



REQUEST FOR CEO ENDORSEMENT

PROJECT TYPE: MEDIUM-SIZED PROJECT

TYPE OF TRUST FUND: GEF TRUST FUND

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PART I: PROJECT INFORMATION

Project Title: Increasing Access to Clean and Affordable Decentralized Energy Services in Selected Vulnerable Areas of Malawi			
Country(ies):	Malawi	GEF Project ID: ¹	5587
GEF Agency(ies):	UNDP	GEF Agency Project ID:	5270
Other Executing Partner(s):	Ministry of Natural Resources, Energy and Mining – Department of Energy Affairs (DEA), Mulanje Electricity Generation Agency (MEGA)	Submission Date:	October 20, 2014
		Resubmission date:	December 1, 2014
GEF Focal Area (s):	CC Mitigation	Project Duration(Months)	48
Name of Parent Program (if applicable):	N/A	Project Agency Fee (\$):	163,875
<ul style="list-style-type: none"> ➤ For SFM/REDD+ <input type="checkbox"/> ➤ For SGP <input type="checkbox"/> ➤ For PPP <input type="checkbox"/> 			

A. FOCAL AREA STRATEGY FRAMEWORK²

Focal Area Objectives	Expected FA Outcomes	Expected FA Outputs	Trust Fund	Grant Amount (\$)	Co-financing (\$)
CCM-3: Renewable Energy: Promote investment in renewable energy technologies	<p>Outcome 3.1: Favorable policy and regulatory environment created for renewable energy investments</p> <p>Outcome 3.2: Investment in renewable energy technologies increased</p>	<p>Output 3.1: Renewable energy policy and regulation in place</p> <p>Output 3.2: Renewable energy capacity installed</p> <p>Output 3.3: Electricity and heat produced from renewable sources</p>	GEF TF	1,725,000	22,785,000
Total project costs				1,725,000	22,785,000

B. PROJECT FRAMEWORK

Project 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, social enterprises and civil society.						
Project Component	Grant Type	Expected Outcomes	Expected Outputs	Trust Fund	Grant Amount (\$)	Confirmed Co-financing (\$)
1. Expansion of the Mulanje Electricity Generation Agency (MEGA) Micro Hydro Power Plant (MHPP) and mini-grid scheme	TA/INV	- Increasing the installed capacity of the MEGA's MHPP ³ scheme to 216 kWp by end of project	1.1 Construction and commissioning of 80 kWp Lujeri MHPP.	GEF TF	300,000 (INV) 230,00 (TA) = 530,000	7,529,000

¹ Project ID number will be assigned by GEFSEC.

² Refer to the [Focal Area Results Framework and LDCE/SCCF Framework](#) when completing Table A.

³ Micro-hydro power plant (MHPP)

		<p>- Achieving MEGA's business plan target of increasing the aggregate household energy savings among the customer base of US\$296,560 per year by 2017/2018⁴</p>	<p>1.2 Yearly energy output of 315,360 kWh/year from the Lujeri.MHPP⁵.</p> <p>1.3 MEGA strengthened institutionally through increased staff capacity with electrical engineering and financial management capabilities.</p> <p>1.4 MEGA develops and implements strategies for fully cost-reflective tariffs in all their plants, increasing productive use and revenues to establish itself as a viable social enterprise.</p>			
2. Replication of MEGA model via piloting of new mini-grid schemes in other areas of Malawi	TA/ INV	<p>- Investment in at least 84 kWp installed capacity of mini-grid schemes established, using a Build-Own-Operate (BOO) Public Private Partnership (PPP) model</p> <p>-Increased aggregate household energy savings among the customer base of US\$55,711 per year from the schemes</p>	<p>2.1 Construction and commissioning of at least 84 kWp of clean energy capacity for mini-grid rural electrification.</p> <p>2.2 Yearly renewable energy output of at least 294,336 kWh/year from the mini-grids supported⁶.</p> <p>2.3 Strengthened institutional capacity of mini-grid BOO operators through establishment of innovative payment systems and training on O&M.</p>	GEF TF	300,000 (INV) 190,000 (TA) = 490,000	11,929,000

⁴ Applies to all MEGA-operated MHPPs – See Section A.5 – Description of Component #1

⁵ The capacity factor for micro-hydro has been taken as 45% based on ESMAP data (2007).

⁶ It is estimated (conservatively) that the targeted mini-grids to be supported under Component #2 will be using wind-solar hybrid technology and the electricity generation outputs have been calculated according – see Section A.5 – Description of Component #2

			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.			
3. Institutional strengthening and capacity building for promotion of decentralized mini-grid applications across the country	TA	<p>-Increased capacity of key stakeholders, especially at the sub-national levels to effectively plan and implement clean energy mini-grids</p> <p>-Increased awareness about relevant business models, policy/regulatory issues, and financing of mini-grids in the Malawian context</p> <p>-Improved policy and regulatory environment to facilitate the sustainable development of mini-grids in Malawi</p>	<p>3.1 Establishment of a web-based information clearing house for mini-grid stakeholders.</p> <p>3.2 Training of 300 national, district, area and village level stakeholders in mini-grid development in all 28 districts (at least 30% of the participants will be women) and preparation of at least 5 area-based electrification plans for clean energy mini-grids.</p> <p>3.3 Review and proposed revisions to the current rural electrification and energy regulation laws⁷ to mainstream mini-grids into rural electrification efforts.</p> <p>3.4 Development and dissemination of case studies and a toolkit on mini-grids.</p>	GEF TF	565,000	2,979,000
Subtotal					1,585,000	22,437,000
Project management Cost (PMC) ⁸				(select)	140,000	348,000
Total project costs					1,725,000	22,785,000

⁷ Proposed amendments to the Rural Electrification and Energy Regulation Acts that if adopted will make mini-grid based electrification eligible for finance from the Rural Electrification Fund.

⁸ PMC should be charged proportionately to focal areas based on focal area project grant amount in Table D below.

C. SOURCES OF CONFIRMED CO-FINANCING FOR THE PROJECT BY SOURCE AND BY NAME (\$)

Sources of Co-financing	Name of Co-financier (source)	Type of Co-financing	Co-financing Amount (\$)
National Government	Ministry of Natural Resources, Energy and Mining – Department of Energy Affairs (DEA)	In-kind	800,000
National Government	Ministry of Natural Resources, Energy and Mining – Environmental Affairs Department (EAD)	In-kind	290,000
National Government	Malawi Energy Regulatory Authority (MERA)	In-kind	200,000
Multilateral Donor	World Bank	Cash	11,000,000
Bilateral Donor	Scottish Government	Cash	1,110,000
Bilateral Donor	Business Innovation Facility – Malawi/ UK DfID	Cash	850,000 ⁹
Bilateral Donor	Japanese International Cooperation Agency (JICA)	Cash	800,000
NGO-owned Social Enterprise	Mulanje Electricity Generation Agency (MEGA)	Cash	1,700,000
NGO	Practical Action (PA)	Cash	4,050,000 ¹⁰
NGO	Mulanje Mountain Conservation Trust (MMCT)	Cash	100,000
NGO	Green Valley Action (GREVA)	Cash	40,000
GEF Agency	UNDP – Sustainable Energy Management (SEM) Project	Cash	1,845,000
Total Co-financing			22,785,000

D. TRUST FUND RESOURCES REQUESTED BY AGENCY, FOCAL AREA AND COUNTRY¹

GEF Agency	Type of Trust Fund	Focal Area	Country Name/ Global	(in \$)		
				Grant Amount (a)	Agency Fee (b) ²	Total c=a+b
UNDP	GEF TF	Climate Change	Malawi	1,725,000	163,875	1,888,875
Total Grant Resources				1,725,000	163,875	1,888,875

¹ In case of a single focal area, single country, single GEF Agency project, and single trust fund project, no need to provide information for this table. PMC amount from Table B should be included proportionately to the focal area amount in this table.

² Indicate fees related to this project.

F. CONSULTANTS WORKING FOR TECHNICAL ASSISTANCE COMPONENTS:

Component	Grant Amount (\$)	Co-financing (\$)	Project Total (\$)
International Consultants	110,000	407,800	517,800
National/Local Consultants	440,000	1,631,200	2,071,200

G. DOES THE PROJECT INCLUDE A “NON-GRANT” INSTRUMENT? No

(If non-grant instruments are used, provide in Annex D an indicative calendar of expected reflows to your Agency and to the GEF/LDCF/SCCF/NPIF Trust Fund).

PART II: PROJECT JUSTIFICATION

A. DESCRIBE ANY CHANGES IN ALIGNMENT WITH THE PROJECT DESIGN OF THE ORIGINAL PIF¹¹

A.1 National strategies and plans or reports and assessments under relevant conventions, if applicable, i.e. 1 NBSAPs, national communications, TNAs, NCSA, NIPs, PRSPs, NPFE, Biennial Update Reports, etc.

⁹ Converted at 1.7 £ to USD

¹⁰ Converted at 1.35 € to USD

¹¹ For questions A.1 –A.7 in Part II, if there are no changes since PIF and if not specifically requested in the review sheet at PIF stage, then no need to respond, please enter “NA” after the respective question.

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N/A - This project is informed by and supportive of all of the relevant national energy and climate change policies already described in the PIF.

A.2. GEF focal area and/or fund(s) strategies, eligibility criteria and priorities.

N/A

A.3 The GEF Agency's comparative advantage:

N/A – The only relevant update since PIF approval is the project's alignment with the new UNDP Strategic Plan (SP) (2014-2017) and the specific relevance of the project to SP Outcome 1: 'Growth and development are Inclusive and sustainable, incorporating productive capacities that create employment and livelihoods for the poor and excluded' and Output 1.5 'Inclusive and sustainable solutions adopted to achieve increased energy efficiency and universal modern energy access (especially off-grid sources of renewable energy)'.

A.4. The baseline project and the problem that it seeks to address:

The PIF already provided a detailed description of the baseline situation, sectoral barriers, and the problem to be addressed; all of this remains valid. The following updates to the barriers described in the PIF are worth highlighting:

First, a major challenge to clean energy mini-grids remains the mobilization of the initial upfront investment capital for the mini-grid generation and distribution system. As the country's first vertically-integrated IPP and mini-grid operator, MEGA has thus far mainly relied on development assistance funds for their initial capital investments. Under current financial market conditions in Malawi where the cost of access and servicing debt capital is extremely high, it is not viable at present to use fully commercial sources to mobilize investment in capital expenditures for mini-grids, especially when one considers the economies of scale needed to successfully operate a viable energy enterprise with revenue from ratepayers. 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 served by MEGA make significant savings on their baseline energy expenditure from mini-grids compared to BAU alternatives. Under MEGA tariff rates (adjusted annually for inflation) and assuming future economies of scale as regards other MHPPs coming on board in the coming years, it is expected that MEGA will be able to cover its cost of operations and maintenance from electricity sales revenue by 2018/19. The latest status of MEGA is described in details in Section A.5 – Component #1 and the potential for similar models in described in Component #2.

Secondly, the current GoM rural electrification act considers only two technology options for official government support – grid extension and solar home systems – and does not include clean energy mini-grids as an option. The Rural Electrification fund (REF) is similarly limited to supporting these two rural electrification options. At present rural electrification investments by the Malawi Rural Electrification Project (MAREP) – which aims at extending electricity grid to rural area and is locally funded through an energy fund derived from fuel levy – have centered on ESCOM-led grid expansion and were not open to NGO and private entities. This practice has now changed in the MAREP phase 7 to allow private participation in certain parts of infrastructure delivery but still does not apply to mini-grids. This has meant that entities such as MEGA and other CSOs and ESCOs have not been able to offer decentralized mini-grid services as electrification options under MAREP. Meanwhile countries such as neighboring Tanzania have simplified the regulatory framework for independently operated mini-grids below 1 MW and accommodated them under revised government policies. A simplified regulatory framework and licensing process for mini-grids in Malawi will allow for more private entities to work with the government on a Public-Private-Partnership (PPP) mode augmenting other parallel on-grid and off-grid efforts. This is described in detail in Section A.5 under Component #3.

As noted in the PIF, 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 DEC's, ADC's and VDC's do not have an understanding and awareness of clean energy mini-grids and rural electrification options. Capacity building at the district level for DEC's as well as the ADC's and VDC's 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 the 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 mini-grid policy, regulation, technology, business and ownership models. There is 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 centers; 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 a very valuable for policy makers and developers and will facilitate the development of more clean energy Mini-grids. . CONREMA has already started the process of developing an information base of clean energy projects in Malawi and this output will build on this existing work and will involve collaboration with various partners. All of this is described in further details in Section A.5 – Component #3.

Baseline co-finance

These descriptions of the baseline projects largely remain valid. However, in the period since the submission of the PIF there have been several developments in the baseline activities relevant to the project, most of which have been positive. 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.

There have been changes in the details and status of several baseline projects and certain project budgets have been expended since PIF approval while other NGO projects listed in the PIF have finished; however overall co-financing for this project has increased significantly. Table 1 below summarizes the changes in co-finance from the PIF stage to CEO Endorsement Request (these changes are also described in the UNDP Project Document in Section 2.3 – Baseline Analysis). Please note that as of July 2014, the new presidential administration in Malawi merged the Ministry of Energy and Ministry of Environment and Climate Change Management into the new Ministry for Natural Resources, Energy and Mining. However the departments which are the project partners i.e. the Department of Energy Affairs and Environmental Affairs Department have been preserved. There is no aggregate change in co-financing from government since the PIF but rather a reorganization with the co-finance indicated against the new ministry name and the department. Similarly the energy regulator – Malawi Energy Regulatory Authority (MERA) – has transferred its co-finance to a cash contribution from an in-kind contribution indicated at the PIF stage. Table 1 below explains **material changes** in co-finance between the PIF and the CEO endorsement stage and/or important updates in baseline activities:

Table 1 – Material changes in co-finance from PIF to CEO Endorsement Request (by donor/funding source)

Source of Co-Financing	PIF Amount (US \$)	Actual Amount at CEO ER (US \$)	Description
National Government (Department of Energy Affairs - DEA)	\$800,000	\$800,000	Malawi Rural Electrification Project (MAREP) is the flagship rural electrification program 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 has been implemented by DEA with financial and technical assistance from JICA. The approach of MAREP is to electrify trading centers or market places in a phased manner. Currently MAREP is in its 7th phase which will be completed in 2015 where 81 additional trading centers 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 centers. 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 centers which will be electrified is being finalized.

Source of Co-Financing	PIF Amount (US \$)	Actual Amount at CEO ER (US \$)	Description
			DEA co-finance support for this project is linked to various activities done in conjunction with the UNDP Malawi Project Support Document: <i>Sustainable Energy Management Support to Malawi</i> (which is partially financed – see section on UNDP) and contributions in staff, office space and administrative support for the project management unit, as well as the appointment of a national project director.
Local Government	90,000	90,000 (included by EAD)	As per the previous practice followed by the Environmental Affairs Department (EAD) in Malawi for past GEF projects, the co-financing from the relevant local government councils is now included in the co-finance letter from the EAD, rather than specified in separate letters from the local councils.
The World Bank	2,900,000	11,000,000	<p>The 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 that project is to strengthen ESCOM's electricity network and its expansion to un-electrified areas. The World Bank grant to this project is \$ 65.4 million with an additional soft loan of \$19.3 million. The value of the baseline activities supported by the World Bank (WB) under the Energy Sector Support Project is more significant than estimated at the PIF stage. The WB is now supporting pre-feasibility, investment, and environmental and social impact assessments for three large-scale hydro power plants which will indirectly support rural electrification in Malawi. The WB is also supporting wind and solar energy resource assessments in Malawi which can improve the feasibility analysis of the planned mini-grids under Component 2. There is also the possibility to link the meta data that will originate from the WB resource assessments to the information clearing house output under Component 3. The increased level of activities and additional resources from the WB will directly and indirectly support and strengthen the project objective and outcomes.</p> <p>The portion of the overall project budget with direct linkages to this project is \$11 million USD.</p>
Government of Scotland	3,000,000	1,110,000	<p>The Scottish Government continues to be among the most prominent supporters of decentralized energy technologies in Malawi and is an important partner in this project. They funded the first Community Energy Malawi Conference in early 2014 as part of the MREAP programme (see below) and in July 2014 the Scottish Government hosted the European Launch of the UN Decade of Sustainable Energy for All, in partnership with the SE4All Global Facilitation Team. They have confirmed their activities on increasing access to clean and affordable decentralized energy services in selected vulnerable areas of Malawi as follows:</p> <ul style="list-style-type: none"> • Malawi Renewable Energy Acceleration Programme (MREAP), for which they have granted a final extension year to the original £1.7M project (this was mentioned in the PIF). That extension of £349,878, for 2014-15, is again being funded through the Scottish Government's International Development Fund); • Renewable Energy Kiosk Project – installation of solar-powered battery rental and charging stations to benefit approximately 6,000 people (£135,496 in 2014-15, funded through the Scottish Government's International Development Fund); and • Energy Policy Seconded to Government of Malawi Department of Energy Affairs to support the development of Malawi's first

Source of Co-Financing	PIF Amount (US \$)	Actual Amount at CEO ER (US \$)	Description
			<p>dedicated Renewable Energy Strategy (approximately £180,000 for 2015-17).</p> <p>The confirmed overall monetary value of their activities budgeted during the envisioned project period (2014-2018) is approximately £665,374 (approx. US\$1,110,000).</p> <p>Additionally the Scottish Government's potential future plans in this area include announcements of successful applicants of their most recent International Development Fund Malawi Development Programme 2015-18 Funding Round early in 2015. For this new Malawi round, their individual project budgets are will be a maximum of £600,000 over 3 years, and the total Fund is £13,890,000 over 3 years, focused across the 4 themes of sustainable economic development (including renewable energy), education, health and civic governance.</p> <p>As the above funding round is open to renewable energy-related projects, there is a good possibility that they will fund further renewable energy-related projects in Malawi over the anticipated timespan of the GEF project. However for conservative purposes we have only listed confirmed co-financing from the Scottish Government at this moment in time (\$1.1 million USD); the final support for baseline activities by the Scottish government could be much higher, depending on the outcome of future funding rounds. These additional funding windows and their eligibility as co-finance will be tracked during the project.</p>
UK Department for International Development, Business Innovation Facility (BIF)	2,000,000	850,000	<p>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. 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.</p> <p>As indicated in the PIF, the Phase II strategy for the Business Innovation Facility (BIF) has now been finalized. The expected new allocation for renewable energy and energy access efforts in Malawi is smaller what was originally indicated at the PIF stage. BIF support will primarily focus on Pico-solar lighting products and will supplement the mini-grid efforts under the project. In the past year BIF has been instrumental in the launch of "Cooperation Network for Renewable Energy in Malawi (CONREMA)."</p>
Japanese International Cooperation Agency	200,000	800,000	<p>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 DEA.</p> <p>JICA continues to be a key supporter of renewable energy in Malawi and intends to expand its role in the sector via support for a 21.8 MW hydro power plant at Tedzani for which detailed feasibility studies are now being undertaken. The current co-finance indicated by JICA in their letter only relates to the advisory support being provided to DEA (funding for a technical</p>

Source of Co-Financing	PIF Amount (US \$)	Actual Amount at CEO ER (US \$)	Description
			advisor within DEA) and not to any future support for the capital expenditures associated with the Tedzani hydro plant under development. Additional JICA co-finance for the plant will be tracked during project implementation.
Mulanje Energy Generation Agency	542,000	1,700,000	The value of MEGA co-financing during the project period is higher than the value estimated at the PIF stage due to additional rounds of successful fund-raising. This updated figure includes both donor contributions and MEGA internal sources. Additional details can be found in Section A.5.
Practical Action (PA)	250,000	4,050,000	Practical Action, which has been and will continue to be a primary supporter and technical partner of MEGA, has recently received EU funding under a new project entitled “Sustainable Energy for Rural Communities (SE4RC) for Malawi and Zimbabwe” which will focus on mini-grids and energy kiosks. 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 facilitating environment for agricultural productivity improvements through energy and market access mechanisms. The project has a financing outlay of €7.1 million ¹² but only a portion of that will go to Malawi. This new EU commitment has significantly increased the co-financing that Practical Action is providing to the project, which will complement ongoing support to MEGA already budgeted from other PA resources.
World Future Council	40,000	40,000 (from GREVA)	World Future Council (WFC) supports activities in Malawi through its local partners since it does not have a local presence. They have been working through local NGOs such as Green Valley Action (GREVA), whose Executive Director coordinates WFC activities in Malawi. In consultation with WFC, GREVA has provided the co-financing letter confirming a similar value as presented in the PIF. Therefore this is a case where the co-financing value remains the same but the co-financing entity has changed due to WFCs working modalities in Malawi.
UNDP	2,400,000	1,845,000	UNDP remains committed to this project via their UNDP Malawi Project Support Document: Sustainable Energy Management Support to Malawi. While the Private Sector Development (PSD) project of UNDP Malawi is progressing well, the focus of PSD is currently in the agricultural sector and current plans indicate an intention to scale-up activities in that area with new donor funding. A proposed plan to expand their focus to work on clean energy issues is currently on hold and therefore the funding under UNDP PSD will not be available to co-finance the project.
Mulanje Mountain Conservation Trust (MMCT)	0	100,000	MMCT are a Malawian environmental endowment trust which has received GEF financing in the past for the Mulanje Mountain Biodiversity Conservation Project implemented by the World Bank. MMCT works in collaboration with Department of Forestry and other stakeholders in facilitating the raising of people's awareness, involvement and understanding of the importance of the conservation and responsible management of the biodiversity and natural resources in the Mulanje Mountain Forest Reserve and to ensure equitable sharing of benefits thereof. MMCT also works in

¹² With a EU co-financing of €5.3 million
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Source of Co-Financing	PIF Amount (US \$)	Actual Amount at CEO ER (US \$)	Description
			collaboration and partnership with various government departments, non-governmental organizations, community-based organizations, schools, youth groups, faith organizations, individuals and institutions with similar objectives to the Trust or with interest in Mulanje Mountain and its unique forest reserve. MMCT has 100% ownership of MEGA and as the parent entity is supporting MEGA to raise additional resources to scale-up its mini-grid based activities. In addition to the support for MEGA already mentioned, MMCT has reportedly been discussing with a number of international donors in Europe (including the Government of Norway) for additional support to MEGA's MHPP and Mini-grid activities. MMCT will be providing additional (new) co-financing to support MEGA which was not envisioned at the PIF stage.
Total	12,622,000	22,785,000	Overall increase of 81% from CEO ER to PIF

Although not listed as co-finance, it is also worth noting that Power Sector Revitalization 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. The MCC compact will invest in power sector reforms and infrastructure development, including transmission and distribution upgrades and extension.

In summary, overall the baseline co-finance investments for the project have increased significantly from the PIF stage and have increased from \$ **12,622,000** at the PIF stage to \$ **22,785,000**, **an overall increase of 81%.** This currently represents a co-financing ratio of over **13:1** (co-finance to the GEF grant). This increase in co-finance is a confirmation of the level of engagement and support that UNDP received during the formulation of the GEF project from all the partners and stakeholders.

A.5. Incremental /Additional cost reasoning: describe the incremental (GEF Trust Fund/NPIF) or additional (LDCF/SCCF) activities requested for GEF/LDCF/SCCF/NPIF financing and the associated global environmental benefits (GEF Trust Fund) or associated adaptation benefits (LDCF/SCCF) to be delivered by the project:

The PIF provides a description of many of the activities and strategies to be supported by GEF. However, following the detailed analyses and consultation undertaken during the project formulation stage, the activities and outputs have been revised in certain parts and further elaborated. The budgetary allocations among the three Components have more or less remained the same with relatively small changes in allocations (+/- 20%); the main change has been a reduction in the budget for Component #2 and a re-allocation of those resources to Component #3. A summary of the budget allocations (disaggregated by component) at PIF stage versus the Project Document are provided below:

Component	GEF Funds at PIF stage (US\$)	GEF Funds at CEO Endorsement (US\$)
Component 1: Expansion of the Mulanje Electricity Generation Agency (MEGA) MHPP scheme	500,000	530,000
Component 2: Replication of MEGA model via piloting of new mini-grid schemes in other areas of Malawi	600,000	490,000

Component 3: Institutional strengthening and capacity building for promotion of decentralized mini-grid applications across the country	485,000	565,000
Project Management	140,000	140,000
Total	1,725,000	1,725,000

The overall approach and the nature of the outcomes remain consistent with those set out in the PIF. The pro-rated costs of a TA adviser have been distributed across the three project components. There is no overall change in the GEF funds earmarked for investment at the PIF stage versus TA or funds for project management.

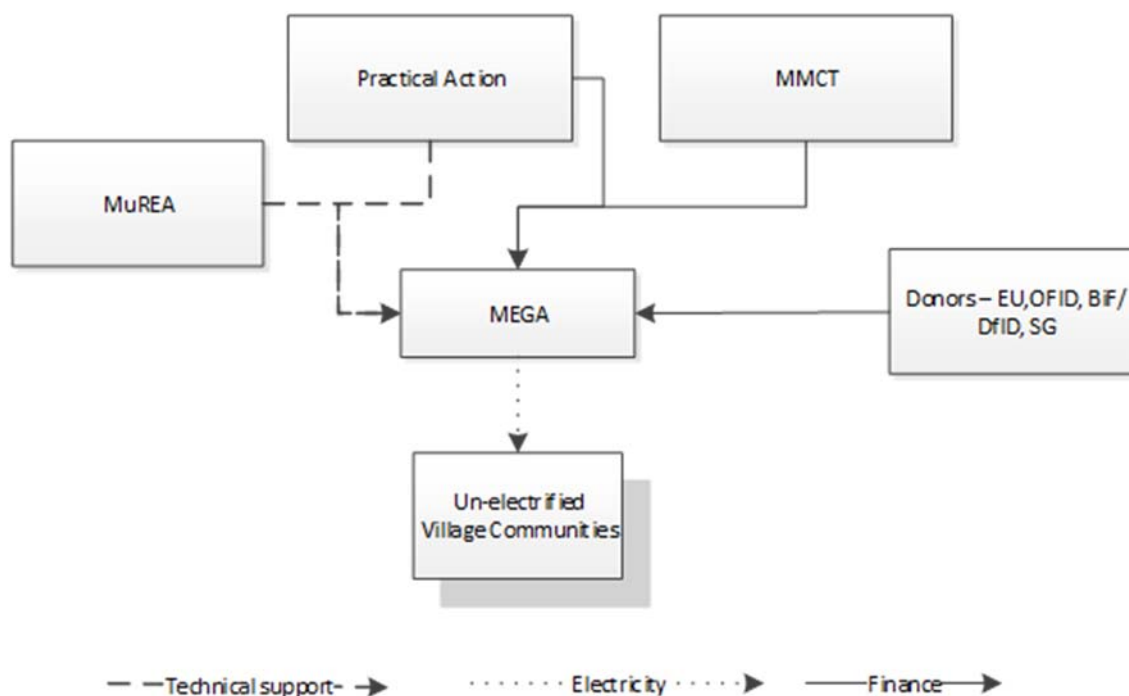
The change/revision of outputs (compared to the PIF) is limited in scope and is summarized in the following paragraphs. Additional details on each of the components are available in the UNDP Project Document (Sections 4 - 6). A summary of the change in outputs in the Project Document vis-à-vis the PIF is provided in a table format at the end of this section.

Component 1: Expansion of the Mulanje Electricity Generation Agency (MEGA) Micro Hydro Power Plant (MHPP) and mini-grid scheme

This component provides GEF funds to “incrementally” contribute to the scale-up and sustainable viability of MEGA, Malawi’s first IPP and most pioneering mini-grid operator. MEGA has been established by and is wholly owned by the NGO Mulanje Mountain Conservation Trust (MMCT)¹³, with Practical Action (PA) contracted as a technical partner. The Mulanje Renewable Energy Agency (MuREA) provides local energy and engineering related technical services to MEGA. As stated earlier MMCT are a Malawian environmental endowment trust which has received GEF financing in the past for the Mulanje Mt. Biodiversity Conservation Project. MMCT works in collaboration with the Department of Forestry and other stakeholders on conservation and responsible management of the biodiversity and natural resources in the Mulanje Mountain Forest Reserve. MMCT believes that sustainable development is at the heart of conservation efforts; hence it pursues its mission to facilitate responsible management of the mountain's resources by involving the communities around the reserve whose livelihoods are dependent on its resources. MMCT believes that solutions to conservation issues must involve local people and they should acknowledge the importance of the mountain and the forest reserve to them. The financing and partnership structure of MEGA is shown in Figure 1 below:

¹³ MEGA is 99.99% owned by MMCT. MEGA is a Limited Company, duly registered.
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Figure 1 – Schematic Diagram of MEGA-related stakeholders



MEGA has previously received financial support from OFID and business planning support from DfID through BiF. PA continues to provide technical support to MEGA and in partnership with Sgurr Energy have submitted a proposal to the Scottish Government’s Malawi Funding Round to fund one of their micro-hydro powered mini-grids¹⁴. MEGA’s business plan is to use donor funding to finance the investment and operational costs of establishing at least five (5) Clean Energy Mini-grids by 2018 (one MHPP, Bondo, is already under operation). MEGA is projected to reach economies of scale and operational self-sufficiency in 2019 when profits from their electricity tariffs will enable it to fully cover its operational costs on a self-sustaining basis. As a socially-oriented entity, MEGA does not seek to maximise profits but rather balance the pricing of its electricity tariffs in such a way that allows it to meet the social objective of offering low-cost electricity and also operating as a financially-viable enterprise. More information on MEGA is available in the UNDP Project Document Sections 2 and 4.

The first and second outputs under this component at the PIF stage envisaged support for two (2) MEGA micro-hydro power plants and mini-grids of 40 KW each totalling 80 kW. However during the project formulation and based on further development of the MEGA business plan and the feasibility investigations done by MEGA since PIF approval, this has been changed to supporting 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 to villages in Namainja. This change is based on further technical and business considerations by MEGA that have prioritized Lujeri as the next MHPP for construction and commissioning versus the other sites previously identified in the PIF.

GEF support to MEGA for the first two outputs related to the construction and operationalization of the 80 kW Lujeri MHPP will come from GEF INV in the form of two Micro-capital grants of \$150K (\$300K total).¹⁵ The first tranche of funding for the first grant to MEGA will follow the development and approval of a grant agreement negotiated between DEA and MEGA during the first six months of the project and the second tranche of funding (the second micro-capital grant from the project) will only be released if the results agreed to in the prior grant agreement have been met by MEGA

¹⁴ The results of which are expected in early 2015

¹⁵ As per UNDP Guidance on Micro-Capital Grants, a recipient organization may receive multiple grants provided the grants do not exceed on a cumulative basis \$300,000 within the same program or project. As such the project has capped GEF INV support for MEGA under Component #1 at this maximum amount.

(as per UNDP regulations a second new micro-capital grant agreement must be approved by the project steering committee). MEGA being a social enterprise which is fully owned by MMCT an NGO which has implemented international projects including GEF projects can be treated as an NGO. The proposed role of MEGA under Component 1 was identified during the PIF stage and has since been validated by the relevant stakeholders and endorsed by the government. Therefore in line with the guidance on micro-capital grants, MEGA need not go through a procurement process and can receive support via the micro-capital grants pending approval by the project steering committee.¹⁶

GEF INV will support part of the costs of the micro-hydro based mini-grid with the matching co-financing coming from MEGA's own internal sources and possible grant assistance from the Scottish Government and OFID. The Lujeri micro-hydro system will use a 96 m head and 100 litres per second (lps) discharge to generate 80 kW electricity. The system will provide electricity to 400 of the 3,480 households in the core of the service area; two to three maize mills; around five shops; two primary schools and one health clinic. **The total cost of the mini-grid system is estimated to be \$780,000 and therefore the GEF INV grants will comprise 38% of the total capital expenditures of the scheme¹⁷** with the remainder matched by MEGA.

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 - ESCOM¹⁸) which are US¢ 6/kWh and US¢ 11/kWh respectively¹⁹. 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 when compared to higher ESCOM 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. The 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. Based on a projected number of 4,520 households serviced by MEGA in 2018 from all MHPPs, the aggregate annual savings/year by households would be \$ 296,560/Year (additional details are available in Section 4 of the UNDP Project Document). With these tariff rates (adjusted annually for inflation) and assuming future economies of scale as regards other MHPPs coming on board in the coming years, it is expected that MEGA will be able to cover its cost of operations and maintenance from electricity sales revenue by 2018/19.

The third and fourth outputs have been developed following further discussions with MEGA and now focus on the institutional development of MEGA by increasing its capabilities in electrical service and billing and financial management. GEF technical assistance will enable MEGA to contract the services of an experienced electrical engineer who will oversee system operation and maintenance of the plant (training local community staff) and the services of a finance and business manager to implement an innovative billing and tariff collection system linked to pre-pay metering. With GEF support 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 current areas of grid coverage that could be relocated to the MEGA service areas. Over the course of the project MEGA will review its current policy of providing free electricity to schools and hospitals and seek to devise an alternative arrangement where efficient energy use is encouraged and the cost of MEGA

¹⁶ As a social enterprise fully owned by an NGO (MMCT) MEGA is treated as an NGO entity and therefore is exempted from competitive procurement process and shall be selected under programming modalities (e.g. review by PAC or project board).

¹⁷ With the balance investments expected to be financed by other MEGA donors.

¹⁸ ESCOM household tariffs are subsidised and often cover only the operating costs. Investments costs in generation and electricity networks have also been met through grants from donors such as World Bank, JICA, Millennium Challenge Corporation etc.

¹⁹ Based on prevailing tariffs published by ESCOM in April 2014

providing services to public users is offset through available government budgets for these institutions' energy use. MEGA will also use the technical assistance funds to train its own staff and community members on O&M of the systems. Additional information on Component 1 can be found in Section 4 of the UNDP Project Document.

Component 2: Replication of MEGA model via piloting of new Mini-grid schemes in other areas of Malawi

The first output under this component at the PIF stage envisaged installation of two micro-hydro power plants and 2 mini-grids of 40 KW each totalling 80 kW in Chitipa and Karonga districts. However during the project formulation based on site-specific feasibility investigations in Karonga and Chitipa and in discussions with the DEA, it was concluded that micro-hydro based mini-grids were not feasible at the locations proposed in the PIF due to the identified locations having already been electrified through grid extension or in the process of electrification²⁰. Therefore based on discussions with the DEA and UNDP it was decided to expand the scope of technologies and open the support to all districts of Malawi. It was also decided that the beneficiaries for this component will be identified and selected through an open call (request for proposals – RfP) and a transparent selection process following experience from the UNDP Malawi Private Sector Development (PSD) project which established the Malawi Innovation Challenge Fund, a facility that provided matching grants to entities in the agricultural and manufacturing sector using an open call for proposals; pre-determined criteria using independent experts; and an objective process for selection of which entities received project financing.

Community NGOs, trusts and social enterprises will be eligible to apply to the RfP. All applicants to the RfP (which will be devised and undertaken by the PMU) should have identified a location²¹ and secured the community and VDC²², ADC²³ and DC²⁴ commitment to the proposed project. 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,²⁵ 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 RfP proposals²⁶ should include the renewable energy resource assessment at the proposed site; a pre-feasibility assessment; a business model and tariff proposals; and an O&M scheme. Proposals that demonstrate sustainable business models providing a major share of energy for productive applications will be preferred. Lessons from the experience of MEGA in community sensitization; business development; tariff setting; and use of 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, MAREP²⁷, MERA, EAD and independent external experts on finance, business, rural developments etc.²⁸. A set of criteria and scoring systems will be announced during the Request for Proposals (RfP). The criteria will include: 1) the proposed

²⁰ During the project implementation and in coordination with the Malawi Rural Electrification Programme it will be ensured that the sites identified by the BOO proposals do not overlap with grid extension plans of the government.

²¹ Which will not be electrified during MAREP Phase 8 and at a sufficient distance from existing and planned ESCOM network.

²² Village Development Committee

²³ Area Development Committee

²⁴ District Councils

²⁵ 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/>

²⁶ The capacity of potential applicants to the RfP such as Renew'N'Able Malawi (RENAMA), Development Aid from People to People(DAPP) Malawi, Electricity for All, and Airtel Communications Ltd is generally considered to be sufficient to develop project proposals and they have already developed past proposals for RfPs run by BIF and MREAP. Moreover the project manager and the international technical adviser will offer support and advice to prospective bidders without affecting the objectivity of the process. Experience of the UNDP-PSD project and BIF-run RfPs will also be leveraged.

²⁷ Malawi Rural Electrification Programme, managed by the DEA. More information can be found in Sub-Section 2.3 of the UNDP Project Document.

²⁸ The possibility to use the Scottish government seconded renewable energy adviser and experts from Scottish renewables will be explored during the design of the RfP

tariff to households²⁹; 2) share of energy for productive and public sector use³⁰; 3) viability of the business model³¹; 4) amount of co-financing³²; and 5) institutional capability³³. The results of the evaluations for all applicants will be published and the selected operators will receive a GEF-funded micro-capital grant for a maximum of 50% of the total capital cost³⁴. It is envisaged that over 84 kW of clean energy mini-grids will be co-financed by GEF in this component with an aggregate investment of \$300,000. As was done in Component #2, funds will be transferred as Micro Capital grants³⁵ to the selected operators, with progress being monitored by the project manager and overseen by the project steering committee. Eligible applicants can propose mini-grid systems powered by a single technology (E.g. Photovoltaics, or Hydro) or hybrid (Wind/PV hybrid). Renewables hybridized with fossil fuels (E.g. Diesel-Photovoltaic hybrid) will also be eligible and GEF co-finance will only fund the costs of the renewable energy component. The winner(s) of the RfP will be awarded a Build-Own-Operate (BOO) contract on a Public-Private Partnership (PPP) mode, elaborated further in Section 6 of the UNDP Project Document and illustrated in Figure 2 below. The process of the RfP³⁶ will be devised during the first year of the project and will be managed by the DEA and PMU supported by an international technical adviser. The disbursement of the micro-capital grant finances to the BOO operators will be contingent on the operating entities obtaining a valid generation and distribution licence from MERA in accordance with the provisions of the Energy Regulation Act. The level of investment for this output remains the same as in the PIF.

Figure 2 – Proposed operation of the BOO Mini-Grid Model

²⁹ Lower tariffs to households get higher points in the scoring system.

³⁰ Higher share of energy use for productive applications and public service use increases the chances of long-term sustainability and would get higher points.

³¹ Higher internal rates of return will receive additional points in the scoring system.

³² More leverage versus GEF funding will mean higher points in the scoring system.

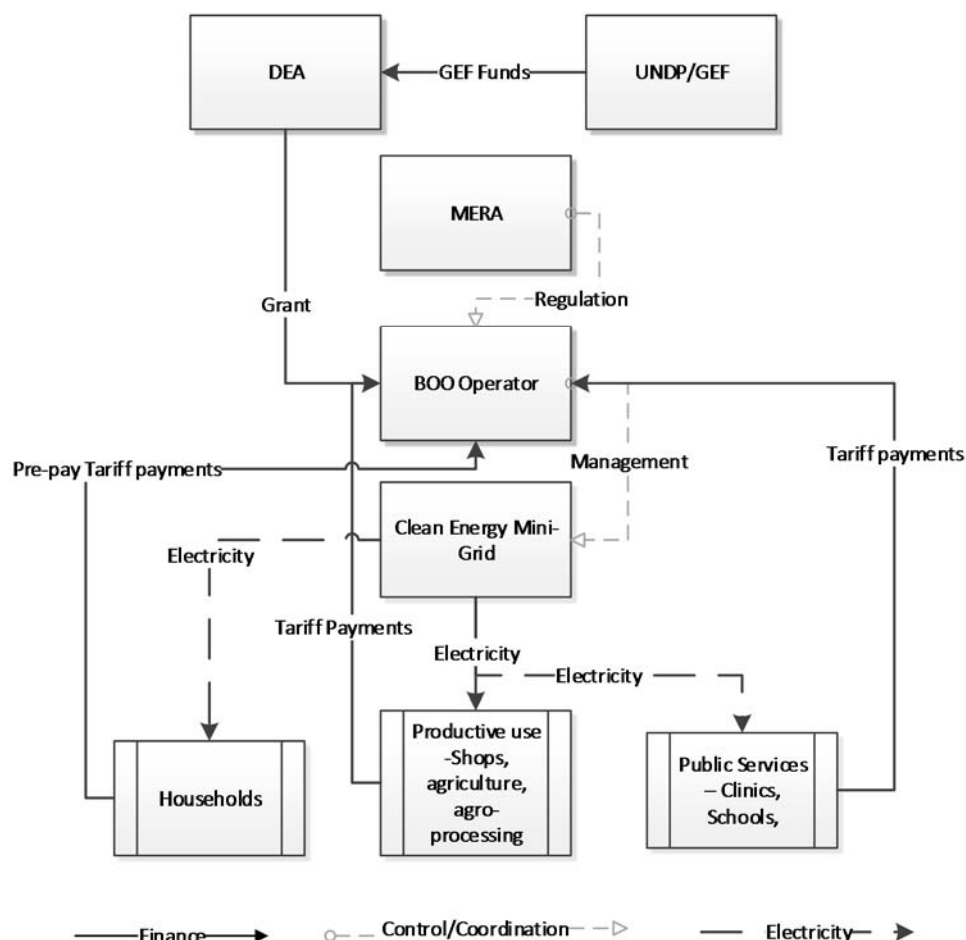
³³ The applicants' track-record, management and financial capacity will all be assessed

³⁴ Currently REF offers 100% financing for ESCOM for rural electrification infrastructure.

³⁵ In compliance with UNDP Guidance on Micro-Capital Grants see <https://info.undp.org/.../Guidance%20on%20Micro-capital%20Grants.doc>

³⁶ Request for Proposals

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The second output under this component will be the operation of the mini-grids selected and developed under Output 2.1. The selected grid operators will receive a rural electrification concession for the life-time of the system on a BOO basis. The diagram above provides details of the BOO operation of the entities that will receive the concession. The entities will be licensed by MERA to carry out the electricity generation and sales. Several local energy stakeholders such as RENAMA³⁷, DAPP³⁸ and Airtel Communications Ltd³⁹ have expressed interest in a BOO arrangement for a mini-grid. 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. It is envisaged that the operation of the mini-grids will result in renewable energy output of at least 294,336 kWh/year assuming that the mini-grids will be using wind-PV hybrid technology⁴⁰ and assuming a 40% capacity factor and 20 year asset lifetime in accordance with international norms⁴¹. The increased aggregate household energy savings amongst the customer base served by the mini-grids supported is estimated to be \$ 55,711/year.

The third output will provide institutional strengthening and capacity building of the mini-grid BOO operators aimed at ensuring the sustainability of the mini-grid business operations that will receive GEF support. The technical assistance will enable the operators to carry out environmental impact assessments⁴² and undertake institutional strengthening and capacity building measures. Technical assistance will also be available for developing and implementing innovative

³⁷ An international NGO active in Malawi on solar rural electrification and solar lighting based energy access.

³⁸ A Malawian NGO active in developmental issues and also community mobilisation and agricultural productivity.

³⁹ The largest mobile telephony operator in Malawi which is planning to spin off a new business unit that which will build, own and operate mobile telecom towers and lease them back to Airtel and other mobile telephony service providers.

⁴⁰ This is the main clean energy mini-grid technology promoted across Malawi by DEA and the current operating mini-grid mix for Malawi.

⁴¹ From ESMAP 2007

⁴² 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.

payment systems such as progressive payments through mobile telephony networks and pre-paid metering mMoney/eWallet based payment systems (footnote and explain) that are feasible in rural areas. The BOO operators will 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 their operational experiences for the Knowledge Management Outputs supported under Component #3.. More information on this Component is available in Section 6 of the UNDP Project Document.

The final output – which has been added since the PIF – 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 INV 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 3: Institutional strengthening and capacity building for promotion of decentralized mini-grid applications across the country

The first output on “Information Clearing House for Mini-grids” will establish an information portal consisting of data collected on current electricity grid networks; planned and known rural electrification efforts of MAREP; existing off-grid systems; population centers; renewable energy resource information and infrastructure criteria⁴³; and the location of government public service institutions⁴⁴ and relevant energy access criteria linked to rural infrastructure⁴⁵, land use⁴⁶, environmental and social issues⁴⁷. This information will be collected for all un-electrified villages and areas of the country in collaboration with MAREP and Millennium Challenge Corporation (MCC) Malawi⁴⁸ and will be validated and published. This information will be made available to all stakeholders through a clean energy mini-grid website⁴⁹ established by the project under the aegis of DEA. Arrangements for periodic updates and maintenance of the website will be overseen by MAREP. Efforts should 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 in Malawi and this output will build on this existing work and will involve collaboration with RLI Berlin⁵⁰, PA, GIS departments of Lilongwe University of Agriculture and Natural Resources (LUANAR), Malawi Polytechnic’s Department of Land Surveys and Geography

⁴³ Roads, waterways, railways and airports

⁴⁴ Schools, Hospitals, Police Stations etc.

⁴⁵ Schools and hospitals run by religious, NGO, community and donor agencies; places of worship; mobile phone towers; rural industries etc.

⁴⁶ Land use patterns, agricultural land, forests, residential etc.

⁴⁷ Location of ecologically sensitive locations, national parks, protected flora and fauna

⁴⁸ 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>

⁴⁹ The web-site can be a micro-site under the URL of the DEA

⁵⁰ A German research institution active in rural electrification and mini-grids analysis and mapping efforts globally and in Sub-Saharan Africa.

Department of Chancellor College of University of Malawi (all of whom have GIS development, surveying, database management and website development skills that may be relevant to the output).

The second output will develop a training plan which includes training at the district levels and national levels with the emphasis on the district level. At the district level training programs will be organized for members from Village Development Committees (VDCs), Area Development Committees (ADCs) and the District Executive Committee (DEC) on mini-grids. The program will focus on technology platforms; economic analysis; environmental and social impacts and their management; institutional arrangements; the role of community and examples of best practices. The training will be conducted at the district level for DEC members and at the area and village level in selected districts (including the target districts⁵¹ under Components #1 and #2) where relevant ADCs and VDCs will participate. Training modules and programs at the village and possibly the area level may need to be developed and 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 a UNDP/GEF BARREM project in each of the districts targeted; as regards selection of districts the 14 vulnerable districts⁵² where the UNDP SEM project is building capacity on renewable energy and energy efficiency will be prioritized.

The training programs will be simple and involve audio-visual displays and practical activities and be tailor-made to focus on issues relevant at district and community levels. It is also envisioned to engage and provide Training of Trainers (ToT) to the relevant Technical and Vocational Education and Training (TVET) institutions and their technical trainers so that the TVET system⁵³ can continue to use the trained trainers for trade certification programs to continue to support the mini-grid development in Malawi after the project is completed. Linkages to the community renewables toolkit being developed with Scottish Government funding will be explored as well as using Scottish Renewables experts in Malawi⁵⁴ as training resources. One or two training programs will also be carried out at the national level engaging government, regulators, banks and financiers, NGOs, private sector, ESCOM, IPPs etc. to help share the latest 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 material for the national level training programs. It is expected that at least 300 people at the sub-national level and 50-60 people at the national level will be trained with women representing at least 30% of all participants trained.

The third output will involve development of a report with recommendations to the government on policy and regulatory changes to facilitate continued financing and policy and regulatory support for mini-grids beyond the project period. This output will carry out a review of existing policies and regulations, namely the Rural Electrification Act, 2004 and Energy Regulation Act, 2004⁵⁵, to identify options to removing 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 and make suggested revisions to those documents in line with that approach. The possibilities/issues to be reviewed are inclusion of mini-grids as a third “official” rural electrification option for government financing in addition to grid extension and stand-alone solar home systems; establishing the process and criteria of options for MAREP to decide between grid extension and mini-grids for a given location; financing options of mini-grids via the Rural Electrification Fund (REF)⁵⁶; and how to establish unified and simplified licensing procedures for mini-grids⁵⁷. These options consisting of recommendations on changes to the laws and regulations will then be formally proposed in a report as recommended amendments to the Rural Electrification and Energy Regulation Acts. These will allow mini-grids to be considered as legitimate rural electrification options and receive REF funding. This output which will consist of policy recommendations will also coordinate with the UNDP SEM project which is supporting the development of a new

⁵¹ 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.

⁵² Viz. Karonga, Salima, Nkhota-kota, Rumpi, NKhata-bay, Mangochi, Dedza, Ntcheu, Balaka, Zomba, Phalombe, Machinga, Blantyre, Chikhwawa and Nsanje

⁵³ TVET system consists of technical schools under the aegis of the government where Malawians can obtain trade and technical certification such as electricians, plumbers, boiler operators etc.

⁵⁴ Government of Scotland will finance the secondment of industry experts on clean energy from Scotland to Malawi.

⁵⁵ Both gazetted in 2007

⁵⁶ The financing mechanism for rural electrification in Malawi financed largely through local levies from the energy sector. REF currently supports extension of the electricity grid network as the only technical option for rural electrification.

⁵⁷ It will review mini-grid licensing procedures introduced in other Sub-Saharan African countries such as Tanzania.

Renewable Energy Policy and 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.

The fourth output will involve the development of a case study and toolkit to showcase mini-grid experience in the country. This effort will involve review of the past experiences and lessons learned of the ESCOM diesel mini-grids; DEA wind-solar hybrid mini-grids; MEGA's existing mini-grid; the new MEGA mini-grids under Component 1 and the new mini-grids supported under Component 2 implemented on a BOO mode. The analytical framework for the case studies and toolkit will cover the technological, economic, policy and regulatory issues; business and financing models; rural development benefits; productive use and income generation aspects; community engagement; and climate change mitigation impacts. Both MEGA and the BOO PPP clean energy mini-grids supported under Components 1 and 2 will provide required inputs and data for the analysis which will be done in year 3. The analysis will compare and contrast the Malawi experience with regional best practices 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 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.

The overall budget for the component 3 was increased to accommodate these two new outputs. The combination and consolidation of a number of outputs have helped in managing the budgetary redistribution.

The comparison of outputs between the PIF and the CEO endorsement request stages are detailed in the table below.

Table 2 - Comparison in Outputs (disaggregated by Component) from PIF to CEO Endorsement Request

Component	Outputs at PIF stage	Outputs at CEO ER	Comments
1: Expansion of the Mulanje Electricity Generation Agency(MEGA) Micro Hydro Power Plant scheme	<p>1.1 Construction and commissioning of Lilulezi (40 kWp) and Fort Lister (40 kWp) MHPPs</p> <p>1.2 Yearly energy output of 490,000 kWh /year from commissioning of two MHPPs</p> <p>1.3 MEGA successfully meeting its tariff pricing, supply efficiency and financial targets (as codified in its business plan) for all sites by end of project</p> <p>1.4 MEGA established as a viable social enterprise, enabling further growth and project development</p> <p>1.5 MEGA's model is showcased and disseminated as a "national case study" for community-based mini-grid development in Malawi</p>	<p>1.1 Construction and commissioning of 80 kWp Lujeri MHPP;</p> <p>1.2 Yearly energy output of 315,360 kWh/year from the Lujeri MHPP;</p> <p>1.3 MEGA strengthened institutionally through increased staff capacity with electrical engineering and financial management capabilities;</p> <p>1.4 MEGA develops and implements strategies for fully cost-reflective tariffs in all plants, increasing productive use and revenues to establish itself as a viable social enterprise.</p>	<p>The outputs are mostly the same and all relate to support for MEGA expansion and strengthening. The main change is the shift to support one MEGA MHPP (Lujeri) versus two separate MHPPs in the PIF</p> <p>Energy production outputs have been revised downward based on latest MEGA operational analyses and further investigations done at the PIF stage. The cumulative energy generation from 216 kW of total MEGA generation capacity in 2018 will be 851,472 kWh/Year (as noted in the Project Results Framework – Annex A)</p> <p>Output 1.5 in the PIF has now been moved to Output 3.4 of the Component #3</p>

2: Replication of MEGA model via piloting of new mini-grid schemes in other areas of Malawi	<p>2.1 Basic pre-feasibility assessments and load forecasts done for mini-grids at two sites in targeted districts</p> <p>2.2 Sensitization campaign conducted with district councils and community groups in targeted areas</p> <p>2.3 Legal establishment of independent mini-grid operator in one of two targeted districts with approved generation/transmission licenses, governance structure, tariff policy and investment plan</p> <p>2.4 Construction and commissioning of two MHPP or solar/wind hybrid schemes (at least 80 kWp total installed capacity)</p> <p>2.5 Yearly energy output of at least 450,000 kWh/year from commissioning of two plants by end of project</p> <p>2.6 Sustainable O&M&M models demonstrated for all mini-grid schemes</p>	<p>2.1 Construction and commissioning of at least 84 kWp of clean energy capacity for mini-grid rural electrification.</p> <p>2.2 Yearly renewable energy output of at least 294,336 kWh/year from the mini-grids supported.</p> <p>2.3 Strengthened institutional capacity of mini-grid BOO operators through establishment of innovative payment systems and training on O&M.</p> <p>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</p>	<p>Outputs similar to PIF as regards installed capacity target with the major change being that the targeted districts, projects and beneficiaries will be selected as the result of an open competitive process to identify and select the best qualified BOO operators rather than identifying pre-selected specific target districts/sites and operators</p> <p>The energy production output is less than the PIF due to the fact that the new baseline scenario for the mini-grid systems are wind/solar hybrids whereas the indicative figure in the PIF was based on the plant load and capacity factor of a MHPP based on MEGA assumptions (applied for mini-grids under Component #1).</p> <p>O&M&M issues will now be introduced as criteria a in the selection of BOO entities and also covered under Output 2.3.</p> <p>A new output has been added as Output 2.4 to make sure that there is an internal project mechanism in place to oversee the selection and implementation of the micro-capital grant disbursement in line with UNDP policies and proper fiduciary standards</p>
3: Institutional strengthening and capacity building for promotion of decentralized mini-grid	<p>3.1 National clearinghouse mechanism for mini-grid developers and investors established</p> <p>3.2 Training for both developers and community stakeholders</p>	<p>3.1 Establishment of a web-based information clearing house for mini-grid stakeholders.</p> <p>3.2 Training of 300 national, district, area and village</p>	<p>Minor revisions and consolidation of PIF outputs based on further analysis and consultations done at the PPG phase. Outputs 3.2 and 3.4 at the PIF stage are now</p>

applications across the country	<p>on basic RE/hybrid mini-grid cost-benefit analysis</p> <p>3.3. Support for dissemination of REN21Africa Mini-grid toolkit</p> <p>3.4 Support to 14 District Executive Committees (DEC) to establish and operationalize district plans for decentralized clean energy applications with accompanying information sharing platforms in place</p>	<p>level stakeholders in mini-grid development (at least 30% of the participants will be women) and preparation of at least 5 area-based electrification plans for clean energy mini-grids.</p> <p>3.3 Review and proposed revisions to the current rural electrification and energy regulation laws⁵⁸ to mainstream mini-grids into rural electrification efforts.</p> <p>3.4 Development and dissemination of case studies and a toolkit on mini-grids.</p>	<p>combined into Output 3.2 to create a single integrated output on training.</p> <p>A new Output 3.3 was introduced to address GEF comments at PIF stage as well as policy, regulatory and financial barriers to the long-term sustainability of project and replication impacts. This was needed to ensure that mini-grids are an eligible rural electrification option and to channel financing for mini-grids from the Rural Electrification fund (REF)</p> <p>Output 3.4 was introduced to consolidate case studies originally intended to be produced from Components 1 and 2 and former Output 3.3 of the PIF</p>
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Global Environmental Benefits

In Malawi under the baseline business-as-usual (BAU) situation households in rural un-electrified areas currently use kerosene lamps for lighting their homes. Commercial activities such as agro-processing – shops which de-husk and grind maize and other agricultural products – typically operate small diesel generators. Many public service establishments like hospitals and schools also use diesel generators for electricity. The MEGA Business Plan prepared by BiF (based on the baseline energy use study in Mulanje carried out by MEGA and MuREA⁵⁹) assumes that 59% of the electricity sales from the mini-grids will be to households and 41% of electricity sales will be to commercial and public service institutions. Therefore for the purpose of this project the baseline scenario is assumed to consist of 59% kerosene use and 41% diesel generator use (for both Components #1 and #2)/

In the GEF alternative, i.e. the project scenario, the households, commercial entities and public service entities in the villages are provided electricity from renewable energy through the clean energy mini-grids. For Component 1, the electricity will be from a micro-hydro powered mini-grid and for the Component 2, the electricity is assumed to come from a combination of wind-solar hybrid system (baseline scenario) or a micro-hydro system using an operating margin approach as these two technologies are the two clean energy technologies which are being used in mini-grid systems in Malawi. The direct emission reductions have been calculated assuming standard assumptions on Plant Load Factor (PLF) and lifetime (years) of hydro mini-grids and wind-solar hybrid systems (all of which are detailed in Annex 2 of the UNDP Project Document) and by using default emission factors for kerosene lamps and diesel generators. Technical assumptions for the system to be supported in Component #1 are based on MEGA inputs and operational data. It is assumed that all

⁵⁸ Proposed amendments to the Rural Electrification and Energy Regulation Acts that if adopted will make mini-grid based electrification eligible for finance from the Rural Electrification Fund.

⁵⁹ Mulanje based renewable energy technical and engineering services agency which was established under funding from a previous German bilateral assistance project. MuREA provides local technical support to MEGA and PA activities.

the electricity generated will be consumed due to the significant levels of suppressed demand existing in rural areas of Malawi.

The key assumptions on GHG emission reduction calculations are provided in the table below

Table 3 – Key Assumptions underlying the Emission Reduction Calculations

Parameter	Value
Specific Kerosene substitution ratio	0.40625 litres/kWh ⁶⁰
Specific Diesel substitution ratio	0.33 litres/kWh ⁶¹
Emission factor for Kerosene energy conversion	2.01 kgCO ₂ e/litre ⁶²
Emission Factor for Diesel energy conversion	1.40 kgCO ₂ e/litre ⁶³
Share of electricity generation displacing diesel and used by businesses, schools, hospitals etc.	41% ⁶⁴
Share of electricity generation displacing kerosene and used by households	59% ⁶⁵

The total lifetime direct emissions avoided as a result of direct GEF support (INV only) for the mini-grid schemes targeted under Components #1 and #2 is a modest 16,203 tCO₂e (the details of the calculations are shown at Annex 2 of the Project Document). However it must be noted that GEF support for MEGA under Component #1 (INV and TA) is part of a suite of integrated investment and support to MEGA from several donors (matched by their own revenue base) that is designed to finance the costs of them meeting their business plan target of establishing at least three (3) Clean Energy Mini-grids by 2018⁶⁶.

The total targeted installed capacity target for MEGA from these three MHPPs is 216 kW⁶⁷ by 2018. GEF TA under Component #1 will not only complement the combined GEF and MEGA INV for the establishment of the 80 kW Lujeri MHPP but also directly support the successful commissioning and operation of one other MHPP targeted by MEGA by the end of the project (bringing the total number of MHPPs under operation, including Bondo – which is already operational – to three MHPPs by the end of the project). The three MHPPs and mini-grid systems to be developed by MEGA and supported under Component #1 have a total lifetime electricity generation of **25,544 MWh**, and the two green field mini-grid systems to be supported under Component #2 have a total lifetime electricity generation of **5,886 MWh**.

Taking into account this baseline target, direct emissions avoided as a result of direct GEF support (INV and TA) for the all mini-grid schemes targeted under Components #1 and #2 is a **33,183 tCO₂e**. This includes the three MHPPs and mini-grid systems to be developed by MEGA and supported under Component #1, and the two green field mini-grid systems to be supported under Component #2. The relatively low levels of direct emissions produced through project activities is consistent with international experience whereby rural areas of least developed 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. As noted in the PIF, Malawi has one of the lowest per capita electricity usage rates in Africa with only about 9% of the total population currently having access to electricity, mostly in urban centres. For the 84% of the people living in rural areas, access to electricity is less than 4%, among the lowest electrification rates in the world.

The contribution of GEF funding vis-à-vis indirect emissions are a much better indication of the long-term contributions of the project to assisting Malawi meet the Rural Electrification Master Plan and SE4All targets of increasing access to electricity to not less than 30% of the population by the year 2030. The indirect emissions

⁶⁰ Based on the baseline surveys carried out in Mulanje by MEGA and the basis for MEGA Business Plan in 2013

⁶¹ Cader, C et al, 2013, High-resolution global cost advantages of stand-alone small-scale hybrid PV-battery-diesel systems

⁶² UNFCCC, Small-scale CDM Methodology 1F : Renewable Electricity Generation for Captive Use and mini-grid

⁶³ IPCC Default Emission Factor

⁶⁴ Based on the baseline surveys carried out in Mulanje by MEGA and the basis for MEGA Business Plan in 2013

⁶⁵ Based on the baseline surveys carried out in Mulanje by MEGA and the basis for MEGA Business Plan in 2013

⁶⁶ Note that two of these mini-grid schemes have now been combined into one larger MHPP of 80 kW to be supported by the project

⁶⁷ Including the 80 kW being supported by the project

reductions that will result from the implementation of the project have been calculated using the top-down and bottom-up approaches as noted below.

Bottom-up approach

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 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.

Top-down approach

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 hydro⁶⁸. 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% currently⁶⁹. 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.

Table 4 below provides details of the targeted direct and indirect emissions avoided by the project.

Table 4: Targeted energy savings and CO₂ emissions avoided from project interventions

Target/Indicator	Value
Direct lifetime emissions avoided due to project outputs 2015-18	
Lifetime Electricity Generation from MEGA micro-hydro powered mini-grid (INV only) – Component #1	9,460 MWh
Lifetime Electricity Generation from all micro-hydro powered mini-grids operated by MEGA by 2018 (TA and INV) - Component #1	25,544 MWh
Lifetime Electricity Generation from a wind-PV hybrid powered mini-grid (s) (TA and INV) – Component #2	5,886 MWh
Diesel savings due to replacement of diesel generator use due to both mini-grids (Components #1 and #2)	2,076,519 liters
Kerosene savings due to replacement of kerosene lamps due to both mini-grids (Components #1 and #2)	3,678,6084 liters

⁶⁸ The wind-PV hybrids are considered as the main option as they correspond to the most prevalent operating mini-grid technology in Malawi at present. Wind-PV mini-grid technologies will also be relevant to renewable energy meteorological data relating to solar and wind energy resources which are fairly evenly distributed across Malawi. However the hydro resource is concentrated in certain locations and no comprehensive assessment of mini-hydro potential has been carried out in Malawi except the Rural Electrification Master Plan in 2002 which identified 12 potential sites for micro-hydro based mini-grids. Therefore the share of hydro energy powered mini-grids has been adjusted downwards based on discussions with MAREP team.

⁶⁹ GoM/UNDP, SE4All Rapid Assessment and Gap Analysis, 2013. SE4All, Global Tracking Framework, 2013

Target/Indicator	Value
Lifetime Emission Reductions due to replacement of diesel generator use due to both mini-grids (Components #1 and #2)	8,809 tCO ₂ e
Lifetime Emission Reductions due to replacement of kerosene lamp use due to both mini-grids (Components #1 and #2)	7,394 tCO ₂ e
Total lifetime direct emissions avoided (INV for all mini-grids supported)	16,203 tCO ₂ e
Additional Lifetime direct emissions avoided from 2 additional MEGA micro-hydro powered mini-grids directly supported by the project (TA)	16,980 tCO ₂ e
Total (adjusted) lifetime direct emissions avoided (GEF TA and INV)	33,183 tCO₂e
Lifetime indirect emissions (bottom-up approach) avoided due to the project impacts post-project	
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 liters
Kerosene savings due to replacement of kerosene lamps use due to all mini-grids	73,572,174 liters
Lifetime Emission Reductions due to replacement of diesel generator use due to all mini-grids	176,189 tCO ₂ e
Lifetime Emission Reductions due to replacement of kerosene lamp use due to all mini-grids	147,880 tCO ₂ e
Total lifetime indirect emission reductions avoided using the bottom-up approach	324,069 tCO₂e
Replication Factor of GEF project (implied)	9.77
Lifetime indirect emissions (top-down approach) avoided due to the project impacts post-project	
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 liters
Kerosene savings due to replacement of kerosene lamps use due to all mini-grids	1,407,191,304 liters
Lifetime Emission Reductions due to replacement of diesel generator use due to all mini-grids	3,369,920 tCO ₂ e
Lifetime Emission Reductions due to replacement of kerosene lamp use due to all mini-grids	2,828,454 tCO ₂ e
Total lifetime indirect emission reductions avoided using the top-down approach after applying a GEF Causality factor of 20%	1,239,675 tCO₂e

A.6 Risks, including climate change, potential social and environmental risks that might prevent the project objectives from being achieved, and measures that address these risks:

An initial risk assessment was presented at the PIF stage and a detailed risk assessment has been carried out during the project formulation and is available in Section 11 in the Project Document. The risks and mitigation measures are summarized in the following table.

Description	Category	Impact & Probability	Countermeasures / Management response	Owner	Date Identified
<p>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.</p> <p>Low water flow could have a major negative impact on the sustainability of MEGA's MHPPs under Component #1.</p>	Environmental	<p>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</p>	<p>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 - <i>Strengthening climate information and early warning systems in Africa for climate resilient development and adaptation to climate change – Malawi</i>. 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.</p>	UNDP/DEA/MERA/MEGA	During project formulation
<p>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</p>	Political	<p>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</p>	<p>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 <i>"Establishment of an independent</i></p>	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	During Project Formulation

			<i>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.</i>	mechanisms established to ensure impartiality.	
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 and not the achievement of the direct GEBs under the project	PM/DEA/MERA	During Project Formulation
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.	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	UNDP, PMU, DEA, PSC, Senior officials of Ministry of Natural Resources, Energy and Mining (if needed and not resolved)	At PPG phase

<p>Moreover the current procedure for licensing applications by mini-grids is not fit 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 counter-intuitive and costly.</p> <p>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 "fit for purpose."</p>			<p>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.</p>		
<p>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</p>	Operational	<p>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</p>	<p>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 investment facilitation platforms for RE operators (as noted in Table 1); it is</p>	PMU, PSC, DEA, UNDP	During Project Formulation

			expected that the RfP developed under Component #2 will be elaborated and implemented in close cooperation with the Government of Scotland to make sure that entities being supported by potential 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 in a recent report by M-REAP).	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 agreements. Operational sustainability and proper tariff pricing will be a central feature of all activities under Components #1 and #2.	PMU, DEA	During Project Formulation
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	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 Component#1. However MEGA will have to explore availability of alternative local experience in micro-hydro design and engineering, and develop (together	PMU, MEGA, MMCT	During Project Formulation

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.			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.		
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 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.	PMU, DEA, local government stakeholders	During concept/ PIF formulation
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 70 for electrical distribution network. For intermittent renewable energy technologies like solar and wind lead acid battery banks	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	PMU, DEA, UNDP, MEGA and BOO operators	During concept/ PIF formulation

⁷⁰ This risk exists for all mini-grids including hydro.

will need to be used for storing energy and these battery banks will need to be safely disposed after their lifetime.			<p>grant agreements to receive GEF funding.</p> <p>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 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</p> <p>(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.</p> <p>(b) Land Use – Only a few settlements will be affected by these developments. Consequently, limited compensation and resettlements will be required.</p> <p>(c) Construction work impact – Minimum land clearing is anticipated at all project sites and any</p>		
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			<p>negative environmental impacts resulting from the construction activities will be addressed as part of the EMPs.</p> <p>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.</p>		
<p>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 support by the Scottish Government and OFID which is under consideration and has yet to be finalized.</p>	Financial	<p>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.</p> <p>I = 5; P = 2</p>	<p>MEGA has already applied for funding under the 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 amounts can be modified depending on the ability of the beneficiaries to meet matching finance criteria.</p>	PMU, MEGA, BOO operators, PSC	During Project Formulation

A.7. Coordination with other relevant GEF financed initiatives

The project will establish coordination arrangements with the following ongoing GEF projects:

- 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 adaptation and planning in the energy and water sectors. The project will coordinate with the LDCF project to consider climate related hydrological risks for the micro-hydro powered mini-grid sites as well as meteorological risks to other clean energy mini-grid sites and take appropriate risk management measures.
- UNDP/LDCF Project – *Climate proofing local development gains in rural and urban areas of Machinga and Mangochi districts – Malawi*. This project aims to promote development and improve food security 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 of the Project will be located in Machinga or Mangochi, the project will coordinate with the LDCF project to integrate risk management and adaptation elements into 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.

In addition, the project will also build on the outcomes and lessons learned from the project *Barrier Removal to Renewable Energy in Malawi* (BARREM), a UNDP-GEF project that was implemented during the period 2002-2007. The project had a GEF grant of \$3.3 million and was aimed at developing the solar market for household, commercial and agro-processing segments. The project was successfully able to initiate 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. The project's training and capacity building activities (under Component #3) will seek to include the 300 energy advisers previously trained by the BARREM project and it is hoped that the targeted mini-grid investments under Component #2 will also benefit from the support of BARREM-trained advisors and stakeholders in the selected districts to receive support.

B. ADDITIONAL INFORMATION NOT ADDRESSED AT PIF STAGE:

B.1 Describe how the stakeholders will be engaged in project implementation.

A large number of stakeholders were consulted during the project preparation phase, many of whom played an important role in the design of the project and will constitute key partners in project implementation. Important government stakeholders included the Department of Energy Affairs and the Malawi Rural Electrification Programme (MAREP); Mulanje Energy Generation Agency (MEGA); Environmental Affairs Department; and Malawi Energy Regulatory Authority (MERA). Other stakeholders who influenced the project formulation included major co-financiers to the project and multilateral and bilateral development agencies such as World Bank, Scottish Government, DfID/BiF and JICA; private sector companies such as Airtel and Standard Bank; the NGO community such as Practical Action, MMCT, GREVA, MuREA, DAPP, RENAMA, E4All; and academic institutions such as Malawi Polytechnic, University of Mzuzu and University of Malawi. As a result of those consultations, the project is to be implemented through an adaptive and collaborative management approach that will ensure that key stakeholders are involved early and throughout project execution. Apart from directly implementing many elements of the project (as detailed in the description of the project components and outputs), most of the key stakeholders will participate on the Project Steering Committee (Section 9 of the UNDP Project

Document provides details of the key stakeholders involved in the steering committee) and some of the stakeholders will also serve on the

In particular MEGA will be a key stakeholder who will be the responsible party (as formally delegated by DEA) to implement Component #1. As regards Component #2 it is expected that stakeholders such as DAPP, Airtel, RENAMA and other private and NGO stakeholders will respond to the RfP for developing and operating the pilot clean energy mini-grids. A large number of stakeholders from Academia, NGOs and private sector are also expected to play a role in implementation of Component #3 on institutional strengthening and capacity building. A summary of different stakeholders and their roles in the project is given below:

Table 5. Summary of Stakeholder Roles and Responsibilities

Stakeholder	Role in Project
Department of Energy Affairs - Ministry of Natural Resources, Energy and Mining	Overall lead coordinator and executing agency – responsible party for Components 2 and 3.
Mulanje Electricity Generation Agency (MEGA)	Responsible Party for Component 1 and key contributor to knowledge management outputs in Component 3
Environmental Affairs Department, Ministry of Natural Resources, Energy and Mining	GEF operational focal point and national climate change focal point. EAD will provide links between the project and national processes and other projects dealing with climate change in the country.
Malawi Energy Regulatory Authority (MERA)	Key partner for the policy and regulatory-related outputs under component 3 and also with regards to regulatory approvals for all the mini-grids approved under Components 2 and 3.
Selected District Councils (Districts of Mulanje and others) and District Executive Committees (DEC)	Key local government partner for the MEGA and other BOO mini-grid investments by the project. Partner for training and capacity building outputs under component 3.
World Bank	Project collaborator as regards collective efforts to strengthen the institutional capacity of energy stakeholders in the country and expand renewable energy generation and access. In parallel to the project the WB will support 3 large-scale hydro power projects and the development of solar and wind resource mapping which has relevance to Component 2.
Government of Scotland (SG)	Key collaborator and co-financier, particularly under Components 1 and 3. The Scottish Government is providing support to GoM on energy access relevant to Component 3 and also considering support to MEGA (which is relevant to Component 1).
Practical Action	Key collaborator under Component 1 and the development of the information clearing house output under Component 3.
Japanese International Cooperation Agency (JICA)	Collaborator under Component 3 as regards strengthening institutional capacity in the energy sector.
Business Innovation Facility - Malawi /DFiD	Collaborator under Component 1 and supporter of MEGA.

CONREMA, Renew'N' Able Malawi (RENAMA), Development Aid from People to People(DAPP) Malawi, Electricity for All, Airtel Communications Ltd	Key partners and likely applicants/partners in the BOO RFP solicitation under Component 2. All these organisations have experience with rural energy systems development. RENAMA is active in solar electrification and lighting, DAPP is involved in community mobilisation and agricultural productivity improvements. Airtel communications is the largest mobile telephony operator in Malawi and is establishing a subsidiary to own, operate and lease mobile telephone towers with electricity supply to all mobile telephony operators in Malawi.
Mzuzu University, Malawi Polytechnic, University of Malawi, RENAMA, Rainer Lemoine Institute (RLI)	Key partners for various outputs under Component 3.

Management Arrangements

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 institution 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.

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 Harmonized 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.

The Project Board also known as the Project Steering Committee will be responsible for 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.

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;
- Oversee independent financial oversight mechanism established under Component #2;
- 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; and
- 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.

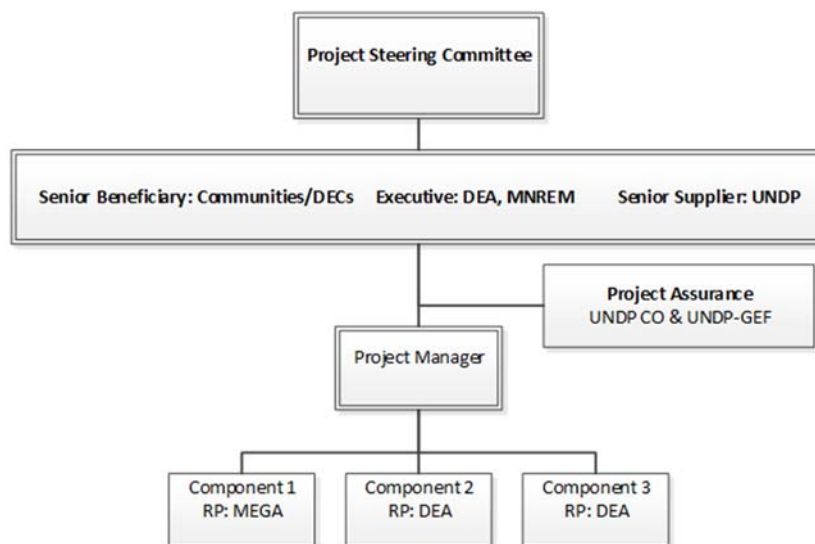
Outcome Board: At the UNDP Country Program level, an Outcome Board is responsible for ensuring the realization of the expected outcome and managing the interdependency of different projects that contribute to a particular outcome. Since this project contributes to one of the country program outcomes within the overall framework of the UNDAF, its outputs will be monitored at program 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 MEGA for component 1
- Closely monitor and manage Components 2 and 3 and associated 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 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 in Annex 3 of the ProDoc. The structure of the project management is shown in figure below:

Figure 3 – Project Management Structure



B.2 Describe the socioeconomic benefits to be delivered by the Project at the national and local levels, including consideration of gender dimensions, and how these will support the achievement of global environment benefits (GEF Trust Fund/NPIF) or adaptation benefits (LDCF/SCCF): The project is expected to deliver the following benefits at the national and local levels:

National level

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 liters of diesel and 3.67 million liters of kerosene, providing major savings to the economy given that 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. It is estimated that activities at this increased scale will result in an additional savings of 41.53 million liters of diesel and 73.57 million liters of kerosene in the bottom-up indirect impacts scenario and possible additional savings of 994 million liters of diesel and 1.4 billion liters of kerosene in the top-down impacts scenario. In addition, there will be socio-economic benefits since 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.

Local level

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 spent on purchasing kerosene or diesel for energy use. Although the energy provided by MEGA is priced at a premium to ESCOM (which is itself not cost-reflective at present as already mentioned in Section A.5), 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 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 spent 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 are relatively small and estimated at 5 people per MHPP⁷¹. 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 catalyzed by the project due to increased economic activities facilitated by the mini-grids in areas such as agro-processing. The employment generated as a result of replication and indirect effects

⁷¹ 2 operators, 2 security personnel and 1 vendor.
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of the MEGA investments alone are estimated in the range of 200 to 4,570 people each year by 2018⁷². A summary of all the local benefits is provided in Table 6.

Table 6. Summary of Local Benefits from the Project Interventions

Benefits	Target
People trained at sub-national levels	300 people
Share of women among trained personnel	30%
Household savings by avoided expenditures on kerosene	\$ 296,560
Employment generated as a result of replication and indirect effects of the MEGA investments only	200 - 4,750 jobs per year

B.3. Explain how cost-effectiveness is reflected in the project design:

As noted in Section A.5, the project's direct lifetime emission reductions will be 33,183 tCO₂e (compared to a very rough estimate of 43,000 at PIF stage). With a GEF contribution of \$ 1,725,000, the unit abatement cost that will be achieved by the project as regards direct emissions will be US\$ 51.98 tCO₂e. 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. As noted in the PIF, emission reduction calculations in Malawi are complicated by the high level of suppressed demand and lack of reliable energy data.

The major impacts of the project as regards emission reduction benefits are expected to be from the replication potential. The lifetime estimated emission reductions for these indirect impacts have been estimated through a bottom-up approach totalling 324,069 tCO₂e. Based on the GEF contribution this represents an abatement cost of US\$5.32/ tCO₂e. The total indirect lifetime GHG emissions avoided adopting the top-down approach (1,239,675 tCO₂e) is even more cost-effective. The unit abatement cost for this scenario (using a very conservative GEF causality factor) are US\$ 1.39/ tCO₂e. Therefore the abatement costs for indirect emission reductions are in the range of US\$1.39 - \$5.32 per tCO₂e which is lower than what was estimated at the PIF stage.

These emission reduction targets are summarized below in Table 7 (details of all these calculations and assumptions are available at Annex 2 of the Project Document):

Table 7 – Summary of GHG Abatement Costs

Category of emission reductions	tCO ₂ e
Direct (adjusted) emission reductions	33,183
Indirect Emission reductions	
Bottom-up	324,069
Top Down	1,239,675
Cost Effectiveness of emission reductions	US\$
GEF Contribution (US\$)	1,725,000

⁷² Based on employment figures contained in the MEGA business plan and projected for all mini-grids
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Direct Cost-Effectiveness (US\$/tCO ₂ e)	\$ 51.98
Indirect Cost-Effectiveness (US\$/tCO ₂ e) – range	\$1.39 to 5.32

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).⁷³ 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 the average solar insulation level in Malawi is about 20MJ/m², 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 is therefore represents a cost-effective investment in helping Malawi achieve its long-term energy targets in a low-carbon fashion.

⁷³ United Nations Development Programme (UNDP), International Human Development Indicators: Malawi hdr.undp.org, accessed May 2014.

C. DESCRIBE THE BUDGETED M &E PLAN:

The UNDP Project Document provides a detailed description of the monitoring, reporting and evaluation to be undertaken during the Project (See Section 10 of the Project Document). Full details of indicators, baseline values and targets are presented in Annex 1 to this document (Results Framework).

Monitoring and evaluation activities will follow standard UNDP and GEF monitoring and evaluation policies and guidelines. Monitoring and evaluation of progress in achieving project results and objectives will be done based on the targets and indicators established in the project Results Framework (Annex 1). The project Monitoring and Evaluation Plan has been budgeted at US\$87,000 (see Table 8 below). The project monitoring and evaluation approach will also facilitate learning and mainstreaming of project outcomes and lessons learned into international good practice as well as national and local policies, plans and practices. A summary of the envisaged M&E activities is provided in the following table.

Table 8 – Monitoring and Evaluation Activity Summary

M&E Activities	Responsibility	Time frame	Budget US\$
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 implementation	None
Audit	UNDP and Project Manager	Every year	Indicative cost per year: 3,000 = \$12,000

M&E Activities	Responsibility	Time frame	Budget US\$
Field visit	Project Manager, Technical adviser, DEA and UNDP.	As required	PM Travel budget
Total Budgeted cost			USD 87,000

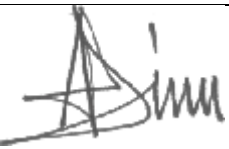
PART III: APPROVAL/ENDORSEMENT BY GEF OPERATIONAL FOCAL POINT(S) AND GEF AGENCY(IES)

- A. RECORD OF ENDORSEMENT OF GEF OPERATIONAL FOCAL POINT(S) ON BEHALF OF THE GOVERNMENT(S):**
(Please attach the [Operational Focal Point endorsement letter\(s\)](#) with this form. For SGP, use this [OFP endorsement letter](#)).

NAME	POSITION	MINISTRY	DATE (MM/dd/yyyy)
Dr Aloysius M Kamperewera	Director, Environmental Affairs Department	MINISTRY OF NATURAL RESOURCES, ENERGY AND MINING	04/18/2013

B. GEF AGENCY(IES) CERTIFICATION

This request has been prepared in accordance with GEF/LDCF/SCCF/NPIF policies and procedures and meets the GEF/LDCF/SCCF/NPIF criteria for CEO endorsement/approval of project.

Agency Coordinator, Agency Name	Signature	Date (Month, day, year)	Project Contact Person	Telephone	Email Address
Adriana Dinu Executive Coordinator, UNDP GEF		December 1, 2014	Lucas Black UNDP Regional Technical Adviser	+90 538 598 5172	Lucas.black@undp.org

ANNEX A: PROJECT RESULTS FRAMEWORK (either copy and paste here the framework from the Agency document, or provide reference to the page in the Project Document where the framework could be found).

This project will contribute to achieving the following Country Programme Outcome as defined in UNDAF Action Plan: <i>UNDAF Outcome 1.3: Targeted population in selected districts benefit from effective management of environment, natural resource, climate change and disaster risk by 2016</i>					
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: Favorable 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 Objective⁷⁴ : To increase access to energy in selected remote, rural areas in Malawi by promoting innovative, community-based mini-grid applications in cooperation with the	Tons of CO ₂ equivalent avoided.	Negligible ⁷⁵	33,183 tCO ₂ e	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.

⁷⁴ Objective (Atlas output) monitored quarterly ERBM and annually in APR/PIR

⁷⁵ 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.

private sector and civil society.	Cumulative renewable energy capacity installed and operational (kWp)	56kW ⁷⁶	164 kWp (only mini-grids directly supported by GEF and MEGA INV under the project) 300 kWp ⁷⁷ (all mini-grids supported)	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 ⁷⁸	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. Customer uptake.
Component 1: Expansion of the Mulanje Electricity Generation Agency(MEGA) Micro Hydro Power Plant					

⁷⁶ 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 which translates to 56 kW. The other wind-solar hybrid mini-grids developed by DEA are not functional at present – see Section 2.4 of the Prodoc.

⁷⁷ 216 kW of hydro powered mini-grids under component 1 and 84 kW of wind/solar powered mini-grids under component 2.

⁷⁸ The Bondo site by MEGA is yet to commence commercial operations but the electricity production data based on test results is indicated.

Outcome 1.1⁷⁹ Increasing the installed capacity of the Mulanje Electricity Generation Agency's (MEGA) MHPP scheme	Cumulative installed power generation capacity - kWp	56 kW ⁸⁰	168 ⁸¹ kWp (from mini-grids directly supported by project INV i.e. Lujeri) 216 kW (all new MEGA MHPPs supported by the project plus the baseline)	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.
	Cumulative renewable electricity generation (kWh/year)	220,752 kWh/Year	851,472 kWh/Year (all mini-grids)	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	Cumulative installed renewable energy mini-grid capacity (kWp)	0 ⁸²	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.

⁷⁹ All outcomes monitored annually in the APR/PIR. It is highly recommended not to have more than 4 outcomes.

⁸⁰ Bondo is currently at a testing stage and the capacity is now estimated as 56 kW

⁸¹ Including 88 kW at Bondo and 80 kW at Lujeri

⁸² Other than those mini-grids installed by MEGA and captured under Component 1 there are no fully functional mini-grids in the rest of the country.

MEGA model and using a Build-Own-Operate (BOO) Public Private Partnership (PPP) model	Cumulative renewable electricity generation (kWh/year)	Nil ⁸³	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 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 DEC, 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

⁸³ The Wind-PV hybrid systems that have been supported by the government are largely defunct and therefore no emissions are being avoided at present.

					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 provide limited 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
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ANNEX B: RESPONSES TO PROJECT REVIEWS (from GEF Secretariat and GEF Agencies, and Responses to Comments from Council at work program inclusion and the Convention Secretariat and STAP at PIF).

The table below explains how the comments received from the GEF Secretariat has been addressed during the PPG stage and the final Project Documentation. Note that there were no comments from STAP at PIF stage.

Comments from GEF Secretariat at PIF Stage	Responses	Changes made in the Full Project
<p>The following are the co-financiers for the project. Please make sure they will provide co-finance letters at the CEO Endorsement Request.</p> <ul style="list-style-type: none"> Ministry of Energy - Department of Energy Affairs (DEA) Ministry of Environment and Climate Change Management Malawi Energy Regulatory Authority (MERA) Selected District Councils (Districts of Mulanje, Karonga and/or Chitipa) World Bank Malawi Renewable Energy Acceleration Program (M-REAP) / Government of Scotland Business Innovation Facility – Malawi /DFiD Japanese International Cooperation Agency (JICA) Mulanje Electricity Generation Agency (MEGA) 	<p>All the co-financing letters from all the specified donors were obtained with the following changes specified in Table 1 of the CEO ER.</p> <p>In summary, overall the baseline co-finance investments for the project have increased significantly from the PIF stage and have increased from \$ 12,622,000 at the PIF stage to \$22,785,000, an overall increase of 81%. This currently represents a co-financing ratio of over 13:1 (co-finance to the GEF grant). This increase in co-finance is a confirmation of the level of engagement and support that UNDP received during the formulation of the GEF project from all the partners and stakeholders.</p>	<p>See Section A4 (particularly Table 1) of the CEO ER which explains all the co-finance commitments</p> <p>See Annex 5 of the UNDP Project Document</p>

<ul style="list-style-type: none"> • Practical Action • World Future Council • UNDP - Private Sector Development project • UNDP - Sustainable Energy Management (SEM) Support to Malawi project 		
<p>Please add details to address the following two elements at CEO endorsement request:</p> <p>1. How the considered tariffs of planned MEGA investment to be supported by GEF will manage to cover both capital investment and costs of operation and maintenance; and</p> <p>2. How the success of GEF supported investments will enable further development of the MEGA model without further GEF support by the end of the project.</p>	<p>The business model, tariff pricing, and plans for the operational viability of MEGA are detailed in Section A.5 of the CEO ER and Section 4 of the Project Document.</p> <p>According to MEGA's business plan, the tariffs for the mini-grids will 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 are currently applied to shared community assets such as schools and public health centers which will be offered electricity at no cost. The MEGA tariff rates for 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. However ESCOM's 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).</p> <p>Nonetheless even when compared to higher ESCOM 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. The 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. Based on a projected number of 4,520 households serviced by MEGA in 2018 from all MHPPs, the aggregate annual savings/year by households would be \$ 296,560/Year (additional details are available in Section 4 of the UNDP</p>	<p>Refer to Sections 4 & 6 in the UNDP Project Document.</p> <p>Refer to Section A.5 of the CEO Endorsement Request – Description of Component #1</p>

	<p>Project Document). MEGA is projected to reach economies of scale and operational self-sufficiency in 2019 when profits from their electricity tariffs should enable it to fully cover its operational costs on a self-sustaining basis. As a socially-oriented entity, MEGA does not seek to maximize profits but rather balance the pricing of its electricity tariffs in such a way that allows it to meet the social objective of offering low-cost electricity and also operating as a financially-viable enterprise.</p> <p>As part of the project MEGA will commit to pursuing (under Output 1.4) a plan to develop and implement strategies for fully cost-reflective tariffs in all their plants, increasing productive use and revenues to establish itself as a viable social enterprise. A key part of that plan will be to improve its utilization factor⁸⁴ which will provide additional revenues without increasing tariffs. Additionally under Output 1.4 there will be a review of MEGA's current stated policy of providing free electricity to social/community institutions connected to its grid such as schools and hospitals. Since there are energy expenditure budgets available for schools and hospitals from the government, it will be proposed that these institutions pay the MEGA tariffs; if this is adopted it will further improve MEGA's revenue base.</p> <p>The success of the GEF-supported investments in MEGA and the BOO mini-grids under Components 1 and 2 will provide the evidence to make the case to amend the existing policies and regulation to enable financing of clean energy mini-grids by the Rural Electrification Fund (Output 3.3). The regulatory mainstreaming of clean energy mini-grids was added as an Output under Component during the project formulation stage specifically to respond to GEF Secretariat comments about post-project sustainability and replicability. It is hoped that the matching GEF mechanism proposed for Components 1 and 2 under this project will be replaced by REF funding after the project period. Due to improvements in technologies and business models, lower levels of REF contribution should also be feasible. This will allow the government to continue with the BOO model of mini-grid implementation using the REF finance alongside grid extension options. REF is funded using levies on electricity and petroleum fuel sales in Malawi and the current funding from REF for rural electrification under the 7th round</p>	
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⁸⁴ Businesses will mostly operate during the day-time when household electricity demand is at its lowest thereby improving the utilisation factor.

	<p>of MAREP is \$17 million and the size of the REF finance is likely to increase as electricity and petroleum fuel use increased in Malawi. This linkage to REF and the decision to allocate a share of REF to mini-grid investments will ensure that clean energy mini-grids will continue to be financed in Malawi beyond the project period without further support by GEF.</p>	
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ANNEX C: STATUS OF IMPLEMENTATION OF PROJECT PREPARATION ACTIVITIES AND THE USE OF FUNDS⁸⁵

A. provide detailed funding amount of the ppg activities financing status in the table below:

PPG Grant Approved at PIF: 100,000			
<i>Project Preparation Activities Implemented</i>	<i>GEF/LDCF/SCCF/NPIF Amount (\$)</i>		
	<i>Budgeted Amount</i>	<i>Amount Spent To date</i>	<i>Amount Committed</i>
Component 1 - Technical studies	16,000	15,673	327
Component 2 - Institutional arrangements, monitoring and evaluation	37,100	11,752	25,348
Component 3 - Financial planning and co-financing investments	31,800	15,148	16,652
Component 4 – Consultation workshops	15,100	1,599	13,501
Total	100,000	44,172	55,828

⁸⁵ If at CEO Endorsement, the PPG activities have not been completed and there is a balance of unspent fund, Agencies can continue undertake the activities up to one year of project start. No later than one year from start of project implementation, Agencies should report this table to the GEF Secretariat on the completion of PPG activities and the amount spent for the activities.