United Nations Development Programme

Country: Malawi

Project Document

Project Title	**Increasing Access to Clean and Affordable Decentralised Energy Services in Selected Vulnerable Areas of Malawi**
UNDAF Outcome(s):	Theme 1, Outcome 1.3**:** Targeted Population in Selected Districts benefit from effective management of environmental, natural resources, climate change and disaster risk by 2016
UNDP Strategic Plan Primary Outcome	Outcome 1: Growth and development are inclusive and sustainable, incorporating productive capacities that create employment and livelihoods for the poor and excluded. Specifically Output 1.5 of Outcome 1 - Inclusive and sustainable solutions adopted to achieve increased energy efficiency and universal modern energy access (especially off-grid sources of renewable energy)
UNDP Strategic Plan Secondary Outcome	Outcome 2: Countries have strengthened institutions to progressively deliver universal access to basic services;
Expected Country Programme Outcome	National policies, local and national institutions effectively support equitable and sustainable economic growth and food security by 2016
Expected UNDAF/CPAP Outputs	Output 1.3.4: Innovative renewable and energy saving technologies piloted in targeted locations in rural and peri-urban areas enabling the development of a national programme.
Implementing Partner	Ministry of Natural Resources, Energy and Mining – Department of Energy Affairs
Responsible Party	Department of Energy Affairs, Mulanje Energy Generation Agency.

Brief Description

Malawi is one of the least electrified countries in the SADC region, with an average per capita consumption of 85 kWh per annum – among the lowest in the world. Provision of sufficient, reliable and clean energy in Malawi is a critical challenge, as recognized by the Government which has put energy as a focus area in both the Malawi Growth and Development Strategy II (MDGS 2011 - 2016) and the Economic Recovery Plan (2012). The demand for electricity by far exceeds the installed capacity and new generation capacity is urgently needed, with the government focused on promoting diversified sources and utilization of the country's abundant renewable energy resources – particularly micro-hydro and solar. Under SE4All the government has committed to ambitious 2015/202 targets for increasing energy access and renewable energy supply.

To increase access, effort is needed to develop power plants and mini-grids close to the end users in the rural areas and since financial resources are scarce, investments for new generation can only be leveraged by involving the private sector and social enterprises. Given the more remote locations of many of the communities that need to be served, and the cost reductions in renewable energy technologies, an important vehicle for meeting these targets will be clean energy mini-grids.

This project addresses rural electrification barriers in rural Malawi where 96% of people do not have electricity access. The project will scale up and strengthen Malawi's first mini-grid, independent vertically-integrated energy company operated as a social enterprise; provide micro-capital grants and pilot innovative service arrangements for clean energy mini-grids; build capacity on mini-grids and rural electrification at the sub-national and national levels; develop an information clearing house on clean energy mini-grids for project developers; and recommend ways to mainstream mini-grids into national rural electrification financing platforms and energy regulatory frameworks. It is expected that the project will set the stage for mini-grids to play a key role going forward in electrifying rural parts of Malawi, thereby assisting the country in meeting its SE4All targets.

Project Period:	4 years
Atlas Award ID:	00086833
PIMS #:	5270
Start date:	Jan 2015
End Date	Dec 2018
PAC Meeting Date	29 Jan 2015
Management Arrangements	NIM

Total resources required	24,510,000 US$
Total allocated resources:	24,510,000 US$
• Regular UNDP	1,845,000 US$
• Other:	
○ GEF	1,725,000 US$
○ World Bank	11,000,000 US$
○ Practical Action	4,050,000 US$
○ MEGA	1,700,000 US$
○ Scottish Govt.	1,110,000 US$
○ Malawi Govt.	1,290,000 US$
○ Other donors (BiF/DfID, JICA, MMCT, GREVA etc.)	1,790,000 US$

Agreed by (Government)

Agreed by (UNDP Malawi):

CONTENTS

ACRONYMS AND UNITS

$	United States Dollar
ACP-EU EF	Africa Caribbean and Pacific- European Union Energy Facility
ADC	Area Development Committee
ADF	Africa Development Fund
AfDB	African Development Bank
BARREM	Barrier Removal to Renewable Energy in Malawi
BOO	Build-Own-Operate
CEDP	Community Energy Development Programme
CES	Community Energy Scotland
CGF	Credit Guarantee Fund
CONREMA	Cooperation Network for Renewable Energy in Malawi
COOPI	Cooperazione Internazionale
CPAP	Country Programme Action Plan
CPD	Country Programme Document
DAPP	Development Aid from People to People
DC	District Commissioner
DEA	Department of Energy Affairs
DEC	District Executive Committee
DfID	Department for International Development
EAD	Environmental Affairs Department
EPC	Engineering Procurement and Construction
ESCOM	Electricity Supply Corporation of Malawi
ESSP	Environmental and Social Screening of Proposals
ESSP	Energy Sector Support Programme of the World Bank
EU	European Union
EUEI-PDF	European Union Energy Initiative- Project Development Facility
FiT	Feed-in-Tariff
GCM	Global Circulation Models
GDP	Gross Domestic Product
GEF	Global Environmental Facility
GHG	Greenhouse Gases
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GoM	Government of Malawi
GVH	Group Village Headman
GWh	Gigawatt-hours
HACT	Harmonised Approach to Cash Transfer
HDI	Human Development Index
HPIC	Heavily Indebted Poor Countries
IEA	International Energy Agency
IFAD	International Fund for Agriculture Development
IPP	Independent Power Producer
IRENA	International Renewable Energy Agency
IRP	Integrated Resource Plan
JICA	Japanese International Cooperation Agency
kWh	Kilowatt-hours
LUANAR	Lilongwe University of Agriculture and Natural Resources
M&E	Monitoring and Evaluation
m/s	Meters per second
MAREP	Malawi Rural Electrification Programme
MCC	Millennium Challenge Corporation

MDC	Malawi Development Corporation
MDG	Millennium Development Goals
MEET	Malawi Environmental Endowment Trust
MEGA	Mulanje Energy Generation Agency
MERA	Malawi Energy Regulatory Authority
MGDS	Malawi Growth and Development Strategy
MICF	Malawi Industrial Challenge Fund
MIRTDC	Malawi Industrial Research and Technology Development Centre
MMCT	Mulanje Mountain Conservation Trust
M-REAP	Malawi Renewable Energy Acceleration Programme
MuREA	Mulanje Renewable Energy Agency
MW	Mega Watt
NASA	National Aeronautics and Space Administration
NB	National Bank
NCCIP	National Climate Change Investment Programme
NCCP	National Climate Change Programme
NEP	National Energy Policy
NGO	Non-Governmental Organisation
NIM	National Implementation
NRSE	New and Renewable Sources of Energy
NSCCC	National Steering Committee on Climate Change
NSREP	National Sustainable and Renewable Energy Project
NTCCC	National Technical Committee on Climate Change
OECD	Organisation for Economic Cooperation and Development
OFID	Organisation of Petroleum Exporting Countries Fund for International Development
OIBM	Opportunity International Bank of Malawi
PA	Practical Action
PIF	Project Information Form
PIMS	Project Information Management System
PJ	Peta-Joules
PLF	Plant Load Factor
PPG	Project Preparation Grant
PPP	Public Private Partnerships
PSD	Private Sector Development Project of UNDP
PSDMP	Power Sector Development Master Plan
PSP	Pico Solar Products
PSRP	Power Sector Revitalisation Programme
PV	Photovoltaics
PwC	Price-waterhouse Coopers
RBM	Results Based Management
RCM	Regional Climate Models
REF	Rural Electrification Fund
REIAMA	Renewable Energy Industry Association of Malawi
REMAP	Rural Electrification Master Plan
REMC	Rural Electrification Management Committee
Ren 21	Renewable Energy Policy Network for the 21st Century
RENAMA	Renew N' Able Malawi
RERA	Regional Energy Regulators Association of Southern Africa
RfP	Request for Proposal
RLI	Reiner Lemoine Institut
RRF	Results and Resources Framework
SBAA	Standard Basic Assistance Agreement

SE4All	Sustainable Energy for All
SE4RC	Sustainable Energy for Rural Communities
SEM	Sustainable Energy Management Project of UNDP
SG	Scottish Government
SHS	Solar Home Systems
STAP	Scientific and Technical Advisory Panel
TA	Technical Assistance
tCO_2e	Tonnes of Carbon Dioxide Equivalent
ToT	Training of Trainers
TVET	Technical and Vocational Education and Training
UK	United Kingdom
UNDAF	United Nations Development Assistance Framework
UNDP	United Nations Development Programme
VDC	Village Development Committee
WEG	Wind Electricity Generator
WEO	World Energy Outlook
ZESCO	Zambia Electricity Supply Corporation

VERNACULAR

Blue Gum	Eucalyptus
Chichewa	The main language in Malawi
Kwacha	Malawian Currency
Tiphunzire	Translates to 'let us learn' in Chichewa, name of a loan product for SMEs by Opportunity Bank

EXECUTIVE SUMMARY

Malawi has low levels of rural electrification with 96% of rural population without access to electricity[1]. Rural areas currently rely mainly on kerosene for lighting and diesel for mechanical and electrical power. Over 40 years of electrification efforts in Malawi have primarily focused on urban areas where 37% of households now have electricity access. On-grid and off-grid electrification approaches have been tried for rural electrification with limited efforts at mini-grid based electrification. Malawi with its strong renewable energy resource base has the potential to use clean energy mini-grids to electrify its rural areas producing both local development benefits and global environmental benefits. However a number of policy & regulatory; institutional capacity and informational; and financial barriers currently constrain the role that clean energy mini-grids could play in rural electrification in Malawi.

There is some existing clean energy mini-grid experience with Mulanje Energy Generation Agency (MEGA) in Mulanje which has demonstrated a social business approach to electrifying rural Malawi. The experiences of MEGA offers an opportunity to build on and replicate similar rural electrification efforts based on mini-grids in Malawi. There is also an associated broader need for technical assistance activities to remove the policy & regulation, capacity, information and business/finance barriers.

The *Increasing Access to Clean and Affordable Decentralised Energy Services in Selected Vulnerable Areas of Malawi* project aims to establish mini-grids as a priority option in Malawi's rural electrification efforts. The project is aimed at 'increasing access to energy in selected remote, rural areas in Malawi by promoting innovative, community-based mini-grid applications in cooperation with the private sector and civil society'. The project has three Components as follows:

Component 1 - Expansion of the Mulanje Electricity Generation Agency (MEGA) Micro Hydro Power Plant (MHPP) and mini-grid scheme: This Component will directly support the implementation of a second 80 kWp micro-hydro powered mini-grid operated by MEGA at Namainja (the Lujeri Micro-hydro power plant - MHPP) and provide institutional support for the development of several other MEGA MHPPs bring the installed capacity of their power production up to 216 kWp by end of project. This Component will also support the institutional capacity of MEGA to help establish it as a self-sustaining entity;

Component 2 - Replication of MEGA model via piloting of new mini-grid schemes in other areas of Malawi: This Component will initiate an open competitive-based mechanism (Request for Proposals – RfP) to select and support the establishment of Public-Private-Partnership (PPP) service delivery platforms for clean energy mini-grids with an emphasis on business models such as Build-Own-Operate (BOO). It is envisaged that Clean Energy Mini-grids with an installed capacity of at least 84 kWp will be supported.

Component 3 - Institutional strengthening and capacity building for promotion of decentralized mini-grid applications across the country: This Component will carry out training and capacity building at sub-national and national levels on Clean Energy Mini-grids and establish a national information clearing house to facilitate mini-grid based rural electrification. The Component will also make the policy and regulatory changes to mainstream

[1] Sustainable Energy for All, 2013, TheSE4All Global Tracking Framework

Clean Energy Mini-grids into rural electrification activities and will also synthesise and show-case the lessons from the clean energy mini-grid based rural electrification experience in Malawi to develop a Toolkit for policy makers.

The project will be implemented over the period 2015-18 and will be implemented by the Department of Energy Affaires under a National Implementation Mechanism. The project expected to establish the foundations for replication of several clean energy mini-grids in Malawi, thereby accelerating efforts to provide universal electricity access to its rural population.

1.0 CONTEXT

Malawi is situated in South-East Africa and is a land-locked country as shown in Fig 1 occupying 118,484 square kilo meters[2]. The population of Malawi was estimated to be 15.381 million in 2011 and the GDP in 2011 was $ 5.966 billion growing at 4.5 %[3]. The country gained independence from the United Kingdom in 1964 and recently marked 50 years of independence. Over 84 % of the population of Malawi live in rural areas[4] and about 75% of the population[5] is engaged in smallholder agriculture.

Fig 1: Political Map of Malawi

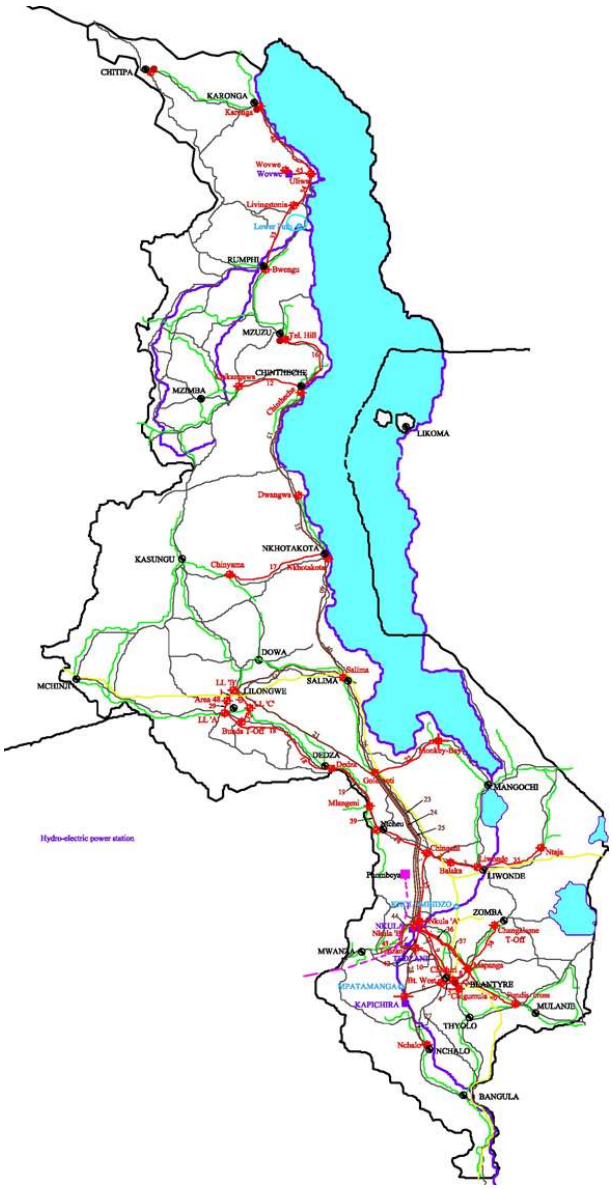
[2] UN Statistics Division, 2013, World Statistics Pocketbook, 2013 edition (Series V, No. 37)
[3] UN Statistics Division, 2013, World Statistics Pocketbook, 2013 edition (Series V, No. 37)
[4] UN Statistics Division, 2013, World Statistics Pocketbook, 2013 edition (Series V, No. 37)
[5] Gamula, GET et al, An Overview of Energy Sector in Malawi, Energy and Power Engineering, 2013, 5

Malawi is predominantly an agricultural country with tobacco, tea, sugar cane and cotton contributing significantly to the economy and making up 75% of exports. The current contribution to GDP by agriculture is 30.7%, followed by trade and hospitality at 18.7%, finance and business services with 13.2% share, manufacturing with 9.9%, mining with 5.3% etc.[6] Mining is currently the fastest growing sector in Malawi growing at 8.5% in 2013 followed by telecommunication services which grew at 7.9%[7]. The Human Development Index (HDI) value of Malawi is 0.418 positioning the country at 170 out of 187 countries[8]. However the HDI has been consistently improving since the 80s and improved by one rank from 171 to 170 last year. With the political uncertainty surrounding the May 2014 tripartite elections having been quickly resolved and assuming continued macro-economic stability, GDP growth in 2014 and 2015 is expected to accelerate to 6.1% and 6.2% respectively[9].

The total primary energy supply for Malawi is 134 PJ[10]. The local electricity generation was 1204.7 GWh[11] from an installed capacity of 315 MW of which over 85 % of generation was from hydropower with the remaining from fossil fuel powered thermal generation[12]. The total installed generation capacity increased to 356 MW in 2014 with the commissioning of Kapichira II hydro power plant. The annual per capita electricity consumption of Malawi was 85 kWh which is significantly below the African average of 579 kWh and the world average of 2,777 kWh[13]. The electricity access rate in Malawi is very low at 9% with only 37% of the urban households and 4% of the rural households having access to electricity[14]. 73.6% of the population of Malawi relies on Kerosene for lighting followed by 17.7% who rely on electricity and 3.6% using candles with remaining households using grass, firewood, solar, gas etc. to light their homes[15]. Considering these challenges and the large number of the population without electricity access, the Sustainable Energy for All (SE4All) Global tracking framework has placed Malawi in the group of 20 key high-impact countries which account for two-thirds of global electrification deficit[16]. The global public policy and electrification efforts catalysed by the SE4All initiative, is likely to focus on these high-impact countries to meet the universal energy access goals for 2030. The Fig 2 illustrates the current High Voltage electrical grid coverage in Malawi. As can be seen in the illustration, the electricity networks cover the whole country except for Likoma and Chizumulu islands in the eastern part of Lake Malawi. However the grid network caters only to the main cities and town in Malawi and the outlying rural areas are often un-electrified. It can also be observed that the electricity grid network density is concentrated in the south of the country where the economic and industrial base is concentrated.

[6]African Development Bank/OECD/UNDP, 2014, African Economic Outlook;
[7] African Development Bank/OECD/UNDP, 2014, African Economic Outlook;
[8] United Nations Development Programme (UNDP), International Human Development Indicators: Malawi hdr.undp.org, accessed May 2014.
[9] African Development Bank/OECD/UNDP, 2014, African Economic Outlook;
[10] International Renewable Energy Agency (IRENA), 2012, Renewable Energy Country Profile: Malawi
[11] National Statistical Office, 2012, Statistical Year Book 2012
[12] International Renewable Energy Agency (IRENA), 2012, Renewable Energy Country Profile: Malawi
[13] International Renewable Energy Agency (IRENA), 2012, Renewable Energy Country Profile: Malawi
[14] Sustainable Energy for All, 2013, TheSE4All Global Tracking Framework.
[15] National Statistical Office, 2012, Statistical Year Book 2012
[16] Sustainable Energy for All, 2013, The SE4All Global Tracking Framework

Fig 2: Overview of Electricity Network in Malawi



(Source: DEA)

Malawi on the other hand has good local energy resources. Renewable energy resources in Malawi are plentiful; for example the untapped hydro power potential in the country is alone estimated at 1,280 MW. Malawi also has good solar energy resources with over 2,640 sunlight hours in a year with annual average insolation levels in the range of 5.21 to 5.79 kWh/m^2/year[17]. Malawi also has reasonable wind energy resources with measured annual

[17] NASA Langley Research Centre

average wind speeds of 3.8 to 4.0 m/s at 10 m heights[18]. The country also generates significant amounts of biomass resources which could also be converted for electrical energy purposes. The biomass resources include 24.11 million m^3/year of wood and 6.12 million m^3/year of crop residues and 50,000 m^3/year of animal dung[19]. The country's renewable energy sources consisting of solar, hydro, wind and biomass have the potential to play an important role in the country increasing electricity access rates and displacing solid biomass fuels otherwise used for energy. However a number of policy, institutional, information, financial and business barriers limit the development and use of locally available energy sources for electrification, limiting rural electricity access and constraining rural development.

2.0 SITUATION ANALYSIS

2.1 POLICY AND REGULATION

The Malawi Growth and Development Strategy (MGDS) implemented during 2006-2011 is a framework that is based on Millennium Development Goals (MDGs) which guides the developmental efforts of the Government of Malawi (GoM). The MGDS II being implemented during the period 2011 - 2016 has also identified energy [20]as a one of the nine key priority areas. One of the expected medium-term outcomes of the MGDS II is increased availability and access to energy. The initial energy policy development in Malawi was the Electricity Act which was enacted in 1998. In 1998, a Power Sector Development Master Plan (PSDMP) covering the period 1998-2015 was developed[21]. The PSDMP was developed further into an Integrated Resource Plan (IRP) in 2004 covering the period 2004-2020[22]. The National Energy Policy (NEP) was published in 2003 and the enactment of NEP has been a significant milestone in the development energy sector in Malawi. The NEP provided a progressive framework and resulted in the following developments relevant to electricity access:

- Established access to modern energy services as one of the strategic policy objectives in the energy sector;
- Established a goal for achieving household electrification targets of 10% by 2010, 30% by 2020 and 40% by 2050;
- Proposed the Rural Electrification Fund (REF) as a sustainable financing mechanism for achieving rural electrification targets. The REF was to be replenished through energy sector levies[23] and other finance flows[24];
- Proposed the energy regulator - Malawi Energy Regulatory Authority (MERA), to provide regulatory oversight to the energy sector;
- Proposed electricity sector reforms, unbundling of Electricity Supply Corporation of Malawi (ESCOM) and private sector participation in the electricity sector and
- Established goals for using renewable energy sources and protecting the environment with renewable energy targets set at 5% by 2010, 7% by 2020 and 10% by 2050;

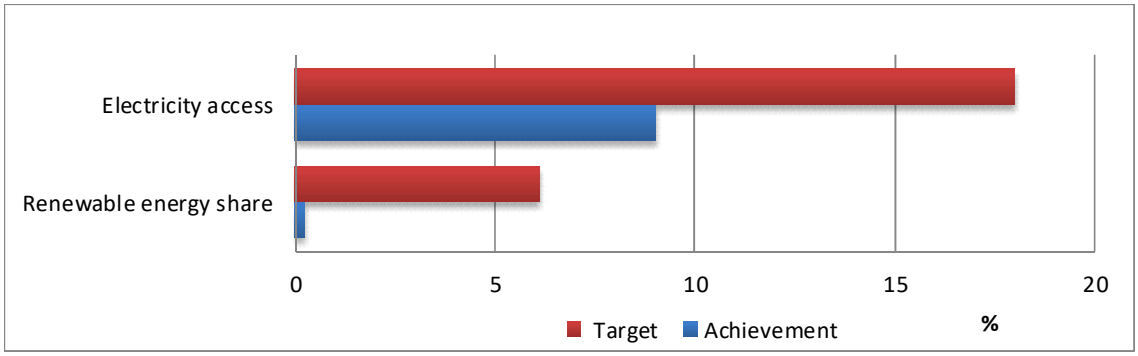
[18] NASA Langley Research Centre
[19] Malawi Biomass Energy Strategy, 2009, EUEI-PDF and Government of Malawi
[20] As part of the priority area of energy, industrial development, mining and tourism;
[21] Ministry of Natural Resources, Energy and Environment, 2010, Energy Sector Project Dossier
[22] Ministry of Natural Resources, Energy and Environment, 2010, Energy Sector Project Dossier
[23] Levies on electricity sales and gaseous and liquid fuel sales;
[24] Proceeds from privatisation and Heavily Indebted Poor Countries (HIPC) programme and donations from national and international development partners;

While significant achievements were made under the aegis of the NEP such as establishment of MERA, REF etc. the achievement of the rural electrification and renewable energy targets and electricity sector reforms and unbundling of ESCOM have lagged behind. ESCOM has, however, been restructured into three business units – generation, transmission and distribution under the same corporate umbrella. A series of four energy laws were promulgated in 2004 which were the Energy Regulation Act, Rural Electrification Act, Electricity Act and the Liquid Fuels and Gas Act[25], which also resulted in the establishment of MERA.

The Rural Electrification Act gazetted in 2007 has been another key milestone. The Act has resulted in the following developments that have supported enhancing electricity access in Malawi[26]:

1. Establishment of a Rural Electrification Management Committee (REMC) accountable to the minister, consisting of senior civil servants to develop the Rural Electrification Master Plan (REMAP) and implement rural electrification activities;
2. Established REF and its legal basis and provided operational guidance and financial provisions;
3. Established provisions for regulation of Rural Electrification by MERA, including licencing, tariff setting and rural electrification concessions.

Fig 3: Electricity Access and Renewable Energy Share in Malawi 2014 – Targets Vs Achievements (%)



(Source: GoM/UNDP, 2014)

The NEP, Electricity and Rural Electrification Acts, Malawi Rural Electrification Programme (MAREP) and establishment of MERA have provided a basic framework for action on increasing the country's share of clean energy. The current status of electricity access and renewable energy contribution is illustrated in Fig 3. As can be seen from Fig. 3, the achievements in electricity access and renewable energy shares are significantly low compared to the targets established for 2014. Nonetheless the GoM has signed up to the SE4All initiative and has committed to increase electricity access to 30%[27] and renewable energy to 6% by 2030 from the current levels of 9% and 0.2% respectively. Significant support and resources from the international community and intense efforts from the public, private sector and civil society (supported by strong institutions and information availability, business and finance models, and conducive policy and regulatory frameworks) are needed to successfully achieve this electrification and clean energy commitment.

[25] Ministry of Natural Resources, Energy and Environment, 2010, Energy Sector Project Dossier
[26] Government of Malawi, 2007, Rural Electrification Act
[27] Reaching 15% by 2015 and 20% by 2020.

2.2 STAKEHOLDERS

There are a large number of stakeholders in the rural electrification and clean energy space in Malawi. The key stakeholders consists of the Department of Energy Affairs (DEA), which coordinates, policy, regional local bodies and development structures that oversee regional and village level development; MERA which is responsible for electricity regulation; ESCOM which is responsible for rural electrification infrastructure; development agencies and international donors who support government efforts with resources and technical assistance; local energy generation and rural electrification companies; local institutions active in education and research; local and international Non-Governmental Organisations (NGOs) active in rural electrification and rural development; local private sector enterprises which are active in renewable energy implementation; private sector; renewable energy industry associations; local banks and financial institutions; and finally the rural and village communities that are the target of rural electrification initiatives. These institutions and stakeholders are described below:

- **DEA** was established in 1992 and is responsible for energy sector policy making; renewable energy and rural electrification. DEA sets targets for rural electrification and renewable energy and facilitates the achievement of targets through appropriate policy and incentives. The DEA also coordinates the Malawi Rural Electrification Programme (MAREP) and also guides the rural electrification and renewable energy development plans of ESCOM, leveraging the 99% ownership of the company by the government;

- **Local Government bodies** at the sub-national level are also responsible for electrification of the local areas and villages in coordination with MAREP and DEA. In each of the districts, the District Executive Committee (DEC) headed by the District Commissioner (DC) are supposed to coordinate the electrification activities but in practice have a limited role. Below the district level, the Area Development Committee (ADC) headed by the traditional authority coordinates rural electrification and at village level the Village Development Committee (VDC) headed by the Group Village Headman (GVH) coordinates local village electrification[28].

- **MERA** is responsible for implementing the electricity regulatory framework and approves licences for generation, transmission and distribution of electricity. MERA also approves the electricity tariffs across the country based on tariff proposals by ESCOM. MERA also develops regulations to encourage private sector participation in the electricity sector and to facilitate deployment of renewable electricity;

- **ESCOM** is the vertically integrated electricity utility in Malawi which was established in 1957 and was corporatized in 1998[29]. ESCOM operates 356 MW of electricity generation capacity predominantly powered by hydro energy and also owns and operates the national electricity transmission and distribution network consisting of 815 km of Steel Tower lines, 1250 km of wood pole lines, 39 substations and 70 transformers[30]. ESCOM serves over

[28] Ministry of Environment and Climate Change Management, 2013, National Climate Change Investment Plan, 2013-2018
[29] Gamula, GET et al, 2013, Development of Renewable Energy Technologies in Malawi, IJRETR;
[30] World Bank, 2011, Project Appraisal Document for the Energy Sector Support Project

20,300 electricity customers primarily in urban areas. ESCOM is 99% owned by the government with 1% ownership by the Malawi Development Corporation (MDC)[31];

- **International development agencies and donors** are quite active in rural electrification and renewable energy development. UNDP has been active in this space since 1998 and continues to play a key role. Japanese International Cooperation Agency (JICA) is supporting the MAREP; the World Bank is providing support through the energy sector support project; the Millennium Challenge Corporation (MCC) is supporting the power sector in Malawi, and European Union (EU) has been providing support through various energy facility supported rural electrification and renewable energy projects. The United Kingdom (UK) Government's Department for International Development (DfID), Government of Scotland (GofS) and German technical assistance agency Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) also all play important roles in clean energy and rural electrification in Malawi;

- **Local and International NGOs** have also played an important role in clean energy development and rural electrification in Malawi. One of the key international NGOs have been Practical Action (PA) which is supporting mini-grid based electrification in Malawi through hydro and solar energy. Cooperazione Internazionale (COOPI) and Community Energy Scotland (CES) have in the past supported community based rural energy development in Malawi. The Mulanje Mountain Conservation Trust (MMCT) has established an electricity company (MEGA) and is a key local NGO active in environment and energy activities. The Mulanje Renewable Energy Agency (MuREA) was established by GIZ and is active in hydro mini-grids and improved cook stoves; Development Aid from People to People (DAPP) is active in energy issues relating to community mobilisation and agricultural productivity; and Renew'N'Able Malawi(RENAMA) is also supporting innovative rural electricity and lighting models in Malawi. The Cooperation Network for Renewable Energy in Malawi (CONREMA) is a network and information sharing platform for RE actors established by RENAMA.

- **Education and Research Institutions** have also played a role in training and capacity building for clean energy and rural electrification and testing and quality control, as well as for research, advisory and consulting services to clean energy and electrification initiatives. Mzuzu university offers bachelor's degree programmes in renewable energy and the Malawi Polytechnic offers bachelor's degree in energy engineering and manages the Government of Scotland's Malawi Renewable Energy Acceleration Programme (M-REAP). The Malawi Industrial Research and Technology Development Centre (MIRTDC) has technology development and assessment capabilities in solar and hydro energy technologies;

- **Private sector and industry associations** have been incubated by a previous UNDP/GEF project on *Barrier Removal to Renewable Energy in Malawi* (BARREM) and several international initiatives around supporting improved cook stoves. The local renewable energy industry[32] is not currently active in manufacturing but is capable of sourcing and integrating photovoltaic lighting and electricity systems and fabricating or manufacturing improved cook stoves. The Renewable Energy Industry Association of Malawi (REIAMA) was originally established and supported by the UNDP/GEF BARREM project but has now morphed into CONREMA.

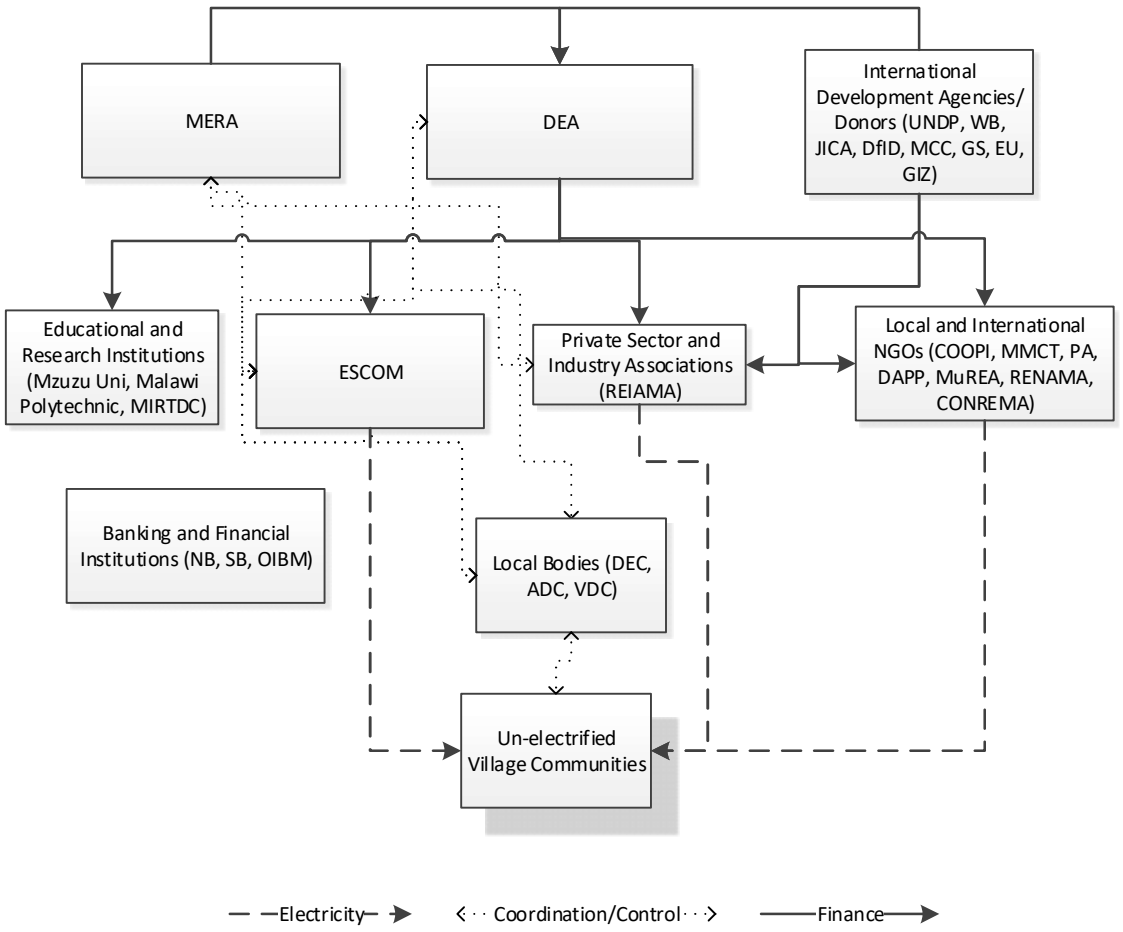
[31] Which was also owned by the government and has now ceased to exist making the government ownership 100%

[32] All renewable energy companies are licenced by MERA

- **Banking and Financial institutions** haven't yet played any significant role in financing rural electrification through project financing, enterprise financing or end user financing. A Credit Guarantee Fund (CGF) was established by BARREM through National Bank (NB) managed by Malawi Environmental Endowment Trust (MEET) to serve as a risk management mechanisms for financing Solar Home System (SHS) lenders but is no longer operating. A Revolving Fund was also established under MAREP. Banks like Standard Bank are interested in offering loan products for companies and other banks like Opportunity International Bank of Malawi (OIBM) have also launched enterprise financing schemes like *tiphunzire* to provide working capital of energy enterprises.

- The Fig. 4 below depicts the stakeholders and institutional arrangements for rural electrification and clean energy in Malawi.

Fig 4: Key Stakeholders for Rural Electrification and Clean Energy in Malawi



As can be seen from the illustration above, the resources from DEA and international development agencies and donors drive rural electrification efforts in Malawi. ESCOM, NGOs and private sector are all active in providing rural electrification to un-electrified communities. DEA, MERA and local bodies play a coordination and control role with research and educational institutions playing a role in capacity building and training. The banking and finance sector does not have a significant role yet in the rural electrification efforts.

2.3 BASELINE ANALYSIS

2.3.1 CURRENT INITIATIVES

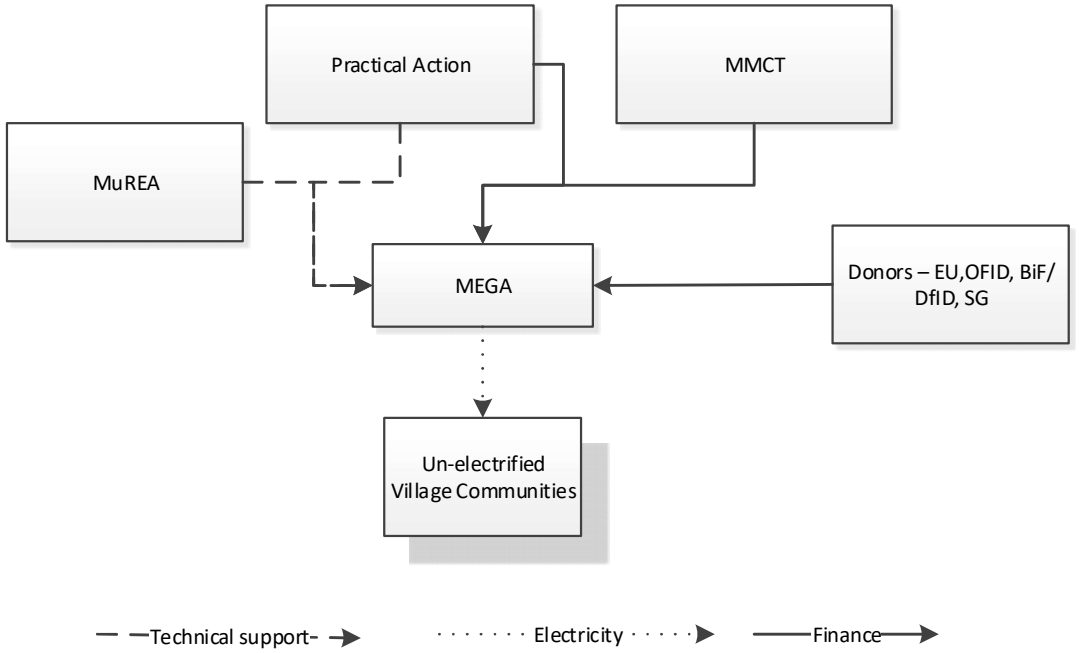
There are a number of initiatives by the government and international development community which will overlap with the project implementation period of 2015-18. These ongoing or proposed efforts in clean energy and rural electrification in Malawi are either already making or on the way to making a tangible difference to the electrification of rural areas:

- **MAREP**: is the flagship rural electrification programme of GoM which started in the 1980s with ESCOM implementing the rural electrification activities with funding from Africa Development Fund (ADF), Germany and Spain and some of ESCOM's internal resources. Since 2002, MAREP is implemented by DEA with financial and technical assistance from JICA. The approach of MAREP is to electrify trading centres or market places in a phased manner. Currently MAREP is in its 7th phase which will be completed in 2015 where 81 additional trading centres will be electrified by ESCOM at a cost of $ 17 million. MAREP Phase 7 is fully funded by REF proceeds with JICA providing only technical assistance. MAREP finances the extension of transmission and distribution network of ESCOM to selected trading centres. A recent positive development with MAREP is opening up the grid extension contracts to a competitive bidding process and inviting private sector participation. MAREP is reporting cost savings and faster implementation by private sector contractors. MAREP Phase 8 is scheduled to begin from 2015 and the list of trading centres which will be electrified is being finalised.

- **Mulanje Energy Generation Agency (MEGA)** is a Malawian company wholly owned by MMCT, a key environmental endowment trust active in biodiversity conservation and natural resources in Mulanje. MEGA has received international support from the EU, Practical Action (PA), OPEC Fund for International Development (OFID) and others for its mini-grid business activities. Fig 5 illustrates the financing and partnership structure of MEGA. MEGA has already implemented an 88 kW micro-hydro based mini-grid in the Lichenya River providing electricity to the Bondo community with technical support from PA and MuREA. MEGA has been supported by the Business Innovation Facility (BiF) to develop a business plan which established that MEGA can be a self-sustaining business entity based on tariffs from operating and servicing hydro mini-grids, provided it establishes a critical mass of operational MHPPs and customer base. MEGA is currently going through a licencing procedure with MERA[33].

[33] MEGA expects their first licence to be awarded in 4Q2014

Fig 5: Financing and Partnership Structure of MEGA



- **Energy Sector Support Project (ESSP)** of the World Bank is being implemented since 2012 and is expected to be completed in 2017. One of the main Components of this project is to strengthen ESCOM's electricity network and its expansion to un-electrified areas[34]. The World Bank grant to this project is $ 65.4 million with an additional soft loan of $19.3 million. A capacity building and technical assistance Component of the project will carry out renewable energy resource assessments, support sectoral studies and provide advice on Independent Power Production (IPP) to engage the private sector in the electricity sector.

- **Power Sector Revitalisation Project (PSRP)** of MCC is investing $ 350.7 million in the power sector in Malawi during the period 2013-2018 with one of the project objectives being increasing energy generation and access. The MCC compact will invest in power sector reforms and infrastructure development including transmission and distribution upgrades and extension. MCC estimates that 5 million people in Malawi will benefit from the compact's impact;

- **Sustainable Energy Management (SEM)** Support to Malawi is a UNDP project being implemented during the period 2013-2016 (it is only partially funded at present). The project, which has a total budget of $ 7.3 million, will carry out policy and institutional development at national and sub-national levels in renewable energy and energy efficiency. The project will provide advisory support; assist in updating policies; develop standards; and establish coordination mechanisms and implementation arrangements. A particular feature of the project will be capacity building and training activities at the district level and the focus of SEM will be in 14 disaster prone districts in Malawi;

[34] Mainly peri-urban areas.

- **Scottish Government's International Development Fund** supports Malawi Renewable Energy Acceleration Programme (MREAP) and other clean energy initiatives. MREAP builds on a previous Community Energy Development Programme (CEDP) and is led by University of Strathclyde with a budget outlay of £1.7 million for four Components: institutional development; community energy development; wind energy preparation programme; and the renewable energy capacity building programme. During 2015-18, the international development fund will finance the seconding of an energy adviser to support DEA develop a renewable energy strategy and support a SE4All coordinating body in Malawi; provide up £2 million[35] to innovative energy access projects in Malawi; develop and pilot a community renewables toolkit in Malawi; launch a skills sharing initiative with Scottish Renewables[36] supporting local renewable energy schemes in Malawi; and possibly offer support to the sector from the Scottish Malawi Development Fund.

- **Japanese International Cooperation Agency (JICA)** supports Malawi in the energy sector and is providing advisory support to MAREP through a JICA adviser seconded to DEA. JICA also extended support to DEA until 2009 for MAREP through the Malawi Rural Electrification Promotion Project (REPP), in which Japanese technical advice on rural electrification technologies were provided to DAE. JICA also implemented an 830 kWp Photovoltaic Power Plant at the Kamuzu International Airport in Malawi under Japan's Cool Earth Partnership. That power plant will supply the needs of the national airport and its residential quarters with clean energy and the surplus energy generated is exported to the ESCOM grid.

- **BiF** is supported by DfID, UK and led by Price Waterhouse Coopers (PwC) together with national partners with an objective of building partnerships between DfID and the private sector in inclusive business opportunities[37]. The pilot phase of BiF covered Bangladesh, India, Malawi, Myanmar, Nigeria and Zambia. During the pilot phase in Malawi BiF supported off-grid and mini-grid electrification activities including business planning support to MEGA. The second phase BiF-II which will begin in 2014 with a budget of £1 million and will support supply chains for Pico Solar Products[38] (PSP) in Malawi;

- **European Union-COOPI** rural energy access through renewable energy project is funded by the Africa, Caribbean and Pacific – European Union (ACP-EU) Energy Facility with a grant of over € 0.6 million and is being implemented primarily in Kasungu district and Likoma island using solar photovoltaic lighting and improved cook stove technologies covering 1250 households. The project is being implemented from 2011 until the beginning of 2015.

- **Sustainable Energy for Rural Communities (SE4RC)** is an ACP-EU Energy Facility funded regional project to be implemented by Practical Action in Malawi and Zimbabwe which will deal with energy and agricultural issues. The project will install 4 mini-grids and 16 energy kiosks in Nsanje and Chikwawa districts in Malawi and Gwanda district in Zimbabwe and provide trainings to entrepreneurs and smallholders and create

[35] Up to £500,000/year for energy access projects in Malawi.
[36] Renewable Energy Industry body in Scotland.
[37] Commercially viable businesses with significant development impacts
[38] Portable Solar Powered Devices typically priced in the range of $5 - $25 for lighting and cell phone charging in un-electrified areas.

facilitating environment for agricultural productivity improvements through energy and market access mechanisms. The project has a financing outlay of € 7.1 million[39].

Table 1: Overview of Current Baseline Energy Initiatives in Malawi

Initiative	Technology/Resource	Financing/Implementation	Management
MAREP	Grid-extension	$ 17 million for phase 7 from REF; Primarily through ESCOM, but private sector role as contractors beginning	ESCOM regulated by MERA
MEGA	Hydro mini-grid	~ $ 0.8 million from OFID, SG, PA; Implementation support from PA, MuREA, SE, Operation by MEGA	MEGA regulated by MERA
ESSP	Grid upgrades; Hydro power; Clean Energy Resource assessments	$ 84.7 million; Primarily through ESCOM	WB/ESCOM
PSRP	Grid generation, transmission and distribution development and power sector reforms	$ 350.7 million; Through DEA and ESCOM	MCC Local office, ESCOM
SEM	Renewable Energy and Energy Efficiency	$ 145 million; Through DEA	DEA/UNDP
Scottish Government	Renewable Energy, Rural Electrification	Phase I - £1.7 million, Phase –II more than £2 million Scottish and local contractors	University of Strathclyde/SG
JICA	Rural Electrification Solar Photovoltaics	REPP Lilongwe Air Port PV plant – Japanese Contractors	DEA/JICA
BiF	Solar Photoviltaics	BiF- II - £1 million	PwC/Imani/PA/DfID
EU-COOPI Rural Energy	Solar Photovoltaics Efficient Cook stoves	€ 0.6 million COOPI and local partners	COOPI/ACP-EU PDF
SE4RC	Solar Photovoltaics	€ 7.1 million Practical Action and local partners	PA/EU-ACP EF

2.3.2 PAST INITIATIVES

There have also been several past projects in rural electrification and clean energy in Malawi implemented by GoM and international development agencies that are relevant to the project which are:

- **European Union/Practical Action** project on energy service delivery project was implemented in Malawi, Mozambique and Zimbabwe. The project was implemented during the period 2008-2012 with a funding of over € 1.6 million from the ACP-EU

[39] With a EU c-financing of € 5.3 million

Energy Facility. The project approach was focused on community managed micro-hydro powered mini-grids for energy access, agricultural productivity increases, and livelihood creation. In Malawi the project effort was centred on Mulanje, an ecologically sensitive area, and primarily worked with MMCT to establish MEGA. MEGA is intended to be a financially self-sustaining and expanding operation[40] operating hydro powered decentralised grids around Mulanje.

- **Barrier Removal to Renewable Energy in Malawi (BARREM)** was a UNDP-GEF project that was implemented during the period 2002-2007. The project was aimed at developing the solar market for household, commercial and agro-processing segments. The project was able to initiative the process of creating a sustainable market for solar electricity and off-grid lighting in Malawi. The project also established a technical quality assurance frame work and initiated efforts towards engaging the banking and financing sector in financing rural electrification.

- **Renewable Energy Project (REP)- MLW/98/007-** was implemented by UNDP during the period 1999-2003. The project with a funding of $ 0.5 million supported the GoM National Sustainable and Renewable Energy Project (NSREP) and had four Components focused on creation of an enabling environment; capacity building; promotion; and resource mobilisation. The REP laid the foundations of the clean energy and rural electrification efforts coordinated by the DEA in Malawi.
-

Table 2: Overview of Past Rural Electrification and Clean Energy Initiatives

Initiative	Technology/Resource	Financing/Implementation	Management
EU-Practical Action	Hydro mini-grids	€ 1.6 million PA, MEGA, MMCT, MuREA	PA, MEGA/ ACP-EU PDF
BARREM	Solar Photovoltaics	$ 3.3 million; Private sector and public institutions	PMO/ DEA/ UNDP
REP	Renewable Energy	$ 0.5 million; Through DEA	DEA/UNDP

2.4 MINI GRIDS AND MALAWI

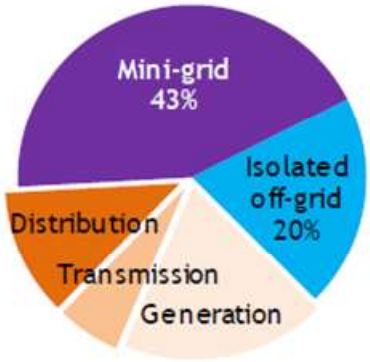
Decentralised grids – small, mini and micro[41] grids are prevalent over the world and the larger national grids of today have grown out of such decentralised grids. Clean energy driven decentralised grids, especially mini-grids powered by hydro are also widely deployed in Asia, Latin America and Africa. Mini-grids have also been used for decades by agro-processing enterprises like tea estates and associated factories. Diesel powered mini and micro-grids are still used around the world to power rural and remote communities. With decreases in costs and improvements in technology and with a rethinking of the rural electrification, clean energy mini-grids are receiving renewed policy and programming attention. Renewable energy based

[40] MEGA, Mulanje Electricity Generation Agency: Brochure

[41] The terms mini and micro and sometimes small grids have been used interchangeably to mean decentralised grids. One approach is to adopt the classifications for hydro p3ower which powers a significant share of decentralised grids. For hydro powered decentralised grids, when the power generation capacity is less than 100 kW, it is classified as micro, between 100 kW and 1000 kW as mini and over 1 MW as small. The decentralised grids envisaged under the project will involve hydro generation of less than 100 kW, hence the term micro-grids have been used.

grids powered by solar, wind and hybrid systems also proliferated across the developing world. The International Energy Agency (IEA) in its 2011, World Energy Outlook (WEO) projected that mini-grids are likely to make the largest contribution to providing universal electricity access to all in 2030. This is illustrated in Fig 6 below:

Fig 6: Electrification Options for Universal Electricity Access by 2030



(Source: IEA)

Mini-grid based electrification programmes are making a strong comeback globally. In Asia and Africa solar mini-grids in the range of Mega-Watts to Watts are playing a role in Rural Electrification. In late 2012 the Zambia Electricity Supply Corporation (ZESCO) commissioned a 1 MW mini-grid at Shiwa N'Gandu with GEF funding and companies like MeraGaoPower[42] are building solar micro-grids in India for $ 1,000 a piece providing electricity at $ 1.6/month to rural households. China is currently the leader in clean energy mini-grids with over 1,000 mini-grids powered by solar, hydro and hybrids. India has over 500 solar, biomass and hydro mini-grids with government and private ownership[43] models. Nepal has over 300 hydro powered mini-grids facilitated by UNDP and mostly operated by village communities and the private sector. In Africa, there are large numbers of diesel mini-grids in countries like Kenya, Mali, Senegal etc. and countries like Zimbabwe have about 400 solar and hydro mini-grids. The use of renewable energy in mini-grids also offers a low-carbon opportunity providing global Greenhouse Gas (GHG) emission reductions. At the policy level, work is being done to support national policy and regulation on mini-grids. The European Union Energy Initiative's Project Development Facility (EUEI-PDF) has supported two projects that deal with mini-grid development in Africa. The first project coordinated by Regional Electricity Regulators Association of Southern Africa (RERA) has developed policy and regulatory tools relevant to mini-grids in the Southern African region[44]. The second project coordinated by Renewable Energy Policy Network for the 21st Century (REN21) is in the final stage of developing a mini-grid policy toolkit relevant to Africa.

Malawi has had a long history of mini grids over the last 40 years (since the early 1970s). These have involved fossil fuel powered as well as renewable energy powered mini-grids with

[42] http://meragaopower.com/
[43] Companies like Husk Power, MeraGaoPower, OMC Power and Desi Power operate biomass and solar mini-grids
[44] More details at http://www.euei-pdf.org/regional-studies/supportive-framework-conditions-for-green-mini-grids

different management arrangements. These different energy technologies and management arrangements in Malawi are explained below:

- **Diesel mini-grids** have been in use at Lilongwe, Mzuzu and Chitipa since 1972, 1980 and 1988 respectively. The diesel powered grids at Lilongwe and Chitipa have subsequently been connected to the national grid and the diesel generators decommissioned. The only functional diesel generator is the one at Mzuzu rated at 1.1 MW which was installed in 1980. There are currently two diesel mini-grids that are operating in Malawi - a 750 kW diesel mini-grid at Likoma islands and a 300 kW diesel grid at Chizumulu islands. All the diesel decentralised grids have been owned and operated by ESCOM and the electricity consumers have paid ESCOM's regulated national electricity tariffs. An analysis by the Reiner Lemoine Institut (RLI) shows that switching from diesel powered mini-grids to PV-diesel hybrids with battery storage in Malawi can reduce an equivalent of 65 Kwacha/kWh in fuel and operating costs[45].

- **Wind-Solar Hybrid** mini-grids have been promoted by DEA in 6 locations in Malawi at Mzimba and Nkhata-Bay in the north; Nkhota-Kota and Ntcheu in central region and Chiradzulu and Thyolo in the south. All systems served 150 households on an average and had a standardised specification of 21 kW of generation capacity with 13.1 kW Wind Electricity Generators (WEG) and 7 kWp Photovoltaic (PV) generators. Village level committees were established by DEA to manage these hybrid mini-grids with an initial period of support provided by the supplier. The tariff collections have not been regular and 5 out of 6 systems[46] have failed at the stage of major repair or battery replacement as the revenue collected was insufficient for repairs/replacement. While the technology choice was considered appropriate, the management, revenue and financial model and the service arrangements seem to have resulted in the system failures.

- **Hydro** mini-grids have been used in Malawi by tea estates and religious missions to power their own infrastructure. The mini and micro hydro potential in the country is concentrated in the north close to the Tanzanian border and in the Mount Mulanje region in the South. JICA carried out a survey in 2002 in Malawi and identified 11 sites in the districts of Chitipa, Rumphi, Nkhata Bay, Mangochi and Thyolo totalling 345 kW. However none of these were subsequently developed for rural electrification. There are two mini-hydro power plants of 319 kW and 650 kW in the Mount Mulanje area owned by the Lujeri tea estate which have been in operation for over 70 years. There was a hydro mini-grid at Matandani Adventist Mission in Neno district which is currently defunct. The mini-grid of 88 kW in the Lichenya River by MEGA is the only one currently operating as a rural electrification mini-grid.

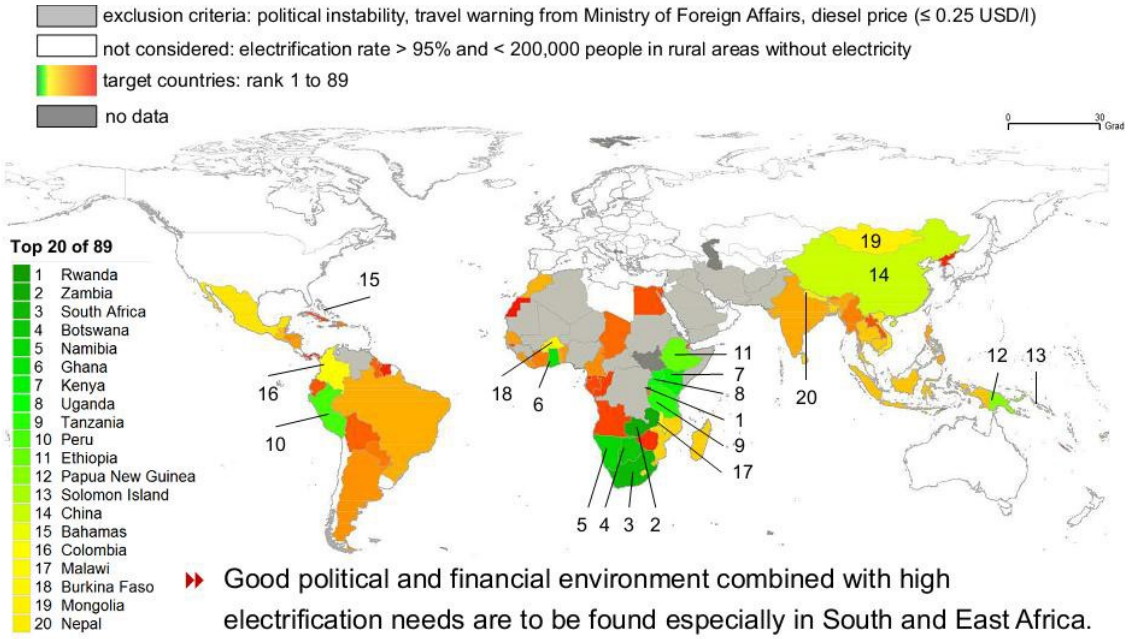
A study by RLI assessing the global potential for PV mini-grids placed Malawi at 17 globally among 89 countries assessed as illustrated in Fig 7. It can be construed from the analysis that the economics of other renewable energy technologies such as hydro, biomass, wind

[45] Cader, C et al, 2013, High-resolution global cost advantages of stand-alone small-scale hybrid PV-battery-diesel systems

[46] The lone working system at Chiradzulu has been installed relatively recently

and hybrid systems will be comparable to if not better than the solar mini-grid potential in Malawi.

Fig 7: Global Potential for Photovoltaic Mini-grids



(Source: RLI)

2.5 LESSONS FROM EXISTING EXPERIENCE

After over forty years of experience in decentralised grids, rural electrification and clean energy programmes in Malawi, 96% of the rural households still do not have access to electricity. Some of the key lessons that can be drawn from the existing experience in Malawi are:

- The establishment of the REF as a sustainable financing mechanism, the MAREP programme and regulatory oversight of MERA have been positive developments for rural electrification in Malawi in the past decade.

- While the rate of rural electrification has increased in the recent decade after the DEA has taken over rural electrification programmes, at the current electrification rate it is unlikely that the government target of 30% electrification by 2030 will be achieved under a BAU scenario;

- Almost all of the government/REF and development assistance led efforts and resources in rural electrification focuses on rural electrification by grid extension. Alternate approaches involving decentralised grids and off-grid options have received relatively insignificant policy attention and resources;

- The role of private sector enterprises have not been utilised in any significant level in rural electrification and the power sector in general. However there are efforts and MAREP is beginning to engage with the private sector with positive results;he

finance and banking sectors participation in rural electrification and clean energy developments has been very limited, due to the local financial market conditions[47]. The involvement of local financial markets is considered important to private sector participation and financial leverage.

- A number of internationally funded initiatives by international and national NGOs are active in the rural electrification space making relatively small but important contributions. It would be possible to increase the sustainability and impact of these initiatives through better coordination among the initiatives themselves and capacity building with local community, local body and local institutions;

- ESCOM remains the only institutional player for rural electrification and the rate of rural electrification suffers due to reliance on a single dominant public sector agency. ESCOM's own institutional constrains, cost structures as well as lack of financial attractiveness of rural markets all result in priority being placed on generation investments than rural grid extensions.

- Increasingly NGO and private initiatives are offering alternatives to traditional grid-extension by public utilities by way of decentralised electricity grids and portable solar lighting systems. These approaches if implemented properly can offer cost savings to un-electrified Malawians with associated positive environmental and social benefits;

- The current rural electrification policy and regulatory and financing framework only recognises grid-extensions and solar home systems as rural electrification options. There is an opportunity to expand this scope to other technology and electricity delivery options;

- The regulatory framework in the country has been evolving to integrate clean energy and private sector participation through development of a Feed-in-Tariff (FiT) scheme and schemes for private sector participation. This offers a good opportunity for extension into rural electrification through mini-grids;

- The DEA through the SEM project is planning to build clean energy capacity at the district levels and decentralise its policy making and implementation functions which are highly centralised currently. This would be a good opportunity to build capacity for rural electrification and mini-grids at the local body level;

- In spite of good examples[48], the current electrification framework and programmes in general does not explicitly recognise the gender aspects and do not target women as beneficiaries or change agents. There is an opportunity in future rural electrification programmes to recognise the role of gender and ensure participation of women.

- The failure of the DEA supported wind-solar hybrid mini-grids point to absence of a professional system operator with the right business model & skills and implementation of a tariff regime which covers both operation, maintenance and replacement costs.

[47] High interest rates, short loan periods and stringent collateral requirements.
[48] Such as Malawian women solar engineers trained by Barefoot college in India

- In the DEA supported mini-grids and MEGA the opportunities to use energy for productive use[49] and public services[50] should be better explored. This will result in better utilisation of the power plants and improved financial viability.

- The use of renewable energy based mini-grids in Malawi will displace significant amounts of kerosene and diesel being used in rural areas for lighting and mechanical power. This will result in local benefits as well as global GHG mitigation benefits while providing development benefits due to electrification.

- The MEGA operated hydro mini-grid in Mulanje offers a good model to be considered as an alternative to current rural electrification options. MEGA offers a professional electricity service operation and proposes tariffs that are designed to ensure sustained operation of the utility while providing benefits and financial savings to users.

The existing experience and past and current rural electrification, renewable energy and mini-grid initiatives and their lessons learned provide an opportunity to develop a new, improved and sustainable mini-grid based electrification project for Malawi with UNDP/GEF funding. Such a project can build on the strengths of the existing experience at MEGA while addressing and learning from the limitations of MEGA and other past mini-grid rural electrification efforts to operate as effective and sustainable mini-grid operators to electrify rural Malawi. The project also offers the opportunity to consider and adapt relevant best practices on clean energy mini-grids from around the world, particularly from Sub-Saharan Africa.

3.0 PROJECT STRATEGY

3.1 PROBLEM STATEMENT

The central problem that the project envisages addressing is the abject energy poverty whereby 91% of the population and 96% of the rural population does not have electricity access. The government's efforts in extending the national grid through MAREP and efforts by private sector, NGOs and international development partners to provide portable solar lighting systems and Solar Home and kiosk systems will not be enough to meet the government target of 30% electricity coverage in the next 17 years by 2030. Clean energy mini-grids operating on similar principles established by MEGA could provide an additional potent option to supplement the current 'on-grid' and 'off-grid' efforts to achieve and exceed electrification targets with added global benefits of GHG mitigation by displacing kerosene and diesel. However, institutional capacity, financing and business, awareness and policy and regulatory barriers severely constrain the role that Clean Energy Mini-grids (CEM) are currently able to play in rural electrification of Malawi.

3.2 BARRIERS

The major barriers to Clean Energy Mini-grids making a more significant contribution to rural electrification in Malawi are related to policy and regulation issues; and institutional capacity, information and business and finance constraints. The mains barriers are explained below.

[49] Uses such as agro-processing, rural commerce and industrial applications etc.
[50] Use by schools, hospitals, police stations, places of worship etc.

BARRIER 1: POLICY & REGULATION

The current rural electrification act considers only two technology options – grid extension and solar home systems or on-grid and off-grid options and does not include Clean Energy Mini-grids as an option. The REF financing is also limited to these two rural electrification options. At present rural electrification investments by MAREP had centred on ESCOM and were not open to NGO and private entities. This practice has changed in the MAREP phase 7 to allow private participation in infrastructure delivery but not as it applies to mini-grids. This has meant that entities such as MEGA and others haven't been able to offer Clean Energy Mini-grids as electrification options under MAREP vis-à-vis the on-grid and off-grid options. Such a possibility would allow full or partial funding for the mini-grid infrastructure through REF. According to the Energy Regulation Act, Clean Energy Mini-grid operators need to obtain a licence for generation and distribution and while MERA tries to take a progressive approach to licencing mini-grids, the regulatory framework treats mini-grids irrespective of the scale in a manner similar to large national grid operators. Several countries such as neighbouring Tanzania have simplified regulatory framework for mini-grids below 1 MW. A simplified regulatory framework and licencing process for mini-grids will allow more private entities to work with the government on a Public-Private-Partnership (PPP) mode augmenting other parallel on-grid and off-grid efforts.

BARRIER 2: INSTITUTIONAL CAPACITY AND INFORMATION

There exists some institutional capacity at the national level in Malawi for energy policy regulation and policy implementation relating to rural electrification. However at the district, area and village level where rural electrification capacity is more relevant, the capacity is largely absent. The DECs, ADCs and VDCs do not have an understanding and awareness of Clean Energy Mini-grids and rural electrification options. Capacity building at the district level for DECs as well as the ADCs and VDCs on issues relating to mini-grid based rural electrification - technologies, costs, business and ownership models, maintenance and replacement, tariffs etc. – is urgently needed. Such capacity at the district, area and village level could result in a bottom-up process of identification of Clean Energy Mini-grid opportunities and better community ownership and management of Clean Energy Mini-grids. In addition to the district and village level capacity building, there is also a need to build capacity and create awareness at DEA and MERA about best practices in Clean Energy Mini-grid policy, regulation, technology, business and ownership models. There is also a lack of centrally available information about the electrification status of Malawi and mini-grid opportunities, including current grid infrastructure; location of population, industrial and trading centres; location of local energy resources; and location of current off-grid and mini-grid electrification projects. Such an informational database with a corresponding Geographical Information System (GIS) will be very valuable for policy makers and developers and will facilitate the development of more Clean Energy Mini-grids. CONREMA has started to create and maintain an information database of all off-grid and mini-grid projects which could be built upon.

BARRIER 3: BUSINESS AND FINANCE

A major challenge to Clean Energy Mini-grids is the mobilisation of the initial investment capital for the mini-grid generation and distribution system. MEGA has relied on development assistance funds for the initial capital investments thus far. The current financial market

conditions where debt interest rates are more than 30%[51], short-term of loans and collateral requirements mean that it is not viable presently to use commercial finance for Clean Energy Mini-grid developments. Analyses of the business case of MEGA by BiF showed that even with electricity tariffs at twice the levels of ESCOM tariffs, un-electrified rural households make significant savings[52] on their baseline energy expenditure from mini-grids compared to BAU alternatives. This demonstrates that if there is a mechanism to provide investment capital as a grant or with an interest subsidy[53], more Clean Energy Mini-grids could be developed in Malawi by the private sector and NGOs with viable business models and offering lower-cost, reliable and cleaner electricity to rural customers. Another challenge is to increase the utilisation of the energy generated by Clean Energy Mini-grids and establish tariff and collection mechanisms to operate the business in a rural context. The current business model being implemented by MEGA mainly target the rural households[54] and use business instruments like pre-paid metering, fee-for-service[55], and post-paid metering[56]. There may be opportunities to improve the business prospects by increasing the share of higher-tariff paying public service customers and focusing more on enterprise and productive use (as well as using mobile telephony linked payment services) to reduce transaction costs and improve collections.

3.3 INCREMENTAL REASONING

3.3.1 GLOBAL ENVIRONMENTAL BENEFITS

The baseline consists of rural un-electrified areas where households currently use kerosene lamps for lighting their homes. Commercial activities such as agro-processing – shops which de-husk and grind maize and other agro-produce – is typically done by operating small diesel generators. Many public service establishments like hospitals and schools also use diesel generators for electricity. The Business Plan prepared by BiF based on the baseline energy use study in Mulanje carried out by MEGA and MuREA show that 59% of the electricity sales will be to households and 41% of electricity sales to commercial and public service institutions. Therefore the baseline for the project (in the absence of national data) is assumed to consist of 59% kerosene for lighting use and 41% of diesel generator use.

In the GEF alternative, i.e. the project scenario, the households, productive uses and public services in the villages are provided electricity from renewable energy through the clean energy mini-grids. For the Component 1 (see next section) the electricity will be from a micro-hydro powered min-grid and for the Component 2 (also see next section) the electricity is assumed to come from a wind-solar hybrid system. The life time direct emission reductions have been calculated taking standard assumptions on Plant Load Factor (PLF) and lifetime of hydro mini-grids and wind-solar hybrid systems and by converting the energy generation to emission reductions using default emission factors for kerosene lamps and diesel generators. It is assumed that all the electricity generated will be consumed due to significant levels of suppressed demand existing in rural areas of Malawi. The key assumptions are given in table 3 below:

[51] 32.5%/Year as on 14th July 2014
[52] MEGA, 2013, Draft Business Plan shows that the proposed tariff of 40 Kwatcha/kWh is 17 times cheaper than using kerosene
[53] Where the interest Component of a term loan is reduced through a subsidy.
[54] The current MEGA business plan for Bondo targets 59% electricity sales to households, 40% electricity sales to businesses and 1% electricity sales to public services.
[55] For battery charging for consumers not served by distribution grid
[56] For larger commercial customers

Table 3: Key Assumptions for Emission Reduction Estimates

Parameter	Value
Specific Kerosene Consumption	0.40625 litres/kWh[57]
Specific Diesel Consumption	0.33 litres/kWh[58]
Emission factor for Kerosene energy conversion	2.01 kgCO_2e/litre[59]
Emission Factor for Diesel energy conversion	1.40 kgCO_2e/litre[60]
Share of electricity generation displacing diesel and used by businesses, schools, hospitals etc.	41%[61]
Share of electricity generation displacing kerosene and used by households	59%[62]

The total lifetime direct emissions avoided as a result of the proposed GEF project Components are 16,203 tCO_2e. The details of the calculations are shown at Annex 2. However the technical assistance support provided by the GEF project will also enable MEGA to install 2 additional hydro powered mini-grids[63] over the project period taking the total hydro power generation capacity added during the project period to 216 kW[64] for which the total lifetime electricity generation is 25,544 MWh. This will increase the total lifetime direct emissions avoided as a result of both the investment and technical assistance outputs of the project to 33,183 tCO_2e. The relatively low levels of emissions avoided through the direct emissions is consistent with international experience where rural areas of developing countries have low levels of energy usage constrained by low levels of economic activity and limited opportunities to use the electricity beyond lighting, communication and radios. The direct post-project emission reductions are not relevant to the project as the project will not establish a funding mechanism or finance facility which will continue to operate after the project period.

Under a customized bottom-up approach, the MEGA business plan envisages implementation of 10 micro-hydro powered mini-grids over the next 10 years (as noted above 3 MHPPs are targeted for commissioning by 2018/2019). Similarly it is also assumed that the DEA will fund and implement at least 10 wind-PV hybrid mini-grids over the ten years beyond project completion. Under Component #3 it is envisaged that mini-grids will be established as a rural electrification option under MAREP and receive subsequent funding through REF. It is assumed that under the REF at least 10 micro-hydro and 10 wind-PV hybrid powered mini-grids will be supported by MAREP in the 10 years beyond project completion (with REF funding). It is important to note that the energy dossier of DEA envisages establishment of 50 MW of

[57] Based on the baseline surveys carried out in Mulanje by MEGA and the basis for MEGA Business Plan in 2013
[58] Cader, C et al, 2013, High-resolution global cost advantages of stand-alone small-scale hybrid PV-battery-diesel systems
[59] UNFCCC, Small-scale CDM Methodology 1F : Renewable Electricity Generation for Captive Use and mini-grid
[60] IPCC Default Emission Factor
[61] Based on the baseline surveys carried out in Mulanje by MEGA and the basis for MEGA Business Plan in 2013
[62] Based on the baseline surveys carried out in Mulanje by MEGA and the basis for MEGA Business Plan in 2013
[63] Lower Bondo, Upper Bondo and Lujeri
[64] Including the 80 kW Lujeri micro-hydro power plant.

mini/micro hydro power plants and 25 MW of wind/PV hybrid systems in the medium term and so these assumptions are conservative given that they constitute only a fraction of these targets and the energy needed to meet the country's SE4All targets. Based on these assumptions the total lifetime indirect emissions avoided (as a result of the envisioned 40 Clean Energy Mini-Grids that will be replicated within ten years after the end of the project) are 324,069 tCO2e which working backwards translates into a replication factor (RF) of 9.77.

Similarly a top-down approach can be used to estimate total lifetime indirect emissions avoided. In this approach it is assumed conservatively that 10% of the un-electrified rural households in Malawi will be electrified through clean energy mini-grids in the ten years following project completion. This will result in deployment of an estimated 914 mini-grids with 777 of these powered through wind and solar and 137 powered by hydro. This will contribute to the Government of Malawi's commitment to the SE4All target of increasing energy access to 30% of the population from the current 9% energy access rate and increasing the national renewable energy share to 6% from the 0.2% currently. The total life time indirect emissions as a result of this scenario would be 6,198,374 tCO2e. Applying a highly conservative GEF causality factor (CF) of 20% (weak), reduced emission reductions of 1,239,675 tCO2e can be indirectly attributed to GEF funding. The details of these calculations are also shown at Annex 2 of the Project Document. The details of these calculations are also shown at Annex 2.

Therefore the project's direct lifetime emission reductions through clean energy mini-grids through the investment and technical assistance Components will be 33,183.84 tCO2e. With a GEF contribution of $ 1,725,000, the unit abatement cost that will be achieved by the project will be 51.98 US$/$tCO_2e$. While this abatement cost may appear high this is consistent with the low levels of non-cooking energy use and limited level of economic activities in un-electrified areas in developing countries, which are reflected in the energy use and the emission reduction estimates. The abatement costs are higher than what was estimated at the PIF stage.

However the real impact of the project will be through its indirect replication and scale-up effects where by clean energy mini-grid developments will continue after the project completion and will be scaled up through financing from the REF. The lifetime emission reductions for these indirect impacts have been estimated through a bottom-up approach which totals to 324,069 tCO2e. For a GEF Grant of $ 1,725,000, this represents a GHG abatement cost of $ 5.32/ tCO2e. Similarly the total indirectlifetime GHG emissions avoided indirect estimated through a top-down approach through GEF funding totals to 1,239,675 tCO2e. For a GEF Grant of $ 1,725,000, this represents a GHG abatement cost of $ 1.39/ tCO2e. Therefore the GHG abatement costs are in the range of $1.39 - $5.32 per tCO2e. Table 4 below gives details of the GHG emissions avoided and more details available at annex 2

Table 4: Estimation of Lifetime Direct and Indirect Emissions Avoided

Parameter	Value
Direct lifetime emissions avoided due to project outputs 2015-18	
Lifetime Electricity Generation from a micro-hydro powered mini-grid	9,460 MWh
Lifetime Electricity Generation from a wind-PV hybrid powered mini-grid	5,886 MWh[65]
Lifetime Electricity Generation from 3 additional micro-hydro powered mini-grids	17,265 MWh
Diesel savings due to replacement of diesel generator use due to	2,076,519 litres

[65] The share of wind electricity is 2,649 MWh and the share of solar electricity is 3,237 MWh

Parameter	Value
both mini-grids	
Kerosene savings due to replacement of kerosene lamps due to both mini-grids	3,678,608 litres
Lifetime Emission Reductions due to replacement of diesel generator use due to both mini-grids	8,809 tCO_2e
Lifetime Emission Reductions due to replacement of kerosene lamp use due to both mini-grids	7,394 tCO_2e
Lifetime electricity generation from all 3 MEGA micro-hydro powered mini-grids directly supported by the project (TA)	25,544 MWh
Total lifetime direct emissions avoided through project investment Components	16,203 tCO_2e
Total lifetime direct emissions avoided through project investment and technical assistance Components	**33,183 tCO_2e**
Lifetime Indirect emissions (bottom-up) avoided due to the project outputs during 2019-2028	
Lifetime Electricity Generation from 20 micro-hydro powered mini-grids	189,216 MWh
Lifetime Electricity Generation from 20 wind-PV hybrid powered mini-grids	117,734 MWh
Diesel savings due to replacement of diesel generator use due to all mini-grids	41,530,389 litres
Kerosene savings due to replacement of kerosene lamps use due to all mini-grids	73,572,174 litres
Lifetime Emission Reductions due to replacement of diesel generator use due to all mini-grids	176, 189 tCO_2e
Lifetime Emission Reductions due to replacement of kerosene lamp use due to all mini-grids	147,880 tCO_2e
Total lifetime indirect emissions avoided using the bottom-up approach	**324,069 tCO_2e**
Replication Factor (Implied)	**9.77**
Lifetime Indirect emissions (Top-Down) avoided due to the project outputs during 2019-2028	
Lifetime Electricity Generation from 137 micro-hydro powered mini-grids	1,297,180 MWh
Lifetime Electricity Generation from 777 wind-PV hybrid powered mini-grids	4,573,761 MWh
Diesel savings due to replacement of diesel generator use due to all mini-grids	794,338,393 litres
Kerosene savings due to replacement of kerosene lamps use due to all mini-grids	1,407,191,304 litres
Lifetime Emission Reductions due to replacement of diesel generator use due to all mini-grids	3,369,920 tCO_2e
Lifetime Emission Reductions due to replacement of kerosene lamp use due to all mini-grids	2,828,454 tCO_2e
Total lifetime indirect emissions avoided using the Top-down approach	6,198,374 tCO_2e
Final estimate of lifetime indirect emissions avoided using the top-down approach after applying a GEF Causality factor of 0.2	**1,239,675 tCO_2e**

However it is impossible to analyze the cost-effectiveness of this project on the basis of unit abatement cost alone. Malawi is one of the poorest countries in the world, with a headcount poverty incidence rate of 50% and a ranking of 170 out of 187 countries in the latest United Nations Human Development Index (an estimated GNI per capita of US$280). It is one of the least electrified countries in the SADC region, with an average per capita consumption of 85 kWh per annum – among the lowest in the world. Provision of sufficient, reliable and clean energy in Malawi is a critical challenge, as recognized by the Government which has put energy as a focus area in both the Malawi Growth and Development Strategy II (MDGS 2011 - 2016) and the Economic Recovery Plan (2012). The demand for electricity by far exceeds the installed capacity and new generation capacity is urgently needed, with the government focused on promoting diversified sources and utilization of the country's abundant renewable energy resources – particularly micro-hydro and solar. Under SE4A the government has committed to ambitious 2015/202 targets for increasing energy access and renewable energy supply.

Meanwhile according to the International Energy Agency (IEA) World Energy Outlook 2011, over 40% of all installed capacity to achieve universal access to electricity by 2030 (almost 400TWh) will be most economically delivered through mini-grids. Given the more remote locations of many of the communities that will be served in this way, and the cost reductions in renewable energy technologies, this objective can be met entirely with clean energy mini-grids. However despite advances in technology and cost reductions, the pace at which clean energy mini-grids are being developed and financed remains off track to achieve the 2030 target.

Africa remains the region with the lowest ratio of small- and micro-hydro deployment-to-potential, and the opportunities for growth – in Malawi and elsewhere – are very large. Micro-hydro schemes are extremely flexible in that they can provide power for industrial, agricultural and domestic uses through direct mechanical power or by the coupling of the turbine to a generator to produce electricity. Because micro- hydro systems are simple, scalable, reasonably reliable and relatively low cost compared to alternatives, they provide a source of cheap, independent and continuous power without the need for major environmental safeguards. At the same time renewable and hybrid energy mini-grids hold significant potential for the African energy sector; not only for increasing energy access, but also by enabling the increased use of renewable energy and mitigating climate change in the continent, with associated benefits for local employment and economic development as already described. Over the last few decades, there has been a growing realization in developing countries that micro-hydro schemes and mini-grids are particularly effective for remote rural areas, especially mountainous ones. The best geographical areas for exploiting micro-scale hydro power are those areas where there are steep rivers flowing all year round, and Malawi's Mulanje region (the focal area of Component #1) certainly falls into that category. Moreover as noted the annual average insolation levels are in the range of 5.21 to 5.79 kWh/m2/year which is relatively high, and for wind energy systems there are quite a good number of areas in the country with mean wind speeds above 5 meters per second for the majority of the year. Since ESCOM's financial resources are scarce, the government has recognized that investments for new generation (both on-grid and off-grid) can only be leveraged by involving the private sector, community organizations and social enterprises. At present most of the government/REF and major development assistance-led efforts and resources in rural electrification focuses on rural electrification by grid extension. Alternate approaches involving decentralized grids and off-grid options have received relatively insignificant policy attention and resources. As such the models promoted under this project are critically important to catalyze Malawi meeting its SE4A goals and represent a highly cost-effective way of meeting those targets with major positive spillover impacts as regards job creation and energy savings.

Similarly GEF support for building the capacity of government, private sector and community stakeholders to develop and plan decentralized energy projects across the country in a systematic fashion is key to sustaining these efforts over the long term and therefore represents a cost-effective investment in helping Malawi achieve its long-term energy targets in a low-carbon fashion.

3.3.2 NATIONAL LEVEL BENEFITS

The project will result in direct and indirect benefits at the national level. The implementation of the GEF funded outputs will result in direct savings of 2.07 million litres of diesel and 3.67 million litres of kerosene providing direct benefits to the economy as Malawi imports all its petroleum fuels. As a result of envisaged replication of the GEF project efforts by MEGA, DEA and MAREP there is also likely to be increased levels of Clean Energy Mini-grid activity beyond the project period till late 2020s. It is estimated that activities at this increased scale will result in additional savings of 41.53 million litres of diesel and 73.57 million litres of kerosene in the bottom-up indirect impacts scenario and possible additional savings of 794 million litres of diesel and 1.4 billion litres of kerosene in the top-down impacts scenario. In addition, there will be national level socio-economic benefits as individuals will receive capacity building and the deployment of Clean Energy Mini-grids will create employment opportunities in the renewable energy and rural electrification sector. The direct employment generated as a result of project activities will be 27 people and offices when fully functional. Therefore the total direct employment created by the project activities is estimated to be 27[66] but a number of indirect job opportunities will be catalysed by the project due to social and economic activities to be powered by the project such as agro-processing, shops, schools and hospitals. The employment generated as a result of replication and indirect effects of the project are in the range of 200 to 4570 people by year 2028[67].

3.3.3 SUB-NATIONAL LEVEL BENEFITS

It should be noted that in the context of a country such as Malawi – one of the least electrified countries in the world with an average per capita consumption of 111kWh per annum – the attainment of local benefits (i.e. expanded energy access and productive uses) is fully compatible with (and in fact cannot be divorced from) the attainment of global environmental benefits such as a shift to cleaner energy sources and the resulting emission reductions.

The project aims to deliver significant benefits at the local level. The capacity building activities will create capacity at the district, area and village levels for rural electrification and renewable energy planning and implementation and operation of clean energy mini-grids. The capacity building activities will directly benefit at least 300 people with women representing at least 30% of the people trained; thousands more people will be indirectly capacitated and or benefit via project activities under Components 1 and 2. The areas and villages serviced by the mini-grids households will save considerable amount of their disposable income which would otherwise have been spend on purchasing kerosene or diesel for energy use. Although the energy provided by MEGA is priced at a premium to ESCOM, studies have shown that the current MEGA tariff is 17 times cheaper than the cost of fossil-fuel based energy paid by the customer in the rural economy under a BAU scenario and thus offers an excellent value proposition to rural households. Additional savings will also be made through avoided investments in grid network expansion by ESCOM financed through REF.

Based on the baseline energy use surveys carried out in Mulanje by MEGA it was found that the average savings for each household per year in the MEGA mini-grid network will be US$ 65.6/year

[66] Direct employment of 5 people at each of the three mini-grids and 12 people employed by MEGA.
[67] Based on employment figures contained in the MEGA business plan and projected for all mini-grids

and based on the projected customer base in 2018 of 4,520 households the aggregate annual household energy savings would be US$296,560. Using those same assumptions and assuming service coverage of 850 households, the mini-grids implemented under Component 2 will result in aggregate yearly annual household energy savings of $55,711. There will also be improvements from clean energy use in targeted areas such as educational benefits to children; better cooking conditions; and elimination of burns and health hazards due to kerosene combustion. There will be direct benefits to women from clean energy for productive uses given that women in the target areas are often directly responsible for manually de-husking and grinding agricultural produce. With the establishment of electric mills, women will benefit as regards time savings and time previously spend on manual processing can be utilized for other activities. There will also be direct and indirect jobs created in rural areas by the clean energy mini-grids. The direct operations-related jobs for each MEGA MHPP and mini-grid site is relatively small and estimated at 5 people per MHPP[68]. However these are just a fraction of the jobs created by the project; thousands of jobs will be created as a direct result of the project from civil works and installation of the technologies and establishment of the mini-grid networks (including reticulation of the areas connected to the grids. Additional jobs will be created for the installers and maintenance personnel connected to the operation and maintenance of the technologies. Thousands of indirect job opportunities will be catalysed by the project due to increased economic activities facilitated by the mini-grids in areas such agro-processing. The employment generated as a result of replication and indirect effects of the MEGA investments alone are estimated in the range of 200 to 4,570 people each year by 2018[69].

3.4 LINKAGES AND COORDINATION

The proposed project will build on the lessons from past GEF financed and other relevant projects. The proposed project will also ensure coordination and synergies with all relevant ongoing GEF financed and other relevant projects. The project will collaborate with all the ongoing projects listed in the baseline section and in particular with MAREP, the Scottish Governments M-REAP, MCC's PSRP, Word Bank's PSRP and UNDP's SEM. Exchange of information and sharing of lessons will also be made with the BiF Phase II project on portable solar lighting, EU/PA project of SE4RC and the EU/COOPI project on rural energy access. The proposed project design has drawn lessons from the GEF financed BARREM project which was completed and the Component 1 (see next section) of the proposed project builds on the EU-PA project on micro-hydro mini-grids.

In addition to the collaboration with the baseline projects as above, the proposed project will also ensure synergies with the following projects that are not included in the baseline. The opportunities for such linkages and coordination is as follows:

- UNDP/GEF LDCF Project – *strengthening climate information and early warning systems in Africa for climate resilient development and adaptation to climate change- Malawi*. This GEF financed project will monitor climate change and gather information, including hydro-meteorological information to support for adaptation and planning in the energy and water sectors. The project will coordinate with the LDCF project to consider climate related hydrological risks to the micro-hydro powered mini-grid sites as well as energy meteorological risks to other clean energy mini-grid sites and to take risk management measures.

[68] 2 operators, 2 security personnel and 1 vendor.
[69] Based on employment figures contained in the MEGA business plan and projected for all mini-grids

- UNDP Private Sector Development (PSD) project aims at establishing productive partnerships between private sector organisations in Malawi. The main donors for the project are DfID and International Fund for Agricultural Development (IFAD). A key feature of the project is the Malawi Innovation Challenge Fund (MICF) which follows an open and transparent business plan competition for the private sector combined with coaching and support by professional fund managers. The project can learn from the processes of the MICF and collaborate with the PSD in carrying out the selection process for the Component 2 (see next section).

- UNDP/LDCF Project – *Climate proofing local development gains in rural and urban areas of Machinga and Mangochi districts – Malawi*. This project aims to secure the development and food security gains through empowering communities in two selected districts to integrate climate change risks into policies, plans and projects. If any of the mini-grid(s) within Component 2 (see next section) will be located in Machinga or Mangochi, the project will coordinate with the LDCF project to integrate risk management and adaptation elements to the mini-grid investment plans.

- UNDP/LDCF Project – *Implementing urgent adaptation priorities through strengthened decentralised and national development plans (ADAPT PLAN*). This project aims to establish and then demonstrate the institutional framework required to mainstream adaptation into development planning at national and local levels, beginning with 3 line ministries (Agriculture, Water and Forestry) and 3 case study districts (Nkhata Bay, Ntcheu and Zomba). The integration of climate change adaptation will be enabled by the establishment of adaptation indicators that will be used by the appropriate parties at local and national level to determine the level of finances to be allocated to planned activities, thereby incentivising active incorporation of adaptation and climate proofing and enabling implementation of Malawi Growth and Development Strategy –II (MGDSII). If any of the mini-grid(s) within Component 2 of the Project will be located in Nkhata Bay, Ntcheu or Zomba, the project will coordinate with the LDCF project to integrate adaptation elements into the mini-grid investment plans.

- African Development Bank (AfDB) Feasibility Study of the 100 MW Kholombidzo Hydro Electric Power plant is being carried out by AfDB consultants and aims to augment the electricity supply situation in Malawi and to consider water supply options to the city of Blantyre. The project will review the results of the feasibility study and the development of the hydro-electric power plant to consider possible risks through on-grid rural electrification to the proposed micro-hydro powered mini-grid in Mulanje.

- *UNDP Programme Support to National Climate Change Programme (NCCP)* aims to support GoM to climate-proof policies, strategies and plans in sectors that are vulnerable to climate change. The National Climate Change Investment Plan (NCCIP) has been prepared and has identified a number of priority adaptation and mitigation technologies for Malawi. There are investments planned in climate change mitigation technology transfer and mitigation technology development. The project can coordinate with these investment Components to explore technology transfer and technology development possibilities relating to energy conversion, control, distribution and metering technologies relating to mini-grids.

3.5 PROJECT OBJECTIVES

The project will have the following objective:

- To increase access to energy in selected remote, rural areas in Malawi by promoting innovative, community-based mini-grid applications in cooperation with the private sector and civil society.

The project will also contribute to achieving the national goals for energy access and renewable energy under SE4All and will also help the national climate change mitigation efforts by avoiding GHG emissions that would have otherwise occurred due to the use of kerosene and diesel in rural homes and rural establishments.

3.6 PROJECT COMPONENTS

The project will be implemented over the period 2015-2018 and will consist of the following three Components:

Component 1 - Expansion of the Mulanje Electricity Generation Agency (MEGA) Micro Hydro Power Plant (MHPP) and mini-grid scheme: This Component will directly support the implementation of a second 80 kWp micro-hydro powered mini-grid operated by MEGA at Namainja (the Lujeri Micro-hydro power plant - MHPP) and provide institutional support for the development of several other MEGA MHPPs bringing the installed capacity of their power production up to 216 kWp by end of project. This Component will also support the institutional capacity of MEGA to help establish it as a self-sustaining entity;

Component 2 - Replication of MEGA model via piloting of new mini-grid schemes in other areas of Malawi: This Component will initiate an open competitive-based mechanism (Request for Proposals – RfP) to select and support the establishment of Public-Private-Partnership (PPP) service delivery platforms for clean energy mini-grids with an emphasis on business models such as Build-Own-Operate (BOO). It is envisaged that Clean Energy Mini-grids with an installed capacity of at least 84 kWp will be supported.

Component 3 - Institutional strengthening and capacity building for promotion of decentralized mini-grid applications across the country: This Component will carry out training and capacity building at sub-national and national levels on Clean Energy Mini-grids and establish a national information clearing house to facilitate mini-grid based rural electrification. The Component will also make the policy and regulatory changes to mainstream Clean Energy Mini-grids into rural electrification activities and will also synthesise and show-case the lessons from the clean energy mini-grid based rural electrification experience in Malawi to develop a Toolkit for policy makers.

These Components are explained in detail in the next sections.

4.0 COMPONENT 1: EXPANSION OF THE MULANJE ELECTRICITY GENERATION AGENCY (MEGA) MICRO HYDRO POWER PLANT AND MINI-GRID SCHEME:

4.1 BASELINE SITUATION

MEGA has been established by MMCT with support from PA through the ACP-EU Energy Facility. MEGA has also received subsequent financing support from OFID and business planning support from DfID through BiF. PA continues to provide technical support to MEGA and both partners together and in partnership with Sgurr Energy has submitted a proposal to the SG Climate Justice Fund to support a micro-hydro powered mini-grid. Discussions are also on with OFID and with other donors for additional support. The MEGA approach is to use donor funding to finance the investment and operational costs of the initial 5 years up to 2018 when 5 Clean Energy Mini-grids would have been established. MEGA is projected to reach economies of scale in 2019 when it will make operational profits and will progressively improve its asset base to be able to at least partially meet the investment costs of new Clean Energy Mini-grids. Being a socially oriented company MEGA will not seek to maximise profits but will balance the pricing of its electricity tariffs between its social objective of offering low-cost electricity and being financially viable. For sustainability, it may be a challenge for MEGA to achieve both its social and financial objectives. MEGA needs to improve its operational efficiency by reducing development costs[70], improving the plant load factors (PLF)[71], developing and commissioning many more, larger mini-grids in order to spread and reduce over head costs as well as increase tariffs.

MEGA faces a number of challenges to accomplish this goal. It currently relies on MuREA and PA to provide technical services[72] and focuses on the operational management of the mini-grid. Institutional sustainability of MuREA is unclear and while PA remains committed to MEGA; MEGA will need to develop in-house capacity to do some initial evaluations and develop additional local partnerships with Malawian organisations that could provide technical services. The Bondo hydro-electric power plant was not functional for four months in 2014 and was finally repaired and components replaced under the supervision of MuREA and PA. Learning from this experience MEGA will procure a complete hydro-mechanical and electro-mechanical generation package from a single source[73] for the next project. MERA inspection of MEGA revealed minor safety issues to be addressed and an Environmental Management Plan (EMP) to be submitted for obtaining generation and distribution licencing. These issues are being resolved now and MEGA is expected to obtain its licence in October 2014. The current level of productive use of electricity is also at lower than expected levels[74] which are needed to ensure operational profits and MEGA has been seeking larger commercial users for the electricity such as mobile telephony service providers. While such challenges are normal in rural electrification and clean energy mini-grids globally, it is important that MEGA internalises the lessons from these initial setbacks and put in place processes to eliminate technical down-time and licencing delays and improve new business development.

4.2 IMPLEMENTATION

This Component will support MEGA by financing part-of the costs of the development of the 80 kW micro-hydro power plant on the Lujeri River in Mulanje to offer mini-grid based electricity

[70] The initial micro-hydro hydro powered mini-grid at Bondo had cost overruns of about 20% and time over-runs.
[71] MEGA business plan envisages a 70% PLF whereas 45% is considered to be feasible for micro-hydro based mini-grids. The GEF emission reduction calculations assume a 45% PLF.
[72] Site evaluations, feasibility investigation, design, engineering, procurement and supervision
[73] From a reputed supplier in Nepal who will be supervised by PA Nepal.
[74] However proposed tariff levels for commercial uses are higher than household tariffs.

to villages in Namainja. The GEF funding as investment will support part of the costs of the micro-hydro based mini-grid and the co-financing is expected to come from MEGA's own internal accruals or an expected funding from the Scottish Government's Malawi Funding Round (applications now under review). The GEF financing will be provided to MEGA[75] as a micro-capital grant for a non-credit activity[76]. In addition to the investment in the Clean Energy Mini-grid infrastructure, GEF will also provide Technical Assistance to strengthen its capacity in electrical system supervision and management, technical and financial management of pre-paid meters; development and implementation of a simplified billing and tariff collection system; identification, development and engagement of productive and commercial use opportunities as well as public service opportunities. MEGA will also catalogue and provide information on its operations and lessons to the project management to show-case MEGA and other mini-grid experience in Malawi as part of the case studies and toolkit to be developed by the project.

4.3 OUTPUTS

There are outputs which will be carried out to support the scale-up of MEGA and improve the sustainability of the MEGA social business model; and these are explained below:

- **Output 1: Commissioning of the Micro-hydro powered Mini-grid**: This output will involve co-financing of the Lujeri MHPP and the associated mini-grid distribution and metering system. The total costs of the mini-grid system is estimated to be $ 780,000[77] and GEF will provide investment co-finance up to $ 300,000 under a micro-capital grant agreement, representing 38% of the total costs. The co-finance is expected from the SG or from MEGA's internal accruals. This GEF investment is contingent on MEGA carrying out an EMP/EIA and obtaining the necessary generation and distribution licences from MERA. It is suggested that the GEF funding be utilised primarily on the supply side on the electricity distribution network and the metering infrastructure. The funding can also be used to carry out development of environmental management plan[78], obtaining licences from MERA and carrying out demand[79] development activities. The financing will be provided under a micro-capital grant agreement by the project, based on a proposal from MEGA containing the implementation plan, allocation of the grant, financial projections and co-financing details. It is suggested that the grant to MEGA be approved by the Project Steering Committee and thereafter funds disbursed under the micro-capital grant to MEGA on an agreed schedule. MEGA will report progress of implementation periodically through the project manager to the project steering committee.

- **Output 2: Operation and energy generation from the micro-hydro powered mini-grid:** The Lujeri micro-hydro system will use a 96 m head and 100 lps discharge to generate 80 kW electricity. The system will provide electricity to a

[75] MEGA is 100% owned by MMCT, a Malawian environmental endowment trust which has received GEF financing in the past.
[76] In compliance with UNDP Guidance on Micro-capital grants dated September 2012.
[77] Based on investigations and scoping from June 2014 submitted to SG and subsequent clarifications by MEGA in October 2014.
[78] In accordance with the Malawi Environmental Management Act of 1996, Environmental Impact Assessment Guidelines of 1997 and all relevant natural resources management policies and legislation.
[79] Identifying opportunities to use energy for productive applications – pre-harvest and post-harvest agricultural activities; commercial activities where use of electricity can drive productivity gains.

portion of the 3,480 households in the service area, 2 to 3 maize mills, around 5 shops, 2 primary schools and 1 clinic. According to MEGA's business plan, the tariffs would be three-tiered. The commercial users such as the shops, maize mills etc. will be offered a higher tariff of US Cents 19/5/kWh whereas the households would be offered a lower tariff of US Cents 9.4/kWh. MEGA's social business principles would be applied to shared community assets such as schools and public health centres which will be offered electricity at no cost. The tariff rates for the rural households and commercial users are considerably higher than those of the prevailing national utility (Electricity Supply Corporation of Malawi - ESCOM) which are US¢ 6/kWh and US¢ 11/kWh respectively[80]. ESCOM tariffs have a cross-subsidy and the domestic household users pay a much lower tariff compared to general commercial and industrial users. In general ESCOM tariffs are subsidized by the Government and only cover the utility's operational costs; investments in generation and electricity network infrastructure are generally supported by donors and rural electrification/grid extensions with support from the Rural Electrification Fund (REF). However even with these higher tariffs the households and the businesses that are un-electrified and will be MEGA clients will realize financial savings compared to the BAU scenario of using Kerosene and Diesel. Note – MEGA business plan assumes based on baseline energy use surveys conducted in Mulanje by MuREA that each household serviced by MEGA will save $65.61/year by switching to MEGA supplied electricity from kerosene use for non-cooking energy use.

- **Output 3: Institutional Support to MEGA**: This output will provide Technical Assistance (TA) to MEGA aimed at increasing its in-house skillsets by improving operational capabilities as a generation and grid system operator and to develop a strategy to be a sustainable social enterprise. The technical assistance will enable MEGA seek electrical engineering expertise to establish electrical engineering and operation and maintenance systems and also develop and seek finance and business management expertise to implement an innovative billing and tariff collection system linked to pre-pay metering. MEGA will also collect, catalogue and provide information on the electricity, business, environmental and social aspects of its operational experience to the Knowledge Management Output (refer to the next section) for development of the case studies and toolkit. MEGA will submit a proposal outlining the allocation of funds for various capacity building activities and upon approval by the project steering committee, disbursements will be made to MEGA according to an agreed schedule. MEGA will provide periodic reports about the implementation of the capacity building activities to the project steering committee.

- **Output 4: Strategies to improve business model viability**: MEGA will also develop and implement a strategy to increase its electricity utilisation by productive activities by: a)identifying existing opportunities for productivity increases in the agriculture, agro-processing, food-processing, commercial and industrial activities in the target villages; b)identifying new opportunities for agriculture, commercial and industrial activities where energy can be used; and c)identifying enterprises active in agriculture, commercial and industrial sectors beyond the areas of grid coverage to relocate to the MEGA service areas. MEGA will also review its current policy of providing free electricity to schools and hospitals and device an arrangement where efficient energy use is encouraged and cost of service is offset through available

[80] Based on prevailing tariffs published by ESCOM in April 2014

government budgets for these institutions for energy use. MEGA will also use the technical assistance funds to train its own staff and community members on O&M of the systems.

Component 1 under the Results Framework in the next section also gives further details such as targets and responsible parties. The detailed budgets and notes are also available in the section on total budget and work plan. The schedule of outputs and the key milestones are given in Annex 1.

4.4 INCREMENTAL REASONING

The direct INV support for MEGA to double its current installed capacity and improve the sustainability of its social business model offers an opportunity to 'incrementally' contribute to Malawi's first IPP and rural mini-grid operator. GEF financing will incrementally build off the baseline investments from Practical Action, MAREP, M-REAP/Scottish Government/International Development Fund Funding, DfID's BiF and UNDP's SEM project. The GEF TA funds will be combined with the investment funds to provide institutional capacity building and to help refine and improve the MEGA business model. The GEF financing will be important to realising MEGA's business plan by building on the management lessons from the Bondo experience and to put in place processes to improve technical performance, licencing and business development. The GEF investment is also important to ensure that the institutional capacity of MEGA is strengthened with technical/electrical and finance/business training of MEGA staff. GEF financing will also help in developing a tariff and revenue generation strategy that will balance the need for financial viability in line with MEGA's social commitments and orientation. The four outputs being supported by GEF are consistent with the ones specified in the approved PIF. The changes with the PIF relate to implementation of one larger 80 kW hydro powered mini-grid instead of two 40 kW hydro powered mini-grids at Fort Lister and Lilulezi. The output relating to showcasing and disseminating the national case study on MEGA has been moved to the knowledge management output under Component 3.

5.0 COMPONENT 2: REPLICATION OF MEGA MODEL VIA PILOTING OF NEW MINI-GRID SCHEMES IN OTHER AREAS OF MALAWI

5.1 BASELINE SITUATION

The experience in Malawi with Clean Energy Mini-grids have mainly been the DEA programme on Wind/PV hybrid mini-grids and the micro-hydro powered mini-grid development in Mulanje by MEGA. The DEA implemented Clean Energy Mini-grids have been unsuccessful due to shortcomings in the operational, business and revenue model. MEGA operates a scalable social business model which will be supported by the project. The micro-hydro based investment opportunities identified at the Project Identification Form (PIF) stage at Chitipa and Karonga districts have been investigated during the Project Preparation Grant (PPG) stage. The feasibility of decentralised micro-hydro powered mini-grids were investigated at 9 sites in these two districts and all 9 sites were either found to be already electrified by MAREP or in the process of MAREP electrification. Out of the 345 kW micro-hydro powered mini-grid potential

identified, there may still be possibilities in the Thyolo district adjacent to Mulanje[81]. As stated earlier Malawi has good solar energy resources with over 2,640 sunlight hours in a year with annual average insolation levels in the range of 5.21 to 5.79 kWh/m^2/year. Malawi also has reasonable wind energy resources with measured annual average wind speeds of 3.8 to 4.0 m/s and there are opportunities to hybridise Wind and Solar PV systems as demonstrated by DEA. The country also generates over 30 million m^3/year of biomass resources which could also be converted for electrical energy purposes. These non-hydro clean energy resources, especially solar and wind energy resources are widespread throughout the country. Clean Energy mini-grids using solar, wind, hydro and biomass and clean energy hybrid system options do have a significant potential to play a role in electrifying rural Malawi. However the challenges are not so much the technology or resource potential but operational arrangements, proper business models, ensuring productive uses and adequate cost-reflective tariff structures.

5.2 IMPLEMENTATION

Give that the planned sites in Karonga and Chitipa were not feasible, in consultation with the DEA and UNDP it was decided to carry out a competitive process of selecting private sector and NGOs active in the clean energy and rural electrification space in Malawi to establish and operate clean energy mini-grids. The effort will be implemented in a Build-Own-Operate (BOO) mode i.e. the private sector or NGO will own and operate the facility they have built; the GEF finance will be used to co-finance the investment costs while technical assistance funds will be used to support the mini-grid operators as a public private partnership (PPP). The implementation will be technology neutral – all renewable energy technologies will be eligible and could be implemented in any viable rural area in the country subject to meeting prescribed criteria (see below). There will be emphasis on income generation using electricity in rural areas through productive use including agriculture[82]. The technical assistance funds will also be available for assisting with Engineering Procurement and Construction (EPC) activities and EMPS/EIAs. TA funds can also support implementation of innovative business models including mobile telephony powered payment systems and energy kiosks[83].

5.3 OUTPUTS

The outputs that will be carried out to pilot new clean energy mini-grid(s) on a BOO mode using GEF financing are:

- **Output 1: Commissioning of pilot clean energy mini-grids:** This output will involve an open call for private and NGO agencies to build, own and operate clean energy mini-grids in rural Malawi. The RfP will be coordinated by the project manager with the oversight of DEA and UNDP and oversight of the independent mechanism established under Output 4. The proponents should have identified a location[84] and secured the community and the VDC, ADC and DC commitment to the project. The proposals should include the renewable energy resource assessment at the site; pre-feasibility assessment, business model and tariff proposals. Proposals that show sustainable

[81] According to MAREP which needs to be investigated
[82] DAPP has a 'farmers club' approach which organises farming communities around productive use and income generation which could be one of the models.
[83] Electricity for All have implemented an energy kiosks model which can also be integrated to mini-grid business models to increase the reach of the mini-grid and to improve the PLF and revenues.
[84] Which will not be electrified during MAREP Phase 8 and at a sufficient distance from existing and planned ESCOM network.

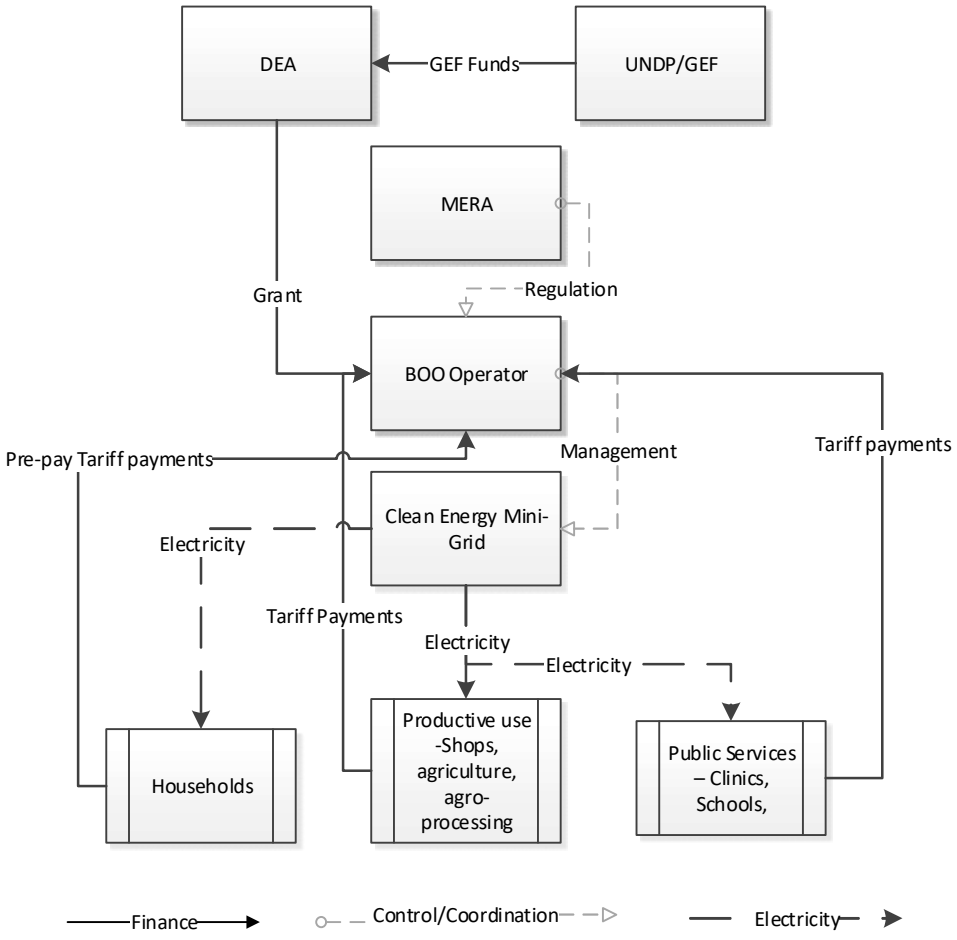
business models providing a major share of energy for productive applications will be preferred. Lessons from the experience of MEGA in development, tariff setting, pre-pay metering should be replicated for these mini-grids. All the mini-grid development proposals will be assessed by a team consisting of UNDP, DEA, MAREP, MERA, EAD, and independent external experts on finance, business, rural developments etc.[85]. A set of criteria and scoring systems will be announced during the Request for Proposals (RfP). The criteria will be: tariff to households[86]; share of energy for productive and public sector use[87]; viability of the business model[88]; amount of co-financing[89]; institutional capability[90] etc. As regards making sure potential applicants are aware of the RfP, engagement will be undertaken with CONREMA, the Cooperation Network for Renewable Energy in Malawi,[91] to make sure that their members are aware of the opportunity and special workshops will be held with CONREMA to explain the RfP process and eligibility criteria. The results of the evaluations for all applicants will be published and the selected operators will receive the GEF investment grant. It is envisaged that over 84 kW of clean energy mini-grids will be co-financed in this Component with an investment of $300,000. This investment will be made as Micro Capital grants[92] for a maximum of 50% of the total capital cost[93] to the selected operators, with progress being monitored by the project manager and overseen by the project steering committee. This can be a single investment or multiple (maximum 2) investments per entity and the system can be powered by a single technology (E.g. Photovoltaics, or Hydro) or hybrid (Wind/PV hybrid). Renewables hybridised with fossil fuels (E.g. Diesel-Photovoltaic hybrid) can also be financed but will receive less preference and **only the costs of the renewable energy component will be eligible for GEF funding.**

- **Output 2: Operation and Energy Generation from the mini-grids:** The selected grid operators will receive a rural electrification concession for the life-time of the system[94] on a BOO basis. Fig 8 provides details of the BOO operation by the entities which will get the concession. The entities can be PPP or NGO-operated and will be licenced by MERA to carry out the electricity generation and sales. The tariffs will be regulated by MERA and the revenue model will be based on the tariff payments by users – households, businesses, public institutions etc. Since MERA will be involved in the selection process the licencing process is expected to be straightforward. The PSD project of UNDP has valuable lessons from the MICF implementation and should be consulted on the process of selection and on selection of independent experts. Several stakeholders such as RENAMA, DAPP and Airtel Communications Limited have expressed interest in a BOO arrangement for the mini-grid. It is envisaged that

[85] The possibility to use the Scottish government seconded renewable energy adviser and experts from Scottish renewables should be explored.
[86] Lower tariffs to households get higher points;
[87] Higher share of energy use for productive applications and public service use increases the chances of long-term sustainability and would get higher points.
[88] Higher the internal rates of return, there will be higher points
[89] More leverage for GEF funding will mean higher points.
[90] Stringer track-record, management and financial strengths would mean higher points.
[91] CONREMA provides an exchange and learning platform for all stakeholders involved in the design, implementation and analysis of energy projects in Malawi or in related policies and strategies. The secretariat is currently hosted by the NGO Renew'N'Able Malawi (RENAMA) with support from the Scottish Government. See http://conrema.org/
[92] In compliance with UNDP Guidance on Micro-capital grants dated September 2012.
[93] Currently REF offers 100% financing for ESCOM for rural electrification infrastructure.
[94] Assumed to be 20 years

the operation of the mini-grids will result in renewable energy output of at least 294,366 kWh/year assuming that the mini-grids will be using wind-PV hybrid technology[95] assuming 40% capacity factor and 20 year life times in accordance with international norms[96]. The increased aggregate household energy savings amongst the customer base served by the mini-grid is estimated to be $ 55,711/year[97].

Fig 8: Build-Own-Operate Clean Energy Mini-Grid Model



- **Output 3: Institutional Support to Mini-grid operators**: This output will provide Technical Assistance (TA) to the mini-grid BOO operators aimed at ensuring the sustainability of the mini-grid business operation. The technical assistance will enable

[95] Which is the clean energy mini-grid technology promoted across Malawi by DEA and the present operating mini-grid mix for Malawi.
[96] From ESMAP 2007
[97] Using the savings estimates from Bondo power plant of MEGA for an estimated service coverage of 850 households, similar to Bondo.

the operators to carry out environmental impact assessments[98], institutional strengthening and capacity building. The technical assistance support will also be available for developing and implementing innovative payment systems such as progressive payments through mobile telephony networks, pre-paid metering mMoney/eWallet based payment systems that are feasible in rural areas. The BOO operators will also be able to use the technical assistance funds to train its own staff and community members on O&M of the systems. The BOO licensees will also collect, catalogue and provide information on the electricity, business, environmental and social aspects of its operational experience to the Knowledge Management Output (refer to the next section) as inputs to the case studies and toolkit;

- **Output 4**: **Independent Review Mechanism**: will provide for the establishment of an independent mechanism (within the project and ring-fenced) that will review and endorse the selection of all recipient institutions under the RfP and assess the performance of these institutions in managing the grants over the course of the project. This mechanism – which is a requirement of UNDP's guidelines on the management of micro-capital grants – will be established during the first six months of the project and will be condition precedent for the disbursement of any investment grants. The UNDP country office in consultation with the stakeholders involved in the independent mechanism will ensure that any institution receiving a micro-capital grant under Component 2 is able to demonstrate competency in the following areas:

    a) **Institutional strength**. Sound institutional culture with a mission and vision that is supportive of the expansion of micro-finance services to low-income clients; management and information systems that provide accurate and transparent financial reports according to internationally recognised standards; and efficient operating systems;
    b) **Quality service and outreach.** Focus on serving low-income clients and on expanding client reach and market penetration; financial services that meet the needs of their clients;
    c) **Sound financial performance**. Interest rates on loans sufficient to cover the full costs of efficient lending on a sustainable basis; low portfolio in arrears and low default rates; a diversified funding base for its micro-finance operations to minimise dependency on donor subsidies.

Component 2 under the Results Framework in the next section also gives further details. The detailed budgets and notes are also available in the section on total budget and work plan. The schedule of outputs and the key milestones are given in Annex 1.

5.4 INCREMENTAL REASONING

The support to BOO clean energy mini-grid operators offers an opportunity to 'incrementally' contribute to Malawi's existing operation and business model by DEA in Wind/PV mini-grids and to improve the existing implementation model being used. GEF financing will incrementally build off the baseline investments from DEA, MREAP/SG, EU/PA SE4RC and UNDP's SEM project. The GEF TA funds will be combined with the investment funds to provide institutional capacity building and to establish BOO business models. The GEF financing is important in ensuring that the future mini-grid developments in Malawi address the current challenges of

[98] in accordance with the Malawi Environmental Management Act of 1996, Environmental Impact Assessment Guidelines of 1997 and all relevant natural resources management policies and legislation.

business model, operational arrangements, tariffs and increased share of productive uses. The proposed GEF financing of the pilots are expected to demonstrate a new PPP approach to mini-grid development on a BOO mode. The proposed outputs are largely consistent with the outputs approved in the PIF. The proposed location in the north of Malawi has been expanded to the whole of the country as the locations identified in the PIF were not feasible. A transparent, competitive process through a multi-criteria decision making by independent experts has also proposed to select the mini-grid operators and the location. An independent review mechanism to oversee the selection of beneficiaries and oversee the disbursement and implementation of the micro-capital grant has also been added at the project formulation stage. The projected electricity generation figures are lower than estimated at the PIF stage, as wind-PV hybrid technology is assumed as the relevant technology platform to be supported based on the existing technologies already demonstrated in Malawi and considering the distribution of the energy meteorological resource.

6.0 COMPONENT 3: INSTITUTIONAL STRENGTHENING AND CAPACITY BUILDING FOR PROMOTION OF DECENTRALISED MINI-GRID APPLICATIONS ACROSS THE COUNTRY

6.1 BASELINE SITUATION

The current rural electrification policy and the Rural Electrification Act only recognizes on-grid and stand-alone off-grid options i.e. grid extension and Solar Home Systems (SHS). Decentralised clean energy mini-grid technologies are not a recognised option in the rural electrification framework in the present form. Such a situation prevents mini-grids from being able to receive financing under MAREP through the REF in a manner similar to the on-grid and off-grid programmes. Similarly the Electricity Regulation Act and the regulator -MERA currently treats mini-grids in a manner which is similar to larger scale generation[99]. Currently mini-grids have to obtain a licence for generation as well as for distribution, similar to procedures that are applicable for a large IPP or for ESCOM. Similarly the policy and the regulatory framework does not deal with situations where the national grid reaches the mini-grid operators service area[100] which makes mini-grid investments riskier.

There is some capacity at the central level with DEA and other key stakeholders to understand the role of mini-grids, develop appropriate policies and oversee mini-grid developments. However these capabilities do not exist at the sub-national levels at the district, area and village levels which remains a critical gap for successful planning, implementation and oversight. The previous GEF mitigation project BARREM had trained and oriented 300 energy advisers[101] at the district and areas levels on renewable energy and solar energy issues and there is an opportunity to build on these corps of trained energy advisers. The SEM project is planning to build capacity at the district level, especially in 14 vulnerable districts[102] in Malawi and provides an opportunity for the project to collaborate.

[99] Although MERA has been taking a constructive approach towards licencing mini-grids
[100] Whereas such provisions already exist in the Rural Electrification Act for SHS
[101] Drawn from the government local bodies, NGOs and private sector.
[102] Chikwakwa, Nsanje, Phalombe, Zomba, Machinga, Mangochi, Balaka, Ntcheu, Salima, Nkhotakhota, Karonga, Blantyre, Dedza and Rumphi

There is no national level information base and information clearing mechanism to share information on mini-grid potential, energy resources, technology, experience etc. to policy makers, regulators and prospective mini-grid developers. Existence of such an information clearing house would help all key stakeholders and should help in accelerating the development of clean energy mini-grids. MEGA and PA have developed some promotional material on MEGA's operations but not much information is available on the lessons from MEGA's and DEA experience with mini-grids and also what it means in the Malawian national and rural electrification context.

6.2 IMPLEMENTATION

Capacity will be built for government officials at the district, area and village level on clean energy mini-grids through targeted training programmes conducted at the district and lower levels. These efforts will focus on the districts which are considered to have mini-grid potential and will be carried out in collaboration with the training component of the UNDP SEM project. On the policy and regulatory side in collaboration with DEA and MERA the project will review the Rural Electrification Act and the Energy Regulation Act and identify options to include clean energy mini-grids as the third technical option via suggested amendments. These options will be developed in consultation with DEA and MERA and proposed amendments will be made to the Rural Electrification and Energy Regulation Acts to enable mainstreaming of clean energy mini-grids as a rural electrification options eligible for REF finance.

Absence of an information clearinghouse on rural electrification and mini-grids is hampering the accelerated development of new clean energy mini-grids in Malawi. Information on current grid coverage, MAREP's planned electrifications, details of population centres and renewable resource distribution information will be synthesised and amalgamated to provide a national mapping of mini-grid opportunities. This information will be made available to all stakeholders under the aegis of the DEA. There is also a need to objectively analyse the experience with mini-grid programmes in Malawi from different dimensions including the experiences thus far and what is being implemented under the project. A toolkit will be developed with information inputs from the project. Finally information and knowledge generated through the project outputs will be shared with all stakeholders through the mini-grid website and social media.

6.3 OUTPUTS

The various outputs that are needed to accomplish the institutional strengthening and capacity building Component and the envisaged outputs are:

- **Output 1: Information Clearing House for Mini-grids:** An information base consisting of current electricity grid network, planned and known rural electrification efforts of MAREP; existing off-grid systems; population centres; renewable energy resource information; infrastructure[103]; location of government public service institutions[104]; location of other rural infrastructure[105], land use[106], environmental and social issues[107], etc. will be collected for all un-electrified villages and areas of the country in

[103] Roads, waterways, railways and airports
[104] Schools, Hospitals, Police Stations etc.
[105] Schools and hospitals run by religious, NGO, community and donor agencies; places of worship; mobile phone towers; rural industries etc.
[106] Land use patterns, agricultural land, forests, residential etc.
[107] Location of ecologically sensitive locations, national parks, protected flora and fauna

collaboration with MAREP and MCC Malawi[108], validated and then published. This information should be made available to all stakeholders through a clean energy mini-grid website[109] established by the project under the aegis of DEA. Arrangements for regular periodic updates to the website will be established and institutionalised while developing the website and 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. CONREMA has already started the process of developing an information base of clean energy projects and opportunity to build on this existing work with CONREMA will be explored. RLI Berlin, PA, GIS departments of Lilongwe University of Agriculture and Natural Resources (LUANAR), Malawi Polytechnic's Department of Land Surveys and Geography Department of Chancellor College of University of Malawi all have GIS development, surveying, database management and website development skills that may be relevant to this output.

- **Output 2: Training and Capacity Building:** A training and capacity building plan will be developed by the project which includes training at the district levels and national levels with the emphasis being at the district level. At the district level training programmes will be organised for members from VDCs, ADCs and the DEC on mini-grids. The programme will focus on technology, economics, environmental and social impacts and their management, institutional arrangements, and the role of community as well as examples of best practices. The training will be conducted at the district level for DECs and at the area and village level in selected districts including the target districts[110], where relevant ADCs and VDCs will participate. Training programmes at the village and possibly the area level may need to be delivered in *Chichewa*. The participants will develop energy plans for their respective areas and scope out opportunities for mini-grids. Efforts will be made to engage the 300 energy advisers previously trained by BARREM in each of the districts. In the 14 vulnerable districts where SEM project is building capacity on renewable energy and energy efficiency, efforts will be made to integrate the training programme to optimise financial and technical/faculty resources as well as synergise work on energy plans. It is strongly recommended that the training programmes be simple and involve audio-visual displays and practical activities and focus on issues relevant at district and community levels. It is also recommended to engage and provide Training of Trainers (ToT) to the relevant Technical and Vocational Education and Training (TVET) institutions and their technical trainers. Linkages to the community renewables toolkit being developed under M-REAP will be explored as well as using Scottish Renewables experts in Malawi as training resources. One or two training programmes should also be carried out at the national level engaging government, regulators, banks and financiers, NGOs, private sector, ESCOM, IPPs etc. to help share the global trends and best practices in technology, business models, community engagement and financing of Clean Energy Mini-grids. The REN21 Mini-grid policy toolkit and the RERA energy regulatory toolkit will be used as resource materials for the national level training programmes. The possibility to organise these training programmes jointly with other donors – E.g. Scottish Government will be explored. It is expected that at least 300 people at the sub-national

[108] MCC Malawi in collaboration with Idaho National Laboratories have developed Virtual Renewable Energy Prospector which the information clearing house can build upon. This is available at http://gis-ext.inl.gov/vrepmalawi/Default.aspx

[109] The web-site can be a micro-site under the URL of the DEA

[110] Mulanje and the other districts where the BOO PPP mini-grids will be implemented. Some additional districts may also be added for area and village level training subject to availability of resources.

level and 50-60 people at the national level will be trained with at least 30% being female participants. Possible institutions which could deliver such training programmes are Mzuzu University and Malawi Polytechnic. The MIRTDC is an another organisation which has experience in community/village level capacity building;

- **Output 3: Mainstreaming Mini-grids into Policy and Regulation**: This Component will carry out a review of existing policies and regulations especially the Rural Electrification Act, 2004 and Energy Regulation Act, 2004[111] to identify options to remove the current policy and regulatory hurdles to mini-grids. The analysis will then identify in collaboration with DEA and MERA options to include mini-grids as part of the rural electrification efforts. Some of the issues to be examined in the policy review of the document are inclusion of mini-grids as a third rural electrification option, in addition to grid extension and solar home systems; establishing a process and criteria of options for MAREP to decide between grid extension and mini-grids for a given location; criteria for financing of mini-grids by REF; and unified and simplified licencing procedures for mini-grids[112]. These options will then be developed further as recommended amendments to the Rural Electrification and Energy Regulation Acts, proposed for amendment through the requisite legislative process. The aim of the process will be to allow mini-grids to be considered as legitimate rural electrification options and receive REF funding. This output will also coordinate with the SEM project which is supporting the development of a Renewable Energy Policy together with the Scottish Government which is seconding an adviser to DEA to work on the renewable energy strategy to ensure the role of clean energy mini-grids is clearly articulated in the policy and strategy.

- **Output 4: Case Study and Toolkit Development and Knowledge Management:** the project will be implemented in an open and transparent manner and regular information updates on outputs; outputs of activities; reports; RfPs; evaluation results; progress of mini-grid implementation; monitoring results of the mini-grids etc. will all be made available through the Clean Energy Mini-grids website (see above). The project will also use social media[113] to communicate about the updates on the project and website. The project will also develop case studies and a toolkit to show case mini-grid experience in the country. This effort will review the experience of the ESCOM diesel mini-grids; DEA wind-solar hybrid mini-grids; MEGA's existing mini-grid; the new MEGA mini-grids and the new mini-grids implemented as BOO PPPs. The analytical framework for the case studies and toolkit will cover the technology, economic, policy and regulation issues; business and financing models; rural development aspects; productive use and income generation; community engagement; and climate change impacts and global environmental benefits. Both MEGA and the BOO PPP clean energy mini-grids supported under Component 1 and 2 (see previous sections) will provide required inputs and data for the analysis. The analysis will compare and contrast the Malawi experience with global best practice in clean energy mini-grids. A final toolkit consisting of lessons from clean energy mini-grid development in Malawi with case studies on MEGA and the BOO PPP clean energy mini-grid(s) will be developed, published and disseminated. The toolkit will be presented in a national workshop and the publication and the underlying data will also be made available through the clean energy mini-grids website. For the analysis and case studies and toolkit development an international

[111] Both gazetted in 2007
[112] Suggested to review mini-grid licencing procedures in Tanzania and elsewhere.
[113] Twitter, LinkedIn and Facebook

expert working with a national expert may be engaged during the latter part of the project.

Component 3 under the Results Framework in the next section also gives further details such as targets and responsible parties. The detailed budgets and notes are also available in the section on total budget and work plan. The schedule of outputs and the key milestones are given in Annex 1.

6.4 INCREMENTAL REASONING

GEF funding for this Component is crucial for addressing the institutional capacity and information availability barriers mentioned. GEF funding for this Component is considered to be critically important as there is currently very little opportunity to mainstream mini-grids into existing policies & regulations and develop and share mini-grid related information (or build capacity on mini-grids). The GEF financing will also incrementally build off investments by DEA, MERA, the Scottish Government and the SEM project of UNDP.

7.0 THE PROJECT RESULTS FRAMEWORK (2015-18)

This project will contribute to achieving the following Country Programme Outcome as defined in UNDAF Action Plan: *UNDAF Outcome 1.3: Targeted population in selected districts benefit from effective management of environment, natural resource, climate change and disaster risk by 2016*					
Country Programme Outcome Indicators: Contribution of renewable energy in the national energy mix increases to 6% in 2016; Proportion of population using solid fuel decreases to 92% in 2016;					
Primary applicable Key Environment and Sustainable Development Key Result Area (same as that on the cover page, circle one): 1. Mainstreaming environment and energy					
Applicable GEF Strategic Objective and Program: CCM Objective 2: Promote investment in renewable energy technologies					
Applicable GEF Expected Outcomes: Outcome 3.2: Investment in renewable energy technologies increased Outcome 3.1: Favourable policy and regulatory environment created for renewable energy investments					
Applicable GEF Outcome Indicators: Indicator 3.2: Volume of investment mobilised Indicator 3.1: Extent to which RE policies and regulations are adopted and enforced					
	Indicator	**Baseline**	**Targets**	**Source of verification**	**Risks and Assumptions**
Project Objective[114] : To increase access to energy in selected remote, rural areas in Malawi by promoting innovative, community-based mini-grid applications in cooperation with the private sector	Tons of CO_2 equivalent avoided.	Negligible [115]	33,183 tCO_2e	Project Annual reports, GHG monitoring and verification reports; MERA, DEA, EAD reports. Annual reports by MEGA and mini-grid operators on energy use.	The mini-grid operators including MEGA continue to operate the systems and supply electricity as per assumptions. Technical performance of the systems meets expectations. Private sector and civil society maintain interest in promoting innovative community-based mini-grid applications.

[114] Objective (Atlas output) monitored quarterly ERBM and annually in APR/PIR

[115] Since MEGA's Bondo project is at a testing phase and since the DEA supported wind-PV mini-grids largely defunct, the current emissions avoided is considered negligible. This baseline figure will be updated by the project once Bondo testing phase is over and electricity supply operations from Bondo to target households begin.

and civil society.	Cumulative renewable energy capacity installed and operational (kWp)	56kW[116]	164 kWp (only mini-grids directly supported by INV) 300 kWp[117] (all mini-grids)	DEA data, MERA data, MRV system.	MEGA, private sector and NGOs engaged by the project and able to co-finance the mini-grid systems
	Cumulative renewable electricity generation (kWh/year)	220,752 kWh/Year [118]	1,145,808 kWh/Year (both Component #1 and #2)	MERA data, M&E reports, final evaluation	The mini-grid operators continue to operate the systems and supply electricity. Technical performance of the systems meets expectations. Communities are not able technically to manage mini-grid applications
	Household energy expenditure savings among customer base (US$)	$65,969	$352,271/Year by 2018	MEGA Annual reports, Project reporting	Technical performance of the systems. Capacity for management and service delivery by MEGA and BOO operators.
Component 1: Expansion of the Mulanje Electricity Generation Agency(MEGA) Micro Hydro Power Plant					
Outcome 1.1[119] **Increasing the installed capacity of the Mulanje Electricity Generation Agency's (MEGA)**	Cumulative installed power generation capacity - kWp	56 kW[120]	168[121] kWp (from mini-grids directly supported by project INV i.e. Lujeri) 216 kWp (all new MEGA MHPPs supported by the project plus	Project reporting, MERA data; MEGA Annual reports	Timely regulatory approvals by MERA. Realization of co-finance by MEGA. Technical performance of the systems. Capacity for management and service delivery by

[116] The 88 kW installed at the Bondo site by MEGA is currently at a testing phase and is yet to commence full-fledged electricity service operations to customers. The current generation levels are at a lower level and translates to 56 kW. The other wind-solar hybrid mini-grids developed by DEA are not functional at present – see Section 2.4.

[117] 216 kW of hydro powered mini-grids under Component 1 and 84 kW of wind/solar powered mini-grids under Component 2.

[118] The Bondo site by MEGA is yet to commence commercial operations but the electricity production dada based on test results is indicated.

[119] All outcomes monitored annually in the APR/PIR. It is highly recommended not to have more than 4 outcomes.

[120] Bondo is currently at a testing stage and the capacity is now estimated as 56 kW

[121] Including 88 kW at Bondo and 80 kW at Lujeri

MHPP scheme			the baseline)		MEGA.
	Cumulative renewable electricity generation (kWh/year)	220,752 kWh/Year	851,472 kWh/Year	Project reporting, MERA data; MEGA Annual reports	Timely regulatory approvals by MERA. Realization of co-finance by MEGA. Technical performance of the systems. Capacity for management and service delivery by MEGA.
Outcome 1.2 Achieving MEGA's business plan target of increasing the aggregate household energy savings among the customer base	Household energy expenditure savings among customer base (US$)	$65,969	$296,560/Year by 2018	MEGA Annual reports, Project reporting	Technical performance of the systems. Capacity for management and service delivery by MEGA. Assumption: There is demand for energy generated from mini-grids
Component 2: Replication of MEGA model via piloting of new Mini-grid schemes in other areas of Malawi					
Outcome 2.1 Investment in Installed capacity of mini-grid schemes established, replicating the MEGA model and using a Build-Own-Operate (BOO) Public Private	Cumulative installed renewable energy mini-grid capacity (kWp)	0[122]	84 kWp greenfield mini-grid(s)established	Project reporting, MERA data; Annual reports of mini-grid operators,	Timely regulatory approvals by MERA Interest and participation by NGOs and private sector. Raising of co-finance by Mini-grid operators.
	Cumulative renewable electricity generation	Nil[123]	294,336 kWh/Year	Project reporting, MERA data; Annual reports of mini-grid operators,	Timely regulatory approvals by MERA Interest and participation by NGOs and private sector. Raising of co-finance by Mini-grid

[122] Other than installed by MEGA and captured under Component 1.

[123] The Wind-PV hybrid systems that have been supported by the government are largely defunct and therefore no emissions are being avoided at present.

Partnership (PPP) model	(kWh/year)				operators.
	No. of new mini-grid operators replicating MEGA model	0	2 mini-grid operations established through a BOO mode.	Annual reports of mini-grid operators, Project reporting	Political influence in selection of beneficiaries. Management and service delivery by Mini-grid operators.
Outcome 2.2 Increased the aggregate household energy savings among the customer base	Household energy expenditure savings among customer base (US$)	0	$55,711/Year	BOO operators Annual reports, Project reporting	Technical performance of the mini-grid systems. Capacity for management and service delivery by BOO operators. Assumption: There is demand for energy generated from mini-grids
Component 3: Institutional Strengthening and Capacity Building for promotion of decentralized mini-grid applications across the country					
Outcome 3.1 Increased capacity of key stakeholders, especially at the sub-national levels to effectively plan and implement clean energy mini-grids	Number of districts where sub-national training and capacity building programmes on clean energy mini-grids conducted	0	28 districts covered by clean energy mini-grid training programmes.	Project reporting; Course schedules, Enrolment/ participation data for training programmes;	Interest at the sub-national levels for capacity building courses. Support and ownership from DECs, ADCs and VDCs for the training programmes.
	Number of people trained on planning and implementing clean energy mini-grids.	0	At least 300 people	Project reporting; Course content, Enrolment/participation data for training programmes;	Interest and engagement by prospective participants at sub-national level. Relevance of participants to clean energy mini-grids development. Assumption: People are available and capable of benefitting from training in planning and implementing

					clean energy mini-grids
	% share of women recipients of the capacity building	0	At least 30% female representation in all trainings	Project reporting; Course content, Enrolment/participation data for training programmes;	Interest and engagement by prospective participants at sub-national level. Relevance of participants to clean energy mini-grids development.
	No. of area-based electrification plans that include mini-grids developed and adopted	Area based electrification plans do not consider electrification through mini-grids	5 area-based electrification plans that include clean energy mini-grids, prepared and adopted	Project reporting; course content; training outputs	Interest and engagement by prospective participants at sub-national level. Relevance of participants to clean energy planning.
Outcome 3.2 Increased awareness about relevant business models, policy/ regulatory issues, and financing of mini-grids in the Malawian context	Number of web-sites in Malawi which stakeholders could use to plan and implement clean energy mini-grids.	Web-sites on renewable energy and rural electrifications do not provide much information on mini-grid options.	Information Clearing house on clean energy mini-grids with a GIS interface available to all stakeholders.	Project reporting, functional and sustainable website.	Technical challenges in implementation of the information clearing house. Lack of ownership from DEA/MERA. Stakeholders do not leverage information from the information clearing house
	Number of case studies and toolkits on Malawi on clean energy mini-grids	Toolkits focus on community energy, energy kiosks etc. or are not specific to Malawi. No case study on mini-grids in Malawi.	Malawi mini-grids toolkit with case studies published and presented in a national workshop and available to all stakeholders.	Project reporting. Publication digital and paper copies; mailing list of publication. Attendance register of national workshop.	Lack of ownership and inputs from mini-grid operators. Limited level of dissemination of case studies and toolkit.
Outcome 3.3 Improved policy and regulatory environment to facilitate the sustainable development of mini-grids in Malawi	Extent to which current energy policies and regulations consider or promote clean energy mini-grids for rural electrification i	Policies do not consider or recognize mini-grids as a viable electrification option nor allow for funding under the REF	Recommendations put forth to government for the Rural Electrification Act, 2004 and Energy Regulation Act 2004 to be amended to include clauses promoting clean energy mini-grids	Project reporting; amended laws; parliamentary proceedings, government gazette notifications.	Lack of ownership and support by DEA and MERA. Political priorities and developments delay the legislative process Assumption: Adequate arrangements to implement and monitoring policies and regulations on clean

					energy mini-grids
	Number of local (government supported) financing mechanisms for clean-energy mini-grids	REF is not presently funding mini-grids	Rural Electrification Fund able to finance clean energy mini-grids as a rural electrification option, through policy and regulatory changes.	Project reporting; amended laws; parliamentary proceedings, government Gazette.	Lack of ownership and support by DEA/MAREP and MERA. Political priorities and developments delay the legislative process

8.0 TOTAL BUDGET AND WORK PLAN

Award ID:	*5587*	Project ID(s):	
Award Title:	Increasing Access to Clean and Affordable Decentralised Energy Services in Selected Vulnerable Areas of Malawi		
Business Unit:	*MWI10*		
Project Title:	Increasing Access to Clean and Affordable Decentralised Energy Services in Selected Vulnerable Areas of Malawi		
PIMS no.	*5270*		
Implementing Partner (Executing Agency)	Ministry of Natural Resources, Energy and Mining		

Project /Component /Atlas Activity	**Responsible Party/ Implementing Agent**	**Fund ID**	**Donor Name**	**Atlas Budgetary Account Code**	**ATLAS Budget Description**	**Amount Year 1 (USD)**	**Amount Year 2 (USD)**	**Amount Year 3 (USD)**	**Amount Year 4 (USD)**	**Total (USD)**	**See Budget Note:**
Component 1: **Expansion of the Mulanje Electricity Generation Agency (MEGA) Micro Hydro Power Plant**	**MEGA**	**62000**	**GEF**	72600	Grants (micro-capital)	100,000	150,000	50,000	0	300,000	1
				72100	Contractual Services-Companies	50,000	50,000	40,000	40,000	180,000	2
				71200	International Consultants	10,000	10,000	0	0	20,000	3
					Total Component 1	**160,000**	**210,000**	**90,000**	**40,000**	**500,000**	
Component 2: **Replication of MEGA model via piloting of new Mini-grid schemes in**	**DEA, MNREM, UNDP**	**62000**	**GEF**	72600	Grants (micro-capital)	50,000	50,000	50,000	0	150,000	4

other areas of Malawi				72600	Grants (micro-capital	50,000	50,000	50,000	0	150,000	5
				72100	Contractual Services - Companies	20,000	20,000	15,000	16,500	71,500	6
				72100	Contractual Services - Companies	20,000	20,000	15,000	16,500	71,500	7
				71200	International Consultants	10,000	10,000	0	0	20,000	3
					Total Component 2	**150,000**	**150,000**	**130,000**	**33,000**	**463,000**	
Component 3: **Institutional Strengthening and Capacity Building for promotion of decentralised mini-grid applications across the country**:	**DEA, MNREM, UNDP**	**62000**	**GEF**	75700	Training & conferences	50,000	45,000	45,000	45,000	185,000	8
				72100	Contractual Services - Companies	0	0	30,000	20,000	50,000	9
				71200	International Consultants	0	0	0	50,000	50,000	10
				71300	National Consultants	0	0	0	20,000	20,000	11
				72100	Contractual Services - Companies	100,000	100,000	0	0	200,000	12
				75700	Training & conferences	0	0	0	10,000	10,000	13
				71200	International Consultants	0	0	10,000	10,000	20,000	3
					Total Component 3	**150,000**	**145,000**	**85,000**	**155,000**	**535,000**	
Outcome 4 [124]: MONITORING, LEARNING, ADAPTIVE FEEDBACK &	**UNDP**	**62000**	**GEF**	71200	International Consultants	0	25,000	0	25,000	50,000	14
				71300	Local Consultants	0	10,000	0	10,000	20,000	15
				74100	Professional Services	3,000	3,000	3,000	3,000	12,000	16

[124] The cost of monitoring and evaluation of $87,000 is spread over the three Components in the rate of $30,000 against Component 1, $ 27,000 against Component 2 and $ 30,000 against Component 3.

EVALUATION (as per the results framework and M&E Plan and Budget)				75700	Training & conferences	5,000	0	0	0	0	17
					Total Component	**8,000**	**38,000**	**3,000**	**38,000**	**87,000**	
PROJECT MANAGEMENT (This is not to appear as an Outcome in the Results Framework and should not exceed 10% of project budget)	**DEA, MNREM, UNDP**	**62000**	**GEF**	71400	Contractual Services - Individual	20,000	20,000	20,000	20,000	80,000	18
				71600	Travel	7,500	5000	7,500	5,000	25,000	19
				72500	Office Supplies	2,500	2,500	2,500	2,500	10,000	20
				74599	UNDP cost recovery charges -Bills	7,000	6,000	6,000	6,000	25,000	21
					Total Management	**37,000**	**33,500**	**36,000**	**33,500**	**140,000**	
				PROJECT TOTAL		**505,000**	**576,500**	**344,000**	**299,500**	**1,725,000**	

Summary of Funds: [125]

	Amount (USD) Year 1	Amount (USD) Year 2	Amount (USD) Year 3	Amount (USD) Year 4	Total (USD)
GEF	505,000	576,500	344,000	299,500	1,725,000
UNDP	461,250	461,250	461,250	461,250	1,845,000
Government	322,500	322,500	322.500	322,500	1,290,000
World Bank	2,750,000	2,750,000	2,750,000	2,750,000	11,000,000
Practical Action	1,012,500	1,012,500	1,012,500	1,012,500	4,050,000
MEGA	425,000	425,000	425,000	425,000	1,700,000
Scottish Government	277,500	277,500	277,500	277,500	1,110,000
Business Innovation Facility/DfID	212,500	212,500	212,500	212,500	850,000
JICA	200,000	200,000	200,000	200,000	800,000
Others (MMCT, WFC)	35,000	35,000	35,000	35,000	140,000
TOTAL	**6,201,250**	**6,272,750**	**6,040,250**	**5,995,750**	**24,510,000**

Budget Notes

1	This is for micro-capital grants. This budget will be used to finance about 38% of the estimated total costs of the proposed mini-grid system at Lujeri. The funding can be provided as micro-capital grants of $ 300,000 and is expected to support the electricity generation network and metering infrastructure. The awarding of the micro capital grant is contingent on MEGA carrying out an EIA and developing and implementing an environmental management plan as well as obtaining necessary generation and distribution licences from MERA and all other stipulations of the grant agreement.
2	This budget amounting to $ 180,000 will be used to support MEGA in increasing in-house skill sets by hiring an experienced electrical engineer and a business and finance manager to implement a billing and tariff collection system linked to pre-pay metering. These funds can also be used for developing and implementing a strategy for increasing the use of electricity for productive uses, review of public services tariffs and training staff and community on O&M of systems, and collection of information for case study and tool kit. The TA activities will be implemented by MEGA.
3	This budget is provided for an external technical adviser for the project for 3 weeks/year at $ 15,000/year for 4 years, totalling $60,000. This budget has been spread pro-rata over the 3 Components at $ 20,000 each.
4	This is for micro-capital grants. This budget of $150,000 will be used to finance a clean energy mini-grid on a PPP mode. The mini-grid operator will be identified through an open and transparent process which will have active participation by UNDP and the government. The mini-grid operator selected through a competitive process will be given a BOO contract. The winner of this contract will be offered a micro-capital grant to cover up to 50% of the mini-grid

[125] *Summary table should include all financing of all kinds: GEF financing, cofinancing, cash, in-kind, etc...*

	system or the micro-capital grant budgetary cap, whichever is smaller.
5	This is for micro-capital grants. This budget of $150,000 will also be used to finance a second clean energy mini-grid on a PPP mode. The mini-grid operator will also be identified through an open and transparent process which will have active participation by UNDP and the government. The mini-grid operator selected through a competitive process will be given a BOO contract. The winner of this second contract will also be offered a micro-capital grant to cover 50% of the mini-grid system or the budgetary cap provision, whichever is smaller. Note that both these budget lines for mini-grids can be combined to award a larger micro-capital grant for a larger mini-grid system.
6	This budget of $71,500 will be available to the first mini-grid contractor to develop and implement environment management plans, developing and implementing innovative payment systems, train staff and the communities on O&M of systems as well as provide information regarding the case study and toolkit.
7	This budget of $ 71,500 will be available to the second mini-grid contractor to develop and implement environment management plans, developing and implementing innovative payment systems, train staff and the communities on O&M of systems as well as provide information regarding the case study and toolkit.
8	This budget is available for carrying out training at the district, area and village levels as well as one or two national level training programmes. A budget of $ 160,000 is provided for district, area and village level training programmes and a budget of $25,000 is provided for national level training programmes.
9	This budget of $50,000 is available for development of policy and regulatory changes to existing rural electrification policies and regulation.
10	This budget of $ 50,000 is available for engaging an international consultant to develop case studies and a toolkit on mini-grids.
11	This budget of $ 20,000 is available for engaging a national consultant to develop case studies and a toolkit on mini-grids.
12	This budget of $200,000 is available to develop an information clearing house with a GIS interface during the initial years of the project
13	This budget is available to hold a national workshop to show-case the mini-grid cases in Malawi and to disseminate the toolkit. A budget of $ 5000 is provided for the national workshop and a budget of $ 5000 is provided for the publication.
14	This budget is provided to engage an international consultant to carry out the mid-term and terminal evaluations of the project. A budget of $ 25,000 is provided for the mid-term evaluation and a budget of $ 25,000 is provided for the terminal evaluation.
15	This budget is provided to engage a national consultant to carry out the mid-term and terminal evaluations of the project. A budget of $ 10,000 is provided for the mid-term evaluation and a budget of $ 10,000 is provided for the terminal evaluation.
16	This budget is provided for annual audits of project financial records, procurement and accounting practices. A budget of $3,000/year is provided for each of the 4 years totalling $12,000.
17	This budget is available for carrying out the inception workshop of the project. A budget of $ 5000 is provided for organising the inception workshop.
18	This budget is provided for remunerating the project manager of the project at $20,000/year for 4 years totalling $ 80,000.
19	This budget of $ 25,000 is provided for travel by the project manager and for financing travel to attend the steering committee meetings by members and for monitoring project sites.
20	A budget of $ 10,000 provided for office equipment, computers, furniture and other office supplies for the project manager.
21	A budget of $ 25,000 provided towards the cost of UNDP direct support costs to the project relating to procurement and finance support. Refer to the DSS agreement in Annex 6 for more details.

9.0 MANAGEMENT ARRANGEMENTS

The project will be implemented over a four year period commencing in 2Q 2015. The project will be executed under UNDP's National Implementation Modality. The Department of Energy Affairs of the Ministry of Natural Resources, Energy and Mining will have overall responsibility of the project and will involve all other relevant players in the implementation of the project. The Project Steering Committee also known as the Project Board will be responsible for providing overall coordination, guidance and oversight to the project in-line with UNDP's Results-Based Management (RBM) approach. The management of allocated funds, procurement and recruitments will be carried out by the project management team at the project management office at DEA according to UNDP financial rules and regulations[126] and based on a four-year work plan (2015-18).

9.1 PROJECT MANAGEMENT

The recent UNDP/GEF projects in Malawi have been managed by a project manager who is located at the responsible ministry with support from UNDP. The government either recruits a project manager or assigns the management of the project to one of the senior officers. While direct involvement and management of the project by a senior government official builds country ownership and increases sustainability, the project implementation does not always receive adequate attention and time allocation from the senior government officers. It is therefore suggested that DEA seek the services of a Project Manager who will report to the Project Coordinator, who will be a senior official from DEA. The project manager will be responsible for management and coordination of project outputs with supervision and strategic guidance from the DEA designated project coordinator.

UNDP will oversee the project implementation and achievement of project outputs and ensure proper use of UNDP/GEF Funds. The UNDP country office will in addition oversee financial expenditures against project budgets, appoint independent evaluators and financial auditors and recruit the project manager and the technical adviser. UNDP will also be responsible for quality assurance, ensuring that the project is implemented in accordance with rules and procedures for managing UNDP projects. UNDP will ensure that specific agreements and structures will be put in place during the first three months of the project as regards the project's use of micro-capital grants and the establishment of the independent mechanism catered for under Output 2.4. UNDP will be responsible for working with the DEA and PSC to develop a Standard Grant Agreement (Micro-Capital Grant Agreement) between the designated institutions of the program or project (DEA and UNDP) and the recipient institutions (under Components 1 and 2). The Grant Agreement will set out: a) the responsibilities of each party; b) the activities to be undertaken; c) the outputs to be produced; d) the performance criteria for the release of future tranches of funding; e) duration of activities; and f) reporting arrangements for credit related purposes.

As a member of the Project Board (Project Steering Committee) UNDP will focus on the expected project outputs; arbitrate on, and ensure resolution, of any donor priority or resource conflicts; contribute opinions on board decisions on whether to implement proposed changes; and ensure that any standards defined for the project are met and used for good effect, and monitor any risks in the implementation of the project.

[126] Unless otherwise agreed with the government.

Ministry of Natural Resources, Energy and Mining: MNREM as the implementing partner will be responsible for the delivery of the project results and accountable for resources provided, in accordance with UNDP rules and procedures. Specifically the implementing partner for the project will be Department of Energy Affairs (DEA) and will be responsible and accountable for managing the project. As regards the micro-capital grant Component DEA responsible for:

- Approving, in consultation with a steering committee, requests for grants;
- Establishing the Standard Grant Agreement (Micro-Capital Grant Agreement) between itself and the recipient institutions;
- Managing the release of the grants;
- Monitoring and reporting to UNDP on the implementation of the activities covered by the grant and the achievement of results from the grant.

MEGA: For Component 1, MEGA would be the Responsible Party (RP) and will implement the Component on behalf of DEA and according to the grant agreements already specified for development as regards receiving micro-capital grant agreements.

Implementation of Component 2 will be by DEA as the implementing partner with the project manager having to manage the initial RfP, selection and contracting process for Component 2 with oversight from the PSC and the independent mechanism established under output 2.4 as regards the selection and distribution of micro-capital grants using GEF funds. For the four outputs under Component 3, there is a need for active management and supervision of outputs and service providers by the project manager on behalf of the DEA.

MNREM is responsible for project and at Project Board level will perform the role of the Executive. The permanent secretary of his/her nominated representative will chair the project board and ensure government ownership of the project. S/He will also ensure that project is focused throughout its life cycle on achieving its objectives and delivering outputs that will contribute to higher level outcomes and that the project gives value for money, ensuring a cost-cautious approach to the project.

UN agencies in Malawi are in the process of conducting micro assessments against the framework for Harmonised Approach to Cash Transfer (HACT) on all ministries and departments of the Government of Malawi. The latest HACT for the Ministry of Natural Resources, Energy and Mining is included in Annex 8 of the Project Document; the risk rating for the Ministry in that HACT was rated as 'Medium'. Other Responsible Partner in this project - MEGA has not yet been assessed, however quarterly spot checks will be made by project manager as it is standard for them to be done quarterly on all implementing partners where the annual fund transfers to an IP exceeds $ 100,000. A sample letter of agreement that can be amended to be used for an agreement between a government and an NGO (in this case MEGA) for delegation as a RP is available at Annex 9. This will be amended and customized appropriately for the agreement to be concluded between MNREM/DEA and MEGA.

The Project Board also known as the project steering Committee will be responsible for l providing overall policy guidance and direction to the project. It will be responsible for making by consensus, management decisions for the project when such guidance is required by the Project manager, including making recommendations to UNDP and the implementing partner to approve project plans and budget revisions. In case of consensus cannot be reached, the final decisions shall rest with the UNDP representative.

The Project Board will also ensure that required resources are committed and will be arbitrate on any conflicts within the project or negotiate a solution for any problems between project and external bodies. In order to ensure UNDP's ultimate accountability, Project Board decisions

should be made in accordance with standards that shall ensure best value for money, fairness, integrity, transparency and effective international competition. In general the responsibilities of the board shall include:

During implementation

The project board shall provide overall guidance including policy input and functional guidance as well as direction to the project, ensuring it remains within any specified constraints;

- Address project issues as raised by the Project Manager;
- Provide guidance and agree on possible countermeasures/management actions to address specific risks;
- Conduct regular meetings to review the Project Quarterly Progress Report and provide direction and recommendations to ensure that the agreed deliverables are produced satisfactorily according to plans.
- Review Combined Delivery Reports (CDR) prior to certification by the Implementing Partner;
- Appraise the Project Annual Review Report, make recommendations for the next AWP, and inform the Outcome Board about the results of the review.
- Review and approve end of project report, make recommendations for follow-on actions;
- Assess and decide on project changes through revisions

During project closure

- Assure that all Project deliverables have been produced satisfactorily;
- Review and approve the Final Project Review Report, including Lessons-learned;
- Make recommendations for follow-on actions to be submitted to the Outcome Board;
- Notify operational completion of the project to the Outcome Board

Outcome Board: At the UNDP Country Programme level, an Outcome Board is responsible for ensuring the realization of the expected outcome and managing the interdependency of different projects that contribute to a particular outcome. Since this project contributes to one of the country programme outcomes within the overall framework of the UNDAF, its outputs will be monitored at programme level through an Outcome Board. Ministry of Natural Resources Energy and Mining as the implementing partner will be responsible for reporting progress and results of this project to the Outcome Board. The Outcome Board will be constituted by the Executing Agency (Ministry of Finance, Planning and Economic Development) and UNDP.

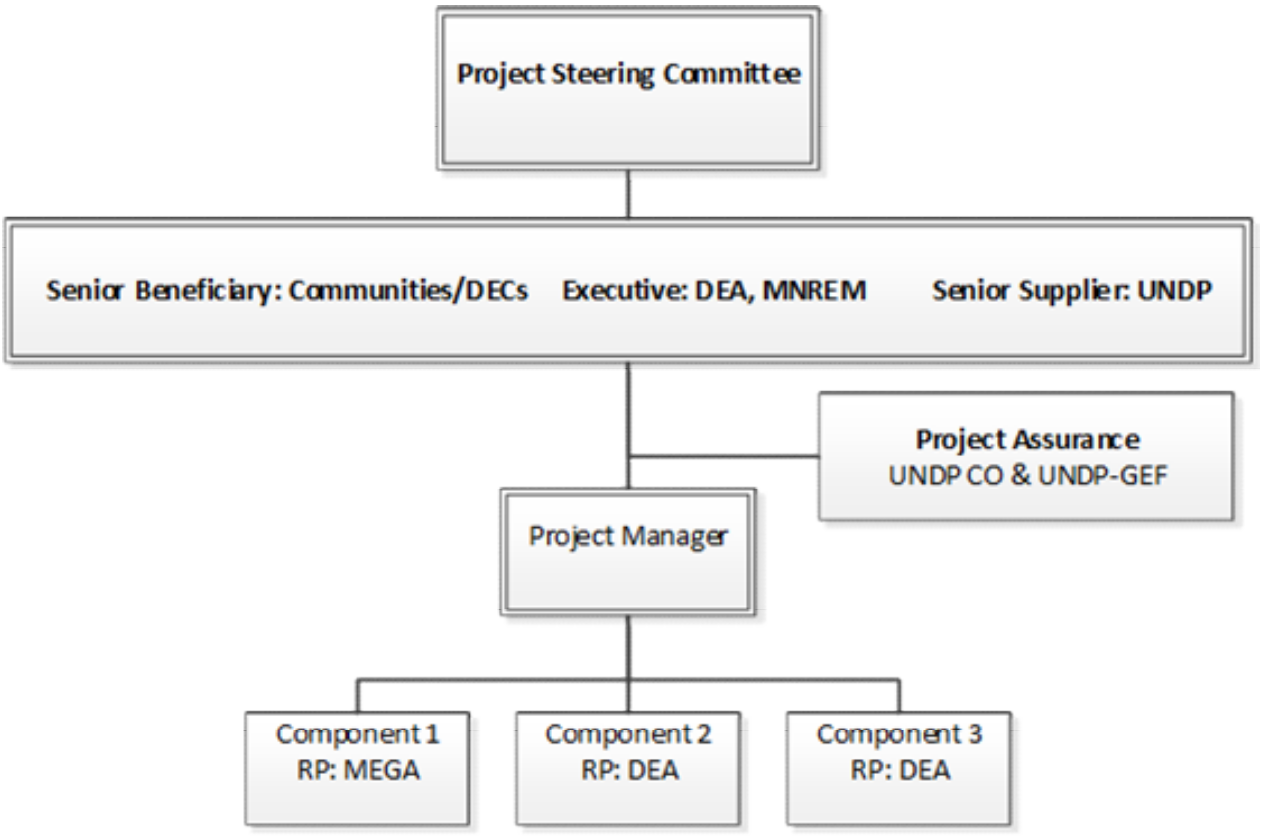
Project Manager: The project manager will carry out the following functions with oversight from project coordinator:

- Management of all project outputs to deliver the planned outputs with highest possible quality within the envisaged timeframes;
- Management of financial resources in a prudent manner to provide the best value to GEF, and UNDP;
- Supervision of outputs implemented by RP for Component 1: MEGA
- Closely monitor and manage Components 2 and 3 and project outputs, identify possible risks and carry out risk management activities;
- Monitor and report on project and project implementation to the project steering committee, GEF, donors and UNDP;

- Consult the project steering committee and UNDP on any strategic issues relating to the Components and project.

The project manager will also be supported on technical, policy and business issues relating to Clean Energy Mini-grids by a part-time international technical adviser. The terms of reference for the project manager and the clean energy mini-grids technical adviser are available at annex 3. The structure of the project management is shown in Fig 9 below:

Fig 9: Project Management Structure of the Project



9.2 PROJECT STEERING COMMITTEE

The Project Steering Committee (PSC) also known as **Project Board (PB)**will be chaired by the GoM and will consist of the following persons:

- Department of Energy Affairs, MNREM representative (Chair);
- UNDP representative;
- Representative of Ministry of Finance, Economic Planning and Development;
- GEF Operational Focal Point from Environmental Affairs Department of MNREM
- MERA
- Project Coordinator and Project Manager;

It is suggested that the PB or PSC also have the following members as representatives of key stakeholder constituencies[127] who can be identified by MNREM and UNDP:

- Representative from Academia;
- Representative from NGOs;
- Representative from clean energy industry/private sector;
- Representative from banking and finance sector;
- Representative from ESCOM;
- Representative(s) of relevant donors who are active on energy access (like Scottish government, DfID etc.)

The Project Board or PSC will meet at least once every six months and provide strategic guidance to the project manager and the project manager will be the secretary to the steering committee. The PB will review the progress of implementation and suggest risk mitigation or corrective measures. At the inception stage of the project and during the first year, it is suggested that the PB meet once every three months to ensure that the project receives the necessary strategic guidance. The project should also update the National Steering Committee on Climate Change (NSCCC) and National Technical Committee on Climate Change (NTCCC) on an annual basis to ensure that the project outcomes influence national efforts on climate change mitigation.

In addition for the Component 1 and 2 – the MEGA micro-hydro powered mini-grid in Mulanje and the BOO clean energy mini-grid(s) a structure of district level coordination group in each of the pilot districts[128] is proposed to help in the implementation and operation.

The district level coordination group will be established at the district level in each of the districts[129] where clean energy mini-grids will be implemented. It is proposed that such a co-ordination group consist of the following:

- District Commissioner (chair);
- District Police Chief;
- Councilors from district assemblies;
- District Health Officer;
- District Education Manager;
- District level ESCOM representative;
- Relevant Area Development Committee member;
- Relevant Village Development Committee member;
- Representative of mini-grid operator[130];
- Representative of MNREM;

The district level coordination group will ensure effective and succesful implementation of the clean energy mini-grids by active participation of all relevant government agencies. The district level coordination group will meet every month till the mini-grids are constructed and implemented and thereafter once every three months during the service delivery stage. The

[127] The industry/private sector and the NGO representative should not have any conflict of interests by virtue of participation in the project activities under any of the 3 Components. Appropriate rules of procedures including disclosures and declarations should be implemented.
[128] This will be established in Mulanje and other districts depending on the number of mini-grids under the Component 2.
[129] There will be a minimum of two districts including Mulanje and a maximum of 3 or 4 depending upon how many clean energy mini-grids are supported under Component 2.
[130] MEGA or the BOO operator

reports from the district level coordination committee meetings will be reviewed by the PB or PSC.

9.3 SUSTAINABILITY

It is important that the mini-grid developments continue and accelerate after the project period to provide a potent third option for rural electrification and make a significant contribution to governmental efforts. The elements of the project design which are expected to ensure sustainability are:

1. Capacity for clean energy mini-grid based rural electrification will be built at the national and sub-national levels with all relevant stakeholders to support continued clean energy mini-grid development for rural electrification.

2. The availability of the information clearing house with detailed information and data sets will encourage private and NGO actors to identify and develop more mini-grid opportunities faster and more cost-effectively.

3. The proposed amendments to the rural electrification and energy regulation acts for mini-grids, simplification of the regulatory framework, and availability of financing from the REF will make development and financing of clean energy mini-grids much more streamlined and significant going forward;

10.0 MONITORING AND EVALUTION

10.1 MONITORING FRAMEWORK

UNDP Malawi will be responsible for monitoring and evaluation (M&E) of the project in line with the M&E policies and procedures with GoM oversight. The M&E system will be governed by the following principles:

- **Accountability**: ability of UNDP to be answerable to GEF and to the donors and beneficiaries through availability of specific, timely and relevant data;
- **Evidence-base**: based on readily available information to support in the development of more appropriate and improved projects in future;
- **Learning**: use of simplified and frequent reporting to support reflection, learning and sharing of good practices and solutions.
- **Transparency**: sharing of information with all of UNDP's stakeholders, including strategies, plans, budgets and reports to promote openness.

10.2 PROJECT LEVEL MONITORING

The project management team will produce two deliverables which are:

- **A project monitoring plan**: the project manager will prepare a monitoring plan which will consist of output indicators and process indicators. The output indicators will include both UNDAF/CPD indicators and non-UNDAF/CPD indicators.

- **Quarterly progress and results report**: this report will contain data/information on the quarterly results achieved on the UNDAF/CPD and non-UNDAF/CPD outputs. The report will also contain quantitative and qualitative information on situational analysis, process, financial management, risks and mitigation and partnerships.

The Results Framework (RRF) is aligned with the UNDAF/CPD outcomes and indicators and GEF CCM objectives, outcomes and indicators and will also provide a basis for performance monitoring and reporting. Table 5 gives details of the key indicators to be monitored to gauge the impact of the project.

Table 5: Key Indicators for Impact Monitoring

Impact to be Monitored	Indicators	Verification Means
GHG emissions avoided	16,203 tCO_2e emissions avoided through three clean energy mini-grids directly supported via INV only. 33,183 tCO_2e emissions avoided through five clean energy mini-grids directly supported (TA and INV)	Project reports, GHG monitoring and verification reports
Cumulative renewable energy capacity added.	300 kWp of clean energy mini-grid capacity added (via support for all 5 mini-grids)	MERA, DEA Data.
Cumulative renewable electricity generation	1,145,808 kWh/Year (both Components #1 and #2)	MERA data, project reports, evaluation reports.
Increased household energy expenditure savings among customers of MEGA and the BOO mini-grids	$296,560/Year by 2018 from MEGA actions $55,711/year from other mini-grids under Component 2.	Project reports, MEGA Annual reports; evaluation reports.
Increased national and sub-national capacity to support clean energy mini-grid developments	300 people trained among 28 districts in Malawi. 30% of the trainees to be women.	Project reporting. Course schedule, participation data.
Policies and regulations to promote clean energy mini-grids as an option for rural electrification in Malawi	Amendments proposed to Rural Electrification Act and Energy Regulation Act	Project reporting, parliamentary proceedings, gazette notifications
Increased awareness on clean energy mini-grid opportunities	Information clearing house available as a website to all stakeholders	Project reporting, publicly available functional website.

10.3 EXTERNAL EVALUATION

In addition to the monitoring and evaluation arrangements internal to the project and the PSC, UNDP will carry out two independent external evaluations as follows:

- **Mid-Term Evaluation**: will be carried out in the 9th quarter of the project implementation and will be independent and external. The evaluation will engage all project partners and stakeholders and will assess the extent to which progress is being made towards the outputs and their alignment with outcomes. The mid-term evaluation will reflect the monitoring requirements by GEF including the Climate Change Mitigation Tracking-Tool. The evaluation may propose mid-course corrective measures and may reassess the objectives and revise implementation strategy.

- **Final Terminal Review**: at the conclusion of the project UNDP will commission a full external evaluation assessing the accomplishment of objectives and providing feedback for future clean energy, rural electrification and climate change mitigation programming in Malawi and elsewhere. The mid-term evaluation will reflect the monitoring requirements by GEF, including the Climate Change Mitigation Tracking-Tool.

10.4 MONITORING AND EVALUATION WORK PLAN

The monitoring framework, the project level monitoring and the evaluations will be implemented through a work plan with delineated responsibilities. A separate budget of $87,000 has been allocated for monitoring and evaluation and included as Outcome 4. Table 6 provides details of the M&E Work Plan.

Table 6: Monitoring and Evaluation Work Plan

M&E Activities	Responsibility	Time frame	Budget US$[131]
Inception Workshop	Project Manager; UNDP	First quarter of project inception	Budgeted cost: 5,000
Monitoring and Verification of Project Progress on outputs and implementation	Project Manager	Annually prior to ARR/PIR and definition of annual work plans	None
ARR/PIR	Project manager; UNDP	Annually	None
Periodic status/ progress reports	Project manager;	Quarterly	None
Mid-term Review	Project manager; Technical Adviser; UNDP; External evaluation team (international and national consultants.	9th quarter of project implementation	Budgeted cost: 35,000
Terminal Evaluation	Project manager; Technical Adviser; UNDP; External evaluation team (international and national consultants.	In the last quarter of project implementation	Budgeted cost: 35,000
Project Terminal Report	Project manager; Technical Adviser; UNDP;	In the last quarter of project	None

[131] Excluding time of the project personnel

M&E Activities	Responsibility	Time frame	Budget US$[131]
		implementation	
Audit	UNDP and Project Manager	Every year $3,000/year for 4 years	12,000
Field visit	Project Manager, Technical adviser, DEA staff.	As required	PM Travel budget[132]
Total Budgeted cost			**USD 87,000**

Audit Clause: Audit will be conducted according to UNDP Financial Regulations and Rules and applicable Audit policies.

10.4 ANNUAL PROJECT REPORT (APR) AND PROJECT IMPLEMENTATION REVIEW (PIR)

1. The APR is a self-assessment report by project management to the country office and provides CO input to the reporting process and the Results Oriented Annual Report (ROAR), as well as forming a key input to the Tripartite Project Review. The PIR is an annual monitoring process mandated by the GEF. These two reporting requirements are so similar in input, purpose and timing that they can be amalgamated into a single report.
2. An APR/PIR is prepared on an annual basis following the first 12 months of project implementation and prior to the Tripartite Project Review. The purpose of the APR/PIR is to reflect progress achieved in meeting the project's annual work plan and assess performance of the project in contributing to intended outcomes through outputs and partnership work. The APR/PIR is discussed in the TPR so that the resultant report represents a document that has been agreed upon by all of the primary stakeholders.
3. A standard format/template for the APR/PIR is provided by UNDP GEF. This includes the following:
    a. An analysis of project performance over the reporting period, including outputs produced and, where possible, information on the status of the outcome.
    b. The constraints experienced in the progress towards results and the reasons for these.
    c. The major constraints to achievement of results.
    d. Annual work plans and related expenditure reports.
    e. Lessons learned
    f. Clear recommendations for future orientation in addressing key problems in lack of progress.

11.0 RISKS AND MITIGATION

Four sets of risks have been identified for this project which are political risks, operational risks environmental risks and financial risks. These risks are presented in the risk assessment matrix and explained in the following sections.

[132] This is included under Travel budget under project management. See note 17 of total budget and work plan.

Impact (I) – 6 highest, 1 lowest
Probability (P) – 6 highest, 1 lowest

Description	Category	Impact & Probability	Countermeasures / Management response	Owner	Date Identified
Malawi's unimodal rainfall pattern is characterized by high spatial and temporal variability. According to Global Circulation Models (GCMs) and Regional Climate Models (RCMs), the predicted effects of climate change (CC) are expected to exacerbate this situation, with some areas expected to get higher rainfall while others will become drier. Furthermore, the projected temperature increase of 1.1 to 3.0 C by the 2060s and 1.5 to 5.0 C by the 2090s will worsen the effects in areas receiving low rainfall due to higher potential evapotranspiration. The water flow level of certain rivers and watersheds may be reduced due to a prolonged dry season exacerbated by climate change. Prolonged dry seasons are becoming more regular due to accelerated deforestation. Low water flow could have a major negative impact on the sustainability of MEGA's MHPPs under Component #1.	Environmental	Lower than predicted water flow in MEGA catchments zones would have a major impact on energy production and the achievement of the project's stated GEBs but the probability of this happening in the short-to medium-term is unlikely I=5, P=2 Persistent heavy precipitation could result in flash flood resulting in loss of lives and damage to infrastructure. I=5, P=2	This risk is caused by both localized and external factors (i.e. climate change) but in the short-term to the extent possible will be mitigated by using the latest climate modeling data from the UNDP/GEF LDCF Project - *Strengthening climate information and early warning systems in Africa for climate resilient development and adaptation to climate change – Malawi*. MEGA's MHPP sites have been selected in watersheds which have been deemed as not having inordinate exposure to reduced water flows from drought and all MEGA MHPPs must have Environmental Management Plans (EMPs) that comply with Malawi's environmental laws. The project will also benefit from a new USAID vulnerability assessment report due out soon which will be shared with MEGA and mainstreamed into all applicable project activities. Use of early warning systems. Robust design and appropriate siting will contribute saving of lives and property.	UNDP/DEA/ MERA/MEGA	During project formulation

Certain government stakeholders may seek to influence or bias the transparent selection of the sites where the mini-grid pilot projects will be implemented (under Component #2) or the choice of operators	Political	The scenario is marginally likely and will directly affect the ability of the project to create the planned impacts and to provide a basis for objectively scaling up clean energy mini-grids in a transparent fashion and according to sound criteria. I = 5; P = 3	To mitigate this risk the selection processes will be made transparent, based on open competition with the criteria and the results announced in the public domain. The selection process will also seek the involvement of external independent experts and leverage the experience of the UNDP Private Sector Development project which has run similar RfPs. Appropriate oversight mechanisms will be put in place. For example, Output 2.4 "*Establishment of an independent mechanism that will review and endorse the selection of recipient institutions (BOO operators) and assess the performance of these institutions in managing the INV grants*" was specifically inserted to mitigate this risk.	UNDP, PMU and DEA (the mechanism established under Output 2.4 for oversight); Project partners such as Government of Scotland and BIF will be brought into the mechanisms established to ensure impartiality.	During Project Formulation
Proposed policy and regulatory change recommendations such as the amendments to the Rural Electrification Act and the Energy Regulation Act will be delayed or will not be acted upon during the project implementation period	Political	Such a possibility will directly affect the long-term achievement of the targeted GEBs as regards replication potential I = 4; P = 2	To mitigate this risk, the PMU, PSC and MERA will liaise closely with the government to work to lobby for the adoption of the proposed amendments. However it should be noted that the project is only responsible for the producing the proposed recommendations for adoption by government and has not committed (as an output) to the <u>actual formal (legal) adoption</u> of the amendments; as such the potential impact only concerns post-project sustainability	PM/ DEA/MERA	During Project Formulation

			and not the achievement of the direct GEBs under the project		
MERA has chronic implementation capacities fulfilling their regulatory functions and expeditiously reviewing applications for joint generation and distribution licenses by mini-grid sponsors. For example, MERA has yet to approve the joint generation and distribution license for MEGA's Bondo scheme despite receiving the initial application more than a year ago and verbally indicating that they have no fundamental problems with any aspect of the application (the latest report is that it will be issued by mid-December). In light of this delay MEGA has no revenue from electricity sales from the Bondo MHPP and MERA has threatened MEGA with a MK 5 million fine if retail activities occur without a license. If such delays from MERA were to continue for the mini-grids supported under the project it would create major delays in project implementation. Moreover the current procedure for licensing applications by mini-grids is not fir for purpose is not fit for purpose. For example, the current procedure specifies that to obtain a license the installation must be in operation which implies that capital works and investment must proceed prior to regulatory approval which is	Regulatory	This is a critical risk for the project since unnecessary delays or disputes in the processing of joint generation and distribution licenses by MERA could seriously hamper implementation progress for the commissioning of the targeted mini-grid schemes under Components #1 and #2 (MERA licenses are a prerequisite for release of GEF-funded micro-capital grants) I = 5; P = 3	This risk will be mitigated in the short-term by MERA being engaged as a key project stakeholder who has provided a letter of co-finance to the project and pledged their strong support for the project's activities. MERA will sit on the PSC and be involved in the drafting of the RfP criteria so as to ensure that the application guidelines for licenses are clearly elaborated in the RfP guidelines. As regards MEGA investments, MERA has pledged that following delays with the Bondo application all subsequent MEGA applications will be dealt with in an expeditious manner. If needed the project will engage the UN Resident Representative to elevate this matter to the Ministerial level. In the medium-term the issue of revising and streamlining the regulatory processes for mini-grid operators will be expressly dealt with under Component #3, most notably outputs 3.1 and 3.3 which specifically deal with these issues from a policy/regulatory/investment facilitation perspective.	UNDP, PMU, DEA, PSC, Senior officials of Ministry of Natural Resources, Energy and Mining (if needed and not resolved)	During project formulation

counter-intuitive and costly. Moreover in the case of MEGA's latest application MERA insisted that it include a generation commissioning report and mini-grid distribution certification from ESCOM; however neither of those documents are specified as requirements under the current application guidelines. This serves as further testament to the fact that the current procedures are not "fir for purpose."					
There is a risk that there will not be sufficient interest from NGO and community stakeholders in the RfP for the BOO mini-grids under Component #2 or capacity to develop proposals in conformity with the prescribed technical specifications or matching financing requirements	Operational	This risk has a medium probability but if it materializes it will seriously affect the ability of the project to implement Component 2 and achieve the planned outputs and outcomes. I = 5; P = 3	As regards making sure potential applicants are aware of the RfP, engagement will be undertaken with CONREMA, the Cooperation Network for Renewable Energy in Malawi, to make sure that their members are aware of the opportunity and special workshops will be held with CONREMA to explain the RfP process and eligibility criteria. During the PPG phase preliminary consultations with several prominent local energy stakeholders such as RENAMA, DAPP and Airtel Communications Ltd confirmed a strong interest in a BOO arrangement for a mini-grid and willingness to respond to an RfP for such schemes. Moreover UNDP has developed this project in close cooperation with the Government of Scotland who is supporting several	PMU, PSC, DEA, UNDP	During Project Formulation

			investment facilitation platforms for RE operators (as noted in Table 1); it is expected that the RfP developed under Component #2 will be elaborated and implemented in close cooperation with the GoS to make sure that entities being supported by Scottish funding can also receive further assistance from this project and vice-versa. As regards capacity to develop proposals, the project itself will assist eligible project proponents and will also coordinate with partners such as BIF who have provided advisory support to RE project developers in the past.		
Lesson learned from many of the government-funded, village solar-wind hybrid stations and mini-grids is that there was not sufficient attention paid to community sensitization on the need for community members to pay for the energy provided and identify the structures to collect tariffs for ongoing operations and maintenance of the mini-grids. The BARREM final evaluation report which noted that a large numbers of government and donor-funded RE installations are now non-operative despite having showed high demand for energy services; this is mainly due lack of sustainable operational models and proper maintenance (this was also highlighted	Operational	I = 3; P = 2	This issue has been expressly addressed vis-à-vis the project design. The specific choice of using the MEGA model was made because of their success in developing successful community-based payment and O&M schemes. Community sensitization on the need for payment of electricity provided and adequate attention to O&M will be stipulated under the RfP criteria. In the case of Component #2 GEF funds will only be released once appropriate arrangements are in place to ensure payment-for-services by beneficiaries which will be part of the BOO structures and grant	PMU, DEA	During Project Formulation

in a recent report by M-REAP).			agreements. Operational sustainability and proper tariff pricing will be a central feature of all activities under Components #1 and #2.		
MEGA has been facing operational challenges with the implementation and operation of their MHPPs and mini-grids. MEGA does not have in-house design and engineering expertise and relies on MuREA and PA to support it. PA has indicated long-term commitment to MEGA but MuREA's institutional future is uncertain. While this may not have a direct bearing on the Lujeri power project, it may affect future micro-hydro developments by MEGA and its ability to operate as a self-sustaining entity.	Operational	Direct impact on Component 1. Potential impact on future developments and project impacts. I = 5; P = 2	The project will partly mitigate some of this risk by strengthening the electricity and grid operational capabilities of MEGA as part of TA provided under Componentn#1. However MEGA will have to explore availability of alternative local experience in micro-hydro design and engineering, and develop (together MMCT and PA) a long-term strategy to making sure this it has the necessary in-house operational capacity. The grant agreement to be negotiated between DEA and MEGA under Component #1 (that will form the basis for the disbursement of the micro-capital grants) will include certain operational benchmarks that MEGA must fulfill (with PA and MMCT support) as a condition of the grant. This issue will be dealt with as an integral part of GEF-funded support to MEGA under Component #1.	PMU, MEGA, MMCT	During Project Formulation
The planned clean energy mini-grid schemes could suffer from the lack of capacity at the district, area and village levels and from low levels of community sensitization and engagement.	Operational	Project's long term impact affected. I = 4; P = 3	To address this risk, the training and capacity building output under Component 3 focuses primarily at building capacity at sub-national levels with an emphasis at the district and village level. The	PMU, DEA, local government stakeholders	During concept/ PIF formulation

			analysis by BIF on the MEGA business model shows that the village level beneficiaries will save a significant share of their income by switching to electricity from the baseline kerosene use, which should be a key driver for engagement and participation.		
There may be localized environmental risks from the installation and operation of the mini-grids. The micro-hydro systems can involve clearance of vegetation for the civil construction of the power plant. There can be issues in water sharing as the water diverted for power generation can compete with agricultural water requirements. For the other renewable energy technologies such as the solar-wind hybrids the environmental impact will be limited to the clearance of vegetation 133 for electrical distribution network. For intermittent renewable energy technologies like solar and wind lead acid battery banks will need to be used for storing energy and these battery banks will need to be safely disposed after their lifetime.	Environmental	Impact on all mini-grids, especially hydro powered. I = 3; P = 2	Irrespective of the size of the mini-grids, EMPs will be developed for all plants and mini-grids supported by the project in accordance with the Malawi Environmental Management Act of 1996, Environmental Impact Assessment Guidelines of 1997 and all relevant natural resources management policies and legislation. The EMPs will focus on potential ecological impacts from land use and civil works and adequate environmental management measures will be stipulated and codified as one of the preconditions in the micro-capital grant agreements to receive GEF funding. Overall as regards the mini-grids to be supported the project is expected to have limited impacts on the social and natural environment in view of the small areas that will be covered by mini-grid schemes and the fact that for the MHPPs they are all "run-of-the-river" (RoR) schemes. Such	PMU, DEA, UNDP, MEGA and BOO operators	During concept/ PIF formulation

[133] This risk exists for all mini-grids including hydro.

			schemes require no water catchments or storage, and thus have minimal environmental impacts. The JICA 2002 RE Mater plan confirmed the limited environmental impacts of MHPPs as follows (a) Fauna and Flora -- There will be little clearance of vegetation related to the installation of the power plants and any special ecological niches existing in the affected catchments will be identified during the preparation of the EMP which is a requirement for the issuance of generation licenses. Appropriate mitigation measures will be taken to ensure all MHPPs supported by the project do not create any adverse environmental impacts. During the preparation of the EMPs, particular attention shall be given to ensure that sedimentation, downstream flows, water usage and quality and their effect on flora, fauna and the people are adequately investigated. (b) Land Use – Only a few settlements will be affected by these developments. Consequently, limited compensation and resettlements will be required. (c) Construction work impact – Minimum land clearing is anticipated at all project sites and		

			any negative environmental impacts resulting from the construction activities will be addressed as part of the EMPs. An Environmental and Social Screening Procedure (ESSP) has been carried out for the project which has indicated limited levels of impacts and risks. This is available as Annex 4 of the UNDP Project Document.		
The commitments and investments from MEGA and the selected BOO operators to provide required matching co-financing to implement the mini-grids may not materialize as indicated. In MEGA's case the co-financing is linked to possible funding by the Scottish Government and OFID which has yet to be finalized.	Financial	Such a possibility is considered unlikely in MEGA's case but if it materializes will directly affect the project's ability to carry out outputs under Component 1. In the case of the BOO operators their financial resources are more uncertain. I = 5; P = 2	MEGA has already applied for funding under the Government of Scotland's International Development Fund Malawi Development Programme which will be selecting beneficiaries in early 2015. The risk of co-finance for the BOO operators is built into the selection criteria and the process. As mentioned ,partners like Scotland and BIF have dedicated financial facilities in place that are supporting RE entities in Malawi with TA and grants for capital equipment and it is highly likely that some of those recipients will apply for the BOO RfP under Component #2. The financial capacity of both MEGA and potential applicants to the BOO RfP will be closely tracked during the project and will be ascertained during the inception workshop. The advantage of the micro-capital rebate schemes is that the funding window and	PMU, MEGA, BOO operators, PSC	During Project Formulation

			amounts can be modified depending on the ability of the beneficiaries to meet matching finance criteria.		

11.1 RISK ASSESSMENT

A total of 10 risks were identified at the project design stage. Of these 4 are operational risks, 3 political and regulatory risks and 2 environmental and 1 financial risk. Of the 10 risks facing the project 6 are of a serious nature with impacts of 5. But the probabilities of these risks precipitating are relatively low. The project is therefore considered to be of medium risk and regular monitoring of the serious risks and the probabilities and development of mitigation measures by the Project Manager is recommended.

12.0 LEGAL CONTEXT

This document together with the Standard Technical Assistance Agreement, CPAP signed by the Malawi Government and UNDP on 15 July 1977 which is incorporated by reference constitute together a Project Document as referred to in the Standard Basic Assistance Agreement (SBAA) [or other appropriate governing agreement] and all CPAP provisions apply to this document.

Consistent with the Article III of the SBAA, the responsibility for the safety and security of the implementing partner and its personnel and property, and of UNDP's property in the implementing partner's custody, rests with the implementing partner.

The implementing partner shall:

1. Put in place an appropriate security plan and maintain the security plan, taking into account the security situation in the country where the project is being carried;
2. Assume all risks and liabilities related to the implementing partner's security, and the full implementation of the security plan.

UNDP reserves the right to verify whether such a plan is in place, and to suggest modifications to the plan when necessary. Failure to maintain and implement an appropriate security plan as required hereunder shall be deemed a breach of this agreement.

The implementing partner agrees to undertake all reasonable efforts to ensure that none of the UNDP funds received pursuant to the Project Document are used to provide support to individuals or entities associated with terrorism and that the recipients of any amounts provided by UNDP hereunder do not appear on the list maintained by the Security Council Committee established pursuant to resolution 1267 (1999). The list can be accessed via http://www.un.org/Docs/sc/committees/1267/1267ListEng.htm. This provision must be included in all sub-contracts or sub-agreements entered into under this Project Document.

ANNEXES

ANNEX 1: SCHEDULE OF PROJECT OUTPUTS

	Year 1				Year 2				Year 3				Year 4			
Outputs	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
Component 1: Expansion of the Mulanje Electricity Generation Agency (MEGA) Micro Hydro Power Plant:																
Commissioning of Clean Energy Mini-grid	x	x	x	x	x	x	x	x◆2								
Operation of the Clean Energy Mini-grid									x	x	x	x	x	x	x	x
Institutional Support to MEGA	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Strategies to improve business model viability	x	x	x	x	x	x	x	x								
Component 2: Replication of MEGA model via piloting of new Mini-grid schemes in other areas of Malawi																
Implement Pilot BOO Clean Energy Micro-Grid(s)	x	x	x	x	x	x	x	x	x	x◆3						
Operation and Energy Generation from the mini-grids											x	x	x	x	x	x
Institutional Support to Mini-grid Operators	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Independent Review Mechanism	x	x◆5	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Component 3: Institutional Strengthening and Capacity Building for promotion of decentralised mini-grid applications across the country																
Information Clearing House for Mini-grids	x	x	x	x◆1												
Training and Capacity Building	x	x	x	x	x	x	x	X								
Policy and regulatory changes							x	X	x	x	x	x	x	x	x	x
Knowledge Management and Case studies/Toolkit development and promotion	x	x	x	x	x	x	x	X	x	x	x	x	x	x	x	x◆4

Key Milestones

◆1- Information Clearing House Completed (12 months)

◆2- MEGA Hydro-mini-grid operational and training and capacity building completed (24 months);

◆3 – The BOO clean energy mini-grid(s) implemented (30 months);

◆4–Institutional support outputs, policy and regulatory changes and toolkit completed (48 months);

◆5– Establishment of Independent mechanism that will review and endorse the selection of recipient institutions (BOO operators) and assess the performance of these institutions in managing the INV grants. (must be set up within 6 months and prior to selection and disbursement of any micro-capital grants);

ANNEX 2: GHG EMISSION RECUCTION CALCULATIONS

Lifetime Direct Emissions Due to the GEF Project Activity

Parameter	Value	Unit	Source
Baseline Scenario (Current Energy Use)			
Share of Households who will displace Kerosene use	59%		MEGA, 2013,
Share of Businesses who will displace diesel use	40%		MEGA, 2013,
Share of Public service establishments that will displace diesel use	1%		MEGA, 2013,
Unit Kerosene Consumption	0.40625	l/kWh	MEGA, 2013,
Unit Diesel Consumption	0.33	l/kWh	Cader et al, 2013
Emission factor for Kerosene Burning	2.01	Kg Co2e/l	Derived from IPCC EF - 71 t Co2/TJ
Default Emission factor Diesel engines	1.40	Kg Co2e/kWh	UNFCCC, CDM AMS -1 F
	0.574		
GEF CEMREM Project Alternative			
Capacity of the Micro-Hydro Mini-Grid	80	kW	
Capacity additions by MEGA till 2018	216	kW	
Capacity of Wind-PV hybrid Mini-grid	84	kW	
Wind share of Capacity of Mini-grid	50.4	(Taken as 60%)	
Photovoltaic Share of Capacity of Mini-grid	33.6	(Taken as 40%)	
Capacity Utilisation Factor for Micro-Hydro Mini-grid	45%		World Bank/ESMAP, 2007
Capacity Utilisation Factor for Wind Mini-grid	30%		World Bank/ESMAP, 2007
Capacity Utilisation Factor for Photovoltaic Mini-grid	20%		World Bank/ESMAP, 2007
Capacity Utilisation Factor for Wind/PV Hybrid Mini-grid	40%		World Bank/ESMAP, 2007
Lifetime for Micro- Hydro Mini-grid	30	Years	World Bank/ESMAP, 2007
Lifetime for Wind Mini-grid	20	Years	World Bank/ESMAP, 2007
Lifetime for PV Mini-grid	25	Years	World Bank/ESMAP, 2007
Lifetime for Wind/PV hybrid Mini-grid	20	Years	World Bank/ESMAP, 2007
Share of wind electricity in wind/PV hybrid mini-grid	45%		
Share of solarelectricity in wind/PV hybrid mini-grid	55%		
Wind Elecrtricity Generation	2,649,024.00	kWh	
Solar Electricity Generation	3,237,696.00	kWh	
Fossil fuel savings			
Diesel savings	2,076,519.46	l	
Kerosene savings	3,678,608.70	l	
GhG Emission Reduction Calculations			
Lifetime Electricity Generation of Hydro Mini-grid	9,460,800.00	kWh	
Lifetime Electricity Generation of Wind-PV Mini-grid	5,886,720.00	kWh	
Total Electricity Generation by Mini-grids	15,347,520.00	kWh	
Emission Reductions Using Current Energy Use Baseline			
Emission Reductions due to Diesel Generator Displacement	8809.47648	tCO2e	
Emission Reductions due to Kerosene Lighting Displacement	7,394.00	tCO2e	
Total Emission Reductions	16,203.48	tCO2e	
Emission Reductions as a result of additional micro-hydro investments by MEGA using current energy baseline			
Emission Reductions due to Diesel Generator Displacement	9,231.85	tCO2e	
Emission Reductions due to Kerosene Lighting Displacement	7,748.51	tCO2e	
Total Emission Reductions	16,980.36	tCO2e	
Emission Reductions for the Project investments and projected MEGA investments Using Current Energy Use Baseline			
Emission Reductions due to Diesel Generator Displacement	18041.32512	tCO2e	
Emission Reductions due to Kerosene Lighting Displacement	15,142.51	tCO2e	
Total Emission Reductions	33,183.84	tCO2e	

Lifetime Indirect Emissions (Bottom-Up) due to the GEF Project Activity

Using a Bottom up Approach		
Proposed Hydro Mini-grid Projects by MEGA over 10 years	10	
Possible Wind/PV Hybrids by DEA over 10 years	10	
Additional Hydro Mini-grids supported/replicated by MAREP due to Policy changes	10	
Additional Wind/PV Mini-grids supported/replicated by MAREP due to Policy changes	10	
Emission Reduction Calculations using current energy use baseline		
Total Electricity Generation by all hydro mini-grids	189,216,000.00	kWh
Total Electricity Generation by all Wind/PV mini-grids	117,734,400.00	kWh
Total Electricity Generation by all mini-grids	306,950,400.00	kWh
Fossil Fuel Savings		
Diesel savings	41,530,389.12	l
Kerosene Savings	73,572,174.00	l
Emission Reductions due to diesel generator displacement	176,189.53	tCO2e
Emission Reductions due to kerosene lamps displacement	147,880.07	tCO2e
Total emission reductions	324,069.60	tCO2e
Indirect emission Reductions (bottom-up approach)	324,069.60	tCO2e
Implied Replication Factor	9.77	

Lifetime Indirect Emissions (Top-Down) due to the GEF Project Activity

Using a top-down approach

	Value	Unit	Source
Electricity access rate in Malawi	9%	%	SE4All Global Tracking Framework
Total households in Malawi	2,869,933		Malawi Statistical Yearbook 2012
Total share of rural households	70%	%	
Number of households serviced by a mini-grid	200		MEGA Business Plan
Assumed Share of Mini-grids in Rural Electrification	10%	%	Assumption
Assumed Share of Wind/PV Mini-grids in Rural Electrification	85%	%	Assumption
Assumed Share of hydro Mini-grids in Rural Electrification	15%	%	Assumption
Total number of wind/PV mini-grids to be deployed	777		
Total number of hydro mini-grids to be deployed	137		
Total number of mini-grids	914		
Total renewable energy capacity added	76	MW	
Emission Reduction Calculations using current energy use baseline			
Total electricity generation by all hydro mini-grids	1,297,180,213	kWh	
Total electricity generation by all Wind/PV mini-grids	4,573,761,344	kWh	
Total electricity generation by all mini-grids	5,870,941,557	kWh	
Fossil fuel savings			
Diesel Savings	794,338,393	l	
Kerosene Savings	1,407,191,304	l	
Emission Reductions due to diesel generator displacement	3,369,920.45	tCO2e	
Emission Reductions due to kerosene lamps displacement	2,828,454.52	tCO2e	
Total Emission Reductions	6,198,374.98	tCO2e	
Causality Factor	0.2		
Indirect Emission Reductions (Top-down Approach)	1,239,675.00	tCO2e	

Summary

Lifetime Direct GhG Emissions Avoided	16,203.48	tCO2e
Lifetime direct GhG Emissions (including MEGA) Avoided	33,183.84	tCO2e
Lifetime Indirect GhG Emissions Avoided taking a bottom-up approach	324,069.60	tCO2e
Lifetime Indirect GhG Emissions Avoided taking a Top-down approach	1,239,675.00	tCO2e
Total Lifetime GhG Emissions Avoided with Bottom-up estimation of Indirect Emissions	357,253.44	tCO2e
Total Lifetime GhG Emissions Avoided with Top-down estimation of Indirect Emissions	1,272,858.83	tCO2e
Total GEF Grant	1,725,000.00	
GEF Abatement cost with Bottom-up estimation of Indirect Emissions	4.83	$/tCO2e
GEF Abatement cost with Top-down estimation of Indirect Emissions	1.36	$/tCO2e
GEF Abatement cost with direct emission reductions only	106.46	$/tCO2e
GEF Abatement cost with direct emission reductions (with MEGA) only	51.98	$/tCO2e
GEF Abatement costs with Only bottom-up indirect emissions avoided	5.32	$/tCO2e
GEF Abetement costs with Only Top-down indirect emissions avoided	1.39	$/tCO2e

ANNEX 3: TERMS-OF-REFERENCE FOR KEY PROJECT PERSONAL

Summary Information

Post Title	Project Manager
Location	Department of Energy Affairs, Lilongwe
Duration	One, year with possibility of extenstion (up to four years)

Overview

The project manager will be selected jointly by the DEA and UNDP, in consultation with the UNDP/GEF Regional Technical Adviser, through an open and competitive process. The Project Manager's prime responsibility is to ensure that the project produces the results specified in the project document, to the required standard of quality and within the specified constraints of time and cost. As such, the PM will be responsible for the overall management of the project, including the mobilization of all project inputs; supervision over project staff, consultants and sub-contractors; and acting as a liaison with the Government, UNDP, private sector partners and other stakeholders, and maintaining close collaboration with any donor agencies providing co-financing. The PM will report to the Project Steering Committee (PSC) on overall progress of project activities. For on-going administrative and reporting functions, the PM will be responsible to the Deputy Director of DEA for administrative, financial and technical matters. The Project Manager will be based at the offices of the DEA in Lilongwe, Malawi. The project manager also will be supported by an internationally-recruited mini-grid Technical Expert, as well by national and international experts and organisations taking the lead in the implementation of the specific technical assistance Components of the project. These services, either of individual consultants or under sub-contacts with consulting companies, will be procured in accordance with applicable UNDP/GEF guidelines.

Duties and Responsibilities

- Supervise and coordinate the production of project outputs, as per the project document;
- Mobilise all project inputs in accordance with procedures for nationally implemented projects;
- Lead the preparation of consultants' and sub-contractors' terms of reference, identification and selection of national and international sub-contractors/consultants, cost estimation, time scheduling, contracting, and reporting on project activities and budget, and supervise and coordinate

the work of all consultants and sub-contractors;
- In close liaison with the project Director at DEA, prepare and revise project work and financial plans;
- Liaise with relevant government agencies, private partners, and all other partners for effective coordination of all project activities;
- Oversee and ensure timely submission of the Inception Report, Combined Project Implementation Review/Annual Project Report (PIR/APR), technical reports, CCM tracking tool, quarterly financial reports, and other reports as may be required by UNDP, GEF, and other oversight agencies;
- Disseminate project reports and respond to queries from stakeholders;
- Report progress of project to the PSC, and ensure the fulfilment of PSC directives.
- Oversee the exchange and sharing of experiences and lessons learned with relevant projects nationally and internationally;
- Ensure the timely and effective implementation of all Components of the project;
- Assist relevant government agencies and implementing partners with development of essential skills through training workshops and on the job training, thereby upgrading their institutional capabilities;
- Carry out regular, announced and unannounced inspections of all sites and activities.
- Undertake other management duties that contribute to the effective implementation of the project.

Qualifications and Experience

Education

Master's degree or equivalent in engineering, economics, international development, social sciences, public administration or other relevant field.

Experience

- Minimum of 5 years of experience in the energy sector.
- Proven experience in project management
- Proven ability to draft, edit and produce written proposals and results-focussed reports.
- Strong presentation and reporting skills;
- Ability to develop and administer budgets, train and work effectively with counterpart staff at all levels and with all groups involved in the project;
- Proven experience working with Government, private sector, civil society, international organizations or donors in combination with the knowledge of economic and financial analysis, institutional, regulatory and policy frameworks.
- Good knowledge of climate change and energy issues and ability to track and understand GHG emission reductions from project activities.

- Prior knowledge and experience of the political, social and environmental factors and issues related to energy development and climate change mitigation in island countries;
- Basic knowledge of and experience with operational modalities and procedures of UNDP and/or GEF is an advantage
- Experience in the use of computers and office software packages (MS Word, Excel, etc.)

Language Requirements Excellent English, both written and oral

Summary Information

Post Title	Clean Energy Mini-grid Technical Adviser
Location	Home office with visits/missions to Lilongwe
Duration	Four years part-time (12 weeks over 4 years)

Overview

The Clean Energy Mini-grid Technical Adviser (CEM TA) will be internationally recruited based on an open competitive process. The CEM TE will report to the Project Manager and to the Deputy Director of DAE. The CEM TA will provide 3 weeks per year of support from his/her home country of which one or two weeks could be in Malawi as needed and agreed with the project manager/DEA. The CEM TA will be responsible for overseeing data collection, data analysis, and monitoring and evaluation of activities being implemented (particularly as regards tracking of GHG emissions).

Duties and Responsibilities

The main duty of the CEM TA will be to provide technical guidance to the Project Manager and the DEA on the overall implementation of project activities, with specific reference to the following:

- Provide overall technical guidance and advice in the planning and implementation of the technical assistance Components of the project, including advising in the preparation of work plans and technical reports;
- Provide advice/guidance to the implementation of the scale-up of MEGA rural electrification model including technical, financial and business issues;
- Provide advice/guidance to the implementation of the mini-grid pilots through BOO mechanism technical, financial and business issues;
- Provide technical guidance and support to DEA and consultants in preparing amendments to the rural electrification and energy regulation acts.

- Provide advice/guidance to Consultants/DEA/PM/ on the development and implementation of the information clearing house;
- Provide advice/guidance to Consultants/DEA/PM/ on the development and implementation of the case studies and toolkits;
- Provide advice/guidance to Consultants/DEA/PM/ on the development and implementation of the sub-national and national level training programmes;
- Provide guidance and assist in tracking and verifying the CCM TT GHG reductions on an annual basis as well as at MTR and TE.
- Assist in the implementation of other technical aspects of the project as needed.

Qualifications and Experience

Education	Minimum of a Masters' degree in an engineering discipline related to clean energy and rural electrification.
Experience	• Minimum of 10 years of experience in the renewable energy sector with extensive knowledge and experience with rural electrification and mini-grid business models. • Practical experience in similar assignments, preferably with clean energy and rural electrification in sub-Saharan Africa. • Demonstrated leadership ability and technical ability to communicate complex ideas verbally and in writing. • Prior UNDP/GEF project experience and knowledge of UNDP and GEF procedures and guidelines is an advantage.
Language Requirements	Excellent English, both written and oral

ANNEX 4: ENVIRONMENTAL AND SOCIAL SCREENING PROCEDURE

(Sent under separate cover)

ANNEX 5: CO-FINANCING LETTERS

(Sent under separate cover)

ANNEX 6: STANDARD LETTER OF AGREEMENT FOR DSS

UNDP Direct Project Service Costs

Letter of Agreement

STANDARD LETTER OF AGREEMENT BETWEEN UNDP AND THE GOVERNMENT FOR THE PROVISION OF SUPPORT SERVICES

Under project the Clean Energy Mini Grids Project

The Secretary for Natural Resources, Energy & Mining

1. Reference is made to consultations between officials of the Government of Malawi (hereinafter referred to as "the Government") and officials of UNDP with respect to the provision of support services by the UNDP country office for nationally managed programmes and projects. UNDP and the Government hereby agree that the UNDP country office may provide such support services at the request of the Government through its institution designated in the relevant project document, as described below.

2. The UNDP country office may provide support services for assistance with reporting requirements and direct payment. In providing such support services, the UNDP country office shall ensure that the capacity of the Government-designated institution is strengthened to enable it to carry out such activities directly. The costs incurred by the UNDP country office in providing such support services shall be recovered from the administrative budget of the office.

3. The UNDP country office may provide, at the request of the designated institution, the following support services for the activities of the project:

(a) Identification and/or recruitment of project and programme personnel;

(b) Identification and facilitation of training activities;

(c) Procurement of goods and services;

(d) Financial support services

4. The procurement of goods and services and the recruitment of project and programme personnel by the UNDP country office shall be in accordance with the UNDP regulations, rules, policies and procedures. Support services described in paragraph 3 above shall be detailed in an annex to the project document, in the form provided in the Attachment hereto. If the requirements for support services by the country office change during the life of a project, the annex to the project document is revised with the mutual agreement of the UNDP resident representative and the designated institution.

5. The relevant provisions of the A*ccord de base type with the government of Malawi with UNDP dated 15th July 1977* (the "SBAA"), including the provisions on liability and privileges and

immunities, shall apply to the provision of such support services. The Government shall retain overall responsibility for the nationally managed programme or project through its designated institution. The responsibility of the UNDP country office for the provision of the support services described herein shall be limited to the provision of such support services detailed in the annex to the programme support document or project document.

6. Any claim or dispute arising under or in connection with the provision of support services by the UNDP country office in accordance with this letter shall be handled pursuant to the relevant provisions of the SBAA.

7. The manner and method of cost-recovery by the UNDP country office in providing the support services described in paragraph 3 above shall be specified in the annex to the project document.

8. The UNDP country office shall submit progress reports on the support services provided and shall report on the costs reimbursed in providing such services, as may be required.

9. Any modification of the present arrangements shall be effected by mutual written agreement of the parties hereto.

If you are in agreement with the provisions set forth above, please sign and return to this office two signed copies of this letter. Upon your signature, this letter shall constitute an agreement between your Government and UNDP on the terms and conditions for the provision of support services by the UNDP country office for nationally managed programmes and projects.

Yours sincerely,

_____

For the Government

Mr Ben Botolo

Secretary for Natural Resources Energy and Mining

Malawi

_____

Signed on behalf of UNDP

Mia Seppo

Resident Representative

UNDP Malawi

Attachment 1

DESCRIPTION OF UNDP COUNTRY OFFICE SUPPORT SERVICES

1. In accordance with the provisions of the letter of agreement and the project document, the UNDP country office shall provide support services for the National Agency for Energy Conservation as described below.

2. Support services to be provided:

Support services	**Schedule for the provision of the support services**	**Cost to UNDP of providing such support services (where appropriate)**	**Amount and method of reimbursement of UNDP (where appropriate)**
Services related to procurement (including but not limited to): Procurement of goods Procurement of services o Review of terms of reference for recruitments o Consultant recruitment o Advertising o Short-listing & selection o Contract issuance	Throughout project implementation when applicable	As per the pro-forma costs: o 32 days over 60 months of GS5 Procurement Assistant: US$ 4,936 o 11 days over 60 months of NOB Procurement Manager: US$ 4,302	UNDP will directly charge the project upon receipt of request of services from the Implementing Partner (IP)
Services related to finance (including but not limited to): o Payments o Creation of vendor forms o Issuing cheques	Ongoing throughout implementation when applicable	As per the pro-forma costs: o 65 days over 60 months of GS5 Finance Associate: US$ 10,026 o 11 days over 50 months of NOB Finance Manager: ……US$ 5,736	As above
Total		**US$ 25,000**	

ANNEX 7: UNDP GUIDANCE ON MICRO-CAPITAL GRANTS

United Nations Development Programme

Title	**Guidance on Micro-Capital Grants**
Responsible Unit	Bureau for Development Policy – Capacity Development Group
Contributor(s)	BDP/CDG, BOM/CBS Team
Date of updates	October 2012 (updated links)
Contact	judith.puyat-magnaye@undp.org, dien.le@undp.org
Document Location	Management Practice Document Repository Project Management - Prescriptive Content Documents > Resource Center
Applicability	This applies to projects
Is Part of	UNDP Programme and Operations Policies and Procedures- Programme & Project Management
Related documents	UNDP User Guide – Project Management – Initiating a Project

A. Identification of Input: Micro-capital grants

1. UNDP provides micro-capital grants for both credit and non-credit purposes as inputs to its programme and project activities. Micro-capital grants are provided to support the activities of non-governmental organizations (NGOs) and community-based organizations (CBOs). See below Section B. Management of Input: Micro-capital grants for policies and procedures on the management of micro capital grants. For information on micro-finance programmes please see the United Nations Capital Development Fund website at http://www.uncdf.org/

2. Micro-capital grants for credit and non-credit activities may be included among the inputs financed by UNDP. An individual micro-capital grant may not exceed $150,000. A recipient organization may receive multiple grants provided the grants do not exceed on a cumulative basis $300,000 within the same programme or project. To receive multiple grants, the recipient organization must have produced the results agreed to in the prior grant

agreement, and a new micro-capital grant agreement must be approved by the steering committee. If the $300,000 cumulative limit is to be exceeded, the country office must submit a request through the Regional Bureau for clearance by BOM/OFA. On all requests related to credit or microfinance, technical clearance from UNCDF is also required. For information on global small grants programmes see the BDP intranet site http://www.undp.org/gef . The detailed requirements and the responsibilities of the recipient organization are set forth in Section B. Management of Input: Micro-capital grants below. Of a country's TRAC allocation, no more than 10 per cent may be spent on micro-capital grants over the Country Programme period.

3. If this percentage is to be exceeded, in addition to the clearances from BOM and UNCDF noted in paragraph 2, approval must be given by the Associate Administrator. The restrictions of paragraph 3 take precedence over the restrictions of paragraph 2 above.

Note: The criteria for approval for grants greater than $300,000 or allocation of the Country Programme above 10 percent shall be: 1] documentation that the recipient has produced the results agreed to in the prior grant agreement; 2] that the results proposed in the next grant agreement will contribute to the sustainability of the activity.

4. The following types of activities are supported by grants for non-credit purposes:

a. Strengthening the institutional capacity of local NGOs and CBOs;
b. Supporting community-based self-help initiatives, which may include income-generating activities designed to alleviate poverty;
c. Promoting advocacy activities and networking between civil society organizations (CSOs), government and donors; and
d. Supporting NGOs and CBOs involved with local environmental protection and poverty eradication activities.

5. NGOs as micro-capital grant recipients are exempted from competitive procurement process and shall be selected under programming modalities (e.g. review by PAC or project board). In all other cases in which NGOs are to be used as providers for professional service, they shall be selected only on the basis of a competitive procurement process undertaken by the Implementing Partner. NGOs as potential micro-capital grant recipients can be identified during project formulation. In such instances the PAC can recommend for RR's approval of their selection and they are listed in the annual work plan as well as the draft terms of reference for their services are attached to the project document.

6. Grants for credit activities can be used by the recipient organization to cover the costs of its operations, purchase equipment, hire new staff, or to capitalize credit funds within the financial limits set out in paragraph 2 above. See the Financial Resources Management Section for details on budget lines for reporting of grants to organizations for credit purposes and grants for non-credit purposes.

7. When grants are made to organizations involved in credit activities (loans, loan guarantees), UNDP requires that the organization have adequate procedures to ensure repayment of the credit it provides. UNDP does not receive repayment itself. The grant is considered a catalyst to help the organization to develop. See Section B on the management of grants.

B. Management of Input: Micro-capital grants

1. *Where a micro-capital grant is to be provided, a Standard Grant Agreement (Micro-Capital Grant Agreement) must be established between the designated institution of the programme or project and the recipient institution. The Grant Agreement sets out:*

   (a) the responsibilities of each party;
   (b) the activities to be undertaken;
   (c) the outputs to be produced;
   (d) the performance criteria for the release of future tranches of funding;
   (e) duration of activities;
   (f) reporting arrangements for credit related purposes.

See the UNDP Microfinance Policy for the policies on micro-capital grant inputs. For credit activities the recipient institution is often a credit institution or a bank, which in turn provides loans to beneficiaries. Also see under Initiating a Project, Templates and Forms the following resources: (a) Standard Grant Agreement (Micro-Capital Grant Agreement) for Non-Credit Related Activities *and (b)* Standard Grant Agreement (Micro-Capital Grant Agreement) for Credit Related Activities .

2. The project document should provide for an independent mechanism that will review and endorse the selection of recipient institutions, and assess the performance of these institutions in managing the grants.

   Such an independent mechanism could take the project board comprised of different actors including civil society, government, private sector and UNDP or its delegated arrangement to carry out the above specific functions (for more details, see POPP at https://intranet.undp.org/global/popp/ppm/Pages/Programme-and-Project-Management-Arrangements.aspx).

3. When used for credit-related activities, UNDP funds must be used in line with "Small and Micro enterprise Finance Guiding Principles for Selecting and Support Intermediaries". The UNDP country office in consultation with the designated institution must ensure that any institution receiving a micro-capital grant is able to demonstrate competency in the following areas:

   a. ***Institutional strength***. *Sound institutional culture with a mission and vision that is supportive of the expansion of micro-finance services to low-income clients; management and information systems that provide accurate and transparent financial reports according to internationally recognised standards; and efficient operating systems;*
   b. ***Quality service and outreach***. *Focus on serving low-income clients and on expanding client reach and market penetration; financial services that meet the needs of their clients;*
      Examples of needs-oriented services are small, short-term loans with collateral substitutes or alternative forms of collateral, and safe, convenient savings facilities. A reasonable time frame for sustainability is 5 to 7 years.

   c. ***Sound financial performance***. *Interest rates on loans sufficient to cover the full costs of efficient lending on a sustainable basis; low portfolio in arrears and low default rates; a diversified funding base for its micro-finance operations to minimise dependency on donor subsidies.*

See the UNDP Microfinance Policy

4. All recipient institutions must have a system for reporting regularly on the quality of its services, outreach and financial performance, as follows:

(a) Reporting on outreach and performance through an initial baseline report and thereafter each quarter;
Reporting allows the partners to measure results. There should be clear expected impact on the institutions receiving grants and their clients.

(b) Financial performance including balance sheet, income statement and audited financial statements, annually;

5. The designated institution of the programme or project is responsible for:

(a) Approving, in consultation with a steering committee, requests for grants;
(b) Establishing the Standard Grant Agreement (Micro-Capital Grant Agreement) between itself and the recipient institution;
(c) Managing the release of the grant;
(d) Monitoring and reporting to UNDP on the implementation of the activities covered by the grant and the achievement of results from the grant.

It is important to work with partners to provide enough financial volume for the credit lines to have effect. Enabling environment and support to the recipient are also crucial for success.

MINISTRY OF ENERGY AND MINES

MICRO ASSESSMENT REPORT

Graham Carr
Certified Public Accountants

ALEXIA INTERNATIONAL

Table of Contents **Page**

1. BACKGROUND

The Ministry of Energy is established by the Constitution of Malawi. Its purpose is to ensure protection and sustainable development, management and utilization of energy and mineral resources for socio-economic development and growth of Malawi.

Functions:

1. The promotion of the development of sustainable utilization and management of energy resources.
2. The promotion and facilitation of the development of the mining sector.
3. The acquiring, maintaining, monitoring and disseminating geo-scientific data and mineral exploration information.
4. The coordination and formulation and monitoring and evaluation of the ministry's policies, programmes and legislations.
5. The provision of sound accounting and administrative services to ensure that core notions are effectively and efficiently executed.
6. The provision of audit services to ensure proper utilization and accountability of financial and material resources in compliance with relevant procurement, financial and accounting requirements.

Organisation's contact information

Physical address :	Capital Hill Lilongwe
Address:	Private Bag 350
	Lilongwe 3
Telephones:	01 789 488

E-mail:	minre@sdnp.org.mw
Contact person	Dr. Winford Masanjala

2 DISCLAIMER

This report is intended only for the use of UNICEF Malawi Country Office and its partners. This report has been prepared solely for the purpose of assessing the Financial Management capacity of UNICEF's and its partners and should not be used for any other purpose. This report is only to be used in its entirety, and for the purpose for which it was prepared. No third parties should rely on the information contained in this report and no part of the contents may be quoted, referred to or disclosed in whole or in part, without UNICEF's and Graham Carr's written consent.

3 SCOPE OF WORK

The purposes of the assessment are:

a) *Capacity development objective*: The review supports the Agencies, government and the IP to identify strengths and weaknesses in the IP's capacity for financial management and areas for capacity building by the IP, government and others.

b) *Financial Management objective*: The review assists in the establishment of appropriate cash transfer modalities, procedures, and assurance activities to be applied by the Agencies.

4 METHODOLOGY

The following methods were used to collect data for the assessment:

- Conducted entrance and exit meetings with the senior officials of the organisation
- Reviewed the accounting records, program documents, policies, annual and audit reports, job descriptions and organizational chart
- Observed transactions taking place at the IP offices
- Administered Checklist B :financial management questionnaire

5 DESCRIPTION OF SPECIFIC INTERNAL CONTROL WEAKNESSES AND RECOMMENDATIONS

In completing the questionnaire, we also assessed the internal control system with equal emphasis on the effectiveness of the system in providing the management with useful and timely information for the proper management of the IP and the general effectiveness of the internal control system in protecting the assets and resources of the IP. As a result of this assessment, we identified the following areas for development in the IP's capacity for financial management and for capacity building by the IP.

5.1 External audits

Observation

It was noted that there are delays in the external audits of the Ministry and also there is no evidence that the issues raised in the last audit report were being implemented.

Implication

This affects the annual work plan of the ministry and also donor confidence is eroded

Recommendation

The Ministry must ensure that external audits are conducted in the shortest possible time to ensure decisions are made in good time and donor confidence is maintained.

5.2 Insurance

Observation

We noted that motor vehicles are insured on a third party and office furniture and equipment are not insured at all.

Implication

The Ministry might not be able to recover any amount in case of fire, burglary or any other event.

Recommendation

All assets should be adequately insured as this ensures that only a minimum loss is suffered in case of loss as some of the costs of replacing damaged or lost assets will be met by insurers.

5.3 Fixed assets register

Observation

We noted the following:

- A fixed assets register is not being maintained
- Periodic check of assets is not done

Implication

The Ministry may not be able to keep track of the existence and conditions of the assets.

Recommendation

An asset register should be introduced and should include among other details the following:

- Name of asset
- Date of purchase
- Supplier
- Location
- Serial number
- Cost
- Depreciation charge for the year
- Accumulated depreciation
- Carrying amount

Property, plant and equipment asset register acts as a control in the accounting system in order to achieve checks and balances of the assets values reflected in the nominal ledger, therefore management should ensure that the values in the nominal ledger reconcile with the asset register.

5.4 Staffing

Observation

Curriculum Vitae for the finance and accounts staff at the Ministry were not provided except for the Controller of Accounting Services.

Implication

There is no evidence that staff are qualified and experienced for the job to be carried out in the Ministry.

Recommendation

Staff personnel records must always be maintained at all times.

5.5 Management accounts

Observation

It was observed that management monthly accounts are not prepared on time and discussed by management

Implication

Results in delays in decision making.

Recommendation

Monthly management accounts should be prepared on time and discussed by management.

5.6 Internal audit

Observation

We noted that there is no evidence on the ground that audit issues raised by the auditors were not being addressed.

Implication

Delays in the implementation of the audit findings will result in relevant decisions not being made, thus affecting the work and productivity of the Ministry.

Recommendation

The Ministry ensure that audit queries raised are being implemented in good time.

6 RATINGS

a. Rating scheme

The following risk ratings were used to rate the financial management capacity of the Judiciary:

H	High risk
S	Significant risk
M	Moderate risk
L	Low risk

b. Overall rating

The following is the summary of the overall risk ratings for funds flow, staffing, accounting policies and procedures, internal audit, external audit, reporting and monitoring and information systems.

	RISK ASSESSMENT			
	H	S	M	L
1. Implementing Partner				
2. Funds Flow				
3. Staffing				
4. Accounting Policies and Procedures				
5. Internal Audit				
6. External Audit				
7. Reporting and Monitoring				
8. Information Systems				

OVERALL RISK ASSESSMENT	H	S	M	L

The Ministry of Energy risk rating is Medium

Graham Carr
January 2013

Checklist B: Financial Management Questionnaire[134]

Implementing Partner: _The Ministry of Energy_____ Date: January 2013

Summary of Risks related to the Financial Management Capacity of Implementing Partner					
Tested Subject Area (see subsequent pages for questions for each area that should be completed and summarized in the sections below)					
	Risk Assessment				
	H	*S*	*M*	*L*	COMMENTS
1. Implementing Partner					The Ministry of Energy is established by the Constitution of Malawi.
2. Funds Flow					The Ministry of Energy has bank accounts maintained with the Reserve Bank of Malawi, Standard Bank and Inde Bank and these are well managed
3. Staffing					The information pertaining to the staff has not been appropriate except for the Controller of Accounting Services who is adequately experienced for the work.

[134] This questionnaire was developed from a questionnaire used by the World Bank.

4. Accounting Policies and Procedures					The Ministry of Energy has desk instruction and Treasury instruction Manuals which are accessible to all staff.
5. Internal Audit					The Ministry of Energy has an internal audit department in place.
6. External Audit					The Ministry of Energy is audited by the Auditor General through the National Audit Office. There were delays in the audit.
7. Reporting and Monitoring					The Ministry of Energy prepares its financial statements yearly for the Government accounts and quarterly management accounts.
8. Information Systems					The Ministry of Energy has a computerised management system
OVERALL RISK ASSESSMENT	*H*	*S*	*M*	*L*	

H – High S – Significant M – Moderate L –Low

Financial Management Questionnaire

SUBJECT AREA	YES	**No**	**N/A**	**Review**	**Remarks/Comments**
1. Implementing partner					

SUBJECT AREA	YES	No	N/A	Review	Remarks/Comments
1.1 Is the implementing partner legally registered? Please note the legal status/registration of the entity.	✓				The Ministry of Energy is established by the Constitution of Malawi.
1.2 Has the implementing partner received UN resources in the past?	✓				The Ministry of Energy has received UN resources before through the Barrier Removal Project funded by the UNDP.
1.3 Does the IP have statutory reporting requirements? Please describe.					The Ministry has a statutory reporting requirement under Public finance Management Act and Public Audit Act which is to produce and submit the financial statements to the Accountant General, as well as the Auditor General.
1.4 Is the governing body for the implementing partner independent?	✓				The governing body of the Ministry of Energy is independent. There is a Committee called Licensing committee to look into applications for mining and MERA in Energy. Members are independent of the Ministry.
1.5 Is the organizational structure appropriate for the work to be carried out under UN cooperation?	✓				The organisational structure of the Ministry of Energy was adequate for the work to be carried out under the UN cooperation.
Risk Assessment (Implementing Partner)	***H***	***S***	***M***	***L***	Circle assessed risk for Subject Area 1
2. Funds Flow					

SUBJECT AREA	YES	No	N/A	Review	Remarks/Comments
2.1 Can the entity receive and transfer funds?	✓				The Entity can receive and transfer funds through its bank accounts held with the Reserve Bank of Malawi and also the Commercial Banks.
2.2 Are the arrangements to transfer the funds to the entity satisfactory?	✓				The Ministry receives its funding through direct transfers to its Operating account at the Reserve Bank of Malawi and the arrangements of funds transfer to the entity are satisfactory.
2.3 HAVE THERE BEEN MAJOR PROBLEMS IN THE PAST IN RECEIPT OF FUNDS BY THE ENTITY, PARTICULARLY WHERE THE FUNDS FLOW FROM THE GOVERNMENT/MINISTRY OF FINANCE?		✓			The Ministry has had no problems in the past in the receipt of funds from the Government.
2.4 IN THE PAST, HAS THE ENTITY HAD ANY PROBLEMS IN THE MANAGEMENT OF DISBURSEMENTS FROM A MEMBER OF THE UN COUNTRY TEAM? PLEASE DESCRIBE.		✓			There have never been any problems in the management of disbursements from a member of the UN country team.
2.5 DOES THE ENTITY HAVE/NEED A CAPACITY TO MANAGE FOREIGN EXCHANGE RISKS? (IF IT IS EXPECTED THAT THE ENTITY WILL BE USING FUNDS OUTSIDE THE COUNTRY.)	✓				The Ministry receives its funding in local currency and is therefore not subjected to any foreign exchange risks.
2.6 HOW ARE THE COUNTERPART FUNDS ACCESSED?				✓	Funds are withdrawn from the Reserve Bank accounts to operating commercial banks held with Inde Bank and Standard Bank of Malawi through cheques and claims by the Commercial Banks from the Reserve Bank.

SUBJECT AREA	YES	No	N/A	Review	Remarks/Comments
2.7 HOW ARE PAYMENTS MADE FROM THE COUNTERPART FUNDS?				✓	Payments are made after approval of payment vouchers which are adequately supported.
2.8 IF SOME ACTIVITIES WILL BE IMPLEMENTED BY COMMUNITIES OR NGOS, DOES THE ENTITY HAVE THE NECESSARY REPORTING AND MONITORING MECHANISMS TO TRACK THE USE OF FUNDS?				✓	There are some activities that are carried out by another organisation, i.e. ESCOM. Quarterly reports and visits are made to monitor usage of funds sub granted to ESCOM.
RISK ASSESSMENT (FUNDS FLOW)	***H***	***S***	***M***	***L***	Circle assessed risk for Subject Area 2
3. Staffing					
3.1 Is the organizational structure of the accounting department appropriate for the level of financial volume? Attach an organization chart.	✓				The organisation structure of the Ministry of Energy is appropriate for the level of financial volume.
3.2 Is the level and competency of staff appropriate for the level of financial volume? Identify the accounts staff, including job title, responsibilities, educational background and professional experience. Attach job descriptions and CVs of key accounting staff.		✓			Except for the Controller of Accounting Services who has a Financal Management Certificate, we were not provided with the job descriptions and CV's of accounts staff and we could not assess the level and competency of the staff.
3.3 Is the implementing partner finance and accounts function staffed adequately?	✓				The finance and accounts function is adequately staffed. The finance staff consists of the Controller of accounting services, the Principal accountant, Accountants, Assistant accountants and accounts assistant. In total they are seventeen finance staff.

SUBJECT AREA	YES	No	N/A	Review	Remarks/Comments
3.4 Are finance and accounts staff adequately qualified and experienced?		✓			Information relating to the qualifications and experience of staff in the finance and accounts department was not.
3.5 Are accounts and finance staff familiar with UN procedures related to cash transfers?		✓			The Ministry has received funding from the UN before and so has had experience in the procedures.
3.6 What is the duration of the contract of finance and accounts staff?	✓				The finance and accounts staff are employed on permanent basis.
3.7 Indicate in the remarks/comments section key positions not contracted yet, and the estimated date of appointment.		✓			The posts of Chief Accountant; Senior Assistant Accountant; Chief Internal Auditor are vacant; but estimated dates of appointment are not known.
3.8 Are staff frequently transferred? At what frequency?	✓				There are no frequent transfers of staff.
3.9 Is there a training policy for the finance and accounting staff? Please describe.	✓				There is no documented training policy in the Ministry.
Risk Assessment (Staffing)	***H***	***S***	***M***	***L***	Circle assessed risk for Subject Area 3
4. Accounting Policies and Procedures					

SUBJECT AREA	YES	No	N/A	Review	Remarks/Comments
4.1 Does the entity have an accounting system that allows for the proper recording of financial transactions from UN Agencies, including the allocation of expenditures in accordance with the respective Components, disbursement categories, and sources of funds?	✓				The Ministry uses Integrated Financial Management System .All the ledgers are maintained at the Accountant General's Office. Parallel manual ledgers are maintained for the other accounts maintained apart from the Government accounts. The recording of the financial transactions from the UN agencies is done in Excel and manual cash books which include the allocation of expenditures in accordance with the respective Components.
4.2 Are controls in place concerning the preparation and approval of transactions, ensuring that all transactions are correctly made and adequately explained?	✓				Section Head fills a form internal requisition order, authorised, confirmation of funds by the accounts dept, stores dept process orders and sources quotations from suppliers. Accounts dept writes a payment voucher. Account assistant responsible for payment voucher, another person posts in the ledger and another authorises and counter signs e.g Principal Accountant, and Deputy Secretary, and not any person from the accounts department. Vouchers are sent to the cash office where cheques are issued and the cheque is signed by the P.S. and another from the Administration dept. Cashier enters them into the cash book and sent to the AG for posting into the cash controls.

SUBJECT AREA	YES	No	N/A	Review	Remarks/Comments
4.3 Is the chart of accounts adequate to properly account for and report on activities and disbursement categories?	✓				The chart of accounts is adequate to properly account for and report on activities and disbursement categories.
4.4 Are cost allocations to the various funding sources made accurately and in accordance with established agreements?	✓				Cost allocations to the various funding sources are made accurately and in accordance with established agreements.
4.5 Are the general ledger and subsidiary ledgers reconciled and in balance?				✓	General ledgers and subsidiary records of the Ministry are in balance.
4.6 Are all accounting and supporting documents retained on a permanent basis in a defined system that allows authorized users easy access?	✓				All accounting and supporting documents of the Ministry are kept in accessible files.
Segregation of Duties					
4.7 Are the following functional responsibilities performed by different units or persons: (a) authorization to execute a transaction; (b) recording of the transaction; and (c) custody of assets involved in the transaction?	✓				There is proper segregation of duties. Authorisation is done by the Principal Secretary. Recording is done by the Accountant General's office. The cheque books are kept at the Accountant General's office. Custody of assets involved in the transaction: Stores department receives and compares receipts and orders.

SUBJECT AREA	YES	No	N/A	Review	Remarks/Comments
4.8 Are the functions of ordering, receiving, accounting for, and paying for goods and services appropriately segregated?	✓				The functions of ordering, receiving and accounting are properly segregated. Ordering is done by the Procurement unit Receiving- stores personnel Payment is done by the Accountant General office in conjunction with accounts department of the Ministry.
4.9 Are bank reconciliations prepared by someone other than those who make or approve payments?	✓				The bank reconciliation for the main account is prepared at the Accountant General's office which is different from those that make approval for payment since payment vouchers are authorised by the Chief Accountant, Chief Court's Administrator and Chief Human Resources Manager. The bank reconciliation for project's account is prepared by the Assistant Accountant and the Controller of Accounting Services checks and approves the reconciliations.
Budgeting System					
4.10 Do the budgets lay down physical and financial targets?	✓				The budgets lay down physical and financial targets.

SUBJECT AREA	YES	No	N/A	Review	Remarks/Comments
4.11 Are budgets prepared for all significant activities in sufficient detail to provide a meaningful tool with which to monitor subsequent performance?	✓				The budgets are prepared for all significant activities in sufficient detail and provide a meaningful tool with which to monitor subsequent performance.
4.12 Are actual expenditures compared to the budget with reasonable frequency, and explanations required for significant variations from the budget?	✓				The actual expenditures are properly compared to the budget.
4.13 Are approvals from variations from the budget required in advance or after the fact?	✓				The approvals from variation are done in advance. The approval is sought from the treasury department before expenditure. For the project the budget is done by the planning dept, the project coordinator and the accounts departments, the approval is sought from the donor e.g. UNICEF by making a further request.
4.14 Who is responsible for preparation and approval of budgets?				✓	They use participatory budgeting system whereby all head of departments come up with their respective department budgets, and then a consolidated budget is done by the Planning Department and sent to the Ministry of finance through Accountant General's office for approval.
4.15 Are procedures in place to plan activities, collect information from the units in charge of the different Components, and prepare the budgets?	✓				The procedures are in place since they use participatory budgeting system.
4.16 Are the plans and budgets of activities realistic, based on valid assumptions, and developed by knowledgeable individuals?	✓				The plans and budgets of activities are realistic and developed by knowledgeable people.

SUBJECT AREA	YES	No	N/A	Review	Remarks/Comments
Payments					
4.17 Do invoice processing procedures provide for: • Copies of purchase orders and receiving reports to be obtained directly from issuing departments? • Comparison of invoice quantities, prices, and terms with those indicated on the purchase order and with records of goods actually received? • Comparison of invoice quantities with those indicated on the receiving reports? • Checking the accuracy of calculations?	✓				Reviewed the payment vouchers and all the payment procedures were followed.
4.18 Are all invoices stamped *PAID*, dated, reviewed and approved, and clearly marked for account code assignment?	✓				Invoices were reviewed and are properly stamped PAID, dated, reviewed and approved and the account code has been clearly marked.
4.19 Do controls exist for the preparation of the payroll and are changes to the payroll properly authorized?	✓				The payroll is prepared at the Accountant General's office any changes such as new employees and others are compiled by the Human resources department in conjunction with the payroll accountants and submitted to the Accountant General's office.
Policies And Procedures					
4.20 Describe the basis of accounting (e.g., cash, accrual)?					The basis of accounting is cash
4.21 Are internationally accepted accounting standards followed? If so, which standard?					Ministry of Energy follows Generally Accepted Accounting Procedures

SUBJECT AREA	YES	No	N/A	Review	Remarks/Comments
4.22 Does the entity have an adequate policies and procedures manual to guide activities and ensure staff accountability?					The Ministry of Energy has in place the Government Financial Accounting Procedures (Desk Instructions) and Treasury Instructions which we reviewed and are adequate.
4.23 Do procedures exist to ensure that only authorized persons can alter or establish a new accounting principle, policy, or procedure to be used by the entity?	✓				The altering or establishment of a new accounting principle, policy or procedure is done by the Accountant General for Desk instructions and the Secretary to the Treasury for Treasury Instruction.
4.24 Are there written policies and procedures covering all routine financial management and related administrative activities? Are these accessible?	✓				There are written policies and procedures manual (desk instruction and Treasury instruction) covering all routine financial management and related administrative activities.
4.25 Do policies and procedures clearly define *conflict of interest* and *related party transactions* (real and apparent) and provide safeguards to protect the organization from them?	✓				The policies and procedures are clearly defined in the Public Procurement Act, Financial Management Act, Corrupt Practices Act,
4.26 Are manuals distributed to appropriate personnel?					The desk instruction and treasury instruction is properly distributed to the appropriate personnel in the accounts department.
Cash and Bank					

SUBJECT AREA	YES	No	N/A	Review	Remarks/Comments
4.27 Indicate in remarks/comments section the names and positions of authorized signatories on the bank accounts.	✓				Authorised bank account signatories for the Ministry are the following: Principal Accountant- Mr. G. Mbewe Controller of Accounting Services- Mr. J.A. Chamdimba Deputy Secretary- Mr. M.M.M. Sibande Principal Economist- Mr H. Chipongwe Deputy Director of Energy- Mr. L. Mhango Director of Finance- Mr. Mavuto (to be included as he has been employed recently).
4.28 Does the implementing partner maintain an adequate, up-to-date cashbook, recording receipts and payments?	✓				The cashbook for the main account is maintained in Integrated Financial Management Systems (IFMIS) at the Accountant General's office. The cashbooks for the projects are maintained in excel and these are regularly updated with receipts and payments.
4.29 Do controls exist for the collection, timely deposit, and recording of receipts at each collection location?	✓				We reviewed the cash receipts and these are timely deposited.
4.30 Are bank and cash reconciled on a monthly basis?					We reviewed the bank reconciliations and these are being prepared monthly.

SUBJECT AREA	YES	No	N/A	Review	Remarks/Comments
4.31 Are all unusual items on the bank reconciliation reviewed and approved by a responsible official?	✓				The bank reconciliations for the other accounts apart from the ones prepared at the Accountant General's office are reviewed by the Chief Accountant.
4.32 Are receipts deposited on a timely basis?	✓				The cash receipts are deposited on time.
Safeguard Over Assets					
4.33 Is there a system of adequate safeguards to protect assets from fraud, waste and abuse?		✓			The Ministry of Energy does not maintain a fixed register
4.34 Are subsidiary records of fixed assets and stocks kept up to date and reconciled with control accounts?		✓			The Ministry of Energy does not maintain the fixed assets register.
4.35 Are there periodic physical inventories of fixed assets and stocks?		✓			There are no periodic physical inventories of fixed assets and stocks.
4.36 Are assets sufficiently covered by insurance policies?		✓			Except for the motor vehicles which are insured under comprehensive insurance cover, the other assets are not insured.
Other Offices or entities[2]*					
4.37 Are there any other regional offices participating in implementation?	✓				Other activities for the Ministry are being implemented by ESCOM.

[2] Other offices or entities refers to sub-offices of the implementing partners and/or respective parties.

SUBJECT AREA	YES	No	N/A	Review	Remarks/Comments
4.38 Has the Implementing Partners established controls and procedures for flow of funds, financial information, accountability, and audits in relation to the other offices or entities? Please describe approval process.	✓				The regional offices maintain bank accounts which are used for banking the receipts collected in the regions. On quarterly basis the regional office compile a quarterly report to the head office.
4.39 Does information among the different offices/Agencies flow in an accurate and timely fashion?	✓				The information among the regional offices flow in an accurate and timely manner.
4.40 Are periodic reconciliations performed among the different offices/Agencies?	✓				For main transactions involving the Ministry of Energy, the regional offices compile the quarterly report which is sent to the head office.
Other					
4.41 Has the implementing partner advised employees, beneficiaries, and other recipients to whom to report if they suspect fraud, waste, or misuse of Agency resources or property?		✓			There is no documented reporting system in cases of fraud, waste or misuse of the Agency's resources or property.
Risk Assessment (Accounting Policies and Procedures)	***H***	***S***	***M***	***L***	Circle assessed risk for Subject Area 4
5. Internal Audit					
5.1 Is there an internal audit department in the entity?	✓				The Ministry of Energy has an Internal Audit Department.

SUBJECT AREA	YES	No	N/A	Review	Remarks/Comments
5.2 What are the qualifications and experience of audit department staff?	✓				The Principal Internal Auditor has a certificate in auditing and 18 years audit experience. The Internal Auditor has a Bachelor's Degree and 7 years audit experience. The Assistant Internal Auditor has a Certificate in Internal Auditing and has worked in the audit department for 20 years.
5.3 Is the internal auditor sufficiently independent to make critical assessments? To whom does the internal auditor report?	✓				The internal auditor reports to the Principal Secretary, NAO, Secretary to the Treasury, the Central Internal Audit Unit.
5.4 Will the internal audit department include the activities financed by the Agencies in its work program?	✓				The internal audit departments work plan includes the activities financed by the Agencies.
5.5 Are actions taken on the internal audit findings?				✓	There is no evidence that actions are taken on the internal audit findings.
Risk Assessment (Internal Audit)	***H***	***S***	***M***	***L***	Circle assessed risk for Subject Area 5
6. External Audit					
6.1 Is the entity financial statement audited regularly by an independent auditor? Who is the auditor?	✓				The financial statements for Ministry of Energy are audited yearly by the National Audit Office.
6.2 Are there any delays in audit of the entity? When are the audit reports issued?	✓				Yes there are delays in the audit; this is because the report is issued upon audit of all government departments.

SUBJECT AREA	YES	No	N/A	Review	Remarks/Comments
6.3 Is the audit of the entity conducted according to the International Standards on Auditing?	✓				The auditors audit the Ministry in accordance with the International Standards on Auditing as well as the International Organisation for Supreme Auditing Institutions (INTOSAI)
6.4 Were there any major accountability issues brought out in the audit report of the past three years?	✓				There was revenue of K718, 300 which was not accounted for by the Ministry, but there is no evidence that this has been resolved.
6.5 Will the entity auditor audit the AWP accounts or will a separate auditor be appointed to audit the AWP financial statements?	✓				The NAO audits the AWP accounts.
6.6 Are there any recommendations made by the auditors in prior audit reports or management letters that have not yet been implemented?		✓			There is no evidence that recommendations have been implemented.
6.7 Has the implementing partner prepared audit plans?	✓				The Ministry has prepared the audit plans.
Risk Assessment (External Audit)	***H***	***S***	***M***	***L***	Circle assessed risk for Subject Area 6
7. Reporting and Monitoring					
7.1 Are financial statements prepared for the entity?	✓				The financial statements are prepared for Ministry.

SUBJECT AREA	YES	No	N/A	Review	Remarks/Comments
7.2 What is the frequency of preparation of financial statements? Are the reports prepared in a timely fashion so as to useful to management for decision making?				✓	The accounts for the Ministry are prepared yearly and Quarterly reports are also prepared and sent to the Ministry of Finance. Monthly reports are also prepared but these are not timely prepared. Financial reports for the project are prepared on quarterly basis and sent to the donor
7.3 Does the reporting system need to be adapted to report on the AWP related expenditure?				✓	The system has already been adapted to report on the AWP related expenditure.
7.4 Does the reporting system have the capacity to link the financial information with the AWP's physical progress? If separate systems are used to gather and compile physical data, what controls are in place to reduce the risk that the physical data may not synchronize with the financial data?	✓				The reporting system has the capacity to link the financial information with the AWP's physical progress.
7.5 Does the Implementing Partner have established financial management reporting responsibilities that specify what reports are to be prepared, what they are to contain, and how they are to be used?	✓				The Ministry of Energy has an established financial management reporting responsibilities.
7.6 Are financial management reports used by management?	✓				The financial management reports are produced on a mid-yearly basis. They are also sent to the Auditor General.
7.7 Do the financial reports compare actual expenditures with budgeted and programmed allocations?	✓				The financial reports do compare the actual expenditures against budgeted amounts.

SUBJECT AREA	YES	No	N/A	Review	Remarks/Comments
7.8 Are financial reports prepared directly by the automated accounting system or are they or are they prepared by spreadsheets or some other means?	✓				The financial reports are prepared directly on the Integrated Financial Management System maintained at the Accountant General office. The financial reports for the projects are maintained on excel.
Risk Assessment (Monitoring and Reporting)	***H***	***S***	***M***	***L***	Circle assessed risk for Subject Area 7
8. Information Systems					
8.1 Is the financial management system computerized?	✓				The Ministry of Energy uses Integrated financial management system
8.2 Can the system produce the necessary financial reports?	✓				The system produces the necessary financial reports.
8.3 Are the staff adequately trained to maintain the system?	✓				The Integrated financial management system is maintained at the Accountant General's office; but for excel all staff are adequately trained.
8.4 Does the management organization and processing system safeguard the confidentiality, integrity, and availability of the data?	✓				The Ministry of Energy maintains the financial records in Integrated financial reporting system maintained at the Accountant General's office and in excel at their office and this information is only accessed by authorised personnel.
Risk Assessment (Information Systems)	***H***	***S***	***M***	***L***	Circle assessed risk for Subject Area 8

ANNEX 9: SAMPLE LETTER OF AGREEMENT FOR A RESPONSIBLE PARTY

SAMPLE LETTER OF AGREEMENT BETWEEN THE GOVERNMENT AND A RESPONSIBLE PARTY (TBD) UNDER NATIONAL IMPLEMENTATION

HOW TO USE THIS AGREEMENT

- This agreement is used when a United Nations agency co-operates in carrying out activities under national implementation. (**It may also be adapted where a United Nations agency undertakes activities under NGO implementation**.)
- The implementing partner prepares this agreement in consultation with the United Nations agency concerned (the signatories to the letter of agreement). Although this is a bilateral agreement between the implementing partner and the UN agency concerned, if required, the UNDP country office can assist with formulating the agreement and liaising with the United Nations agency.
- After counter-signature by UNDP, UNDP keeps one original and provides the [UN Agency] with the other original.

TERMINOLOGY

1. This Agreement utilizes the harmonized terminology in line with the revised financial regulations and rules (FRR) which have introduced new/redefined terms as follows:
   a. 'Execution' is the overall ownership and responsibility for UNDP programme results at the country level which is exercised by the government, through the Government Coordinating Agency by approving and signing the Country Programme Action Plan (CPAP) with UNDP. Therefore, all activities falling within the CPAP are nationally executed.

   b. 'Implementation' is the management and delivery of programme activities to achieve specified results, specifically the mobilization of UNDP programme inputs and their use in producing outputs that will contribute to development outcomes, as set forth in the Annual Work Plans (AWPs).

   These two terms are elaborated under the Legal Framework section of the Programme and Project Management Section of the POPP.

2. It is important to note that at the level of project management, the terms “execution” under the non-harmonized operational modalities, including global and regional projects and “implementation” under the harmonized operational modalities have the same meaning, i.e. management and delivery of project activities to produce specified outputs and efficient use of resources. Therefore, this Agreement uses the term “implementation” in line with the “harmonized operational modalities” to cover also at the project level the term “execution” under the non-harmonized operational modalities. More specifically, all references to “Executing Agency” have been replaced with “Implementing Partner”.

3. When using this Letter of Agreement in non-harmonized or non-CPAP countries, change the following terms as follows:
   a. Execution instead of Implementation

   b. Executing Entity instead of Implementing Partner

Dear [*name of head of United Nations agency*],

1. Reference is made to consultations between officials of the [*insert name of the government implementing partner for the project*] (hereinafter referred to as "*the implementing partner* ") and officials of the [*name of United Nations agency*] ("the United Nations agency") with respect to the participation of the [*name of the United Nations agency*] in the UNDP support to project [*number and title of project*], to be managed by the Government. The latter shall be represented for the purpose of such management by the implementing partner; [*name of the government implementing partner*].

2. The implementing partner recognises that [*insert name of the United Nations agency*] enjoys privileges and immunities under the Convention on the Privileges and Immunities of the Specialised Agencies, to which the Government of [*programme country*] became a signatory on [*insert date of signature of the Convention; information available with BOM/OLPS*].

3. In accordance with the programme support document or project document and with the following terms and conditions, we confirm our acceptance of the services to be provided by the United Nations agency towards this programme or project. Close consultations will be held between the United Nations agency and the implementing partner on all aspects of the services to be rendered as described in Attachment 1: Description of services of this letter of agreement.

4. The United Nations agency shall provide the services and facilities described in Attachment 1: Description of services of this letter of agreement.

5. The implementing partner shall retain overall responsibility for the UNDP support to the project and shall designate a project co-ordinator [*National Director or other title of this official*].

6. The personnel assigned by the United Nations agency to the project, and under contract with the United Nations agency shall work under the supervision of the project co-ordinator. The supervisory arrangements shall be determined in mutual consultation and described in the relevant terms of reference of the personnel. This personnel shall remain accountable to the United Nations agency for the manner in which assigned functions are discharged.

7. In the event of disagreement between the project co-ordinator and the project personnel of the United Nations agency, the project co-ordinator shall refer the matter under dispute to the United Nations agency for the purpose of finding a satisfactory solution. In the interim, the decisions of the project co-ordinator shall prevail.

8. Upon signature of this letter of agreement and pursuant to the budget of the project document and the work plan, the implementing partner agrees that UNDP headquarters will advance funds to the United Nations agency, according to the schedule of payments specified in Attachment 2: Schedule of services, facilities and payments.

9. The United Nations agency shall submit a cumulative statement of expenditure each quarter (31 March, 30 June, 30 September and 31 December). The statement will be submitted to the implementing partner through the UNDP resident representative within 30 days following those dates. The format will follow the standard expenditure report of the United Nations agency, unless otherwise agreed to between the parties

[in which case the format will be attached to this agreement]. The implementing partner will include the expenditure reported by the United Nations agency in the financial report.

10. The United Nations agency shall recost and rephase the schedule of services and facilities described in Attachment 2, as necessary, when submitting the statement of expenditure to the implementing partner. The United Nations agency may incur expenditures that exceed its assigned annual budget by four per cent or by US$20,000.00, whichever is higher, in order to cover differences between actual and pro-forma costs. The implementing partner shall adjust its financial records and confirm the revision submitted by the United Nations agency.

11. The United Nations agency shall submit such reports relating to the project as may reasonably be required by the project co-ordinator in the exercise of his or her duties.

12. The United Nations agency shall provide the implementing partner with an annual report of non-expendable equipment purchased by the United Nations agency for the project. The report shall be submitted within 30 days following 31 December, and shall be included by the Government implementing partner in the main inventory for the project.

13. The United Nations agency shall submit job descriptions and candidates for the posts foreseen in section 1 of Attachment 2 and obtain clearance of the Government implementing partner for the personnel to be assigned to the project.

14. Any changes to the programme support document or project document which would affect the work being performed by the United Nations agency in accordance with Attachment 1 shall be recommended only after consultation with the United Nations agency. Any changes to these arrangements shall be effected by mutual agreement through an amendment to this letter of agreement.

15. The arrangements described in this agreement will remain in effect until the end of the project, or the completion of activities of the United Nations agency according to Attachment 2, or until terminated in writing by either party. The schedule of payments specified in Attachment 2 remains in effect based on continued performance by the United Nations agency unless UNDP receives written indication to the contrary by the implementing partner.

16. For any matters not specifically covered by this agreement, the appropriate provisions of the project document and revisions thereof and the appropriate provisions of the financial regulations and rules of the United Nations agency shall apply.

17. All further correspondence regarding this agreement, other than signed letters of agreement or amendments thereto should be addressed to [*name and address of implementing partner official*].

18. The implementing partner and the United Nations agency shall keep the UNDP Resident Representative fully informed of all actions undertaken by them in carrying out this agreement.

19. Except as provided in paragraph 6 above, any dispute between the implementing partner and the United Nations agency arising out of or relating to this letter which is not settled by negotiation or other agreed node of settlement, shall, at the request of either party, be submitted to a Tribunal of three arbitrators. Each party shall appoint one arbitrator, and the two arbitrators so appointed a third arbitrator,

who shall be the chairperson of the Tribunal. If, within 15 days of the appointment of two arbitrators, the third arbitrator has not been appointed, either party may request the President of the International Court of Justice to appoint the arbitrator referred to. The Tribunal shall determine its own procedures, provided that any two arbitrators shall constitute a quorum for all purposes, and all decisions shall require the agreement of any two arbitrators. The expenses of the Tribunal shall be borne by the Parties as assessed by the Tribunal. The arbitral award shall contain a statement of the reasons on which it is based and shall be final and binding on the parties.

20. The implementing partner shall handle and be responsible for any third-party claim or dispute arising from operations under this agreement against UNDP or the United Nations agency, their officials or other persons performing services on their behalf, and shall hold them harmless in respect of such claims or disputes. The foregoing provision shall not apply where the parties agree that a claim or dispute arises from the gross negligence or willful misconduct of the above-mentioned individuals.

If you are in agreement with the provisions set forth above, please sign and return to this office two copies of this letter. Your acceptance shall thereby constitute the basis for your organisation's participation in the project.

Yours sincerely,

For the implementing partner of [*country*]

[*Name and title*]

[*Date*]

Signed on behalf of the [United Nations agency]

[*Name and title*]

[*Date*]

Attachment 1

DESCRIPTION OF SERVICES

Project number: Project title:

Work to be performed by the United Nations agency:

Provide a summary of the results to be achieved by the United Nations agency, particularly the outputs they are expected to produce. Explain also the activities to be carried out by the United Nations agency.

Description of services:

Provide a detailed description of the projects inputs by Component. This may include identifying candidates for project posts based on terms of reference provided by the Government-implementing partner or recruiting already identified candidates.

Annexes:

Attach, as appropriate, job descriptions for consultants, terms of reference for contracts, technical specifications for equipment items, training nomination forms, etc.

Attachment 2

SCHEDULE OF SERVICES, FACILITIES AND PAYMENTS

				Estimated expenditure by year		Schedule of payments	
Section	Budget line	Work months	Total costs	Year 1	Year ...n	Year 1	Year ...n
Section 1 : Personnel							
Section 2 : contracts							
Section 3 : Training							
Section 4 : Equipment							
Section 5 : Miscellaneous							
Section 6: Micro-capital grants							
Total							

Note:

- Expenditures for personnel services may be limited to salary, allowances and other entitlements, including the reimbursement of income taxes due and travel costs on appointment to the project, duty travel within the programme country or region and repatriation costs.
- The implementing partner shall be responsible for providing miscellaneous services such as secretarial assistance; postage and cable services and transportation as may be required by the United Nations agency personnel in carrying out their assignment.
- Adjustments within each of the sections may be made in consultation between the implementing partner and the United Nations agency. Such adjustments may be made if they are in keeping with the provisions of the programme support document or project document and if they are found to be in the best interest of the programme or project.

ANNEX 10: GEF CLIMATE CHANGE MITIGATION TRACKING TOOL

(Sent under separate cover)