vehicle performance using ethanol. Following these trials, in October 2012, the Cabinet authorized the NCST to proceed with the rolling out of a

programme for the increased use of ethanol in motor vehicles through the Malawi Ethanol Programme 2013, which will:

- Review policies and regulations related to ethanol fuel, its distribution and utilisation within the ethanol supply chain
- Increase ethanol production, distribution and storage
- Carry out capacity building activities throughout the ethanol value chain
- Increase public awareness of the programme
- Undertake research and development (R&D) on emerging issues on ethanol at all levels of the supply chain
- Monitor and evaluate of the programme

Overall, the programme aims to to “increase bioethanol production and its use as fuel from the current 18 million litres per annum to 49 million litres and 104 million litres per annum by 2015 and 2020 respectively”.

Biodiesel

Malawi also produces domestic biodiesel, at a smaller scale to bioethanol with only one domestic company with production levels of 70,000 litres in 2015 (Econoler, 2016).

Biodiesel can also be blended with conventional diesel and therefore, like bioethanol, can quickly make an impact on the sustainability of the country’s current vehicles. BERL have ambitious production figures and estimate that by 2020 they alone would be producing some 1 million litres of biodiesel (Econoler, 2016).

4.4.3 Next Steps

Regulation

Given that there are already companies in Malawi producing bioethanol domestically, and the current rates of blending are not at their maximum level, a simple first step to increase the sustainability of transport fuel is to set regulated targets for blended ethanol with petrol to reach 20% by 2025.

For biodiesel it has been determined that more modest targets should be set, aiming for a 10% blend in 2025 and 30% blend in 2030. Based on estimates developed in the UN’s SE4All Action Agenda that would represent the need of 30 million litres of biodiesel produced in 2025 and 110 million litres in 2030.

In order to implement this kind of strategy GoM should work with MERA to estimate the exact level of blend which will be aimed for each year, for both biodiesel and bioethanol, and determine what penalties fuel suppliers would have to pay should this level not be met.

Pricing

The price of ethanol is pegged to that of petrol in Malawi, which is often to the disadvantage of ethanol companies. GoM has committed to uncoupling the two prices and by bringing in regulations to reach set levels of of biofuels in the fuel mix this should ensure a set demand and for ethanol is achieved and that domestic producers are encouraged to invest to produce more ethanol every year by investing in the appropriate infrastructure and human capital to deliver desired levels. If these levels aren’t achieved at reasonable prices, GoM will have to consider allowing for biodiesel imports.

Research and Development

In 2014, MERA approved ethanol as a motor vehicle fuel (100% ethanol, not only in blending). This has resulted in plans which are underway to construct separate ethanol pumps at filling stations in all major towns.

Following this initiative, Press Corporation Limited rolled out the Flexi fuel vehicle which can run on either 100% ethanol or 100% or on any blend of the two through installation of a conversion kit. Fifty cars were used in a successful trial run of the vehicles.

Developing ethanol filling stations on the open market has been slow due to a lack of demand. As a first step towards this kind of initiative and to work out how a pricing model may operate GoM will work with the private sector to implement a pilot project to operate a fleet of vehicles which run on 100% ethanol while introducing test filling pumps in Lilongwe, Blantyre and Mzuzu. GoM and Press Corporation should work on a feasibility study for this project in 2017 with any other willing partners with the project being taken forward in 2018 if it is deemed suitable.

In terms of electric cars, GoM is aware of global advances in the technology and the intention that charging stations for such vehicles can be powered by solar energy. We will continue to review the market for electric cars that can run on solar energy as our renewables market grows and global advancements in the technology continue, however there are no concrete actions to take at this stage.

5. Cross Cutting Issues

5.1 The Rural Electrification Fund and Energy Agency

5.1.1 Actions

Year of completion	Action	Implementers	Progress	Funding Status
2018	Full details of possible expansion of the Rural Electrification Fund to be announced.	GoM in partnership with agencies and key stakeholders.	No formal discussions as yet taken place, should begin as soon as possible.	Funders to work with GoM to establish whether investment can be made in an expanded Rural Electrification Fund.
2020	Renewable Energy or Rural Electrification Agency to be established.	GoM in partnership with agencies and key stakeholders.	No discussions yet taken place, early stage discussions should take place as to what remit the group could have and formal plans to be made if the Rural Electrification Fund is expanded and GoM determines an agency should lead on delivering that fund.	Long terms funding welcomed if an agency is established to deliver funds.

5.1.2 Current Status and Potential

Malawi's Rural Electrification Act (2004) was established to, "make provision for the promotion, funding, management and regulation of rural electrification".

So far, the fund has been used effectively for extending Malawi's electricity grid to areas that didn't previously benefit from access to the national grid. It is primarily funded by a levy on fuel, as stated in earlier in the MRES.

Although rural electrification by extending the grid was a key part of the original purpose of the fund, there is scope within the Act to broaden this purpose to cover a range of activities in relation

to rural electrification, cutting across a range of technologies and scales. The full scope of purposes for the fund are included in the Act as follows:

- the capital cost of rural electrification grid extension and off-grid electrification
- the capital cost of solar home system equipment to be acquired for public institutions
- operational and maintenance costs of rural electrification projects, to the extent to which it makes the project viable
- provision of credit guarantees for the capital cost of solar home system equipment other than those to be acquired by a concessionaire
- any monetary contribution required to be made by the Government for the implementation and execution of a donor-funded rural electrification project
- the administrative expenses associated with the execution of the duties and functions and responsibilities of the Committee and the management of the Fund
- research and consultancy assignments related to rural electrification
- expenses for credit guarantee funds management
- compensation for removal of off-grid installations in accordance with section 33.

GoM recognise the benefits of many of these activities and has actively promoted policies and programmes of this nature throughout this MRES. Given their relevance, GoM will explore whether mechanisms can be put in place to fairly and effectively utilise the Rural Electrification Fund to benefit a wider range of activities than it currently does.

5.1.3 Next Steps

GoM will work internally at first and then with key stakeholders across the sector to carry out assessments as to whether the fund could be used for any other purposes, considering the financial constraints of the fund and other practical constraints to implementing and expanding the scheme.

If the scope of beneficiaries and the remit of the fund is significantly expanded, GoM will consider as to whether a separate renewable energy agency is established be the delivery body for these projects. This ties in with the direction in the National Energy Policy to, ‘Create the Rural Electrification Authority as a semi-autonomous legal entity under an Act of Parliament and that its mandate includes renewable energy activities’ as well as the UN Sustainable Energy for All Action Agenda which indicates that a renewables agency should be established. However, the first stage in this process needs to be exploring the scope of funding, before determining how best to deliver it.

5.2 District Energy Officers

5.2.1 Actions

Year of completion	Action	Implementers	Progress	Funding Status
2017	Completion of project to blueprint the role of a District Energy Officer.	GoM, Lilongwe District Council, Community Energy Malawi and Strathclyde University	Project underway to be complete in first half of 2017.	Funded.
2019	District Energy officers to have	GoM in partnership with Community	Proposals should be outlined as	Additional funding and

	been piloted in different regions of the country.	Energy Malawi and Local Government.	part of the conclusion to the blueprinting exercise.	support likely to be required.
2022	Energy Officers to be rolled out in all districts of the country.	GoM, local Government and potentially Malawi's Renewable Energy Agency.	Following pilot schemes, final proposals for remit and function of officers should be made.	No funding yet identified, but significant amounts required.

5.2.2 Current Status and Potential

Advice and support for energy issues in local areas is not readily available. Although some support is often provided by smaller GoM projects and donor and NGO programmes which operate in rural areas, it is not strategically planned and coordinated. For example, it is often the case that programmes to distribute PSPs or sustainable cookstoves have an element of energy education and advice to them in order to highlight why the technologies are useful to those who could benefit.

Furthermore, part of the UNDP's Sustainable Energy Management programme in conjunction with GoM includes funding to build capacity to mainstream innovative RE and EE technologies in some district development plans. Since DoE does not have technical officers at district level and no field officers at community level, it has been necessary to work with and train extension workers from other departments such as Forestry and Community Services to promote renewable energy initiatives. This is certainly progress in terms of mainstreaming energy as a critical issue but energy is not a priority for these officers and given the importance of energy issues to so many aspects of development in Malawi there is significant need for leadership in the area.

Given the lack of a targeted programme of advice and support for much of the population in Malawi there is a strong feeling among stakeholders and GoM that officers in districts should provide more assistance and advice on energy matters, especially since energy issues are often at the heart of many problems the local communities are facing, whether that be in healthcare, education or the environmental.

To help fulfil these duties, GoM will seek to introduce district officials who specialise in energy. However, there is work to be done to fully establish what the role and responsibilities of a district officer would be, what benefits such a role would create and the associated costs of implementation. There is also a need to consider how best to integrate district energy officers, whether through local governments directly or potentially via a standalone agency. This could be the same agency which is in place to deliver an expanded rural electrification programme.

5.2.3 Blueprinting the Role

GoM will support ongoing work by local NGO, Community Energy Malawi, and Strathclyde University who are being funded by the Scottish Government to 'blueprint' the role of a district energy officer. Following the outcome of this study we will be better placed to understand the full benefits and costs of such a role and to take a decision as to how to begin to implement a District Energy Officer network across the country.

Community Energy Malawi will carry out field work by developing and testing the role and remit of an energy officer in the field along with research techniques to determine what the local demands are for an energy officer.

Although the blueprinting will enable us to better determine the final role of a District Energy Officer, we expect the following principles will be at the heart of the job:

- Providing impartial advice to local communities and District Governments in order to develop more sustainable and effective energy planning within District Development Plans.
- Working directly with other district officers in departments such as forestry, health, education and environment in order to incorporate sustainable and effective energy strategies into all local government planning.
- Targeting public sector institutions, especially schools and hospitals, to determine how best to meet their energy needs with a focus on renewable and sustainable solutions, especially off-grid.
- Increasing awareness of product standards and being able to provide impartial advice to local people and groups.
- Pointing local groups towards ongoing initiatives to assist with energy projects and financing.

The above list represents a broad overview of the kinds of activities and knowledge we expect a District Energy Officer would have. We await further work to refine and develop the role over the coming months.

5.2.4 Funding and Integration with District Governments

Following this study and the published results, GoM will work with Community Energy Malawi, key local Government officials and other stakeholders to develop a finalised job description as well as considering how energy officers will be integrated into districts, including an evaluation of how much the scheme would cost if implemented across the country.

As well as the role and remit, GoM will have to determine how to best manage the new district energy officers to achieve maximum impact. This could be through housing officers directly within the current local government structure or, as mentioned previously, they could be part of a national renewable energy agency that operated as an umbrella organisation which trains and organises the officers while working with local and national government.

GoM is aiming to have the first district officers in place by the end of 2018 and to have officers in all districts by 2022.

5.1 Education

5.1.1 Actions

Year of completion	Action	Implementers	Progress	Funding Status
2017	Ensure current short courses in renewable energy are continued and review how they could be affordable and practical for greater number of people.	Educational institutions	Ongoing but further investment in reach of courses needed.	Funding could be sought for remote learning and subsidised rates.
2018	Review completed as to how to implement affordable training and capacity building for local communities in order for them to begin to implement renewables projects.	GoM, educational institutions.	No progress made, discussions should start as soon as possible.	Funding required
	Review completed to consider where to develop further education courses to fill current and future skills gaps for renewable energy across a range of areas such as engineering, law and finance.	GoM, Education Institutions and key industry stakeholders.	No progress made, discussions should start as soon as possible.	Funding required
	Capacity building efforts in Malawi to be more coordinated and strategic.	GoM in collaboration with donors and NGOs who are delivering capacity building activities.	No progress made, discussion should start as soon as possible as part of MRET.	Funding available but needs to be better coordinated.

5.1.2 Current Status and Potential

Developing and supporting Malawi's human capital is essential in order to foster a successful renewables sector. Malawi requires trained individuals with a huge range of skills sets and functions within the renewables sector including technicians, engineers, legal experts, financial professionals and managers.

As is also clear from the MRES, the sector in Malawi must service various different technologies at a range of scales. It is a challenge for Malawi to find people with these skills, but an opportunity for GoM and educational institutions to train people in these skills.

5.1.3 Higher Education

There is already some provision through the higher education institutions, but this needs to be further enhanced, particularly to address the needs of the newly restructured electricity industry.

The Polytechnic University offers a 4-year Bachelor's degree in electrical engineering, with a strong focus on renewable energy technologies. Students from this programme undertake industry placements for one semester, as well as a compulsory module in entrepreneurship and business management.

The Polytechnic has also developed an MPhil research degree programme in renewable energy. This programme began in 2013 and so far has graduated around 20 students with research degrees, predominantly in technical aspects of Renewable Energy. There are also plans in place to develop an international MSc in Renewable Energy, currently under development.

There is a Bachelors in Energy Studies that is offered by Mzuzu University, plus a number of short courses offered in a variety of locations around the country.

Chancellors College offers Bachelors programmes in Physics which includes components of technical research into renewable energy technologies.

5.1.4 Institutional Capacity Building

There is significant demand for technical training from ESCOM, and from MERA. Training courses offered by commercial training organisations are often over-subscribed. At the small scale end of the spectrum, a number of solar installation companies have been established with in-house training provided by the equipment suppliers.

In order for Malawi to fully implement and support a modern IPP framework over the long term, expertise is required within institutions who will be working with and negotiating with power producers. This includes legal and financial expertise to manage complex PPAs.

It is clear Malawi's energy system would also likely to benefit from enhanced grid demand and supply management. This requires not only an upgrade in terms of the software and hardware on the grid, but also trained engineers and technicians who can build, operate and manage such systems.

The Millennium Challenge Account, through the restructuring of the electricity industry has also highlighted the above areas as priorities for skills development, which are as follows:

- Technical understanding of grid management for the inclusion of renewables.
- The technical basis of long term grid development planning.
- Economic understanding for tariff setting within the openly competitive power market.
- Policy instruments for the support of renewable energy development.
- Legal and commercial knowledge for the development and monitoring of power purchase agreements.

The Government of Malawi urges Universities in Malawi to recognise these gaps and build upon the current programmes and to add to them with a focus on how the identified skills gaps can be filled.

In the short term, before Malawi develops these skills within the country, institutions like ESCOM and MERA should continue to seek outside expertise where there are skills gaps. This has already proved successful in helping to develop an IPP framework and was again supported by the Millennium Challenge Account.

5.1.5 Local Capacity Building

As well as the large-scale electricity industry which requires a high level of engineering excellence, the rural power sector, which has the potential to reach the majority of Malawi's population, also urgently needs people on the ground who have the skills and knowledge to establish and maintain energy systems, from individual solar devices to mini grids.

Malawi already has a number of short courses provided by the University of Malawi in Mzuzu which focus on renewable energy technologies. This kind of course is ideal for those in more rural areas off-grid who are looking to establish themselves as community champions of renewable energy and start energy businesses in local areas. However, there is a danger that this is still inaccessible to the majority of the population due to a lack of awareness, location and cost.

In mini-grids and solar off-grid solar, skilled workers are required to maintain and manage systems and can also become involved in the sale of such devices and systems. The University of Mzuzu should work with other institutions across the country and with GoM to try to provide these courses at an affordable rate across different regions in Malawi.

As well as skilled local technicians, more basic capacity building and awareness is required. A number of donor and NGO delivered programmes already deliver capacity building as part of their projects, for example the EnDev cookstoves manufacturing programme for example coordination around the planning and delivery of these programmes.

There is an opportunity here for this kind of capacity building not only to raise awareness of how to use renewable technologies but also to provide more holistic insights into why renewables technologies are now necessary. For example, a capacity building course for cookstoves manufacturing could also highlight the importance of protecting forests.

It is likely that when they are in place, District Energy Officers will be able to play an important role in both providing basic advice to communities and in highlighting where training can be accessed across the country as well as how this could be funded. Until this point, Government, donors and NGOs need to make sure their capacity building is coordinated and strategic in order to best utilise the resources currently being used. The MRET could be a good forum for discussion on this issue.

5.1.6 Future Leaders in Renewables

At all levels, skilled managers and leaders will be required, from coordinating the roll-out of new grid extensions in the public sector or developing distribution channels for pico-solar products in the private sector. It is clear that Malawi's further and higher education institutions who offer courses in management and leadership will have a critical role in educating the next generation of those who will take forward the renewable energy industry in the country.

As a result, renewables will be promoted by GoM and education institutions as a career which is fulfilling in terms of progression and responsibility and also in terms of benefitting Malawi's wider society.

5.2 Information, Transparency and Statistics

5.2.1 Actions

Year of completion	Action	Implementers	Progress	Funding Status
Ongoing	Cookstoves Map with location of sales as well as production centres maintained.	EnDev, GIZ and the NCSC	Published and will be maintained.	Funded
2017	Publish and regularly update energy statistics on the Department of Energy Affairs website.	GoM	Ongoing	Funding sought for more advanced monitoring and reporting of statistics in line with the UN Global Tracking Framework.
2018	Map of grid network, expansion plans, off-grid systems, population centres, renewable energy resources, and other key information to be published to assist developers and communities.	GoM, UN and partners who can assist with information.	Project to begin in early 2017.	Funded.

5.2.2 Public Data

GoM intends to make a lot more data on renewable energy and energy access far more accessible to key stakeholders and the general public.

The new Department of Energy Affairs website will lead the way in publishing new energy statistics online in 2017. This will give the wider public awareness of Malawi's energy sector including basic

statistics on the capacity and output of our power stations as well as a list of where developments are and the number of people who have energy access in the country. It is envisaged that this page will be updated at least every 6 months.

5.2.3 Tracking Progress

As outlined in the summary of targets at the start of the MRES GoM aims to eventually adopt UN SE4All Global Tracking Framework to measure energy access in Malawi.

The framework better represents the energy situation in Malawi and recognises the role of off-grid renewables and clean energy mini-grids across the country. As things stand we only measure electricity and energy access through customers who are connected to the national electricity grid. However, as the MRES demonstrates, modern energy services can be provided by off-grid means, the vast majority of which are fuelled from a renewable source.

The framework measures energy access at six different scales, and we have adopted these to fit with the Malawian sector:

- 1) No Access
- 2) Pico Solar Access
- 3) Mini-Grid under 1MW
- 4) Mini-Grid 1 to 10 MW
- 5) Grid Connected (Lower Reliability)
- 6) Grid Connected (High Reliability)

With more funding and partners we would like to fully adapt the UN Global Tracking Framework to measure energy access in a number of better ways, however, forecasting electricity access using a similar technique is a useful start.

We aim to work with partners in the sector to update the electricity access statistics annually. This requires cooperation from businesses, donors and NGOs working in these sectors to assist in providing high level information in order to inform these statistics. Only by collecting this kind of information will we be able to determine where progress is being made and where our shortfalls are. Therefore, it is in the interest of all stakeholders to work with GoM to update these statistics in future.

5.2.4 Mapping

Mini-Grid Information ‘Clearing House’ and Grid Map

As part of the UNDP’s *‘Increasing Access to Clean and Affordable Decentralised Energy Services in Selected Vulnerable Areas of Malawi’* programme, an online information portal will be created which will consist of the following data:

- current electricity grid networks
- planned and known rural electrification efforts of MAREP
- existing off-grid systems
- population centres
- renewable energy resource information and infrastructure criteria
- location of government public service institutions
- energy access criteria linked to rural infrastructure, land use, environmental and social issues.

This information will be collected for all un-electrified villages and areas of the country in collaboration with MAREP and Millennium Challenge Corporation (MCC) Malawi and will be validated and published. This adds to publically available, general information on mini-grids which can be found as part of the UN's Sustainable Energy for All Africa online 'Green Mini Grid Help Desk' which is found at the following web address - <http://greenminigrid.se4all-africa.org/>

This information will be made available to all stakeholders through a clean energy mini-grid website on GoM's Department of Energy Affairs website (DoE). Arrangements for periodic updates and maintenance of the website will be overseen by MAREP. Efforts will be made to make available the information on the website in a graphical GIS format with all stakeholders being able to download the datasets for each un-electrified village.

Although primarily designed to be a clearing house for mini-grid developments, the project will serve as a valuable source of information for a range of other stakeholders and members of the public. The map and clearing house are expected to be available for use in 2018.

Biomass Cookstoves Map

As mentioned earlier, the National Cookstoves Steering Committee, through the EnDev programme, has developed a national database and map of cookstove production and sales. This is available online now at the following link:

https://energypedia.info/wiki/Malawi_Cookstove_DB

All of these interactive maps will be available through links from the newly updated Department of Energy Affairs website in 2017 or as soon as they become available.

6. Coordination, Leadership and Next Steps

6.1.1 Actions

Year of completion	Action	Implementers	Progress	Funding Status
2017	Establish the Malawi Renewable Energy Taskforce (MRET)	GoM and key industry, donor and NGO stakeholders	Should be implemented on publication of MRES	Seeking long term funding for the group.
2018	REIAMA to formally relaunch following a comprehensive review of role and remit	REIAMA staff. Industry, donors and NGOs	Early discussions held but formal discussions need to commence.	Funding should be sought but on a sustainable basis without reliance on one source.
tbc	Publish regional Renewable Energy and Energy Efficiency Strategy and Action Plan (REEESAP)	GoM, with Southern African Development Community	Project underway, a project completion date should be estimated.	Funded.
Ongoing until 2030	Closely engage with SE4All process globally	GoM, UN, SE4All	Links already made, MRET to link up with SE4All global advisory groups.	Funded

6.1.2 Overview

For the MRES to succeed it is clear that a collective approach is need with a clear agenda which all stakeholders agree on and can work towards together.

There are a number of stakeholder groups which meet in the renewable energy sector in Malawi and they should continue to do so. However, there is still a clear gap identified by many for an overarching group to help deliver shared objectives across the renewable energy sector. As things stand there is a huge amount of activity taking place across Malawi but also a lack of strategic thinking collectively and strategically across Government, industry, donors and NGOs to achieve the long term vision outlined in the MRES.

6.1.3 Malawi Renewable Energy Taskforce (MRET)

The Government of Malawi recognise the importance of implementation of the actions outlined with the MRES as we worked towards our vision for renewable energy.

We also recognise that this task is not one which can be completed alone and without cooperation with a number of key stakeholders. Therefore, we intend to establish a Malawi Renewable Energy Taskforce (MRET) to help deliver the actions identified in the MRES. Only with ongoing support and engagement from donors, NGO and the private sector will such a group be a success. For that reason, we will be seeking the group to be co-chaired and managed by the Department of Energy Affairs along with a key stakeholder from the renewables sector.

Membership of the taskforce will consist of a range of stakeholders from across, Government, agencies, industry, donors, NGOs and civic society. The group will meet quarterly and measure progress against the actions as well as determining what the next steps are to be able to fully implement the actions or where new actions need to be identified. The MRET will be the body responsible for periodic re-drafting of the MRES as and when required. The group's agenda should reflect the identified actions of the MRES and these actions should evolve and develop as they are undertaken, while always relating to the overall vision and aims of the MRES and NEP.

The group will also act as a focal point for those working across the sector, something which a number of organisations have called for in Malawi. Networking opportunities in the renewables sector in Malawi are not common and the group will be a chance to coordinate work and resources more strategically as well as sharing ideas and results.

6.1.4 Industry, Donor and NGO coordination

The renewables industry in Malawi is a mix of private sector companies as well as donors and NGOs who are looking to help develop the sector. Since the sector is in its infancy in Malawi, we encourage these broad groups to work together as much as possible to provide a united voice to the Government of Malawi on key issues effecting the sector. Many donors and NGOs also bring experience from more developed markets and can pass on critical knowledge about how to help grow Malawi's fledgling renewables sector.

The MRES group needs strong voices from the private sector and the international donor community to continue to highlight where progress needs to be made and what changes are a priority in the sector. Other already established groups such as the National Cookstoves Steering Committee and the emerging DFID Energy Africa group of donors should also feed into this group and provide updates on progress in their respective areas. The Government of Malawi would welcome more of this kind of coordination and collaboration to inform the direction of the MRES in future.

The motivation for industry stakeholders to meet to discuss their interests and the current environment for renewables in Malawi inherently exists in the sector and that what is needed is a small amount of work to coordinate these organisations and groups to bring them together more regularly.

The Renewable Energy Industry Association of Malawi (REIAMA) could play an important role helping to organise such meetings between like-minded stakeholders under a single banner.

The organization has received funding from the USAFD from 2014-16 to help with running costs and has managed to attract around 20 paying members during that period to try to become self-

sustaining. However, the level of membership is not yet enough to pay for the organisation's costs and to become a more effective representative group, more groups need to become involved.

Even with limited resources, in the short term REIAMA should seek to fulfil a core function of facilitating further industry discussions, fulfilling a simple secretariat role to help meet the demand industry stakeholders have to meet up to discuss shared issues.

If REIAMA is active in this role initially and helps to coordinate such meetings, it is hoped that funders can be found to offer support for administration costs or to offer venues to meet in. As the network of organisations involved grows, REIAMA could then explore income generating revenues of their own such as asking for membership fees, hosting events and conferences or in sharing industry information.

Although traditionally REIAMA has sought to only cater for the needs for commercial companies, given the current stage of Malawi's renewables sector, the group should also look to include donors and NGOs as the market develops.

A possible plan for the re-development REIAMA could be as follows:

- REIAMA to provide a basic secretariat to facilitate industry discussion, including donors and NGOs. This may require some support from willing industry partners and the donor community.
- Sector meetings should be organised and attendance should be open to any organisation interested in discussing key issues.
- To reduce costs and barriers, organisations should offer office space for meetings and organisational support if required.
- If groups are successful, continue to meet and require more organisation, REIAMA will be able to seek membership fees from a wider range of stakeholders.
- REIAMA should eventually seek to be the host industry events and disseminating key industry information on a more regular basis.

6.1.5 The International Community

The Southern Africa Development Community

We recognise that to achieve our goals in renewables we will need to work hard as a country but also to collaborate closely with those closest to us. To that end we have been involved in a project with the Southern Africa Development Community (SADC) to develop of a Renewable Energy and Energy Efficiency Strategy and Action Plan (REEESAP).

Much like the SE4All Action Agenda the REEESAP aims to provide a framework for member states in the SADC to develop their own renewable energy and energy efficiency strategies and action plans to contribute towards achieving access to clean, modern, sustainable and affordable energy services for the planned industrialisation, ensuring energy security and achieving energy access.

The MRES builds on the knowledge and work already undertaken by those in the Department of Energy Affairs who are involved in the SADC REEESAP process.

United Nations and Sustainable Energy for All

The Government of Malawi recognises that climate change is a global issue that needs global solutions, while also realising how important renewable energy can be to our country domestically.

This is why we are delighted to be one of the first countries to be involved in the UN's Sustainable Energy for All (SE4All) initiative to help increase access to sustainable, modern energy solutions for everyone by 2030.

The Action Agenda SE4All is a high high level umbrella framework for the energy sector in Malawi that also includes a focus on issues such as food security, gender, health and water. Of course, many of its goals and ambitions are in renewable energy and we hope the MRET is able to help deliver actions which will contribute to these aims. The MRET should be the first point of contact for future work on the SE4All Action Agenda in order to ensure that the MRES and Action Agenda are complimentary and work towards the same vision to improve the renewable energy sector in Malawi for all citizens.

Works Cited

- Business Innovation Facility. (2016). *Off-grid lighting and phone charging study*.
- Econoler. (2016). *Draft Malawi Action Agenda, Sustainable Energy for All*.
- ESCOM. (2016). *Distribution, ESCOM*. Retrieved 2016, from ESCOM:
<http://www.escom.mw/distribution.php>
- ESCOM. (2016). *Generation, ESCOM*. Retrieved 2016, from ESCOM:
<http://www.escom.mw/generation.php>
- ESCOM. (2016). *News, ESCOM*. Retrieved from ESCOM:
<http://www.escom.mw/waterlevels-energysituation-malawi.php>
- Government of Malawi. (2009). *Malawi Biomass Energy Strategy*. Policy, Government of Malawi, Department of Energy Affairs.
- MCA. (2016). *IPP Framework Advisor 3rd Draft IPP Framework*.
- Mott MacDonald. (2016). *Malawi Grid Capacity Study*.
- National Cookstoves Steering Committee, Malawi*. (2016). Retrieved from Energypedia:
https://energypedia.info/wiki/Malawi_Cookstove_DB
- PWC. (2016). *Malawi Draft National Energy Policy*.
- REEEP. (2012). *Malawi (2012)*. Retrieved 2016, from REEEP:
<http://www.reeep.org/malawi-2012>
- Strathclyde University. (2015). *Malawi Renewable Energy Acceleration Programme (MREAP)*. Retrieved 2016, from Strathclyde University:
<https://www.strath.ac.uk/engineering/electricelectricalengineering/ourinternationalprogrammesprojects/malawirenewableenergyaccelerationprogramme/>
- Strathclyde University, MEGA, Practical Action. (2015). *Mini-grid Contribution to the Malawi National Energy Policy Review*.
- United Nations. (2016). *UN Country Profile - Malawi*. Retrieved 2016, from UN DATA:
<http://data.un.org/CountryProfile.aspx?crName=malawi>
- World Bank. (2015). *Malawi Inflation*. Retrieved 2016, from World Bank:
<http://data.worldbank.org/indicator/FP.CPI.TOTL.ZG?locations=MW>
- World Bank. (2015). *Malawi Solar Mapping*. Retrieved 2016, from World Bank:
<http://pubdocs.worldbank.org/en/881621471528512411/Malawi-Solar-Mapping-Solar-Modeling-Report-WB-ESMAP-March2015.pdf>
- World Bank. (2016). *Malawi Data Bank*. Retrieved from World Bank Data Bank:
<http://data.worldbank.org/country/malawi>
- Zalengera. (2014). Overview of the Malawi energy situation and A PESTLE analysis for sustainable development of renewable energy. *Renewable and Sustainable Energy Reviews*.