GEF-6 REQUEST FOR PROJECT ENDORSEMENT/APPROVAL

PROJECT TYPE: FULL-SIZED PROJECT
TYPE OF TRUST FUND: GEF TRUST FUND

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PART I: PROJECT INFORMATION

Project Title: Towards sustainable energy for all in Mozambique: Promoting market-based dissemination of integrated renewable energy systems for productive activities in rural areas			
Country(ies):	Mozambique	GEF Project ID:[1]	9225
GEF Agency(ies):	UNIDO	GEF Agency Project ID:	150263
Other Executing Partner(s):	Ministry of Land, Environment and Rural Development (MITADER), Ministry of Energy and Mines Resources (MIREME), Ministry of Agriculture and Food Security (MASA), Ministry of Education and Human Development (MEC), National Sustainable Development Fund (FNDS), Energy Fund (FUNAE); SADC Centre for Renewable Energy and Energy Efficiency (SACREEE)	Submission Date: Resubmission Date:	04/20/2017 05/08/2017 06/20/2017 07/18/2017
GEF Focal Area (s):	Climate Change	Project Duration (Months)	48
Integrated Approach Pilot	IAP-Cities ☐ IAP-Commodities ☐ IAP-Food Security ☐		Corporate Program: SGP ☐
Name of Parent Program	[if applicable]	Agency Fee ($)	270,881

A. FOCAL AREA STRATEGY FRAMEWORK AND OTHER PROGRAM STRATEGIES[2]

Focal Area Objectives/Programs	Focal Area Outcomes	Trust Fund	(in $) GEF Project Financing	(in $) Co-financing
CCM-1 Program 1	Outcome A: Accelerated adoption of innovative technologies and management practices for GHG emission reduction and carbon sequestration	GEFTF	2,851,384	11,284,997
	Total project costs		2,851,384	11,284,997

B. PROJECT DESCRIPTION SUMMARY

Project Objective: To promote market-based dissemination of integrated renewable energy systems for productive uses in rural areas of Mozambique

Project Components/ Programs	Financing Type[3]	Project Outcomes	Project Outputs	Trust Fund	(in $) GEF Project Financing	(in $) Confirmed Co-financing
1. Establishment of a conducive policy and regulatory environment	TA	1.1 Policy and regulatory environment promoting integrated renewable energy systems in rural areas established	1.1.1 Policy framework for private sector engagement in integrated renewable energy systems in rural areas adapted and presented for adoption	GEFTF	139,664	282,211

[1] Project ID number remains the same as the assigned PIF number.
[2] When completing Table A, refer to the excerpts on GEF 6 Results Frameworks for GETF, LDCF and SCCF and CBIT programming directions.
[3] Financing type can be either investment or technical assistance.

			1.1.2 Guidelines on private sector involvement in renewable energy projects in rural areas adapted and presented to authorities 1.1.3 Standards for typical integrated renewable energy systems for rural areas enhanced and presented to authorities			
2. Capacity building and knowledge management	TA	2.1 Capacity of key players strengthened and information available for market enablers and players	2.1.1 Five training sessions for fifty (50) government officials at both national and provincial levels on RE integrated systems conducted 2.1.2 Ten training sessions targeting 250 participants from financial institutions, and other private sector organizations on financing integrated renewable energy systems in rural areas conducted 2.1.3 Training of universities and vocational training institutions staff (25) on various aspects of integrated RE systems on a train-the-trainer basis conducted	GEFTF	274,600	399,000
3. Technology demonstration and scaling up	Inv	3.1 Integrated RE systems demonstrated	3.1.1 Demonstration projects on integrated RE systems installed in selected productive sectors with high visibility to achieved 250kW of capacity	GEFTF	502,132	918,915
	Inv	3.2 Investment in integrated RE Systems scaled up	3.2.1 Financial mechanism established to support the installations of solar water pumping systems for irrigation and Waste-to-Energy projects for agro-food processing in rural areas to achieve	GEFTF	1,680,208	8,845,490

			1.2 MW of installed capacity			
	TA	3.3 Increased confidence and awareness of technical feasibility and commercial viability of integrated RE systems	3.3.1 Demonstration and investment projects are independently evaluated and results widely disseminated	GEFTF	45,000	150,000
4. Monitoring and Evaluation	TA	4.1 Project progress towards objectives continuously monitored and evaluated	4.1.1 Mid-term review and terminal evaluation carried out 4.1.2 Project progress monitored, documented and recommended actions formulated	GEFTF	74,000	152,000
			Subtotal		2,715,604	10,747,616
			Project Management Cost (PMC)[4]	GEFTF	135,780	537,381
			Total project costs		2,851,384	11,284,997

C. CONFIRMED SOURCES OF CO-FINANCING FOR THE PROJECT BY NAME AND BY TYPE

Please include evidence for co-financing for the project with this form.

Sources of Co-financing	Name of Co-financier	Type of Cofinancing	Amount ($)
Implementing Agency	UNIDO	Grants	$60,000
Implementing Agency	UNIDO	In-Kind	$140,000
Recipient Government	National Sustainable Development Fund (FNDS)[5]	Cash	$1,633,330
Recipient Government	National Directorate for Rural Development (DNDR)	In-kind	$300,000
Others	SACREEE	Cash	$60,000
Others	SACREEE	In-kind	$200,000
Others	BCI	Loans	$4,000,000
Private Sector	ADPP, Ajuda de Desenvolvimento do Povo para o Povo	Cash	$500,000

[4] For GEF Project Financing up to $2 million, PMC could be up to10% of the subtotal; above $2 million, PMC could be up to 5% of the subtotal. PMC should be charged proportionately to focal areas based on focal area project financing amount in Table D below.

[5] This co-financing is to be used towards the implementation of pilot project activities for the Tindzawene Animal Farm and Caju Ilha.

Sources of Co-financing	Name of Co-financier	Type of Cofinancing	Amount ($)
Private Sector	JFS, João Ferreira dos Santos, Agro-Industrial Group	Cash	$191,667
Private Sector	ELECTROTECNICA	In-kind	$700,000
Private Sector	FENAGRI	Cash	$2,500,000
Private Sector	Chamber of Commerce of Mozambique	Cash	$1,000,000
		Total Co-financing[6]	**$11,284,997**

D. TRUST FUND RESOURCES REQUESTED BY AGENCY(IES), COUNTRY(IES), FOCAL AREA AND THE PROGRAMMING OF FUNDS

GEF Agency	Trust Fund	Country Name/Global	Focal Area	Programming of Funds	(in $)		
					GEF Project Financing (a)	**Agency Fee** a) (b)[2]	**Total** (c)=a+b
UNIDO	GEFTF	Mozambique	CCM-1 Program 1		2,851,384	270,881	3,122,265
Total Grant Resources					2,851,384	270,881	3,122,265

a) Refer to the Fee Policy for GEF Partner Agencies

[6] Further co-financing is expected to be mobilized from private sector entities and/or project beneficiaries during project implementation after CEO endorsement in line with the GEF Co-financing Policy GEF/C.46/09.

E. PROJECT'S TARGET CONTRIBUTIONS TO GLOBAL ENVIRONMENTAL BENEFITS[7]

Provide the expected project targets as appropriate.

Corporate Results	Replenishment Targets	Project Targets
1. Maintain globally significant biodiversity and the ecosystem goods and services that it provides to society	Improved management of landscapes and seascapes covering 300 million hectares	*hectares*
2. Sustainable land management in production systems (agriculture, rangelands, and forest landscapes)	120 million hectares under sustainable land management	*hectares*
3. Promotion of collective management of transboundary water systems and implementation of the full range of policy, legal, and institutional reforms and investments contributing to sustainable use and maintenance of ecosystem services	Water-food-ecosystems security and conjunctive management of surface and groundwater in at least 10 freshwater basins;	*Number of freshwater basins*
	20% of globally over-exploited fisheries (by volume) moved to more sustainable levels	*Percent of fisheries, by volume*
4. Support to transformational shifts towards a low-emission and resilient development path	750 million tons of CO_{2e} mitigated (include both direct and indirect)	7,760 tCO2 of direct emissions 116,406 tCO2 of consequential emissions In total 124,167 tCO2 reduced over project lifetime
5. Increase in phase-out, disposal and reduction of releases of POPs, ODS, mercury and other chemicals of global concern	Disposal of 80,000 tons of POPs (PCB, obsolete pesticides)	*metric tons*
	Reduction of 1000 tons of Mercury	*metric tons*
	Phase-out of 303.44 tons of ODP (HCFC)	*ODP tons*
6. Enhance capacity of countries to implement MEAs (multilateral environmental agreements) and mainstream into national and sub-national policy, planning financial and legal frameworks	Development and sectoral planning frameworks integrate measurable targets drawn from the MEAs in at least 10 countries	*Number of Countries:*
	Functional environmental information systems are established to support decision-making in at least 10 countries	*Number of Countries:*

F. DOES THE PROJECT INCLUDE A "NON-GRANT" INSTRUMENT? (Select)

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

[7] Update the applicable indicators provided at PIF stage. Progress in programming against these targets for the projects per the *Corporate Results Framework* in the *GEF-6 Programming Directions*, will be aggregated and reported during mid-term and at the conclusion of the replenishment period.

PART II: PROJECT JUSTIFICATION

A. DESCRIBE ANY CHANGES IN ALIGNMENT WITH THE PROJECT DESIGN WITH THE ORIGINAL PIF[8]

The baseline of the project changed due to the current political and economic situation in Mozambique. Recently, there has been social and political instability as a result of the renewed tensions between Mozambique National Resistance (Renamo) and Mozambique Liberation Front (Frelimo). In addition in 2016, the discovery of previously undisclosed debt worth $1.4 billion –representing 10.7% of Mozambique's Gross Domestic Product (GDP)– combined with the exchange rate depreciation led to a substantial increase in debt ratios and debt service burden. As such, the ongoing fragile economic situation in Mozambique has hindered to some extent the commitments and engagement of some stakeholders to co-finance this project as they perceive their involvement under the status quo as too risky. Still, the majority of stakeholders remain very much interested in the project as the country has a vast potential for energy generation from RE sources such as solar, small hydro, wind and biomass, which is of particular importance for the sustainable development of rural areas.

Despite the unfavorable short-term prospects, anticipated key investments will shape the recovery with growth projected to reach 6.9% by 2018. Besides, Foreign Direct Investment (FDI) inflows are expected to support the external position with international reserves slowly recovering. It is envisaged that once the economy starts improving and the pilot projects are showcased, the private and financial sector will be more prone to participate in RE endeavours in rural areas as the risks and benefits of adopting RE technologies will be better understood.

Even though, the structure and nature of the current project does not have significant changes if compared with the project design at PIF level, the table below describes the main differences between the CEO Endorsement document and the approved PIF.

Approved PIF	CEO Endorsement
Limited contextual and background information was provided.	Complementary information was incorporated on the context and background of the country with specific emphasis on available renewable energy (RE) sources, use of RE systems applications for productive uses, involvement of the private sector in this market and the current political and macroeconomic situation of the country.
The main executing partners were: Ministry of Land, Environment and Rural Development (MITADER), Ministry of Agriculture and Food Security (MASA), Ministry of Energy and Mines Resources (MIREME), Environment Fund (FUNAB), Energy Fund (FUNAE), Mozambique National Cleaner Production Center (MNCPC).	The current executing partners are: MITADER, MIREME, MASA, MEC, FNDS, FUNAE and SADC Centre for Renewable Energy and Energy Efficiency (SACREEE)
Component 2 on capacity building targeted government officials, financial institutions and other private sector organizations.	Component 2 on capacity building targets in addition to the identified stakeholders at PIF stage, universities and vocational training institutions. Through a train-the-trainers approach on various aspects of RE systems, the project will promote the sustainability of the knowledge and skills developed after project closure.
Component 3 on technology demonstration aimed at	Due to the fragile political and economic situation, the

[8] For questions A.1 –A.7 in Part II, if there are no changes since PIF , no need to respond, please enter "NA" after the respective question.

implementing 5 demonstration projects.	active involvement of the private sector in the project has been challenging. As such, Component 3 on technology demonstration will implement 4 demonstration projects.
Component 3 had a single outcome namely: Outcome 3.1 Integrated RE systems demonstrated and scaled up	Component 3 has three outcomes namely: 3.1 Integrated RE systems demonstrated 3.2 Investment in integrated RE Systems scaled up 3.3 Increased confidence and awareness of technical feasibility and commercial viability of integrated RE systems
The greenhouse gas (GHG) emission reductions were estimated to be 4,435,073 tCO2e.	During the PPG phase, it was noted that the GHG emission reductions were miscalculated in the approved PIF. Therefore, the GHG emission reductions were recalculated to accurately reflect the situation on the ground using actual data from the Pre-feasibility studies following the GEF methodology. The GHG emission reductions were estimated to be 124,167 tCO2 reduced over project lifetime.

The following table compares the project framework and budget of the PIF and CEO endorsement. The changes in the framework are due to the new information compiled and analyzed during the PPG phase.

Project Components/ Programs		Project Outcomes		Project Outputs		GEF Funding (USD)		Co-financing (USD)	
PIF	**CEO**	**PIF**	**CEO**	**PIF**	**CEO**	**PIF**	**CEO**	**PIF**	**CEO**
1. Establishment of a conducive policy and regulatory environment	1. Establishment of a conducive policy and regulatory environment	1.1 Regulatory environment for integrated renewable energy systems in rural areas established	1.1 Policy and regulatory environment promoting integrated renewable energy systems in rural areas established	1.1.1 Policy framework for private sector engagement developed 1.1.2 Guidelines on private sector involvement in RE projects in rural areas developed 1.1.3 Standards for typical integrated RE systems for rural areas developed and adopted	1.1.1 Policy framework for private sector engagement in integrated renewable energy systems in rural areas adapted and presented for adoption 1.1.2 Guidelines on private sector involvement in renewable energy projects in rural areas adapted and presented to authorities 1.1.3 Standards for typical integrated renewable energy systems for rural areas enhanced and presented to authorities	130,000	139,664	380,000	282,211
2. Capacity building and knowledge management	2. Capacity building and knowledge management	2.1 Capacities of key players strengthened and information available for market enablers and players	2.1 Capacity of key players strengthened and information available for market enablers and players	2.1.1 Five training sessions for (50) government officials at both federal and provincial levels on RE integrated systems developed and trainings conducted 2.1.2 Ten training sessions targeting 250 participants from financial institutions, and other private sector organisations on integrated RE systems developed and trainings conducted	2.1.1 Five training sessions for fifty (50) government officials at both national and provincial levels on RE integrated systems conducted 2.1.2 Ten training sessions targeting 250 participants from financial institutions, and other private sector organizations on financing integrated renewable energy systems in rural areas conducted 2.1.3 Training of universities and vocational training institutions staff (25) on various aspects of integrated RE systems on a train-the-trainer basis conducted	100,000	274,600	380,000	399,000

3. Demonstration of technologies and scaling up	3. Technology demonstration and scaling up	3.1 Integrated RE systems demonstrated and scaled up	3.1 Integrated RE systems demonstrated 3.2 Investment in integrated RE Systems scaled up 3.3 Increased confidence and awareness of technical feasibility and commercial viability of integrated RE systems	3.1.1 Five (5) demonstration projects on integrated RE systems installed in a selected number of productive sectors with high visibility 3.2.1 Financial mechanism established to support the installations of thirty (30) solar water pumping systems for irrigation and thirty (30) biogas digesters for agro-food processing in rural areas 3.3.1 Demonstration and investment projects are independently evaluated and results widely disseminated	3.1.1 Demonstration projects on integrated RE systems installed in selected productive sectors with high visibility to achieved 250kW of capacity 3.2.1 Financial mechanism established to support the installations of solar water pumping systems for irrigation and Waste-to-Energy projects for agro-food processing in rural areas to achieve 1.2 MW of installed capacity 3.3.1 Demonstration and investment projects are independently evaluated and results widely disseminated	2,415,604	2,227,340	7,890,000	9,914,405
4. Monitoring and Evaluation	4. Monitoring and Evaluation	4.1 Project progress towards objectives continuously monitored and evaluated	4.Project's progress towards objectives continuously monitored and evaluated	4.1.1 Mid-term review and terminal evaluation carried out 4.1.2 Project progress monitored, documented and recommended actions formulated	4.1.1 Mid-term review and terminal evaluation carried out 4.1.2 Project progress monitored, documented and recommended actions formulated	70,000	74,000	150,000	152,000
					Subtotal	2,715,604	2,715,604	8,800,000	10,747,616
					Project Management Cost (PMC)	135,780	135,780	420,000	537,381
					Total project costs	2,851,384	2,851,384	9,220,000	11,284,997

A.1. *Project Description*. Elaborate on: 1) the global environmental and/or adaptation problems, root causes and barriers that need to be addressed; 2) the baseline scenario or any associated baseline projects, 3) the proposed alternative scenario, GEF focal area[9] strategies, with a brief description of expected outcomes and components of the project, 4) incremental/additional cost reasoning and expected contributions from the baseline, the GEFTF, LDCF, SCCF, CBIT and co-financing; 5) global environmental benefits (GEFTF) and/or adaptation benefits (LDCF/SCCF); and 6) innovativeness, sustainability and potential for scaling up.

1) The global environmental and/or adaptation problems, root causes and barriers that need to be addressed;

Country context and background[10]

Worldwide, 1.1 billion people do not have access to electricity and energy services and an additional billion is under-electrified. From those lacking electricity, 87% live in rural areas, mostly in Sub-Saharan Africa and South East Asia. In 2014, the rural electrification rate was only 71% as the extension of electricity grids has proven to be technically difficult, very costly and sometimes an inefficient solution due to the remoteness and sparse population density. As such, the International Energy Agency (IEA) estimated that to obtain universal energy access in 2030, 60% of the rural areas without electricity will have to integrate mini-grid or other off-grid decentralised solutions. Currently, RE technologies represent the most cost-effective option to expand electricity access in most rural areas due to the rapid cost reductions. As poverty is directly related to the lack of access to energy sources, many countries have established energy access in rural areas as one of the top government priorities and have actively pursued programmes to increase the energy supply and diversify the energy mix through the adoption of integrated RE technologies.

In this regard, Mozambique –one of the poorest African countries with 54.7% of the population at national poverty lines (2008, World Bank latest data) – reached 40% of the electricity coverage in 2014 after making remarkable progress on extending the national grid. In 2015, the population reached 27,977,863 inhabitants from which 68% live in rural areas. Agriculture is one of the most important sectors of the Mozambican economy accounting for 31.8% of the Gross Domestic Product (GDP) and providing a livelihood to almost 81% of the labour force. The main crops are cashew nuts, cotton, tobacco and sugarcane which are mostly harvested using traditional farming methods as mechanized agriculture is still very localized and available for few farmers.

Mozambique is characterised by a great asymmetry between the north and the south of the country, as well as between urban and rural areas. For instance, the urban electrification rate is 67% while the rural one only reached 27% in 2014. To tackle these disparities, the Government of Mozambique (GoM) has established several development strategies; unfortunately, the implementation of those strategies has faced severe challenges due to 16 years of military conflict. Currently, the grid supplies more than one million households while modern energy services from photovoltaic (PV) systems supply more than 2.8 million people, particularly in rural schools and clinics.

Energy demand and supply

Biomass meets 78% of the country's energy demand followed by hydropower (9%), oil products (8%), coal (4%) and natural gas (1%). Although the country is a producer of natural gas and has recently discovered more reserves, the current use of gas in electricity generation is still marginal. As mentioned before, Mozambique's electricity supply is provided by both on-grid and off-grid systems. The on-grid energy is managed by *Electricidade de Mocambique* (EDM) which is the national electricity company responsible for the generation, transmission and distribution of electricity to

[9] For biodiversity projects, in addition to explaining the project's consistency with the biodiversity focal area strategy, objectives and programs, please also describe which Aichi Target(s) the project will directly contribute to achieving..

[10] Bibliographic references used in this section:
Suit, Kilara; Choudhary, Vikas, Mozambique: agricultural sector risk assessment, 2015
IRENA, Africa 2030: roadmap for a renewable energy future, 2015
GoM, Estrategia de Energia 2015-2024, 2014
World Bank Data – Mozambique, 2014
GoM, Rapid Assessment and Gap Analysis for Mozambique, 2012
Rodrigues, Armando, Report SE4All Mozambique Powerpoint presentation, 2012
INNOQ webpage and online documentation

main urban centres. Since 2012, the national grid covers 84% of the 128 district headquarters of the country, as well as some smaller villages. In the provincial capital cities, electrification was completed in 2005 and the electrification of the remaining district headquarters is planned to follow. Moreover, a number of smaller villages and rural areas isolated from the national grid are fed with electricity from a range of energy solutions implemented by the *Fundo de Energia* (FUNAE) including diesel powered generators up to 200 kW, electric solar PV systems and mini-hydroelectric plants. The energy systems installed by FUNAE are managed by local commissions comprised of beneficiaries; however, maintenance and repair have been challenging, particularly for diesel generators.

Small farms and agro-food processing industries, which are in most cases located in rural remote areas, face serious challenges in accessing electricity and other forms of modern energy. Most of these farms and industries have invested in decentralized diesel generators which expose them to oil price fluctuations at the global level. In periods of unreliable supply of diesel, these farms and industries rely on firewood and charcoal for their operations. Furthermore, in many cases their waste is dumped in unregulated areas and rivers resulting in local ground and water pollution; when organic waste is discarded in river streams, downstream users have been consequently affected.

Renewable energy resources

Mozambique has a vast potential for energy generation from RE sources such as solar, small hydro, wind and biomass. In fact, the Renewable Energy Atlas of Mozambique estimates a potential of 7 GW on renewable projects. Currently, RE from wood fuel and hydroelectric sources are those with higher participation in the energy mix in terms of production and consumption as primary energy.

Biomass

Mozambique has significant biomass energy resources including standing biomass (plantation forests); residues/waste from agriculture (sugarcane waste, corn cobs, castor seed, cashew nut shells); and livestock (dairy farms waste, swine, poultry, and chicken waste). In 2013, forests in Mozambique were estimated to represent 49.1% of the country land area. Nevertheless, 90% of the population in Mozambique use wood fuel and charcoal for cooking and water heating. As such, the continuous consumption of biomass fuels by urban and rural populations has shown to be unsustainable since the rate of deforestation is greater than the natural growth of forests.

According to the International Energy Agency (IEA) 2006 statistics, agricultural residues as well as domestic and animal waste have an estimated energy generation potential of nearly 300,934 GWh per year. However, this potential largely goes unutilised as the relevant technologies for small to medium scale applications are not readily available in the local market, and consequently there is little, if any, knowledge about their operation.

Solar

Mozambique has a significant and largely untapped solar potential. Annual average solar radiation is estimated to be 5.2 $kWh/m^2/day$ and varies between 4 and 7 $kWh/m^2/day$ across the country. The potential for solar power is expected at approximately 1.49 million GWh (IRENA, 2012).

Wind

Wind resources have better potential mainly over the coastline and in the southern part of the country, with several large scale sites close to Maputo, with potential for more than 300 MW and with winds above 7 m/s measured and confirmed. Potential for wind projects extends to Beira and several locations in Zambezia and Tete.

Hydro

According to the Rapid Assessment and Gap Analysis (RAGA), Mozambique has over 1,000 MW of mini-hydro potential in addition to large hydropower plants which are already in the future expansion plans of the country.

Energy use in productive activities

Small farms and agro-food processing industries –which are in most cases located in rural remote areas– continue to face serious challenges in accessing power and other forms of energy. Therefore, most of these farms and industries have invested in decentralized diesel powered generators resulting in a bigger environmental footprint. In addition, the reliance of these farms and industries on diesel powered generators exposes them to oil price fluctuations at the global

level. In periods of unreliable diesel supply, these farms and industries rely on firewood and charcoal for their operations.

The use of modern energies for productive uses in agricultural activities, cattle breeding and fisheries is very limited. In 2012, the percentage of agriculture/livestock units that use (a) electric pumps were only 0.1 % and the majority (51.5%) were situated in the southern region, in Maputo and Gaza; (b) motor pumps were 0.2%; and (c) mechanical and transport means to access the required liquid fuels were around 6%.

Some of the typical industries still consume large quantities of wood fuels including ceramics, brick makers, bakeries, and oil, tea, tobacco, and soap producers. The main reasons for this preference are the conviction that wood fuel is the cheapest energy source, the lack of knowledge about alternative energy sources and, in some cases, the belief that the use of fuel wood influences positively the quality of the final product. In addition, the switch from fuel wood to modern energy sources requires the acquisition of new technologies and producers are usually not willing to incur in the respective investment.

Standards and quality assurance

In 1993, Mozambique's National Institute for Standardization and Quality (INNOQ, *Institute Nacional de Normalização e Qualidade*) was created with the aim of promoting and coordinating the national quality policy in the fields of standardization, metrology, certification and quality management, for the national economy development (INNOQ,2016). Regarding off-grid technologies, national efforts to establish stringent standards and quality assurance frameworks can substantially bolster market development. Building confidence within communities in system performance and reliability is essential for the widespread acceptance of off-grid solutions. In this regard, the Lighting Africa initiative is a prime example of regional cooperation to implement quality-assurance frameworks including minimum standards for off-grid lighting products that have been adopted by the International Electro technical Commission. Currently, more than 50% of the off-grid lighting market consists of products that meet these standards which represents a remarkable increase from the 3% that met the standard in 2009 (IRENA, 2015).

Political and macroeconomic scenario in Mozambique

The average annual economic growth saw a slowdown to 6.3% in 2015 as the country faces defining economic and political challenges. The slower GDP growth was due to lower than expected exports and a decrease in public expenditure and foreign direct investment. A reduced influx of hard currency assisted the devaluation of the metical (MZN) against the US dollar and pressured the balance of payments. This was halted only by a USD 282.9 million standby credit facility agreement with the International Monetary Fund in December, 2015. The budget deficit was reduced from 6.6% in 2014 to 5.4% in 2015. The main short-term challenge is to regain growth momentum while ensuring fiscal and debt sustainability.

Since October 2016, the monetary policy tightening has resulted in a rebalancing of the foreign exchange market with the metical appreciating by about 8% vis-à-vis the US dollar, following a 40% depreciation over the first nine months of the year. Despite recent positive developments, the economic outlook remains challenging. Growth is now projected at 3.4%, down from 6.6% in 2015. Inflation, which is expected to peak soon, is still high. Increased spending on wages and salaries is putting pressure on fiscal policy, although the 2017 budget deficit is still expected to narrow to about 6% of GDP.

To continue with the necessary economic policy reforms, the IMF recently conducted a mission to Mozambique to discuss policies supporting macroeconomic stability and a new economic program. While good progress was achieved through the credit facility provided by the IMF, additional policy adjustments are required to further consolidate macroeconomic and financial stability, and pave the way for a fund-supported program. One of the top priorities for 2017 is fiscal consolidation as well as the containment of the wage bill and the gradual elimination of general price subsidies.[11] The IMF will continue supporting Mozambique through a new aid programme only if the Government agrees to renegotiate loans with creditors and allow an independent debt audit.

[11] For further reference, please visit: http://www.imf.org/en/News/Articles/2016/12/13/PR16555-Mozambique-IMF-Staff-Team-Concludes-Visit):

Financial sector overview

Mozambique's financial sector is less developed in comparison to the regional average, but is comparable in size to other countries in the low-income group. The net interest margins, bank cost-income ratios, bank overhead costs and levels of financial intermediation show that the efficiency of the banking system is lower than the regional and income group averages. Despite recent growth in the overall financial system, access to finance remains limited, particularly outside urban areas. Structural impediments to financial intermediation, lack of competition, high costs and interest spreads in the banking sector and a large informal sector combined with the related lack of collateral and legal documentation have contributed to wide-spread financial exclusion across the country. Currently, there are around 20 commercial banks operational in Mozambique. In 2015, only 6.5% of the adult population were borrowers with a commercial bank and a ratio of 10 ATMs per 100,000 inhabitants. Regarding microfinance, the sector has experienced significant growth supported by strong government efforts including lowering capital requirements and start-up costs. However, the sector remains small and highly concentrated and is still not systemically important. High levels of non-performing loans and poor reporting records in some microfinance institutions (MFIs), as well as very low minimum capital requirements for rural MFIs present potential sources of risk.[12]

Figure 1 shows the distribution of credits allocated by the Bank of Mozambique (BoM) for 2015, the latest year available. Here, it can be seen that the sector comprising electricity, natural gas and water only received 3% of the total; likewise, the agriculture, livestock farming, forestry and fishery related activities.

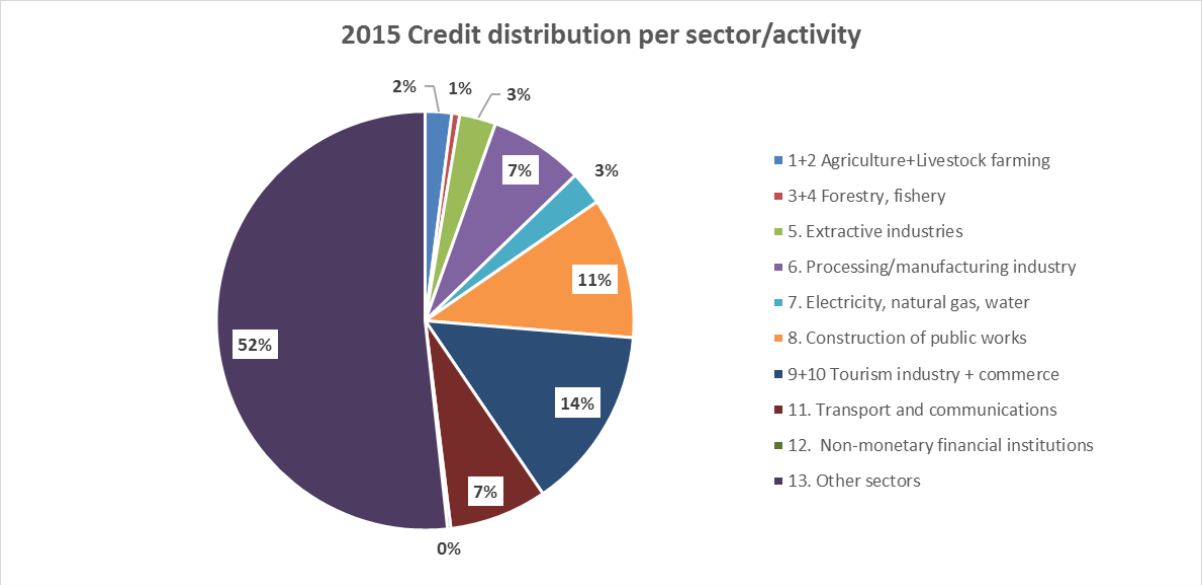


Figure 1: Credit distribution for the latest year with data, 2015, per sector/activity

Barriers and opportunities to be addressed by the project

- **Policy and regulatory frameworks are not conducive to private sector investments**

  The participation of private investors in off-grid electrification is hampered by the absence of an enabling policy and regulatory framework. Although the existing policies and regulations express the need to promote the involvement of the private sector in RE generation, they do not provide specific information or mechanisms for the engagement and operation of IPPs in decentralized renewable energy systems as they do for grid-connected systems where there is a REFiT scheme in place. Even though the country has a Master Plan for Off-grid Energy, there is no regulation or provision that fosters private sector active involvement in the process. For instance, in the event that a farmer or an industry produces excess power from renewable stand-alone systems, there are no regulations on how such power could be sold to nearby customers. In addition, for such a new industry, there are no standards for integrated renewable energy systems that could be developed and adopted.

[12] Making Finance Work for Africa https://www.mfw4a.org/mozambique.html

The off-grid market needs dedicated policy and regulatory frameworks in order to incentivise the private sector, foster innovative business and financing models and create enabling conditions for deployment.

Moreover for some energy related activities, it is necessary to request an operating licence. According to the information provided by the GoM on their official website, different types of activities need different types of licences, demand certain documentation and have different lead times to obtain the licence. For instance:

- Hotel/lodging/tourism and industrial activities: An Environmental Impact Assessment (EIA) is required from large, medium and small-scale enterprises/industries in order to apply for an environmental licence. After obtaining it, enterprises/industries can apply for the operating licence. The timeline for obtaining the operating licence is approximately 70 days. Micro-scale industries are exempt from this procedure and just need to register, except in the case of food and pharmaceutical industries.
- Commercial activities: a license or permit is required but the GoM website does not provide any reference on having to conduct an EIA. Timelines are variable depending on the type of commercial activity and its location (rural, national, and international).

When an EIA or Simplified Environmental Impact Assessment (SEIA) report is needed, as indicated in Decree n° 45/2004, the authorities allocate 45 business days to evaluate it, counting from the date when the project proponent submits all the necessary documentation and registers for EIA/SEIA report evaluation. All these procedures can be time consuming and bureaucratic.

The WB's *Doing Business*[13] measures and reports the actual effect of a government policy that enhances or constrains business activities including starting a business, dealing with construction permits, getting electricity, registering property, and getting credit, among others. In this ranking, Mozambique is in the 137th place of 190 countries listed[14]. From the ranking two main changes can be highlighted: Mozambique made starting a business more difficult by increasing registration and notary fees but improved the access to credit information by enacting a law that allows the establishment of a new credit bureau.

- **Lack of capacity and knowledge to design, install, maintain and operate renewable energy systems**
  The local market players and enablers still lack key skills to support the uptake of a vibrant renewable energy market in rural areas. On the side of market enablers, there are capacity gaps in terms of planning and regulating the sector, while key market players like private investors, farmers or industrialists lack skills to translate their ideas into bankable investment projects. Furthermore, the universities and vocational training centres have limited curricula on specialized renewable energy technologies and services; hence, the country does not have a cadre of qualified personnel to provide services including the design of renewable energy systems and operation and maintenance services. Availability, accuracy and data disaggregation and statistics is also an issue to be addressed since it has a negative impact on GoM's planning and decision-making ability.

- **Lack of appreciation of technical feasibility and commercial viability of integrating renewable energy technologies in farms and industries**

  Most of the solar powered systems installed in the country are in households and public buildings such as hospitals and schools. The maintenance of the systems installed in public buildings has faced challenges related to the lack of ownership and business approach to their operation; hence there has been no replication. In rural Mozambique, renewable energy technologies are generally viewed as more relevant for lighting rather than for productive uses. This is due to the fact that, to date, solar photovoltaic energy has been mainly promoted for lighting purposes. As such, the potential for renewable energy technologies applications in farms and industries is not yet recognized. It is important to demonstrate the technical feasibility and commercial viability of solar energy and other renewables in productive sectors such as agriculture and industry. Given the lack of maintenance service providers, it is imperative that any demonstration project is closely linked to maintenance

[13] World Bank. 2017. *Doing Business 2017: Equal Opportunity for All*. Washington, DC: World Bank. DOI: 10.1596/978-1-4648-0948-4. License: Creative Commons Attribution CC BY 3.0 IGO

[14] See http://www.doingbusiness.org/data/exploreeconomies/mozambique

services. For instance as part of the UN Joint Programme, UNIDO installed solar water pumping systems with a total capacity of 15 kW in the villages of Madulo, Braganca, Ndombe, Mepuzi, Chicualacuala B, Eduardo Mondlane and Mapai located in Chicualacuala district. The monitoring exercise within this project showed that systems handed over to private entities for management have continued to operate, while systems managed by local communities could not maintain the equipment as those communities do not charge cost-reflective tariffs for the services provided. In addition, Mozambique has recorded sixty-nine (69) diesel-fuelled mini-grids that are managed by local communities, most of them having stopped operating because –like the previous case– rural communities do not charge cost-reflective tariffs.

Technical feasibility and commercial viability are linked to a lack of visible best practices examples since there are no business models that prove the viability of such RE projects for productive uses. For this reason, the present UNIDO/GEF project proposes to undertake several demonstration projects –with up to 33% grant funding for capital costs. These projects will serve as best practice examples to raise private sector interest in investing in integrated RE for productive uses.

- **Lack of appropriate financial mechanisms to support the adoption of RE/EE for productive uses**

  Financial services providers have generally seen RE projects as risky and have not been providing tailor made financial mechanisms to support such projects. Only with a clear national framework, the renewable energy projects of strategic interest can attract private sector actors to funding them. In this regard, investment promotion measures are needed to attract both domestic and foreign investors and awareness needs to be raised among local financial institutions about the on and off-grid renewable energy market. Public-private partnerships can be most effective if used to reduce risk perceptions and to share investment costs.

  The baseline assessment conducted found that there has been previous experience in providing finance for renewable energy or energy efficiency related projects in Mozambique. However, the lending rates for the products offered vary according to the type of project as they tend to apply a "case by case" approach when evaluating the project. For more information on the baseline, please consult the Baseline Report under Annex I.

2) The baseline scenario or any associated baseline projects

The baseline scenario would consist of the continuation of the current activities and projects that the country is undertaking in the field of greenhouse (GHG) mitigation as well as in the field of RE technologies installed in rural mainly for residential use.

In the business as usual scenario, the barriers and challenges presented in the previous section would not be adequately addressed since the country would continue:

- to have a legal and regulatory framework that does not provide the appropriate means to incentivise the participation of the private sector in energy generation initiatives for productive activities in rural area;
- to develop projects and programmes which are mainly focused on domestic applications of RE systems, which do not target the inclusion of productive or income generation applications;
- to rely on the usual financing means and institutions, such as the FUNAE or grants from multilateral organisations;
- to apply the REFiT scheme which only applies for on-grid RE systems;
- to have capacity gaps in market players and enablers to translate RE ideas into bankable projects;
- to rely on fossil fuels (e.g. diesel generators) as well as on wood fuel and charcoal derived from unsustainable exploitation of forests and unregulated cutting of trees;
- to pollute the environment (soil and water bodies) by dumping of agricultural solid waste and wastewater.

Associated baseline projects – at national level:

- FUNAE operates at the national level to finance and provide financial guarantees to projects that contribute to the development, production and use of low-cost alternative sources of energy in order to increase energy access in urban and rural areas. PV projects by FUNAE have focused on electrification of rural schools, health

centres and administrative posts. As stated in the PIF, FUNAE primarily provides financial support or guarantees to economically and financially viable projects. Much is still to be done in order to expand FUNAE's interventions so as to adequately respond to existent challenges at scale and level that will have impact on the lives of the majority in rural areas. To date, most of FUNAE activities in promoting RE have focused on providing solar systems to schools and hospitals, through grant funding. Given the limited success of this approach and the huge number of people who still do not have access to energy, FUNAE will work closely with the project to adopt a market-based approach which will attract private sector investments in off-grid electrification at a scale and level that will sustain markets in rural areas and actually have a continued impact.

- EDM promotes an ambitious grid-extension programme that has significantly increased electricity access in many towns and service centres, but has not yet reached most of rural areas. The majority of these developments have been financed through grants and soft loans. As such, the project will focus on rural electrification to complement the urban electrification effort carried out by EDM.
- Under the Ministry of Science and Technology, the Boane Agrarian Institute is currently testing locally produced biogas systems for households. The project is willing to collaborate with the Institute to promote the dissemination of market ready digesters and to participate in the planned training programmes by providing know-how and skills on this technology.
- In 2006, the GoM introduced a Professional Education Reform in order to improve the educative offer to satisfy the market demand for specific and new capabilities. A RE pilot programme was carried out achieving the following results (Caetano, 2013):
    - 25 teachers were trained on RE technologies in Germany;
    - A RE laboratory was installed in the Industrial Institute of Maputo (IIM);
    - The Eduardo Mondlane University developed specialization programmes (Masters and PhDs) on RE technologies, rural development, etc. promoted by the Ministry of Science and Technology. Currently, the UEM offers a Master program in Energy Technologies and Agrarian Development and a PhD course in Renewable Energy at the Department of Engineering. [15]
    - The National Institute for Employment and Vocational Training (INEFP) offered short RE courses;
    - An initiative on the use of solar energy in Beira's traffic lights was carried out during the "Technical Teaching Week".
    - Electronic Centre for Renewable Energies (NEER) was created at the Pedagogical University to conduct research, training of trainers, and to promote the idea of using RE among the young generations;
    - The Institute for Spatial Planning and the Environment started promoting clean energy in different sectors of the economy;
    - The National Museum of Geology with funds from Belgium carried out an institutional capacity building project on environmental management in technical schools and developed an environmental manual;
    - The UNESCO-UNEVOC[16] International Centre actively participated in the development of a strategy for environmentally friendly technical education carried out by the Direcção Nacional do Ensino Técnico-Profissional (DINET);
    - The Ministry of Education and Human Development (MEC) has assumed its role in creating enabling conditions to adequately respond to the growing demand of RE by conducting staff trainings.

Building on all the above training initiatives, the project will supplement the local capacity available in universities and vocational training institutions by providing specialized training on the integration of RE in productive activities, especially agriculture and farming. Furthermore, it will train government officials, both at national and provincial level, and financial institutions and private sector stakeholders on how to support the integration of RE systems in rural areas.

[15] For a full list of courses please visit http://www.uem.mz/index.php/ensino/pos-graduacao

[16] UNESCO-UNEVOC is UNESCO's specialized Centre for technical and vocational education and training (TVET). It assists UNESCO's 195 member states to strengthen and upgrade their TVET systems.

Associated baseline projects – at regional level:

- The establishment of the SADC Centre for Renewable Energy and Energy Efficiency (SACREEE) in Namibia has been formally approved by the SADC ministers. The Centre's mandate is to promote market-based adoption of RE and EE technologies and services in SADC member States. The centre will contribute substantially to the development of thriving regional RE and EE markets through knowledge sharing and technical advice in the areas of policy and regulation, technology cooperation, capacity development as well as investment promotion. It is envisaged that SACREEE will support the project by providing policy advisory services.
- EUEI PDF RECP (Africa-EU Renewable Energy Cooperation Programme)[17] aims to connect African and European developers and investors. RECP supports European and African entrepreneurs through the provision of dedicated market information with market briefings for certain African markets and a finance facilitator service which is an advisory platform that will support the development of meso-scale RE project preparation. The RECP has already identified over 75 relevant individual financing instruments for RE projects in Africa covering loans, equity and grant facilities. The project will build on the financial instruments already identified and will adapt them to the Mozambican context.

- The EnDev Mozambique programme lead by German Development Agency (GIZ) works in the field of picoPV and solar home systems (SHS) to promote the participation of the private sector on all levels along the value chain. The intervention provides technical and business training to importers, wholesalers and retailers of solar products while networking and business relationships are facilitated between them. Besides, it supports new distribution channels in rural areas with new partners by assisting the private sector to overcome initial market entry barriers. This project will complement EnDev interventions by creating business opportunities for the local RE technologies market.

- The project "Integrating Skills for Green Jobs in the Mozambican TVET System" developed by GIZ carried out a programme to strengthen or set up Technical and Vocational Training and Education (TVET) institutions focussing on RE to cater for the demand of technicians in the sector. The project has implemented 3 pilot projects in close collaboration with MEC to integrate skills for green jobs and improve basic and vocational training in Mozambique. The target group & intermediaries included: children and youth with limited access to basic and vocational education; girls and women who are particularly disadvantaged within the education sector; teachers of teachers' training institutes and of technical-vocational institutes; executive and technical staff at national, district and provincial level with a focus on Sofala, Inhanbane and Manica. The pilots consisted of:
    i) Political awareness raising which included the active participation in international conferences and workshops, the first national seminar on TVET for RE and an active exchange with South Africa on skills for RE;
    ii) Capacity building on green skills integrating electro/electronics curriculum, installing the first training laboratory for renewable energies, and organizing short courses for entrepreneurs and other stakeholders;
    iii) Training of trainers taught at least 25 people on RE in Germany and Mozambique and established a network of multipliers in each region of the country.

  In general terms, this GIZ financed experience was mostly focused on improving technical capabilities and skills on RE for the youngest so they can be absorbed by the labour market and evolve with it (e.g. providing maintenance services). The present GEF/UNIDO project builds on the results of this project to improve the offered curricula at universities and vocational training institutions and complements it by providing tailor-made training to market enablers to plan and regulate the sector, as well as training private investors, farmers, industrialists, etc. to translate their project ideas into bankable investment projects. [18]

- The EU Technical Assistance Facility (TAF) for the "Sustainable Energy for all" (SE4ALL) initiative supports developing countries (and regional bodies) in East and Southern Africa that are eligible under the European

[17] http://www.africa-eu-renewables.org/

[18] From presentation by Julia Giebeler, Pro-Educação, *Integrating skills for green jobs in the Mozambican TVET system Pilot experiences*

Development Fund (EDF) whilst priority is given to those countries that are committed to reform and development of the energy sector and to scaling-up public and private investments.

- Renewable Energy for Rural Development (RERD) Programme –closed in 2016– was one of the main components of the Belgian bilateral programme in Mozambique. The objective of the programme was to increase access to energy in rural areas by focusing on off-grid energy systems based on RE resources (hydraulic, solar and wind) in remote rural areas where no grid connection was foreseen within the next five years. The main objectives were (a) to finance, on grant basis, electrification systems for community infrastructures such as administrative buildings, schools, health centres, water pumping devices and public lighting, (b) to stimulate renewable energy installations for private use (household, shops or small enterprises) by subsidies (investment funds) and soft loans through micro-finance systems. The institutional counterpart was FUNAE. The study also looked into the potential role FUNAE could play in promoting private sector engagement in the RE market. Four pilot interventions were proposed: i) Pay-as-you-go, ii) solar battery charging stations, iii) PV systems and maintenance. As the project finished recently, it remains to be seen to what extent private companies are interested in tapping into this energy market. The project will build on the knowledge and experience developed within FUNAE to continue promoting and facilitating the active engagement of the private sector in the rural energy market.

Baseline policies

Currently, there are plans, programmes and strategies aiming to increase the utilisation of renewable energy technologies to promote sustainable development and private sector involvement. Although several laws and policies clearly promote the involvement of the private sector in the electricity generation field (Electricity Law 1997, Energy Policy 1998, Energy Strategy 2015-2024, National Development Strategy 2015-2035, Policy on the Development of New and Renewable Energy, Strategy for New and Renewable Energy Development 2011-2025), efforts have not brought the desired results. In fact, the power generation sector has a track record of slow development with several projects abandoned and many others being deployed at very slow rates due to financing difficulties related to, for example, the ability to access additional financing options. Therefore, it is relevant to analyse in detail the financial mechanisms and incentives that are currently in place to understand the challenges and device appropriate interventions. The existing incentives for the RE sector in Mozambique entail feed-in-tariffs, grid code revisions, biofuels mandate/obligation, public investment, loans or grants. Besides, there are not many regulations addressing or providing a framework for a large-scale deployment and use of low-carbon energy solutions in rural areas, especially when considering the private sector involvement.

In the early 2000s, an initiative by the Ministry of Energy involved the private sector in distribution activities which led to the award of an isolated grid supplied by natural gas engines to a private company. However, this experience failed because of the high electricity generation and system operation costs associated with the lack of financial support for system expansion. In 2007, EDM had to take over the operation of the isolated grid. Despite this experience, a number of companies are still interested in becoming large scale independent power producers (IPPs) by taking advantage of the Electricity Law (1997) which envisages the private sector involvement. In 2014, a number of new thermal generation projects based on coal and natural gas as well as hydroelectric schemes were in advanced planning stages involving IPPs or public private partnerships (PPPs).

In recent years, the GoM has produced several plans and strategies to promote the utilization of solar energy (on- and off-grid) for productive uses and to encourage the use of waste-to-energy technologies. Besides, Mozambique has set targets per type of renewable energy source. Still, additional efforts are required to further improve the regulatory framework providing the necessary policy tools for the actual implementation of projects. The GoM has in place a RE Feed-in-Tariff (REFiT) scheme in place -whose tariffs were revised in 2015- but it applies merely to grid-connected projects that use renewable energy sources. The REFiT depends on the size of the system and the type of RE. With regards to rural areas and off-grid generation, there are not many specific regulations addressing the subject. Only with a clear national policy and regulatory framework, the private sector will become interested in funding renewable energy projects to achieve the targets set.

At the regional level, the SADC Regional Energy Access Strategy and Action Plan (REASAP), approved by the SADC Ministers in 2010, proposed two broad goals for energy access:

- A strategic goal to harness regional energy resources to ensure, through national and regional action, that all the people of the SADC region have access to adequate, reliable, least-cost, environmentally sustainable energy services; and
- An operational goal to halve the proportion of people without such access within 10 years for each end use, and halve it again in successive 5 years' period until there is universal access to energy.

REASAP includes detailed description of possible technical and policy options for increasing access with renewables stand-alone systems and mini-grids as an alternative to grid extension.

The "SADC Renewable Energy and Energy Efficiency Status Report"[19] 2015 prepared by UNIDO in collaboration with the Renewable Energy Policy Network for the 21st Century (REN21) is a relevant source of information to compare Mozambique's case to other countries in the region, including their RE targets and different incentive schemes adopted to increase the use of RE. In the case of Mozambique, it has identified potentials for different RE sources and set a target to be achieved by 2025.

RE source	RE Potential	Target by 2025
Solar	23 TW	597 MW
Hydro	18 GW	5.4 GW
Biomass	2 GW	128 MW

For additional information on the baseline scenario, please consult the Baseline Report in Annex I.

3) the proposed alternative scenario, GEF Focal area strategies, with a brief description of expected outcomes and components of the project

The proposed alternative scenario is to carry out a series of components and activities that will lead to the market-based adoption of integrated renewable energy systems (solar PV for irrigation and waste-to-energy) in small to medium-scale farms and rural agro-food processing industries in Mozambique. Under the baseline scenario, the barriers would not be adequately addressed providing a rationale for GEF involvement. The GEF financing will provide the necessary catalytic support to create and sustain an environment that is conducive to promoting investments and adopting appropriate RE systems contributing to climate change mitigation and associated environmental and socio-economic benefits to Mozambique.

The proposed project is aligned with the GEF Focal area strategy of Climate Change-1 (CCM-1) Program 1 since the promotion of renewable energy integrated systems such as solar PV and biomass usage for energy generation displaces the use of carbon-intensive fuels (e.g. diesel generators), thus contributing to the reduction of GHG emissions and benefiting the development of a low-emission development path. In order to reach the project's objective, four components are proposed.

Component 1 Establishment of a conducive policy and regulatory environment

The activities to be undertaken under Component 1 are intended to enhance the regulatory and policy environment in order to promote the involvement of the private sector in the development of integrated RE systems for rural areas. Besides, Component 1 will create institutional capacity in the local counterparts to guarantee that the activities continue once the project is closed.

[19] http://www.unido.org/news/press/new-report-highlight.html

Output 1.1.1. Policy framework for private sector engagement integrated renewable energy systems in rural areas adapted and presented for adoption

Activity 1.1.1.1. Establishment of a Policy and Regulatory Taskforce

The analysis conducted in the PPG phase to identify the existing gaps and barriers in the policy and regulatory framework was necessary to understand what needs to be improved, modified or created to actively involve the private sector in the development of RE systems in rural areas. Besides, it is envisaged that the Mozambican economy will start recovering shortly increasing the energy demand in rural areas. To respond to changing circumstances, policies and regulations need to be updated regularly. In this regard, having a dedicated Taskforce will ensure the continuous revision of the policy and regulatory frameworks and the timely response to market needs in relation to RE energy and low-carbon emission technologies even after the end of the project.

The Taskforce to be established will be composed of representatives of National Environmental Directorate (DNA), MIREME/DNE/DNENR, FUNAE, FNDS, National Council of Electricity (CNELEC)[20] and will be coordinated by MITADER. The Taskforce will support the following activities:

- Development of detailed studies with specialized consultants on policy and regulatory related matters focusing on off-grid electricity generation and monitoring;
- Identification of synergies with other activities being undertaken in Mozambique, which can contribute to the policy and regulatory framework improvements in rural areas;
- Identification of relevant measures to improve the policy and regulatory frameworks by overcoming the barriers previously described and to develop strategies for the sector/s involved in the project;
- Inclusion of gender dimensions in national policies, regulations, legislations, plans and strategies.

A strong coordination effort will be needed to organise and guide the Taskforce's work towards improving the policy and regulatory environment. With this in mind, SACREEE will support the Taskforce to establish and improve coordination and collaboration mechanisms for synergy building, information sharing, awareness and advocacy. Furthermore, SACREEE will support the organization of scheduled meetings among Taskforce members which will be conducted considering the following:

- The Taskforce coordinator (MITADER) will be responsible for scheduling meetings and informing members about upcoming dates;
- Each participating institution/entity will select a representative person to attend the Taskforce meetings as well as one or two replacements if the person cannot attend;
- During the meetings, activities and tasks to be conducted should be identified and assigned to the corresponding members, indicating objectives, work plan activities, milestones and deadlines to be fulfilled. The results will be discussed in the following meeting to identify any possible delays, hurdles or changes;
- Minutes will be drafted each Taskforce meeting including the discussions held, the participants and next steps. This will ease communication and will promote transparency on the activities and the responsibility allocated. The responsibilities will be distributed among all Taskforce members even to those not present;
- A computer-based information sharing and storage tool will be used to collect and share relevant information. Members will be able to upload/modify information after informing the Taskforce coordinator;
- A communication protocol will be developed to be followed by Taskforce members;
- Best practices in good governance will be followed to ensure that intended outcomes are achieved.

At least 40% of the Taskforce members should be women of relevant institutions and entities in order to promote gender balance. As the establishment/improvement of the policy and regulatory framework will be carried out throughout the entire project, the Taskforce will meet 3 times a year during the 4 years of the project duration; even though, it is expected that the Taskforce will continue meeting after project completion. These meetings will last two days and the PMU will be invited to present the results achieved under Activities 1.1.1.2 and 1.1.1.3.

Activity 1.1.1.2. Continuous gap analysis on policy and regulatory frameworks conducted and recommendations developed

[20] It is planned that CENELEC will transform into ARENE in the near future.

This activity will verify the inventory of the gaps identified during the PPG in terms of policy and regulations which are needed to foster the involvement of the private sector in the development of integrated RE systems in the rural sector. After corroborating the current regulatory and legal framework and the identified barriers, SACREEE in close cooperation with MITADER and MIREME will develop a first report containing a series of recommendations on any revisions or additions needed focusing on the legal and policy aspects. The report will be presented to the Taskforce during their meetings for revision and endorsement. SACREEE will build national capacity in MITADER and MIREME so that they continue revising the regulatory and legal framework and providing recommendations to the Taskforce after project closure.

From the analysis carried out so far, some of the topics that should be addressed involve:

- Applicable mechanisms and incentives that encourage the participation of the private sector in off-grid energy generation (e.g. development of a Public and Private Partnership (PPP) model)
- Applicable tariffs and Power Purchase Agreements (PPAs) for energy commercialisation between off-grid generators and customers in rural areas;
- Regulations related to farms and food processing industries and other industries located in rural areas to generate power for self-consumption and to eventually sell the surplus energy to nearby villages or consumers;
- Establishment of private wire networks and feed-in-tariff (FiT) systems to support private investment in off-grid energy systems (current FiT applies for grid-connected systems);
- Ways of removing technological barriers associated to the availability of novel low-carbon technologies in the country (e.g. tax exemptions);
- Identify mechanisms and incentives to be applied to the different sectors (e.g. cotton industry, cattle breeding, charcoal production, etc.) considering their specific needs when using RE for electricity generation, as well as to the rural energy sector as a whole;
- Creation of a RE fund (financed through grants or a small environmental tax on export oriented large projects such as coal or large hydro) to cover the "viability gap" (difference between required tariff and value of electricity) and provide a higher feed-in tariff for the initial years. This would have the advantage of improving pay-back and reducing risk for investors while allowing for a competitive cost in the future;[21]
- Gender issues and dimensions should be addressed in the policies and regulations focused on improving the socioeconomic development of rural areas, particularly electricity access for productive uses.

It is foreseen that the gap analysis -which makes use of the baseline report findings- will be updated on a yearly basis by SACREEE, MITADER and MIREME to enable a continuous improvement of the policy and regulatory framework throughout the course of the project and by MITADER and MIREME when the project is closed. The reports will be complemented by information developed under Activities 1.1.1.3 and 1.1.2.1

Activity 1.1.1.3. Policy and regulatory framework workshops conducted

The objective of carrying out a series of workshops is to discuss amongst the Taskforce and other involved stakeholders, the findings from Activity 1.1.1.2 on what should be improved in terms of policy and regulations.

The main goals are to discuss possible options and approaches to "fill in the gaps," to surpass the policy, legal and regulatory barriers that were found and improved the framework to attract the private sector to provide RE solutions in rural areas for productive uses.

It is envisaged that the following organisations and stakeholders will participate in the workshop:

- The Taskforce created under Activity 1.1.1.1
- UNIDO and the appointed National Project Coordinator
- Local financial institutions (public and/or private)
- Local decision-makers in the field of regulations and policies
- Representatives of provincial governments
- Other strategic partners and stakeholders (public and/or private)

[21] "Power generation scenarios for Mozambique - Prioritisation of investments", Gesto Energy Consulting, 2014.

The outcomes of the workshops will be included in the reports developed under Activity 1.1.1.2 on the potential revisions or additions that are needed to improve the current policy and regulatory framework; including specific activities, technologies, sectors, tariffs, PPAs models, gender considerations, etc. Also, they will be complemented by the results obtained from Activity 1.1.2.1 "Consultation with private sector actors" since their conclusions may have an impact on which policies and regulations should be taken into consideration.

SACREEE is expected to support the Taskforce to successfully conduct the workshops and to include the conclusions reached in the final versions of the recommendation reports. It is envisioned that four workshops will be carried out throughout the project execution as one-day events each with around 50 participants.

Output 1.1.2. Guidelines on private sector involvement in renewable energy projects in rural areas developed and adopted

In Mozambique, the private sector is represented by various licensed private enterprises which participate in the grid extension and household connection works of EDM and private enterprises involved in the provision and installation of PV products, often situated exclusively in Maputo. A microfinance sector with banks and NGOs is active throughout the country but often restricted to the province and/or district capitals (Government of Mozambique, RAGA Report, 2012). As such, the participation of the private sector in off-grid electricity generation initiatives is very limited. Furthermore, private investors and financing institutions require some type of guarantees or incentive mechanisms to invest which can be challenging to obtain.

In this regard, it is relevant to conduct a consultation process that will enable MITADER and MIREME to collect information about the private sector's most common challenges, barriers, and risks faced when trying to get involved in the rural renewable energy market. This will then be used to develop guidelines to aid the private sector. This should be done after establishing the Taskforce under activity 1.1.1.1 so as to consider any potential modifications. In addition, these guidelines should be conceived as a dynamic document that compiles the relevant information for the private sector and integrates any changes that may arise in terms of incentives, tax or non-tax benefits, etc.

Activity 1.1.2.1. Consultation with private sector actors

SACREEE in close cooperation with MITADER and MIREME will design and carry out a national and sub-national consultation campaign focusing on the private sector. It is envisioned that this campaign will be carried out in several ways: consultation via e-mail/telephone; face to face interviews and consultation meetings. The objective of this consultation campaign is to find out the most common barriers, risks and challenges faced by the private sector while trying to develop renewable energy projects, particularly in rural areas.

The consultation should focus on the following:

- The degree of interest/reluctance of the private sector in carrying out RE projects in rural areas of Mozambique as well as the perceived risks,
- The level of awareness in terms of RE resources availability, technologies and ways of applying RE technologies (e.g. for PUE),
- Financial instruments available to invest in RE in rural areas and the suitability of those instruments for the private sector needs,
- Tools used to analyse the technical and financial feasibility of project ideas,
- Capacity and skills present in the private sector to install, manage, operate and maintain the RE business,
- Collect information about best practices and success stories of RE projects located in rural areas of Mozambique that could be scaled-up,
- Other information of relevance including gender impact in RE projects.

Activity 1.1.2.2. Development and dissemination of guidelines for private sector engagement

Following the results obtained from Activities 1.1.1.2 and 1.1.1.3 and 1.1.2.1, SACREE in close cooperation with MITADER and MIREME will develop an user-friendly and tailor-made web-based guidelines for the private sector to use in order to start getting acquainted to the renewable energy business in rural areas. These guidelines should be publicly available from the MITADER, MIREME and project websites and regularly updated to consider the results from Output 1.1.1 in case any new policy or regulation favours the development of renewable energy projects and providing new valuable information to the private sector. SACREEE will build national capacity in MITADER and

MIREME so that they continue updating the private sector guidelines after project completion. The web-based guidelines for investment decisions will be presented at a workshop directed towards the private sector.

Output 1.1.3. Standards for typical integrated renewable energy systems for rural areas developed and adopted

Building confidence within communities in system performance, quality, safety and reliability is essential for the acceptance and use of off grid solutions. Mozambique's National Institute for Standardization and Quality (INNOQ) is the organisation responsible for the development and publication of the National Standards for Mozambique, and therefore all activities under this output will be done in collaboration with the INNOQ.

Activity 1.1.3.1. Information analysis about standards at national and international levels

At national level, the INNOQ has an official catalogue of Standards applicable in Mozambique which includes:

- List of INNOQ's Standards sorted by type, following the International Classification for Standards (ICS) criteria set by International Organisation for Standardization (ISO),
- Numerical list of INNOQ Standards which are no longer in force,
- Numerical list of current INNOQ Standards.

The current online catalogue –which was last updated in 2014– has a specific chapter on 10 different standards related to solar PV including: specifications for PV systems, their classification, mechanical and environmental testing methods for PV modules, specifications on reference cells and modules, etc. In addition, there are several standards addressing electro-technical issues, electric systems installations, etc. which may also need to be taken into consideration for electricity generation from renewable sources. In 2015, the INNOQ published the list of the new standards approved by the Technical Commissions of Standardization by sector. The list includes the *"NM 626:2015* - Photovoltaic systems (PV) – Characteristics of connection interface with the electricity distribution grid – Procedure for conformance test, under "electric installations in buildings area."

As indicated before, there are national standards for PV applications connected to the grid; however there is still a need to develop further standards for other RE technologies as well as for rural electrification cases, including mini-grid and standalone systems.

Under this activity, the national standards will be thoroughly analysed to identify gaps. International standards usually applied in rural electrification systems as well as gender dimensions will be taken into consideration and adapted to the Mozambican context. This activity will be conducted by SACREEE in collaboration with INNOQ and MIREME and will focus on the technical aspects of RE systems operations.

Activity 1.1.3.2. Improvement/development of the national standards, publication and dissemination

Once the gap in the national standards have been identified under Activity 1.1.3.1, SACREEE in close collaboration with INNOQ will propose those standards deemed necessary to promote off-grid RE solutions in line with the existing ones. Since the recommended standards were developed in close consultation with INNOQ, it is expected that INNOQ will be keen on following the already established procedure for their adoption. The improved/developed standards will be disseminated through the project website and presented at a workshop organized under Activity 1.1.1.3. SACREEE will build national capacity in INNOQ so that it continues improving the national standards for RE technologies after project closure.

Component 1 Establishment of a conducive policy and regulatory environment	
Outcome 1.1. Policy and regulatory environment promoting integrated renewable energy systems in rural areas established	
The component is directed at reducing the institutional, regulatory and policy barriers in Mozambique for the successful implementation of the project investments and scale-up.	
Output 1.1.1. Policy and regulatory environment promoting integrated renewable energy systems in rural areas established	
Planned and Envisioned Activities	***Main counterparts***

Activity 1.1.1.1. Establishment of a Policy and Regulatory Taskforce	SACREEE, MIREME, MITADER, FNDS, FUNAE, CNELEC, DNA
Activity 1.1.1.2. Continuous gap analysis on policy and regulatory frameworks conducted and recommendations developed	SACREEE, MITADER, MIREME
Activity 1.1.1.3. Policy and regulatory framework workshops conducted	SACREEE, Taskforce
Output 1.1.2. Guidelines on private sector involvement in renewable energy projects in rural areas developed and adopted	
Activity 1.1.2.1. Consultation with private sector actors	SACREEE, MITADER, MIREME
Activity 1.1.2.2. Development and dissemination of guidelines for private sector engagement	SACREEE, MITADER, MIREME
Output 1.1.3. Standards for typical integrated renewable energy systems for rural areas developed and adopted	
Activity 1.1.3.1. Information analysis about standards at national and international levels	SACREEE, INNOQ, MIREME
Activity 1.1.3.2. Improvement/development of the national standards, publication and dissemination	SACREEE, INNOQ

Project Component 2 Capacity building and knowledge management

Component 2 aims at improving and developing the capabilities and knowledge of market players and enablers in the RE sector. In order to support the development of a RE market and to improve the country's lack of key skills in that field, a capacity building program is needed. On the market enablers' side, there are capacity gaps in terms of planning and regulating the sector. On the key market players' side including private investors, farmers and industrialists, there are limited skills to translate project ideas into bankable investment projects. Furthermore, the universities and vocational training centres have limited curricula on specialized RE technologies and services; hence, the country does not have a cadre of qualified personnel to provide services including the design of RE systems and operation and maintenance services. The capacity building component will be coordinated by Eduardo Mondlane University (UEM) in close collaboration with SACREEE and supported by other key stakeholders, including FUNAE, FNDS, MEC, MITADER, Council for Development of Mozambique (CDC), EDM, DNE, National Directorate of Agriculture (DINA), DNA, and local finance institutions (banks and MFIs) as well as Civil Society Organisations (CSOs) and NGOs.

Output 2.1.1. Five training sessions for fifty (50) government officials at both national and provincial levels on RE integrated systems conducted

The design of the training course and materials has to meet the identified needs of government officials. A total of 5 training sessions in the fields of integrated RE technologies for productive uses in rural areas for 50 government officials are expected to be conducted. The final number of officials to be trained can be adjusted during execution if a smaller or bigger audience is foreseen. The development of the training materials is an integral part of this assignment and involves designing training tools, developing and planning learning exercises, and working with international consultants and trainers specialized in renewable energy systems application in off-grid areas. This process is expected to be lengthy as multiple revisions may be needed from SACREEE, UEM, FUNAE, FNDS, MITADER, CDC, EDM, DNE, MIREME, DINA, etc. Besides, it is necessary to make sure that the training materials and exercises match the expected learning results and the subsequent training phases should reflect these outcomes.

International best-practices and available material in the country should be taken into consideration for the design and implementation of the capacity building activities to avoid the duplication of efforts and data. In addition, South-South cooperation –especially with SADC countries– is expected in terms of information exchange on RE technologies

experiences. The training programme will be conducted initially with the support of international expertise; nevertheless under Activity 2.1.1.3, the project will create the necessary local capacity for the trainings to be conducted by local experts after project closure.

Activity 2.1.1.1. Identify capacity and knowledge gaps of government officials for defined regions/institutions

The activity will conduct a needs assessment to ensure optimum results are obtained from the planned training activities. Interviews and discussions with key staff members from different regional and provincial government institutions will be conducted. These will cover aspects such as: benchmarking of existing capacity, perception of development issues, knowledge of technical, financial, environmental and policy aspects of RE, data collection methods, identification of relevant indicators and generation of statistics.

The assessment and interviews will be carried out in close coordination with the UEM and SACREEE. The government entities to be interviewed should include:

- National level government bodies (ministries)
- Provincial governments

Activity 2.1.1.2. Develop selection process for training targeting government officials

Having good and consistent recruitment and selection procedures will help to choose the suitable candidates to participate in the training program. The criteria to select the government officials (provincial and national level) may include different aspects:

- Obtained degrees (e.g. engineering, renewable energy or energy-related field)
- Relevant work experience in the energy sector;
- Participation in previous trainings related to RE or similar fields;
- Gender and age;
- Current position in the government structure (national level, provincial level); and
- Province of residence

Figure 2 illustrates the procedure to select candidates once the criteria for selection have been defined through the needs assessment conducted under Activity 2.1.1.1.

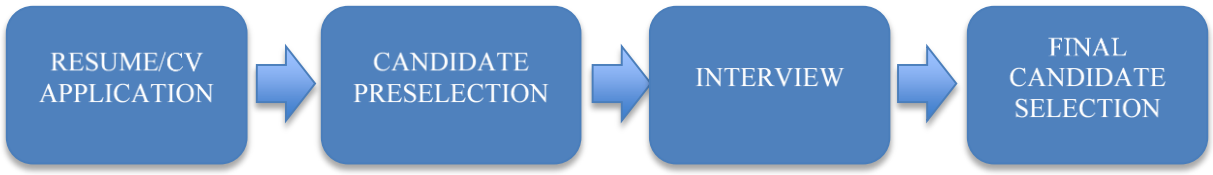


Figure 2: GoM candidates' selection process to participate in training sessions

MITADER, FUNAE, FNDS and DINA will participate in the selection of candidates for the training programme along with the UEM. Those provinces with less capacities and skills in RE, energy access and related topics will be identified as part of this process. In addition, efforts will be made to ensure that at least 40% of the trainees are women by developing a strategy that provides equal opportunities to women, men and the youth.

Activity 2.1.1.3. Develop training programme and implementation plan

The objective of this task is to have a clear description of the future training programme including: training objectives and targets, expected learning outcomes, scope, structure, overview of the training modules (number, duration, main contents, etc.), as well as the implementation schedule. A total of five training sessions for 50 government officials will be conducted. The training sessions for government officials will focus on two main topics:

- Integrated RE systems and local legislation targeting provincial officials and institutions intervening in local development; and
- The market of renewable technologies to improve energy access, particularly solar and PV applications, targeting national government officials, ministry departments, research institutes and development partners.

Three training sessions are planned for officials in selected provinces and two sessions will target national government officials. Moreover to optimise results and fully meet the expectations of the project, the training programme will be reviewed by SACREEE and UEM. Finally to provide a training program specific for the Mozambique context and tailored to the local capacity needs, the participating stakeholders will first conduct an in-depth review of the existing documentation related to RE development including:

- Results from activities conducted under Component 1;
- Status of the energy sector and local energy market in Mozambique including an overview of energy consumption levels, national energy mix (coal, gas, etc.), electricity & fuel prices, energy inflation, key market players, existing professional capacities, implemented or on-going activities and main hurdles for RE development;
- Information on existing RE projects; specifically solar PV pumps and Waste-to-Energy;
- Previous studies/reports on capacity building and training needs assessments;
- Identification of international experiences and best practices that can be replicated in the Mozambican context.

Activity 2.1.1.4. Develop training materials

International experts specialized in the fields related to this training will develop the training materials in close coordination with the UEM and SACREEE as well as other relevant entities.

The training approach will not only introduce the underlying theory but devote substantial time to case-based learning as this will provide a more practical and relevant learning method for the attendees, especially for those who do not have an energy background.

The training program will be categorised in a series of modules that are essential for RE projects or programs planning and/or implementation. The training activities will be developed based on the findings of the needs assessment and from the discussion with the different stakeholders regarding the draft training programme. By introducing extensive seminars in the training programme, it is expected that the trainees will be able to gain sufficient basic information on all aspects of RE projects and programmes and that the gained knowledge will be sufficient to take pertinent decisions regarding the potential feasibility of a RE project.

The contents and materials of the training course will:

- Adapt past energy courses delivered in Mozambique;
- Identify training equipment needed;
- Include case studies and training manuals.

Activity 2.1.1.5. Conduct trainings

The training sessions will be conducted initially by a team of qualified international trainers; in a later stage and once the local capacity has been built, the trainings will be carried out by national experts. In order to produce a highly positive impact and keep the attention of trainees, the training course will combine classroom lectures, case-studies, practical exercises, field visits, role play, working group sessions, etc. Prior to the training session, each trainee will also be provided with the printed training material.

The training will be carried out using participatory methods whereby the trainees will interact with the trainers constantly. Visual aids will be used to highlight certain features of the various technologies (such as solar pumps and biomass). The organisation of the training sessions will be carefully planned between UEM and SACREEE and will follow the programme as defined in Activity 2.1.1.3 including securing the venue, sending the training materials for printing, administrative tasks, etc. It is envisioned that each training session will take five (5) full days, one of which will include site visits to RE projects.

Output 2.1.2. Ten training sessions targeting 250 participants from financial institutions and private sector organisations on integrated RE systems conducted

A total of 10 training sessions for 250 participants from the banking sector and private companies will be conducted on RE projects and its requirements. The final number of participants can be adjusted during project execution if a smaller or bigger number is foreseen. The design of the training course and materials has to meet the identified training needs of the target audience. The content of the training materials include commercial and technical feasibility as well as risks,

challenges and potential mitigation measures in the usage of RE technologies in farms and industries. This process is expected to be lengthy as multiple revisions may be needed from SACREEE, UEM, FUNAE, FNDS, MITADER, CDC, EDM, DNE, MIREME, DNA, etc. Besides, it is necessary to make sure that the training materials and exercises match the expected learning results and the subsequent training phases should reflect these outcomes. The training programme will be conducted initially with the support of international expertise; nevertheless under Activity 2.1.1.3, the project will create the necessary local capacity for the trainings to be conducted by local experts after project closure.

Activity 2.1.2.1. Identify key financial institutions (FIs) and private sector organisations to be trained

MIREME, MITADER, FUNAE, FNDS and DINA past experience with rural electrification projects and RE technologies will be utilised to identify potential FIs and private sector organisations that will benefit from the training programme. On the one hand, the selected FIs should show some readiness to get involved into the RE market in order to be considered as candidates for the training programme. On the other hand, they should have previous experience on financing agricultural and farming developments in rural areas providing them with an in-depth understanding of the rural market, regulations and main players. The identification process will be undertaken in collaboration with the UEM and government entities such as MIREME, MITADER, FUNAE, FNDS and DINA.

Activity 2.1.2.2. Assess capacity of the identified FIs and private sector organisations' staff in RE

A needs assessment for the selected FIs and private sector organisations will be undertaken to ensure that optimum results are obtained from the planned training activities. This assessment will be carried out through communications with the department managers to understand the capabilities of their staff and thus identify the training needs. In addition, interviews and discussions with key staff members will be conducted covering aspects such as benchmarking of existing capacity, perception of development issues, knowledge of financial, policy and environmental aspects of RE. This task will be undertaken in close collaboration with MIREME, MITADER, FUNAE, FNDS and DINA.

Activity 2.1.2.3. Develop selection process for training of FIs and private sector organisations

The development of clear and robust recruitment and selection procedures will help to choose the most suitable candidates to participate in the training programme. The criteria that will be used to select the banking and FIs staff will be discussed and agreed with the MIREME, MITADER, UEM, FUNAE, FNDS, and other relevant stakeholders. The criteria will include:

- Candidate financial experience in agricultural and farming projects
- Relevant work experience in the energy sector, particularly in RE
- Candidate's interest in renewable technologies
- Obtained degrees (e.g. engineering, renewable energy or energy-related field)
- Gender and age
- Current position and responsibilities
- Other relevant criteria

Figure 3 illustrates the procedure to select candidates once the criteria have been agreed with the respective Government bodies and stakeholders.

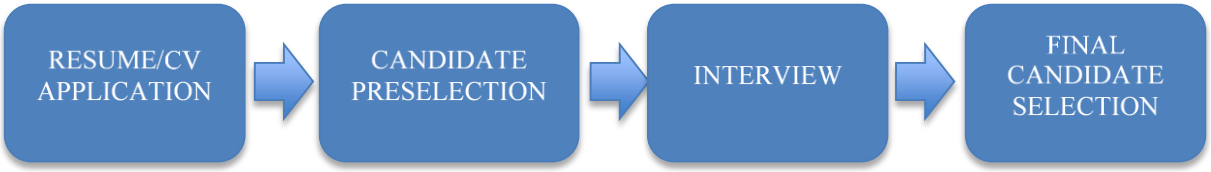


Figure 3: FIs and Banking sector candidates' selection process to participate in training sessions

It is expected that at least 20% of the trainees will be women as they are underrepresented in financial institutions and private sector. Nevertheless, the project will prioritize women candidates for the trainings. MIREME, MITADER,

UEM, FUNAE, FNDS, and other relevant stakeholders will be involved in this task as their previous experience in rural areas and past projects will be very useful to identify the suitable candidates for the training programme.

Activity 2.1.2.4. Develop and present outline for training programme

The aim of this activity is to develop a clear description of the training programme including: training objectives and targets, expected learning outcomes, scope, structure, overview of the training modules (number, duration, main contents, etc.) as well as implementation schedule. A total of 10 training sessions for 250 staff from FIs and private sector organisations will be conducted on RE projects' bankability and requirements, especially for solar pumps and Waste-to-Energy applications.

In order to optimise results and fully meet the expectations, SACREEE will closely consult the UEM and other stakeholders as deemed relevant when defining the outlines of the training programme.

In order to provide a training program specific for the Mozambican context and tailored to the local capacity needs, the participating stakeholders will first conduct an in-depth review of the existing documentation related to RE development including:

- Assessing the local energy market in terms of key market players, existing professional capability, implemented or on-going activities, identify the risks and barriers for RE development;
- Assessing the typical Capital Expenditure (CAPEX) and Operational Expenditure (OPEX) for solar PV pumps and Waste-to-Energy technologies as well as *state-of-the-art* technologies;
- Results from activities conducted under Component 1;
- Information on existing solar PV pumps and Waste-to-Energy projects;
- Status of the energy sector and local energy market in Mozambique allowing to have a better understanding and overview regarding: energy consumption levels, national energy mix (coal, gas, etc.), electricity & fuel prices, energy inflation, key market players, existing professional capacities, implemented or ongoing activities and main hurdles for renewable energy development.
- Reviewing previous studies/reports on capacity building and training needs assessment;
- Identification of international experiences and best practices that can be replicated in the Mozambican context.

Activity 2.1.2.5. Develop training materials

The training materials will be developed in close coordination with the UEM and SACREEE as well as other relevant stakeholders. The training approach will not only introduce the underlying theory but devote substantial time to the financial and commercial aspects of case based learning providing a more practical and relevant learning method for the attendees, especially for those who do not have a sound energy background. The training activities will be developed based on the findings of the needs assessment and from the discussion with different stakeholders. By introducing extensive seminars for the training programme, it is expected that the trainees will gain sufficient basic information on all aspects of RE projects and programmes. The gained knowledge will be sufficient to develop bankable projects as well as to take decisions regarding the potential of a renewable energy project.

The contents and materials of the training course will:

- Adapt past energy courses delivered in Mozambique;
- Identify training equipment needed;
- Include case studies and training manuals.

Activity 2.1.2.6. Conduct trainings

The training sessions will be conducted initially by a team of qualified trainers consisting of at least two international consultants supported by a national consultant. In a later stage and once the local capacity has been built, the trainings will be conducted by national experts. In order to produce a highly positive impact and keep the attention of trainees, the training course will combine classroom lectures, case-studies, practical exercises, field visits, role play, working group sessions, etc. Prior to the training session, each trainee will also be provided with the printed training material. The content of the materials will include technical feasibility, commercial viability, typical systems costs, O&M expenditures, challenges and possible mitigation measures, and risks involved in the use of RE systems, particularly focused on solar PV Pumps and Waste-to-Energy applications in farms and agricultural facilities.

The training will be carried out using participatory methods whereby the trainees will interact with the trainers constantly. Visual aids will be used to highlight certain features of the various technologies. The organisation of the training sessions will be carefully planned between UEM and SACREEE and will follow the programme as defined in Activity 2.1.2.4. including securing the venue, sending the training materials for printing, administrative tasks, etc. It is envisioned that the training will be provided in several modules taking a total of around ten days of which two will be used for site visits to RE projects. It must be noted that the training will not be provided in 10 consecutive days but in several modules covering 2 or 3 days.

Output 2.1.3. Training of universities and vocational training institutions staff (25) on various aspects of integrated RE systems on a train-the-trainer basis conducted

Training sessions for 25 participants from universities and vocational training institutions staff will be conducted on integrated RE systems and projects using the train-the-trainer approach. The final number of participants can be adjusted during project execution if a smaller or bigger number is foreseen. The design of the training course and materials has to meet the identified training needs of the target audience. The content of the training materials will include general knowledge on potential of RE technologies for productive uses to technical knowledge on how to integrate, operate and maintain them and is expected to build on the curricula developed by GIZ through its Vocational Training project. This process is expected to be lengthy as multiple revisions may be needed from MEC, UEM and other stakeholders as deemed appropriate (SACREEE, FUNAE, FNDS, MITADER, CDC, EDM, DNE, MIREME, DNA, etc.). Besides, it is necessary to make sure that the training materials and exercises match the expected learning results and the subsequent training phases should reflect these outcomes.

Activity 2.1.3.1. Identify key universities and vocational training institutions to be trained

MEC in close collaboration with the UEM and other stakeholders as deemed appropriate will support the identification of key universities and vocational training institutions that could benefit from the training programme. On the one hand, the selected universities and vocational training institutions should have ongoing related basic technical programmes in order to be considered as candidates for the training programme. On the other hand, they should be willing to integrate the developed curricula as part of the educational catalogue.

Activity 2.1.3.2. Assess capacity of the identified institutions in RE

A needs assessment for the selected universities and vocational training institutions will be undertaken to ensure that optimum results are obtained from the planned training activities. This assessment will be carried out through communications with the directors/deans of universities and vocational training institutions to understand the capabilities of their academicians and thus identify the training needs. In addition, interviews and discussions with key academicians will be conducted covering aspects such as existing curricula and infrastructure, interest and needs of students and career prospects in RE, among others. This task will be undertaken in close collaboration with MEC and UEM.

Activity 2.1.3.3. Develop selection process for training universities and vocational training institutions

The development of clear and robust selection procedures will help to choose the most suitable academicians to participate in the training programme. The criteria that will be used to select the universities and vocational training institutions staff will be discussed and agreed with MEC, UEM and other stakeholders if deemed appropriate. The criteria will include:

- RE knowledge, in particular for agricultural and farming uses
- Relevant work experience in the energy sector, particularly in RE
- Candidate’s interest in integrated renewable energy technologies
- Teaching curricula (e.g. engineering, renewable energy or energy-related field)
- Gender and age
- Current position and responsibilities
- Other relevant criteria

Figure 4 illustrates the procedure to select candidates once the criteria have been agreed with the respective Government bodies and stakeholders.

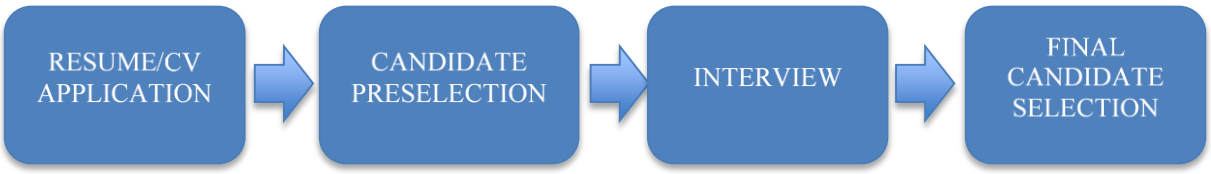


Figure 4: Universities and vocational training institutions candidates' selection process to participate in training sessions

It is expected that at least 40% of the trainees will be women.

Activity 2.1.3.4. Develop and present outline for training programme

The aim of this activity is to develop a clear description of the training programme including: training objectives and targets, expected learning outcomes, scope, structure, overview of the training modules (number, duration, main contents, etc.) as well as implementation schedule. Several training sessions for 25 staff from universities and vocational training institutions will be conducted on RE technologies and systems, technical and financial feasibility as well as policy and regulatory framework in order to equip them with the necessary knowledge to become trainers themselves.

To optimise results and fully meet the expectations, MEC and UEM will consult with other stakeholders as deemed relevant when defining the outlines of the training programme.

In order to provide a training program specific for the Mozambican context and tailored to the local capacity needs, the participating stakeholders will first conduct an in-depth review of the existing documentation related to RE development including:

- Assessing the universities and vocational training institutions capacities in terms of existing professional capability and knowledge barriers for renewable energy development;
- Reviewing previous studies/reports on capacity building and training needs assessment;
- Assessing the existing curricula including the developed by GIZ under its Vocational Training project;
- Status of career development in the renewable energy sector in Mozambique;
- Identification of international experiences and best practices that can be replicated in the Mozambican context.

Activity 2.1.3.5. Develop training materials

The international consultants (trainers) supported by the national consultant will be in charge of developing the training materials in close coordination with MEC and UEM as well as other relevant entities. The training approach will not only introduce the basic knowledge on RE technologies and systems but devote substantial time to the technical aspects of installing, operating and maintaining them. By introducing extensive seminars for the training programme, it is expected that the trainees will gain sufficient information on all aspects of RE projects and programmes. Besides, it is expected that the training will include practical sessions for the trainees to enhance their technical capabilities. The training activities will be developed based on the findings of the needs assessment and from the discussion with different stakeholders.

The contents and materials of the training course will:

- Adapt past energy courses delivered in Mozambique;
- Identify training equipment needed;
- Include case studies and training manuals.

Activity 2.1.3.6. Conduct trainings

A team of international experienced trainers will be responsible for delivering a tailored train-the-trainer programme. The aim is to fulfil the educational capacity gaps and ensure a good quality training product. The academicians and educational staff trained will be qualified to become trainers in order guaranteeing the sustainability of Output 2.1.1, Output 2.1.2, and Output 2.1.3.

To produce a highly positive and long term impact, the training course will combine classroom lectures, case-studies, practical exercises, field visits, role play, working group sessions, etc. Prior to the training session, each trainee will also be provided with the printed training material.

Due to the nature and approach of the training, trainer and trainees will be constantly interacting with each other. Visual aids will be used to highlight certain features of the various technologies. The organisation of the training sessions will be carefully planned between MEC and UEM and will follow the programme as defined in Activity 2.1.3.4. including securing the venue, sending the training materials for printing, administrative tasks, etc. It is envisioned that the training will take around ten (10) days of which two will be used for site visits to RE projects. It must be noted that all the developed material will be shared with MEC and UEM to continue the project activities once it is closed.

Project Component 2 Capacity building and knowledge management	
Outcome 2.1. Capacity of key players strengthened and information available for market enablers and players	
The component aims at improving and developing the capabilities and knowledge in the areas of Waste-to-Energy and solar water pumping. In order to support the uptake of a sustainable RE market, the country's lack of key skills, by both market players and enablers, requires the development and implementation of a capacity building program.	
Output 2.1.1. Five training sessions for (50) government officials at both national and provincial levels on RE integrated systems conducted	
Planned and Envisioned Activities	***Main counterparts***
Activity 2.1.1.1. Identify capacity and knowledge gaps of government officials for defined regions/institutions	UEM and SACREEE
Activity 2.1.1.2. Develop selection process for training targeting government officials	MITADER, FUNAE, FNDS, DINA, UEM
Activity 2.1.1.3. Develop training programme and implementation plan	UEM and SACREEE
Activity 2.1.1.4. Develop training materials	UEM and SACREEE
Activity 2.1.1.5. Conduct trainings	UEM and SACREEE
Output 2.1.2. Ten training sessions targeting 250 participants from financial institutions, and other private sector organisations on integrated RE systems conducted	
Activity 2.1.2.1. Identify key financial institutions (FIs) and private sector organisations to be trained	UEM, MITADER, MIREME, FNDS, FUNAE, DINA
Activity 2.1.2.2. Assess capacity of the identified FIs' and private sector organisations in RE	UEM, MITADER, MIREME, FNDS, FUNAE, DINA
Activity 2.1.2.3. Develop selection process for training of FIs and private sector organisations	MIREME, MITADER, UEM, FUNAE, FNDS
Activity 2.1.2.4. Develop and present outline for training programme	UEM and SACREEE
Activity 2.1.2.5. Develop training materials	UEM and SACREEE
Activity 2.1.2.6. Conduct trainings	UEM and SACREEE
Output 2.1.3 Training of universities and vocational training institutions staff (25) on various aspects of integrated RE systems on a train-the-trainer basis conducted	
Activity 2.1.3.1. Identify key universities and vocational training institutions to be trained	MEC and UEM

Activity 2.1.3.2. Assess capacity of the identified institutions in RE	MEC and UEM
Activity 2.1.3.3. Develop selection process for training universities and vocational training institutions	MEC and UEM
Activity 2.1.3.4. Develop and present outline for training programme	MEC and UEM
Activity 2.1.3.5. Develop training materials	MEC and UEM
Activity 2.1.3.6. Conduct trainings	MEC and UEM

Component 3 Technology demonstration and scaling up

The activities to be undertaken under Component 3 aim at demonstrating the application of RE technologies in agricultural activities located in rural areas of Mozambique, namely: solar PV water pumping and biogas/biomass usage in agro-food processing industries.

The main objective is to develop several demonstration projects that will prove the technical and market viability of RE technologies for future scale-up, and thus reducing technical and financial barriers. The demonstration projects will generate high social, economic and environmental impacts for the final beneficiaries including the mitigation of GHG emissions and will result in a transformational change of the agricultural and energy sector by means of introducing RE systems, reducing diesel-based energy generation or unsustainable/inexistent use of biomass resources.

The demonstration projects' counterparts, namely ADPP Moçambique, AICAJU/Gani Comercial Lda and Tindzawene Mabalane Farm, will be responsible for the execution of the demonstration projects by procuring and installing the equipment. The counterparts will mobilize around 70-80% of the investment costs and the remaining will be financed by the GEF grant through a series of payments disbursed on the basis of verified progress.

Output 3.1.1. Demonstration projects on integrated RE systems with about 250kW of installed capacity implemented in selected productive sectors with high visibility and replication potential

During the PPG, the selection of sites was undertaken in close consultation with national counterparts. The suitable sites for installing RE projects -in this case solar PV water pumps or Waste-to-Energy technologies- were carefully selected as the characteristics of the sites strongly influence the technical and economic feasibility of potential projects. A site was considered suitable when the RE devices could be installed under favourable technical, financial and legal framework conditions. As such, eligible demonstration projects were those located in energy intensive agriculture and small agro-food processing industries usually exposed to oil prices fluctuations, unreliable fuel supply, access to waste resources such as agricultural residues, domestic and animal waste, or abundant solar resources. Furthermore, while identifying eligible projects, the scalability potential was considered to support the expansive capacity of existing sites to serve a larger number of beneficiaries in the future.

The following criteria was taken into consideration for assessing and selecting demonstration projects:

Site selection

Selecting a suitable site is a crucial aspect for developing a viable solar or Waste-to-Energy project. During the PPG, the site selection criteria and process was defined in close consultation with national stakeholders. As such, the selection process took into consideration relevant parameters and variables as well as possible constraints and the impact they will have on the cost of the electricity generated including:

- Energy demand;
- Solar global irradiation levels and/or waste resources;
- Available land area;
- CAPEX;
- Yearly OPEX;

- Accessibility;[22]
- Topography;
- Climatic characteristics and potential extreme weather events;
- Negative and positive impacts on the environment and biodiversity; among others.

Technical and financial feasibility

The objectives of conducting a technical and financial evaluation of the demonstration projects were:

- To estimate whether it is possible to generate a given amount of energy using a specific technology and available natural resources;
- To assess the technological robustness, O&M requirements, component replacements, and spare parts;
- To determine if the project generates enough income to meet all the costs and some revenue to obtain a profit or an acceptable return on investment. Note that for the CAPEX estimate, a conservative assumption has been made to consider potential unforeseen costs.

The feasibility analysis involved technical design, economic assessment, environmental and social benefits as well as possible sources of co-finance.

Assessment of scalability potential

In order to increase the impact of the demonstration projects, it was crucial to evaluate their scalability potential. The scalability assessment aimed at defining the likelihood of a project to be replicated based on its success and sustainability over its lifetime. As such, it is expected that by increasing the visibility of the demonstration projects, RE projects will attract more support and investment.

During the selection of sites to implement RE systems, the capacities to operate and maintain them were also analysed. In addition, it was key to identify the community's needs that were not being sufficiently met by existing resources before implementing a RE project. In other words, while evaluating the scalability, it was important to ensure that the project was not located in an area already saturated with similar services. Otherwise, the demonstration project will likely start competing for end-users and local resources adding little value to the local community.

The executing partners involved in the demonstration projects will be MITADER, MIREME, FUNAE, FNDS, project developers and NGOs at community level.

Activity 3.1.1.1. Implementation of demonstration projects

The selected demonstration projects are described below.

Pilot project 1: Tindzawene Mabalane Farm biodigestion project

The Tindzawene Animal Farm *(Centro de Produção de Tindzawene*) is part of the Tindzawene Penitenciary located in Mabalane region. Currently, the farm breeds different types of cattle, namely: cows, goats, sheep and swine. The farm is considering the possibility of generating biogas with an anaerobic bio-digestion process using cattle manure for energy generation.

Cows and swine are bred in confinement making it possible to collect the manure. However, goats and sheep are bred in open spaces where it is logistically very difficult to collect the manure and the excreta volumes are less than 10% of what a typical cow excretes. Therefore, it was decided to exclude them from the analysis which only considers cows' and swine's manure.

Figure 5 shows the basics of an anaerobic bio digestion process. The steps involved in a biogas generation system with anaerobic bio digestion are:

1. Organic material (e.g. animal manure) is collected and taken to the digestion tank,

[22] This does not mean than remote areas will be discarded. Nevertheless, a balance between remoteness, accessibility and relevance of testing the technology in a given place should be taken into consideration.

2. The digestion tank is the container where microorganisms start digesting manure and transforming it into two main products,

   3.a. Biogas which is mainly composed of methane (CH_4) and carbon dioxide (CO_2) and can be used for energy generation (electricity, heat)

   3. b. Co-products refer to the digested sludge which can be used to produce fertilizer, compost, etc.

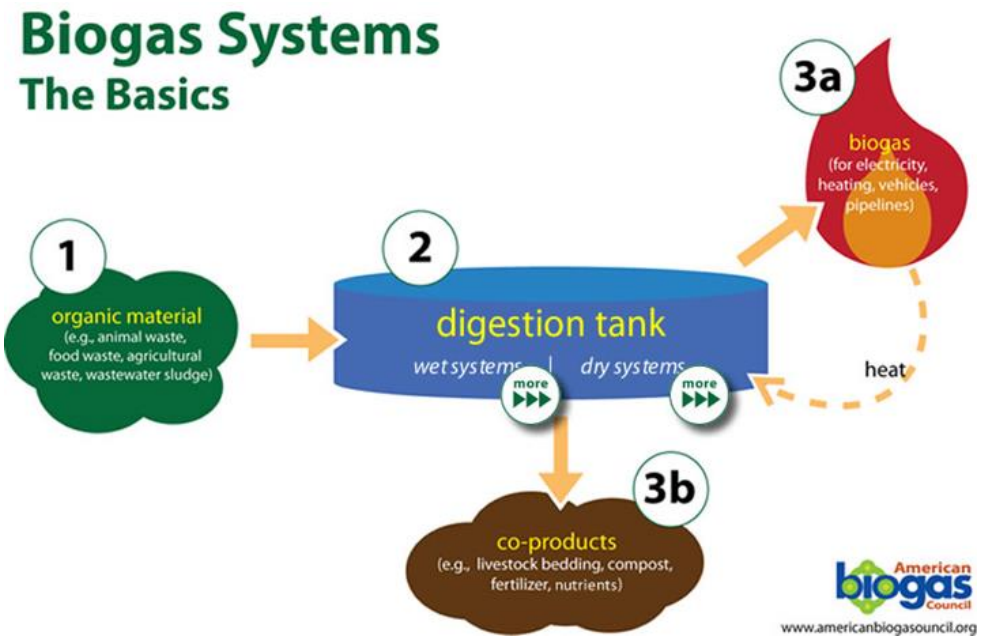


Figure 5: Schematic of an anaerobic bio digestion process and its components

A range of anaerobic digestion technologies are commercially available in the international market. They can be classified based on the organic waste stream type they are designed to treat: manure, municipal wastewater treatment, industrial wastewater treatment and municipal solid waste. The Pre-feasibility study focused on animal manure treatment.

Based on the estimated manure resources, the Anaerobic Digestion (AD) system for the Tindzawene farm will have a power capacity of 30 kWe by running 8 hours per day at nominal power and will supply 72,793 kWh/year of electricity with a capacity factor of 28%. Figure 6 indicates the manure, digestate and biogas production outputs which are:

- The volume of biogas generated in the anaerobic digestor is, on average, 128 m^3/day (initial retention times are 30-40 days) representing a gross energy average value of 790 kWh/day. It has to be noted that based on the lack of detailed data no seasonality considerations were made thus assuming a flat biogas production rate over the year.
- The biogas generator will be able to generate 72,793 kWh/year representing $37,124 of savings from diesel plus the assumed escalating factor of diesel fuel prices of 3% estimated for Mozambique over the following 20 years. This represents an annual diesel saving of approximately 2,160 litres.
- The farm will generate 6 tonnes of digestate on a daily basis which 99% will come from cow dung. The generated post-digestate of the anaerobic digestion can be utilised as field fertilizer for existing agricultural activities in the farm.
- The digester will have an hydraulic retention period of 30 days. The AD volume will be 380 m^3 occupying approximately 80 m^2 of surface for a 5 m deposit height. The complete biogas plant will occupy an area of 160-180 m^2.

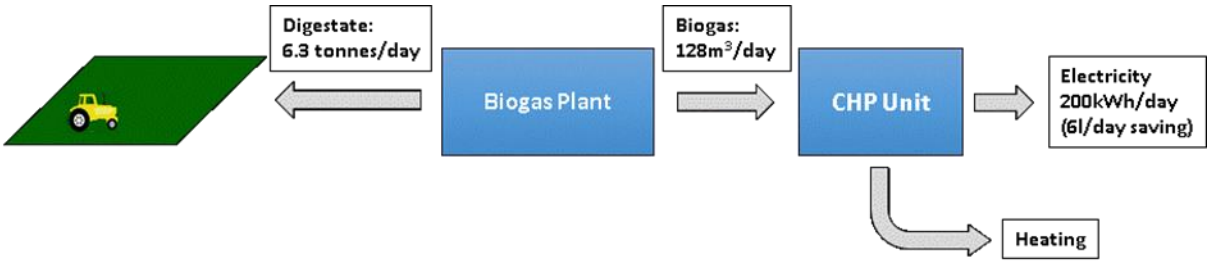


Figure 6: Anaerobic Digestion Outputs for Tindzawene farm case

The project will have environmental and socioeconomic benefits for the community due to a reduction in fossil fuels use and the appropriate handling of animal manure. Although it is not common to use fertilizers of any kind in small farms, if future analysis shows that there is interest from the community in using bio fertilizers, the co-product generated after the anaerobic bio digestion could be commercialized. In fact, a study from the Washington State University shows that market values in the US are 10USD/wet ton of fibre, USD250/dry ton of Ammonia Sulphate, and USD150/dry ton of Phosphorus-rich solids.

Furthermore, details on the investment and financial indicators for this pilot project are estimated at:

- CAPEX: USD 267,859
- O&M Costs (4% of CAPEX): USD 10,714 per year
- Project lifetime: 20 years
- IRR: 7.4%
- LCOE: 0.461 USD/kWh

More information on this demonstration project can be found in the Pre-feasibility Report in Annex J.

Pilot project 2: Development of Solar PV Pumps in 27 Sites of Zambezia Province and Sofala Province, Mozambique (Ajuda de Desenvolvimento do Povo para o Povo)

The farmers targeted under this pilot project is organized in the ADPP Farmers' Club project which objective is to increase food security and household income among rural populations. The club trains small farmers in efficient and sustainable conservation farming techniques, enhances their access to well managed water resources and improves their access to local and regional markets through market linkages and training in product commercialization, pricing and marketing.

ADPP has identified several sites where there is a need to improve the irrigation systems used for agricultural purposes. There are 27 identified places located in the Provinces of Zambezia and Sofala which share similar characteristics and will be used for agricultural facilities. As such, the present Pre-feasibility study will consider the Yowane Farmers' club, located in Nhafuba, Zona Mataca, 20 km west from the district's capital, Nicoadala, in the Nicoadala District, Zambezia Province, as a standard model and then extrapolate the case study to the other 26 sites.

The Farmers' Club consists of 50 members who have a 1 ha field 20 m beside the Licuar River, which contains water all year-round. The main crops that will be produced are vegetables, particularly in the dry season, but other crops can also benefit from the development of a solar PV pumping irrigation scheme. The site is close to the road EN7 which gives the farmers possibility to provide fresh products to the markets in Quelimane and Mocuba. Hence this pilot project would support the productive activities developed by the farmers in the local market and agro companies.

Typically, fresh water is transported from wells or rivers for domestic consumption, irrigation used for productive uses like agriculture, and/or other diverse purposes. Currently, no organized irrigation system is in place so farmers fetch water from the rivers employing manual pumps and buckets. For remotely located non-electrified regions, power supply needs to be achieved by other means. RE systems such as solar PV generators feeding solar pumps to run the irrigation systems have been regarded a cost-effective alternative for agricultural facilities.

The following information has been collected for Nhafuba site in order to select the most appropriate system configuration:

- The assumed water demand profile is constant over the year, and is equal to 39 m^3/ha/day thus totalling 14,300 m^3/ha/year;
- No night time irrigation is required;
- The agricultural facility is nearby the Licuar river;
- The Licuar river contains sufficient water all year round for the irrigation requirements of the Nhafuba site.

The solar pumping systems are simple, reliable and require low maintenance. Besides, they can fulfil several needs ranging from small to large herds watering and the irrigation of small agricultural plots to human consumption. A solar pumping irrigation system is similar to a conventional irrigation plant with the exception that the pumps are fed by a PV array.

Different models of irrigation systems have been considered, but from bad experiences from nearby projects where drip irrigation was introduced and rats ate the hoses, a system consisting of tubes and flexible water hoses has been chosen for manual irrigation.

The field is divided into 50 areas and each farmer has a plot of around 200 m^2. Main tubes transport the water from the water tower to 20 faucets to where the farmers can connect their flexible water hoses.

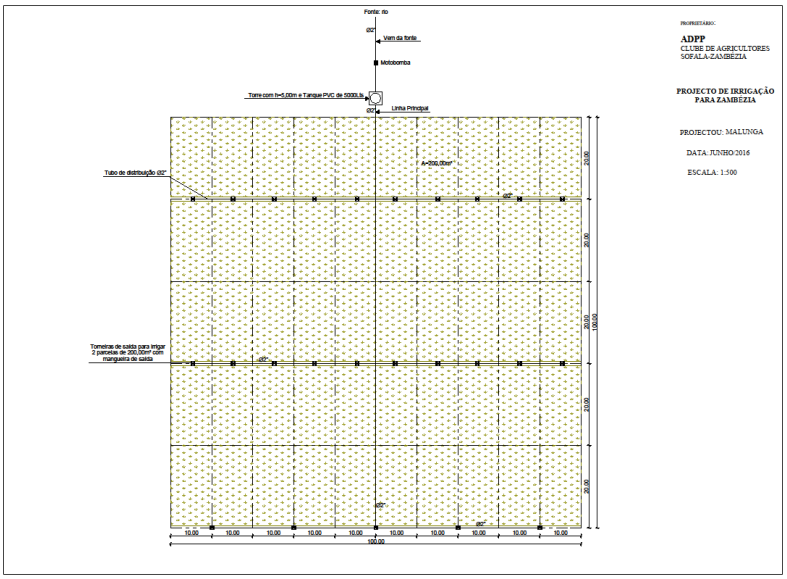


Figure 7: drawing of irrigation system

Solar resources are the main and more consistent RE source throughout the Mozambican territory with an average of 1,906 kWh/m^2 per year in Nicoadala district in accordance to SWERA Solar.

For the Nhafuba site and its estimated energy requirement, a 1.05 kWp PV system has been estimated, consisting of 7 mono crystalline panels of 150 W each. The PV panels will be directly connected to the pump through a controller. It has a pumping average capacity of 54.6 m^3 of water per day, and 19,969 m^3 per year. The PV panels will be located in an area with no shading impact and facing pure North with 18° inclination. The system will be installed on a ground mounted metal frame structure, which will be enforced for protection against theft.

In the baseline scenario, the population would use a diesel fuelled pump to extract water from the river as an alternative to retrieving water with buckets if an organised pumping system was to be put in place. As such, environmental and economic benefits are associated with preventing diesel purchases for water pumping as it will be replaced with solar installations. It is expected that the diesel savings will be of approximately 627 litres per year per system.

More information on this demonstration project can be found in the Pre-feasibility Report in Annex J.

Replication to 26 sites of Sofala and Zambezia provinces

Taking the Nhafuba site case as example, it is possible to extrapolate the case to 27 potential sites identified by ADPP as eligible to install a solar PV application for irrigation of agricultural facilities. Furthermore, details on the investment and financial indicators for the one system are estimated at:

- CAPEX: USD 14,606 (per system)
- O&M Costs (5% of CAPEX): USD 700 per year
- Project lifetime: 20 years

More information on this demonstration project can be found in the Pre-feasibility Report in Annex J.

Pilot project 3: Cashew shells utilisation for energy generation in "Caju Ilha"

This pilot consists of using cashew shells resulting from the cashew nuts processing as a biomass resource to generate energy to replace fossil fuels. The project proponent has two facilities in Nampula province which process cashew nuts for exportation, one located in Angoche with a capacity of 4,000 tons/year and a second located at Lumbo with a capacity of 3,000 tons/year. The agro-industrial waste generated during the cashew nuts processing can be used for energy purposes. In this case, the biomass which will be used as energy resource will consist of cashew shells. Figure 8 shows the basic production steps followed when processing cashew nuts.

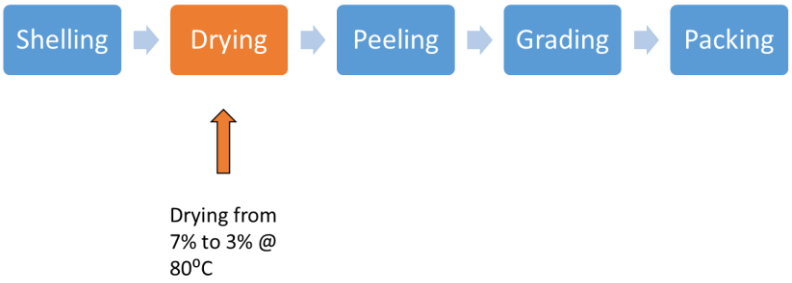


Figure 8: Cashew production process

There are several technologies applicable to different types of biomass. The characteristics of the biomass are crucial in order to select the most appropriate technology. In the case of cashew shells, due to its moisture content and the high lignin content, combustion - a thermochemical process- is more convenient.

If combusted in a boiler, hot water or steam can be generated. Steam can be used in an industrial process or to generate electricity. Hot water can be used as part of an industrial process. For this project, hot water will be used as a heat source for the drying step.

Since there are two facilities, one system for each one has been considered and sized based on the information shown in Table 1.

Table 1: Cashew processing and shells generation

Facility	Processed cashew (ton/year)	Generated shells (waste) (ton/year)	Monthly average (ton/month)	Daily average (kg/day)
Lumbo	3,000	2,160	180	6,000
Angoche	4,000	2,880	240	8,000
Total	**7,000**	**5,040**	**420**	**14,000**

The project proponent informed that approximately 72% of the cashew corresponds to the generation of shells. Currently, the cashew shells are not being used at the facilities and just managed as waste. The two cashew facilities run during 11 months per year for 22 days per month.

Table 2: Thermal energy generation from cashew shells and fuel savings

Energy supply from cashew shells	Lumbo		Angoche	
	Value	Unit	Value	Unit
Expected daily heat generated	450	kWh/day	601	kWh/day
Expected yearly heat generated	109,010	kWh/year	145,346	kWh/year
Yearly Volume Diesel Fuel Savings	10,922	litres/year	14,563	litres/year
Gross power required for drying daily	50.1	kWth	66.7	kWth

As such, biomass boilers are an appropriate option to consider as they specifically designed to run on different types of biomass residues, e.g. pellets, "orujo" (olive residues), almond shells, pine nuts, peaches or plums pits (bone), etc. Figure 9 shows an example of the boiler that will apply to these plants in order to burn cashew shells generating hot water for industrial purposes.

Figure 9: Biomass boiler[23]

Based on the results summarized in Table 2, a selection of the system size for each of the plants has been conducted. Assuming the business will continue to grow, the following boiler sizes are suggested for each plant. For the Lumbo facility, a 50 kW boiler is suggested while for the Angoche facility, an 80 kW boiler.

Financial analysis

Table 3 shows an estimate of the potential costs for a 50 kW system and a 80 kW and

Table *4* shows the estimated Operation and Maintenance (O&M) costs for the biomass boilers.

Table 3: Cost breakdown

Capital Expenditure (Capex)	Cost USD Lumbo 50 kW	Cost USD Angoche 80 kW	Total USD
System Cost (included freight	10,111.36	11,090.41	**21,201.77**

[23] From http://www.q-techshop.es/_qtshop/devventas/en/boilers/11-biomass-pellets-boiler-cmd.html

costs and import duties)			

Table 4: Estimated O&M Costs

O&M	Value		Unit
	Lumbo	Angoche	
O/M Cost against CAPEX	5.0	7.0	%
O&M Costs	505.6	776.3	USD/Year
O&M costs escalation rate	5.0	5.0	%

Savings are associated to diesel fuel purchase as it will be replaced by the cashew shells. The diesel oil savings will be approximately 25,485 litres per year in both facilities (Angoche 14,563 + Lumbo 10,922). Over a 20-year lifecycle 509,700 litres of diesel will be saved.

An IRR of 143% has been calculated for Angoche and 173% for Lumbo. The generation cost or the levelised cost of energy (LCOE) is 0.014 USD/kWh for Lumbo and 0.015 USD/kWh for Angoche plant. As such, the full loan repayment will take less than 1 year assuming a 20-year lifecycle for the installations.

More information on this demonstration project can be found in the Pre-feasibility report in Annex J.

Pilot project 4: Biomass waste from cotton stubble for electricity generation in Niassa

Joao Ferreira dos Santos Agro-industrial Group (JFS) has proposed a project that will construct a processing plant that transforms cotton stubble (Figure 10) into briquettes or pellets that will feed a gasification unit to generate electricity. The unit will be connected to a mini-grid that provides electricity to Titimane village, located in the District of Cuamba 23 km southwest of the city, in Niassa, Mozambique.

The mini network of Titimane will have an energy generation mix composed of an installation of 60 kW gasification of biomass (i.e. the present pilot project), in addition to a PV installation of 100 kWp, a storage bench with useful capacity of 340 kWh, with the respective inverters to a peak power of 120 kVA, and diesel back-up genset of 150 kVA Prime Power. A low voltage distribution network will deliver the electricity to the population, including the creation of the internal electric installation of each household.

Figure 10: Stack of stubble cut by the root made by employees of JFS for testing

Energy generation and technical description

About two thirds of the energy production is expected to be obtained from gasification of wood pellets of cotton crop stubble, produced locally in the village, and processed in Cuamba. The volume of annual production of pellets for the first years is estimated at 350 tons/year. Considering that every farmer in the region of Titimane can provide annually about 790 kg of cotton waste, it is estimated that between 410 to 626 farmers are required to provide enough biomass

for the production of pellets for the Titimane powerplant. The cotton waste should be taken from the field, processed or not, until the end of November. To avoid collecting cotton stubble during the cotton campaign, the waste collection process should take place between September 30th and November 30th. In other words, there are approximately 40 working days for this process, before the rainy season starts.

In the first year of production it will nenecessary to acquire enough crop waste for the production of 1 year and 2 months in order to give 2 months interval for the beginning of production in the following year. Thus, on November 30th in the 2nd year of operation, when the collection of stubble in that year has finished, but no pellets have yet been produced, there will still be a stock of 2 months of the previous year's production to maintain the Titimane powerplant in operation. The transformation line will thus have up to 2 months to start production of pellets in the new year. Once started, the production will release a constant amount of pellets per day, higher than the daily need for the powerplant and with a goal to quickly obtain a minimum stock of 1 month, producing the total quantity of pellets to be sold in a year, after a maximum of 5 months, and minimum of 2 months (in the scenario of production only for Titimane). The maximum stock will thus be 12 - 2+1=11 months.

In Cuamba, the stubble will be stored in the roofed cotton storage area or inside the wharehouses of JFS. The total volume it can achieve, if the transformation stage does not start during the cotton campaign, is 5,000 m3.

Figure 11: briquetting machine DI PIU MB60 (left) and MB50 (right) (Italian)

Although the chosen technology solution for the line is the one of briquettes (Figure 11), for an electrically driven piston action, technically the product can still be called a "Pellet" due to its small size, by comparison with the standard dimension of a briquette which is 50 mm in diameter. For this reason and to facilitate the understanding, the nomenclature for the product of "pellet" is kept.

Economic analysis

Taking into account the technical aspects of the project, a complete business plan for the production and sale of pellets was elaborated. In this plan it was taken as a base case the demand for pellets by the mini-electricity grid of Titimane, which starts at 321 tonnes in the first year and grows up to 477 tons per year after 20 years.

The total project investment is €250,000. A DCF (Discounted Cash Flow) analysis was conducted taking into account the business plan designed for a project lifetime equivalent to the business plan of the Titimane powerplant, 20 years. This analysis determines the cash flows per year and deducts them at the WACC rate in order to ascertain the NPV - Net Present Value of the project.

More information on this demonstration project can be found in the Pre-feasibility report in Annex J.

Output 3.2.1. Financial mechanism established to support the installations of solar water pumping systems for irrigation and Waste-to-Energy projects for agro-food processing in rural areas to achieve 1.2 MW of installed capacity

To stimulate a broader adoption of RE across the country, the project will provide technical and financial assistance in the design and operationalization of a catered financial mechanism.

Activity 3.2.1.1. Design of the most suitable financial mechanism for Waste-to-Energy (biogas or biomass) and solar PV water pumping systems

In remote and poor rural areas, RE-based electrification represents a challenge. The main issues are associated to cultural and educational aspects, financing, sustainability, political and regulatory risks, technology availability, and others.

The financial hurdles of developing RE projects in rural areas need to be identified in order to ascertain appropriate financing mechanisms that will help to overcome those typical barriers including access to loans at low cost for local businesses, investment uncertainty, distance from the grid and distance between consumers, among others.

The financial mechanism will be designed based on existing information from the thorough analysis of national RE projects carried out as part of Output 3.1. as well as relevant international projects. This information will be utilised to develop a suitable and bespoke financial mechanism able to mitigate and/or overcome existing barriers. Therefore, identifying, listing, and weighting the level of relevance of the most common barriers for each site in addition to evaluating their impact are key to provide a clear overview of the challenges. Afterwards, the collected information will be used to forecast and decide among different financial mechanisms such as Pay as you Go; Fee for Service; direct loans to beneficiaries; guarantee scheme involving the intervention of a third party to provide O&M services to beneficiaries; etc. The financial mechanism proposed will also consider the gender dimension.

At the PPG stage, discussions on the possible financial mechanism for renewable energy projects were undertaken with the Commercial and Investment Bank (BCI). The BCI has a credit line to support the development of this type of projects and will support the project by structuring a catered financial mechanism to support replication projects. The activity will be developed by the CDC, FUNAE and FNDS in close collaboration with BCI and other relevant rural banks.

Activity 3.2.1.2. Workshop for FIs sector on catered financial mechanisms

In order to ensure that the proposed financial mechanism is acceptable for financial services providers and that they are interested in providing associated financial services and products, a workshop will be conducted to collect their feedback in order to improve the proposed financial mechanism.

The workshop will be conducted in close collaboration with MITADER, MIREME, FUNAE, FNDS, BCI and other stakeholders as deemed relevant. It is envisioned that the workshop will be a one day event for around 50 people. It is expected that at least 20% of the attendees will be women.

Activity 3.2.1.3. Identify and implement replication projects

BCI, in collaboration with MITADER, MIREME, FUNAE, and FNDS, will develop a clear strategy to identify and analyse Waste to Energy, solar PV water pumping and other RE-related projects. The strategy will be used by BCI to select projects that will use the catered financial mechanism developed under Activity 3.2.1.1. Through a call for proposals managed by BCI, a thorough analysis will be conducted to define the eligibility of the submitted project proposals for the financial incentive; a key aspect of the eligibility criteria will be the provision of investment by beneficiary enterprises. Beneficiaries will be required to provide around 60-80% of the overall investment, while the remaining portion will be covered by the financial mechanism. The key result of this Activity will be supporting the installation of around thirty solar water pumps systems for irrigation purposes and thirty biogas digesters or biomass projects as replication projects, reaching a total of 1.2 MW of installed capacity for agro-food processing in rural areas. In light of this target and the eligibility requirements for funding support, a conservative estimate of US $4 million of investment is made for these replication projects, to be leveraged from beneficiary enterprises during the project implementation period.

Output 3.3.1. Demonstration and investment projects are independently evaluated and results widely disseminated

Activity 3.3.1.1. External demonstration and investment projects evaluation

The objective of the activity is to evaluate the current state of project implementation, find out to what extent it complied with defined criteria for project success and identify opportunities for improving the project, if any.

The evaluation will involve a site visit and survey to assess the technical performance of the installation and social acceptance levels, economic impacts, among other topics. This activity will define if the project goals have been met and will assess the quality and sustainability of the RE project. Results obtained from the evaluation process will constitute lessons learnt that can feed similar projects in the future.

Before starting the evaluation process, it is fundamental to define its objectives. In order to undertake the inspection visit, an evaluation team will have to be selected by MIREME, MITADER and BCI. A template for the evaluations will be developed in order to provide a clear guidance on the required contents of the evaluation reports.

As part of the evaluation process, the verification of the project will involve various activities including:

- Verification of the correct completion of the installation;
- Obtaining information about performed and non-performed activities for each of the project phases;
- Review the generated project documentation (O&M Manuals, Checklists, User Manuals, etc.);
- Check compliance with defined goals and agreed specifications;
- Propose measures for improvement;
- Verification of whether renewable energy project results were accepted and whether the project was successful overall;
- Interview users (communities) and operators of renewable energy systems, among others.

It is envisioned that the demonstration and investment projects will be independently evaluated twice a year.

Activity 3.3.1.2. Project dissemination campaign

The final goal of the demonstration projects is to disseminate the results among government officials, local councils, agricultural and farming associations, Small and Medium Enterprises (SMEs), educational institutions, communities, and other relevant organizations and institutions supporting the integration of RE or low-carbon technologies in the operations of SMEs. As such, the dissemination campaign will organize meetings and workshops with the above mentioned stakeholders in Maputo, in other main cities and in rural areas. One of them will target rural women to make sure they obtain the information on the available technologies and the financing mechanism.

In the case of rural environments, an effective dissemination campaign requires a wide range of interventions, activities and approaches, including:

- Community meetings
- Awareness campaigns and meetings with local authorities, community or religious leaders which could be held during cultural events to take advantage of the high concentration of people.
- Radio, television, billboards or other media to reach a wide segment of the community. In rural areas, the use of radio campaigns will be prioritized as it remains one of the most powerful and cost effective mass media which can reach a large number of people in isolated areas.

By combining different campaigning strategies, the chances of success at both local and national levels will increase. The awareness campaign will be developed by the international and national consultants in close cooperation with MITADER, MIREME, CDC, DNA and rural NGOs and CSOs will enhance the effectiveness of the campaign as they possess extensive experience in dealing with rural projects and communities.

Project Component 3 Technology demonstration and scaling up
Outcome 3.1. Integrated RE systems demonstrated
The main objective of this component is to show pilot experiences to demonstrate the applicability of RE technologies in agricultural activities located in rural areas of Mozambique.
Output 3.1.1. Demonstration projects on integrated renewable energy systems with about 250kW of installed capacity implemented in selected productive sectors with high visibility and replication potential

Planned and Envisioned Activities	***Main counterparts***
Activity 3.1.1.1. Implementation of demonstration projects	Project developers (ADPP, Tindzawene Mabalane Farm, Gani Commercial Lda/AICAJI and JFS), MITADER, MIREME, FUNAE, FNDS and NGOs at community level
Outcome 3.2. Investment in integrated RE Systems scaled up	
Output 3.2.1. Financial mechanism established to support the installations of solar water pumping systems for irrigation and Waste-to-Energy projects for agro-food processing in rural areas to achieve 1.2MW of installed capacity	
Activity 3.2.1.1. Design of the most suitable financial mechanism for Waste-to-Energy (biogas or biomass) and solar PV water pumping systems	CDC, FUNAE, FNDS, BCI and other financial institutions
Activity 3.2.1.2. Workshop for FIs sector on applicable financial mechanisms	MITADER, MIREME, FUNAE, FNDS, BCI
Activity3.2.1.3. Identify and implement replication projects	MITADER, MIREME, FUNAE, FNDS, BCI
Outcome 3.3. Increased confidence and awareness of technical feasibility and commercial viability of integrated RE systems	
Output 3.3.1. Demonstration and investment projects are independently evaluated and results widely disseminated	
Activity 3.3.1.1. External demonstration and investment projects evaluation	External Evaluation Team, MITADER, MIREME, FUNAE and FNDS
Activity 3.3.1.2.Project dissemination campaign	MITADER, MIREME, CDC, DNA, rural NGOs and CSOs

Project Component 4: Monitoring and Evaluation

The objectives of this component are to:

- establish and conduct adequate and systematic M&E and reporting of all project indicators following UNIDO and GEF procedures to ensure successful project implementation;
- establish a dedicated website for the project;
- ensure that the dissemination programme is implemented and project milestones/reports etc., are regularly posted on the website.

Output 4.1.1. Mid-term review and terminal evaluation carried out

Activity 4.1.1.1 Mid-term review

The PMU will prepare the Terms of Reference (TORs) for the recruitment of the international evaluator that will perform the mid-term review. Achievements made up to this stage should be identified and compared against baseline and targets, and the evaluator should also report on the possible risks until the finalisation of the project.

Since this project falls under GEF CCM-1 Program 1 "Promote the timely development, demonstration, and financing of low-carbon technologies and mitigation options" achieved GHG emission reductions will be evaluated and reported.

Activity 4.1.1.2. Terminal evaluation

UNIDO's Office of Independent Evaluation and Quality Monitoring will prepare the TORs for the recruitment of the international evaluator that will perform the terminal evaluation of the project. Achievements made should be identified and compared against baseline and targets in order to evaluate the overall project performance during operation.

Since this project falls under GEF CCM-1 Program 1 "Promote the timely development, demonstration, and financing of low-carbon technologies and mitigation options" achieved GHG emission reductions will be evaluated and reported.

Output 4.1.2. Project progress monitored, documented and recommended actions formulated

Activity 4.1.2.1. Design M&E framework

The PMU in close consultation with UNIDO PM will develop a detailed work plan for the execution of the project including schedule, roles and responsibilities, milestones, etc. The work plan must consist of all the necessary items to be applied during project execution and should be designed following GEF and UNIDO procedures. The work plan will be based on the logical framework which includes baselines, indicators and targets for each outcome and output to allow for later comparison against achievements during evaluation stages.

A proper M&E framework consists of the following processes:

- Monitoring refers to the continuous and systematic process of collecting data on the agreed indicators to evaluate the effectiveness of the activities implemented and provide information on the progress made. The monitoring should be conducted following specific procedures to collect and manage information, data, and variables. If available, ongoing procedures to track variables should be taken into consideration as well as the synergies with other on-going initiatives (e.g. SE4All initiative).
- Evaluation refers to the action of assessing the achievements in comparison to the original baseline scenario and to the expected targets at any given moment during implementation. This will help the evaluator to understand if the objectives set for each indicator were met or not. This comparison enables the evaluator to identify delays or deviations and to take corrective actions accordingly (e.g. modify targets or implementation strategies). Proper monitoring is vital for conducting a successful evaluation which has to be always in accordance with the type of activity under execution and the targets. The typical evaluation frequency is once a year.
- Reporting refers to the systematic and timely provision of essential and useful information showing how the project is progressing toward achieving its goals. It should take place at periodic intervals and should result in the publication of a simple report indicating the expected objectives and achievements as well as any problems faced during the reporting period.

Activity 4.1.2.2. M&E framework implementation

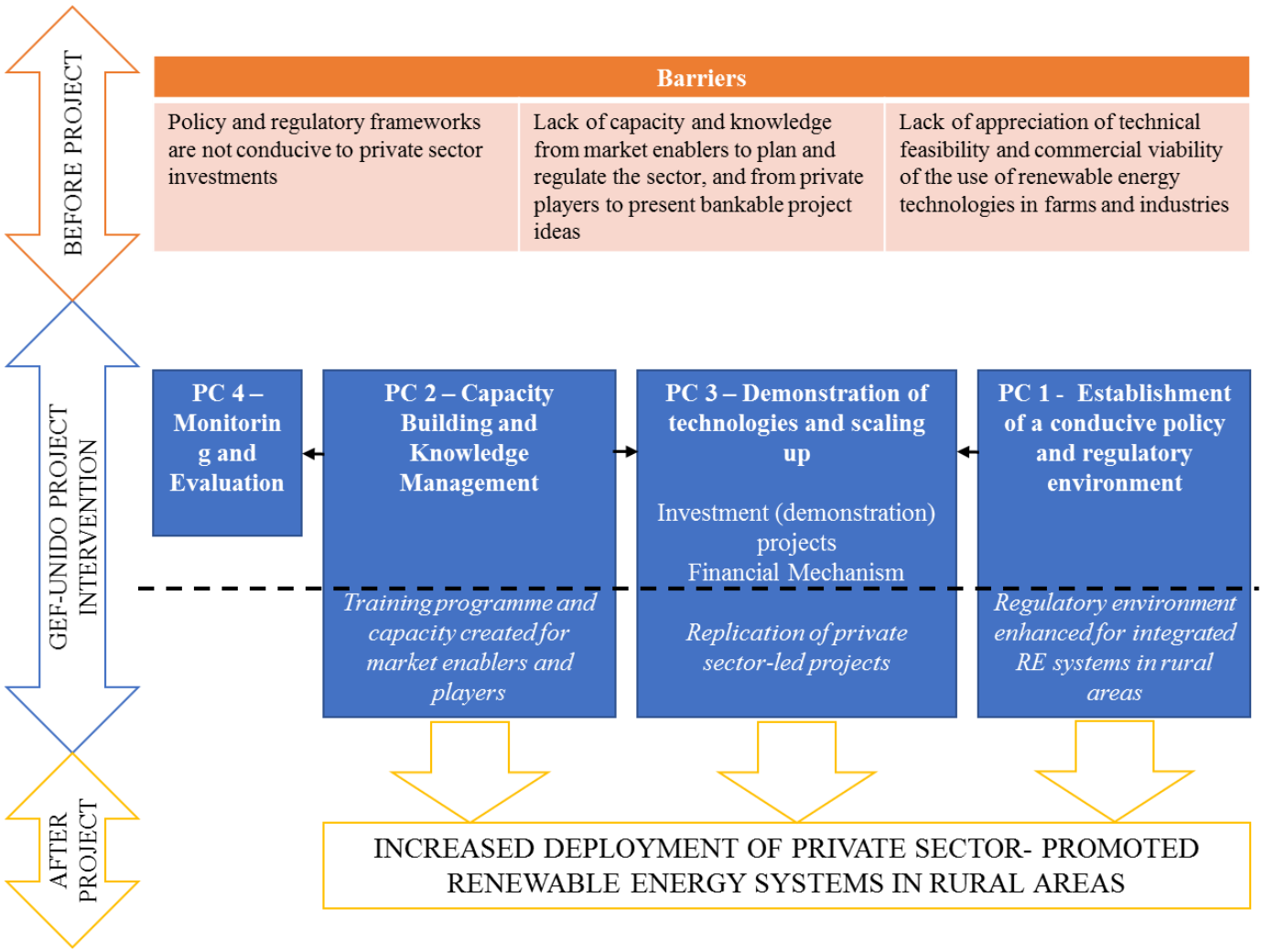
The M&E will be applied as described in its design including the roles and responsibilities of the different actors. The M&E plan will be reviewed and updated periodically based on the results achieved throughout project implementation. The PMU will be responsible for the day-to-day management, monitoring and evaluation of project activities and will coordinate all project activities carried out by project national experts and partners.

Activity 4.1.2.3. Establishment and maintenance of the project website

The website for this project will be designed and developed as a sub-site of existing government sites, such as MIREME and MITADER. The sub-site will be the main communication and dissemination channel used throughout the implementation of the project to keep the population and stakeholders informed about project progress. It will be designed by a web designer under the guidance of the PMU, MIREME and MITADER. Day to day maintenance of the site as well as uploading up-dates will be of the responsibility of the PMU.

Component 4 Monitoring and Evaluation	
Outcome 4.1. Project progress towards objectives continuously monitored and evaluated	
Project progress towards objectives continuously monitored and evaluated.	
Output 4.1.1. Mid-term review and terminal evaluation carried out	
Planned and Envisioned Activities	***Main counterparts***
Activity 4.1.1.1 Mid-term review	International evaluator
Activity 4.1.1.2. Terminal evaluation	International evaluator
Output 4.1.2. Project progress monitored, documented and recommended actions formulated	
Activity 4.1.2.1. Design M&E framework	PMU

Activity 4.1.2.2. M&E framework implementation	PMU
Activity 4.1.2.3. Establishment and maintenance of the project website	PMU, MIREME, MITADER



4) incremental/additional cost reasoning and expected contributions from the baseline, the GEFTF, LDCF, SCCF, and co-financing;

The proposed project will focus on increasing renewable energy participation through a market-based approach by means of adopting solar PV and Waste-to-Energy solutions in small to medium scale farms and agro food processing facilities. A set of demonstration projects are proposed for which individual Pre-feasibility studies can be found in Annex J. The aim of the pilots is to show the applicability of renewable energy solutions of several types: solar PV systems for water pumping and irrigation of farms, bio digestion of animal manure to generate biogas and digestate as soil fertilizer, and the use of other type of solid biomass (e.g. cashew shells) as energy source for heat generation in agricultural processes. The objective is to introduce these technologies to the agro-processing sector and address the specific challenges outlined above.

This will be achieved by a combination of interventions including improving the policy and regulatory environment, incentivising private sector participation for market development, and building the capacity of market players and enablers. The added value of this project will be to promote these technologies in the small and medium scale businesses, particularly in rural areas. Without GEF intervention, these technologies are unlikely to have widespread

uptake, even where useful organic waste streams or sufficient solar resources are available. The project will act as a trigger to demonstration and rapid replication in the integration of RE technology. GEF funding will be used to support all outcomes of the project, especially the ones involving support from international consultants, the implementation of investment projects, and project evaluation activities.

The project will be co-financed –financially and in kind– by the Government of Mozambique through MITADER. Besides, the Commercial and Investment Bank (BCI) will co-finance the project through a catered credit line for the development of RE projects for productive uses in rural areas while the SADC Centre for Renewable Energy and Energy Efficiency (SACREEE) will provide in-kind and financial contributions to develop a policy and regulatory environment that promotes the integration of RE technologies in rural areas. SACREEE will also provide in-kind co-financing to support the capacity building activities on RE technologies. Also, the private sector will play a key role in co-financing the technology demonstration and scaling-up component of the project. Finally, UNIDO will support the project co-financing through in kind and financial contributions.

5) global environmental benefits (GEFTF) and/or adaptation benefits (LDCF/SCCF), and

As defined by the GEF, the main global environmental benefit of the Climate Change Mitigation focal area is the reduction of anthropogenic greenhouse gases (GHG) in the atmosphere. The project intervention will significantly contribute to climate change mitigation by replacing diesel-fuelled systems with RE systems. As such, GHG emissions in the form of CO_2 from diesel combustion will be avoided or reduced through the integration of solar resources and biomass in the form of agriculture residues (e.g. cashew nuts shells and cotton stubble) and livestock manure.

The project will generate direct and consequential GHG emission reductions. The estimated emission reductions were calculated following the Manual for Calculating GHG Benefits of GEF Projects: Energy Efficiency and Renewable Energy Projects and the Tracking Tool as well as the Intergovernmental Panel on Climate Change (IPCC) Guidelines for Greenhouse Gas Inventories as reference.

Direct Emission Reductions

Output 3.1.1 will implement demonstration projects resulting in direct GHG emission reductions during the project's implementation phase. The direct GHG emission reductions have been calculated for each pilot in Table 5.

Table 5: Direct GHG emission reductions per pilot project

Project Case	Direct GHG emission Reductions (tCO_2e/year)	Total direct reduction over lifetime (tCO_2/20 years)*
Tindzawene Mabalane Farm bio digestion project	22.85	457
Solar PV water pumping stations in Zambezia and Sofala	45.31	906
Cashew shells utilisation for energy generation in "Caju Ilha"	68.21	1,364
Cotton stubble use for electricity generation	251.66	5,033
TOTAL	**388**	**7,760**

It is worth mentioning that additional GHG emission reductions will be achieved after the financial mechanism becomes operational and further projects start being implemented. The expected reductions from these are difficult to calculate on an *ex-ante* basis since data and information on potential projects to be undertaken is not sufficient at this stage.

Table 6: Baseline and alternative scenarios for each pilot

Case	Baseline	Alternative Scenario	Reduction/Avoidance
Tindzawene	No appropriate collection	Collection of cattle manures	Diesel fuel combustion emissions

Mabalane Farm bio digestion project	of manure is conducted and it is not used for energy purposes. Electricity is generated with a diesel fuelled engine.	(cows and swine) to anaerobically generate biogas and burn it for electricity generation on-site.	are reduced.
Solar PV water pumping stations in Sofala and Zambezia provinces	Diesel fuelled pumping system is used for water pumping.	Solar PV system is used to pump water from the river.	Diesel fuel combustion emissions are reduced.
Cashew shells utilisation for energy generation in "Caju Ilha"	Diesel fuelled boilers are used and cashew shells are treated as waste.	Cashew shells are used in biomass boilers to replace diesel fuelled ones.	Diesel fuel combustion emissions are reduced.
Cotton stubble use for electricity generation	Diesel fuelled engines are used to generate energy	Cotton stubble is transformed into pellets to be used in a gasifier unit to generate electricity	Diesel fuel combustion emissions are reduced.

Assumptions made and data obtained to estimate emission reductions on a case by case basis are included in the Pre-feasibility Report included in Annex J.

Consequential Emission Reductions

The different demonstration projects can be replicated in many other farms, pumps and industrial facilities given that the financial mechanism is in place. As such, it has been estimated that the project has a replication factor of 15 as established during the PIF. The assumptions made for each of the cases are explained in the Tracking Tool.

Table 7: Consequential GHG emission reductions per pilot project

Project Case	Consequential bottom-up GHG emissions avoided (tCO_2e)
Tindzawene Mabalane Farm bio digestion project	6,854
Solar PV water pumping stations in Namacurra	13,593
Cashew shells utilisation for energy generation in "Caju Ilha"	20,463
Cotton stubble use for electricity generation	75,497
Total	**116,406**

In addition to the global environmental benefits, local environmental benefits will be achieved. It is expected that the project will reduce the amount of organic waste dumped in local water bodies reducing water pollution and that soil fertility will be enhanced by using the digestate from the digester as fertilizer in the case of Tindzawene.

6) innovativeness, sustainability and potential for scaling up

Innovation: The main innovation under this project is the promotion of a private sector driven process for the introduction of integrated renewable energy systems for productive uses in rural areas of Mozambique. By introducing renewable energy technologies in farms and agro-processing industries across the country, the project will quick start a process of continued technology innovation for these industries. Furthermore, the project will develop an innovative business model and effective financial mechanism to replicate the access to modern energy systems through decentralized solutions that can be cost effective. The proposed approach will acknowledge the different needs from local stakeholders including finance institutions, technology suppliers, and services providers. The cross cutting nature of the project components will create a sound framework for farmers and agro-processing industries to continually pursue technology innovation in their operations. In addition, South-South cooperation will be promoted by inviting international experts from developing countries to share their experience and expertise with the local stakeholders.

Sustainability: The project sustainability hinges on its intervention strategy that focuses on the policy and regulatory frameworks, capacity building and on implementing demonstration projects on the ground. By working on the policy and regulatory framework, the project will create an environment conducive to private sector investments in renewable energy systems in rural areas well beyond the lifetime of the project. As for the capacity building component, the project will work with a local university to build its capacity to provide training programmes on renewable energy to different market enablers and actors. Besides, the demonstration projects under this project will be owned by private companies who will have an economic interest in sustaining the operations of the project.

Scaling up: This project will create a critical mass of market interventions to support the electrification of rural areas in Mozambique by adopting a market-based approach that targets productive sectors. This approach could be replicated throughout the country and potentially across Southern Africa. Moreover, the financial mechanism to be established under this project will support the replication efforts adding to the sustainability of the project.

Market transformation impact: The project will play a catalytic role in accelerating the adoption of renewable energy systems in rural areas in Mozambique. As such, the market for renewable energy systems in rural areas will be transformed and will produce spill over benefits in other areas and sectors. The enhanced policy and regulatory framework will change the market environment so as to attract more private sector investments and the capacity built will effectively create the technical and managerial capacity required to have a functional market for renewable energy systems. The demonstration will show the role of renewable energy systems for productive uses thereby creating confidence amongst all players. Once the confident on these systems is created, investors will be keen to use the financing mechanism to integrate RE technology in their own projects.

A.2. Child Project? If this is a child project under a program, describe how the components contribute to the overall program impact.
N/A

A.3. Stakeholders. Identify key stakeholders and elaborate on how the key stakeholders' engagement is incorporated in the preparation and implementation of the project. Do they include civil society organizations (yes ☒ /no☐)? and indigenous peoples (yes ☐ /no☒)? [24]

During the PPG phase, a stakeholder consultation process was carried out through: (i) face-to-face individual meetings; (ii) workshops/meetings with larger audiences; and (iii) direct consultation by e-mail or phone. As a result, national and international stakeholders jointly defined the activities to be implemented under the project including the identification of demonstration projects and conduction of feasibility analysis. The stakeholder consultation reached out to government agencies, multilateral organizations, development agencies, academia, private sector, financial institutions and civil society organizations. It must be noted that indigenous people will not be impacted nor involved in this project.

[24] *As per the GEF-6 Corporate Results Framework in the GEF Programming Directions and GEF-6 Gender Core Indicators in the Gender Equality Action Plan, provide information on these specific indicators on stakeholders (including civil society organization and indigenous peoples) and gender.*

After an extensive stakeholder analysis the following stakeholders were identified as directly relevant for the project: MITADER, MIREME, MASA, MEC, INNOQ, FNDS, FUNAE, MNCPC, UEM, SACREEE, CDC, BCI, ADPP Moçambique, Associação Dos Industriais Do Caju (AICAJU), JFS and Tindzawene Mabalane Animal Farm.

Besides, the following stakeholders were identified as indirectly relevant for the project: Department for International Development (DFID-UK), African Development Bank (AfDB), Energia Solar Sustentável Lda, ZOE ENTERPRISE, NDZiLO, João Ferreira dos Santos S.A. (JFS), LIVANINGO, Netherlands Development Organisation (SNV), Kreditanstalt für Wiederaufbau (KfW), GIZ, WB, Kulima, Câmara de Comercio de Moçambique (Mozambique Chamber of Commerce), Associaçao dos Produtores de Açúcar de Mozambique (APAMO), Kukula, Agency for Cooperation and Research in Development (ACORD), Embassy of Japan, and Conselho Empresarial Provincial (CEP).

The following table describes the roles of the different stakeholders that will be involved during project implementation.

Stakeholder	**Role**
United Nations Industrial Development Organization (UNIDO)	GEF implementing agency.
Ministry of Land, Environment and Rural Development (MITADER)	MITADER has been created with the mandate to ensure and promote sustainable and equitable development. The mission of MITADER is to reduce socio-economic inequalities with emphasis on the rural environment by promoting a diversified economy and inclusiveness. It encompasses multiple areas of intervention including earth, environment and rural development ensuring that the implementation of a National Sustainable Development Program is carried out in an integrated and comprehensive manner. Besides of being the GEF Focal Point, MITADER will be one of the main executing partners during the project.
Ministry of Energy and Mines Resources (MIREME)	MIREME's objective is to increase the economic value of energy and mineral resources. It aims to contribute to economic and social development through the creation of a national industry supplying goods and services for energy and mineral industries and strong linkages between the energy and mining industry and the rest of the economy. MIREME will be one of the main executing partners during the project.
Ministry of Agriculture and Food Security (MASA)	MASA's objective is to improve food security and poverty reduction by supporting families, private sector, government and non-governmental agencies to increase agricultural productivity, agro-industry and marketing within the principles of sustainable exploitation of natural resources. MASA will be one of the executing partners during the project.
Ministry of Education and Human Development (MEC)	The Ministry of Education is responsible for planning, coordination and development of activities in the field of education. MEC is accountable for the formulation of education policies; training and qualification of citizens by providing them with scientific, technical and cultural knowledge and ensuring increased access to science and culture; regulation, supervision and inspection of education activities; expansion of access to education and professional technical training; improvement and constant updating of the quality of education, based on scientific and technological advances; training of teachers and other education technicians; promotion of scientific, technological, social and cultural research in

Stakeholder	Role
	educational institutions; administration of professional technical education that confers scientific, technical and professional knowledge in coordination with other entities of the state and with civil society. MEC will support the identification of key universities and vocational training institutions as well as the development of training material under Component 2.
National Sustainable Development Fund (FNDS)	FNDS –previously National Environment Fund (FUNAB)– was created on February, 2016 with the Decree 06/2016 which provided legal personality and administrative financial and assets management autonomy, under the supervision of MITADER. It main objective is the development and financing of programs and projects that ensure sustainable, harmonious and inclusive development, satisfying current needs without compromising the ability of future generations to meet their own needs. FNDS will provide co-financing and will act as an executing partner during the project.
Energy Fund (FUNAE)	FUNAE is a public institution operating on a national level with legal personality financed and administered autonomously. FUNAE provides financial assistance, financial guarantees, or/and loans to enterprises that have the objective to produce and disseminate low-carbon production techniques as well as distribute and conserve energy. Particular attention is given to the use of innovative and renewable power sources. FUNAE will act as a main executing partner in the project.
National Institute for Standardization and Quality (INNOQ)	INNOQ is a public institute of national scope, supervised by the Ministry of Industry and Commerce (MIC), with legal personality and administrative autonomy. INNOQ was created with the fundamental objective of boosting and coordinating the National Quality Policy, through the accomplishment of activities of Standardization, Metrology, Certification and Quality Management aimed at the development of the national economy. INNOQ will be a strategic partner during the project implementation and will facilitate generation of knowledge and capacity building in activities related to standards for integrated RE systems.
National Council of Electricity (CNELEC)[25]	CNELEC is a public entity, endowed with legal, administrative and financial autonomy under the supervision of the Ministry of Energy. The Council aims to promote the implementation of legislation relevant to the electricity sector and evaluate and advocate for the development and expansion of services in accordance with the needs of current and future users. Furthermore, CNELEC monitors the procedure for awarding concessions and their execution. CNELEC will be part of the Taskforce developed under Component.
University Eduardo Mondlane (UEM)	The Eduardo Mondlane University is a multidisciplinary institution for the training of professionals of higher education, research, extension and mastery and cultivation of human knowledge. UEM's objective is to provide services and products adding value and contribute to the development of society. UEM will act as a main executing partner during the project and holds a strategic role for knowledge generation and dissemination in capacity building activities.
Commercial and	The BCI is a member of the Portuguese Caixa Geral de Depósitos (CGD) Group which

[25] It is planned that CENELEC will transform into ARENE in the near future.

Stakeholder	Role
Investment Bank (BCI)	established in Mozambique in 1997. BCI vision is to actively contribute to the economic and social development of Mozambique by creating value for its stakeholders and the communities in a socially responsible and sustainable way. BCI will co-finance the project with a catered credit line to develop RE projects for productive uses in rural areas.
Mozambique National Cleaner Production Center (MNCPC)	The Mozambique National Cleaner Production Centre (MNCPC) was officially established in 2001, and operates as the executive arm of FEMA - Business Forum for the Environment. The UNIDO and UNEP Resource Efficient and Cleaner Production (RECP) Programme was developed to support the continuous application of an integrated preventive environmental strategy to processes, products and services to increase efficiency and reduce risks to humans and the environment. MNCPC will hold a strategic role in knowledge-generation and dissemination in capacity building activities. This project will benefit from the networks, the capacity building activities.
Development Aid from People to People (ADPP) -Moçambique	ADPP is a non-governmental association focusing on education, health, agriculture and renewable energies in order to improve local livelihoods. All developments are embedded in local communities. ADPP will act as a project developer in the implementation of one of the demonstration projects under Output 3.1.1. The demonstration project will install Solar PV Pumps and Dams using the GEF grant and mobilized co-finance.
Gani Comercial Lda/ Association of Cashew Manufacturers (AICAJU)	Gani Comercial Lda is a trading company which trade commodities include: rice; wheat; can fish; jute & PPBags; cashew nut raw & kernel; sesame seed; pigeon peas; peanut; beans and maize. AICAJU is a private sector organization established by Mozambican cashew processors. AICAJU –as a member of the African Cashew Alliance– represents its members in their efforts to contribute to the development of the cashew subsector in Mozambique. AICAJU works with government authorities to implement strategies to increase production volumes, as well as encouraging the expansion of cashew processing within Mozambique. AICAJU will act as a project developer in the implementation of one of the demonstration projects under Output 3.1.1. The demonstration project will use cashew residues to generate energy.
João Ferreira dos Santos (JFS)	João Ferreira dos Santos creates innovative models for sustainable development which are leveraged through strategic partnerships and focused on people in the most deprived areas where the group companies are active. In the cotton sector, about 1.5 million dollars were invested in 2012 to purchase and install a new cotton processing plant in Niassa with a capacity of 30,000 tons/year. Currently,JFS produces more than 15% of the total national cotton production, and for two consecutive years is the company with the highest growth rate in the sector. JFS will act as a project developer in the implementation of one of the demonstration projects under Output 3.1.1. The demonstration project will use cotton stubble to generate electricity.
Tindzawene Mabalane Animal Farm	The Tindzawene Mabalane animal farm breeds different type of cattle such as cows, goats, sheep and swine. The Tindzawene animal farm will act as a project developer in the implementation of one of the demonstration projects under Output 3.1.1. The demonstration

Stakeholder	Role
	project will use cattle manure to generate energy.
SADC Centre for Renewable Energy and Energy Efficiency (SACREEE)	The establishment of the SADC Centre for Renewable Energy and Energy Efficiency (SACREEE) in Namibia has been formally approved by the SADC ministers. The Centre's mandate is to promote market-based adoption of RE and EE technologies and services in SADC member States. The centre aims to contribute substantially to the development of thriving regional RE and EE markets through knowledge sharing and technical advice in the areas of policy and regulation, technology cooperation, capacity development as well as investment promotion. It is envisaged that SACREEE will support the project by providing policy advisory services and private sector guidelines under Component 1.
NGOs/CSOs	Civil society will be actively involved in the project activities during implementation phase as contributors to awareness campaigns as well as facilitators for information dissemination through and to their already established networks. Some potential NGOs/CSOs that could be involve in the project include: • AMA – Environmental Association; • ITC – Community Lands Initiative; • AMME - Mozambican Association for Women and Education; • NELY Agricultural And Livestock-Raising Association; and • OMR – Rural Observatory.

A more detailed description of the roles of the different stakeholders during the project implementation is presented below in section *A.6. Institutional Arrangement and Coordination*.

A.4. Gender Equality and Women's Empowerment. Elaborate on how gender equality and women's empowerment issues are mainstreamed into the project implementation and monitoring, taking into account the differences, needs, roles and priorities of women and men. In addition, 1) did the project conduct a gender analysis during project preparation (yes ☒ /no☐)?; 2) did the project incorporate a gender responsive project results framework, including sex-disaggregated indicators (yes ☒ /no☐)?; and 3) what is the share of women and men direct beneficiaries (women X%, men X%)? [26]

UNIDO recognizes that gender equality and the empowerment of women have a significant positive impact on sustained economic growth and inclusive industrial development, which are key drivers for poverty alleviation and social progress. Commitment of UNIDO towards gender equality and women's empowerment is demonstrated in its policy on Gender Equality and the Empowerment of Women (2015) which provides the overall guidelines for establishing a gender mainstreaming strategy. Besides, UNIDO has developed an operational energy-gender guide to support gender mainstreaming within its sustainable energy initiatives.

The design of this project is premised on the recognition that energy interventions are expected to impact populations and are, therefore, not gender-neutral. In fact, due to diverging needs, rights, roles and opportunities regarding energy consumption and production, women and men are expected to be affected differently by the project and hence, the need for differentiated interventions. The project aims to demonstrate good practices in mainstreaming gender aspects wherever possible into promoting market-based dissemination of integrated renewable energy systems for productive activities in rural areas of Mozambique and to avoid negative impacts on women or men due to their gender, ethnicity, social status or age. Consequently during the whole project cycle, the project will systematically consider gender dimensions and the project components will have gender-sensitive targets.

[26] For the summarize of the share of direct beneficiaries of this project in terms of %women and %men please refer to Table 8.

To mainstream gender in this project, the baseline analysis carried out at PPG phase identified entry points for defining gender specific project outcomes, outputs and related activities. Furthermore, it identified the specific circumstances of women and youth in Mozambique, and provided a basis on how the priorities and needs of these groups are to be integrated in the implementation of the project. During the PPG phase, UNIDO ensured that the relevant gender dimensions were considered and embedded in the project log-frame which includes gender targets. The guiding principle of the project will be to ensure that both women and men are provided equal opportunities to access, participate in, and benefit from the project, without compromising the technical quality of envisaged results.

In practical terms:

- All the decision-making processes will consider gender dimensions. At project management level, PSC meetings will invite observers to ensure that gender dimensions are fairly taken into account.
- Gender-sensitive recruitment will be practiced at all levels where possible, especially in the selection of project staff. Gender responsive TORs will be used to mainstream gender in the activities of consultants and experts. In cases where the project does not have direct influence, gender-sensitive recruitment will be encouraged. Furthermore, whenever possible existing staff will be trained on gender issues.
- Under Component 1, the project will ensure that the policies and guidelines developed are gender sensitive and that at least 40% of the Taskforce members are women. Efforts will be made to consult with stakeholders focusing on gender equality and women's empowerment issues which will be especially relevant during the policy review and formulation.
- Under Component 2, efforts will be made to promote the participation of women in training activities, both at managerial and technical levels. For Output 2.1.1 and Output 2.1.3, at least 40% of those to be trained will be women. As for Output 2.1.2, at least 20% of the trainees will be women as rural women are underrepresented in the private sector due to the fact that they are mainly involved in subsistence agriculture and/or the informal sector. In spite of these circumstances, efforts will be made to promote women participation. For instance, the project will provide bridging courses in case some women do not have the requisite technical background and will provide training in local languages to encourage the participation of women who may be illiterate.
- Under Component 3, a dissemination campaign will be conducted through a series of meetings and workshops. One of them will target rural women to make sure they obtain the information on available technologies and financing mechanism. Furthermore, the financial mechanism developed will include gender considerations considerations in order to allow more rural women to have access to it, it is expected that 20% of the applicants to the financing mechanism will be women.
- When collecting and assessing data during implementation, gender dimensions will be considered including sex-disaggregated data, gender analysis as part of Environmental and Social Impact Assessments (ESIAs), etc. It must be noted that during the PPG while identifying demonstration projects, gender dimensions were considered and information was collected on disaggregated indicators (e.g. % of women/men working on the dairy farm).

In sum, the project was designed to acknowledge the differences of energy access impacts considering the distribution of economic activities and social roles between women and men in rural areas of Mozambique, in line with GEF 6 Programming Strategy.

Table 8: Target percentage of women and men direct beneficiaries

Project Component	Target percentage of men	Target percentage of women
Component 1	60%	40%
Component 2		
Output 2.1.1	60%	40%
Output 2.1.2	80%	20%
Output 2.1.3	60%	40%
Component 3	80%	20%

A.5 Risk. Elaborate on indicated risks, including climate change, potential social and environmental risks that might prevent the project objectives from being achieved, and, if possible, the proposed measures that address these risks at the time of project implementation.(table format acceptable):

Risks	Impact on the Project	Risk Description and Mitigation Actions
1. Political and economic instability may drive the project off track	High	There has been some political instability and violence in Mozambique since 2012 due to the renewed tensions between Renamo (Mozambique National Resistance) and Frelimo (Mozambique Liberation Front). Besides, economic growth has been slowing down caused by lower than expected exports and a decrease in public expenditure and foreign direct investment. A reduced influx of hard currency assisted the devaluation of the metical (MZN) against the US dollar and pressured the balance of payments. Thus, there is a risk that political and economic instability may impact the project implementation, especially in terms of government commitment and private sector involvement. *Probability*: High. During the PPG stage, the country political instability impacted the level of engagement of the stakeholders (both public and private) on the process as well the level of financing that could be raised for the project implementation. *Mitigation Measures:* High level of cooperation with SACREEE and high government involvement in all project activities may mitigate the risk.
2. Lack of government commitment to integrate project results at local level, or RE technologies use in rural areas into national strategy(ies) on energy	Low	There may be some reluctance from the Government to integrate into national strategies the project results in terms of deployment of renewable technologies in rural areas. Nevertheless, the project objectives and planning are in line with national policies and objectives for addressing existing energy access and security challenges at an affordable cost and in a sustainable manner. *Probability*: Low *Mitigation Measures:* The project integrates activities to provide support to the integration of the findings on national strategies. The project has already identified and discussed the project with partner public institutions to ensure that their representatives provide full support throughout the project implementation and beyond.
3. Technologies promoted may not be mature enough for electricity and self-generation in rural areas	Low	PV water pumping and biomass energy technologies are not commonly used in rural areas of Mozambique, despite their great potential. As such, they are not fully integrated into the existent environment and there is a lack of availability of supporting services for operation and maintenance of these technologies. *Probability*: Low *Mitigation Measures:*

Risks	Impact on the Project	Risk Description and Mitigation Actions
		The GEF/UNIDO project actively seeks to encourage systems that have been promoted by UNIDO in similar environments and countries such as Tanzania and Rwanda. The South-South cooperation model - especially with SADC countries- will lower this risk by using technologies which were tested and validated in comparable settings. The project also integrates in Component 2 training programmes to establish the required skills to provide operation and maintenance services for these types of technologies. Moreover, the demonstration projects selected pay great attention to the integration and demonstration of operation and maintenance activities to mitigate any potential technology risk.
4. Delay in commissioning of demonstration and replication projects and availability of results	Moderate	There is a technical risk associated with the demonstration projects due to limited experience in the country with the proposed technologies. There are no noteworthy technical risks associated with the policy measures and capacity building activities proposed by the UNIDO-GEF project. All of them are well proven interventions tested in many other countries. *Probability*: Low *Mitigation Measures*: Execution of activities to be implemented under Component 3 will be carried out with the support of international experts/companies with demonstrated and successful past experience. Besides, only mature and proven technologies are being proposed to be installed as demonstration projects. The status of the demonstration projects will be regularly reviewed and any necessary corrective steps will be promptly taken. Finally, the results and lessons learnt will be widely disseminated.
5. Relevant stakeholders do not participate/ engage actively in the project	Moderate	Due to the lack of information and awareness in small to medium scale renewable energy initiatives, there is a risk that there is not active participation from stakeholders. Nevertheless, the high cost of traditional energy sources (fossil fuel based) in the country are pushing organizations to identify and consider energy alternatives. During the PPG stage, there has been a strong involvement of the sector stakeholders and participants have been involved in the activities by providing feedback and information that has been crucial for the project development. Nonetheless, it is important to acknowledge that due to the political instability in the country the level of interest and collaboration shown by enterprises during the PPG stage has diminished from the start to the end of the phase. *Probability*: Moderate. During the PPG phase members of the MIREME-DNE, MITADER (DINA), FUNAE, FNDS, KfW, public and private organisations, NGOs and national and international financing institutions in Mozambique were approached. The general response was of strong support and interest to participate in the project. Nonetheless in consultation

Risks	Impact on the Project	Risk Description and Mitigation Actions
		activities carried out towards the end of the PPG stage there was a lower level of participation and some reluctance from stakeholders to participate in the project, due to the political and economic instability that the country is facing. *Mitigation Measures:* A well-structured national dissemination campaign demonstrating the viability of the demonstration projects and outlining the opportunities during project implementation combined with an active dialogue and involvement of associations at the national and local level during the whole project duration will ensure the desired stakeholder response to the project.
6. Reluctance or lack of interest from stakeholders to actively promote gender equality under the project activities	Low	There could be some reluctance or lack of interest from stakeholders in the active promotion of gender equality under the project activities. There could also be a low female participation to deliver support services due to lack of interest, inadequate design of activities or not enough adequate candidates to engage in planned activities. *Probability*: Low. The project activities have been design to foster women participation and integration including the selected demonstration projects. *Mitigation Measures:* A thorough gender responsive communication strategy will ensure stakeholders' involvement at all levels including CSOs and NGOs promoting gender equality and the empowerment of women (GEEW). Furthermore, a gender expert will monitor that women are properly and actively engaged in project activities. The demonstration projects also integrate mitigation measures to promote gender equality, create a culture of mutual acceptance, and maximize the potential contribution of the project to improving gender mainstreaming in the energy field.
7. Financial and credit constraints prevent enterprises from investing in renewable energy	Moderate	The ability of companies to invest in small to medium scale renewable energy projects will impact the replication of the demonstration projects and the long term market potential for small to medium scale renewable energy projects. Currently in Mozambique, access to finance is possible but at very high interest rates. Also, the local financial sector has very limited experience in providing financing for RE projects. In fact, only BCI has a credit line for these types of projects with a very high interest rate. *Probability:* Low to moderate. *Mitigation Measures:* Early dialogue with grant providers will be initiated and the financial mechanism will be fully established which will enable the access to finance for small scale promoters at affordable interest rates. One of the key advantages to invest in small to medium scale renewable energy is the offset of either grid electricity or diesel fuel – both of

Risks	Impact on the Project	Risk Description and Mitigation Actions
		which are very expensive/unavailable within rural areas of Mozambique. As part of the training under Component 2, a life cycle analysis will be taught to show the lifetime benefits of renewable energy projects, particularly in a volatile fossil fuel market. Demonstrating these benefits is expected to lead to further investment in small to medium scale renewable energy projects. Training will also be provided to local financial institutions so that they fully understand the risks and benefits of small to medium scale RE projects and provide an appropriate financial mechanism.
8. Diesel price variability	Moderate	Industries will decide whether or not to invest in integrated renewable energy systems based on the cost savings potential. In the recent past, the price of oil has continued to fall and some projections foresee a barrel below 50US$. As such, some of the industries and farmers may no longer be interested to invest in renewable energy systems when the price of oil, and therefore diesel, is decreasing significantly. Also Mozambique found out some oil reserves which may reduce the cost of diesel in the country. *Probability* Moderate *Mitigation Measures:* The criteria used on the project to show the attractiveness of renewable energy systems do not only focus on cost savings, but include other aspects such as energy independence and reliability of supply, as well as local and global environmental benefits. Under Component 3, a decision making tool will be developed to help farmers and other project developers to analyse the viability of PV and Waste-to-Energy projects.
9. Implementation risk	Moderate	UNIDO has long-standing direct experience in the development and implementation of renewable energy projects and it has a strong knowledge of the key variables that determine the success and the failure of a project during its implementation. *Probability:* Low to moderate. *Mitigation Measures:* Due to capacity issues related to the fragile country situation and in line with discussions held with the government, UNIDO will provide initial execution support. Detailed work plans will be developed in close cooperation with in-country project partners, stakeholders and developers. Agreed and transparent *modus operandi* will be defined before the start of the project implementation. The national project manager to be contracted should have experience in working with the RE sector, should be aware of critical issues and should have strong links to the country and regional organisations, such as SADC.

Risks	Impact on the Project	Risk Description and Mitigation Actions
		All other project execution partners (MITADER, MIREME, SACREEE, UEM, etc.) have previous experience in the development of RE projects in Mozambique.
10. Sustainability	Moderate	The sustainability of the activities to be implemented under all components of the project, especially the implementation of the demonstration projects, is a key issue which has to be addressed. *Probability:* Low to moderate. *Mitigation Measures:* All demonstration projects include capacity development activities for the project owners/promoters to create a critical mass of skilled personnel to provide operation and maintenance of the demonstration projects. For the scaling-up phase, the financing mechanism established will be linked to operation and maintenance service providers who will support the projects. Furthermore, the project will work with industry associations to ensure that lessons and experience from the demonstration projects are documented and disseminated widely.
11. Climate change impacts on the region may affect project development	Low	The execution and operation of the demonstration projects can suffer delays/be impacted due to climate change effects in Mozambique. Drought periods in Mozambique are frequent since 1980s, and these may affect the availability of biomass for biomass-related projects (both agriculture residues and livestock manure). Unusual cloud cover and more-than-usual frequent rains may reduce the energy generated by PV systems, and thus impact the performance of PV pumps. *Probability*: Low *Mitigation measures*: The demonstration projects and the projects implemented during the scaling-up phase will include a climate change analysis and will integrate mitigation strategies. An organised schedule and project monitoring will assist in the identification of delays and reprogramming in the execution of activities.

A.6. Institutional Arrangement and Coordination. Describe the institutional arrangement for project implementation. Elaborate on the planned coordination with other relevant GEF-financed projects and other initiatives.

Institutional Arrangements

The project will be implemented by UNIDO which will manage the overall project budget. Besides, UNIDO will be responsible for monitoring the project implementation, timely reporting of the progress to GEF as well as organizing mandatory and non-mandatory evaluations. In addition, UNIDO will provide some execution support for the procurement of goods and services, as well as recruitment of technical experts. The full or partial title and ownership of equipment purchased under the project may be transferred to national counterparts and/or project beneficiaries during the project implementation as deemed appropriate by the UNIDO Project Manager in consultation with project

stakeholders. Finally, UNIDO will support the co-ordination and networking with other related initiatives and institutions in the country and in the region.

During the PPG, SACREEE was identified as a key partner to provide policy advisory and capacity building services. As such, UNIDO will enter into contract with SACREEE to provide policy and regulatory advisory support under Component 1 and capcity building support under Component 2 with clear deliverables and timelines. For Component 3, four project developers have been identified during the PPG phase to carry out the execution of demonstration projects; namely, ADPP Moçambique, AICAJU/Gani Comercial Lda, JFS and Tindzawene Mabalane Farm. The project developers will be responsible for the demonstration projects, will procure the equipment and will bear part of the investment costs. Table 9 shows the estimated costs per pilot and the expected GEF grant contribution and co-financing.

Table 9: Estimated costs per pilot project

#	Project	Company name	Capex (USD)	Proposed grant (USD)	Percentage	Proposed co-financing (USD)
1	Tindzawene Mabalane Farm biodigestion project	Centro de Produção de Tindzawene	267,859	53,572	20%	214,287
2	Development of Solar PV Pumps in 27 Sites of Zambezia Province and Sofala Province, Mozambique	Ajuda de Desenvolvimento de Povo para Povo (ADPP)	714,285	214,285	30%	500,000
3	Cashew shells utilisation for energy generation in “Caju Ilha”	Gani Comercial Lda and AICAJU (Associação Dos Industriais Do Caju)	21,201	4,240	20%	16,961
4	Biomass waste from cotton stubble for electricity generation in Niassa	João Ferreira dos Santos Group (JFS)	287,500	95,833	33%	191,667

As such, UNIDO will issue a grant contract for each project developer under which they are expected to mobilize co-financing, procure and install the agreed RE systems. The payments to these demonstration projects will be disbursed on the basis of progress verified by UNIDO and national counterparts. Exact details will be described in the contractual arrangements established with these developers.In the exceptional case that one or more of the demonstration projects are not able to materialize, an open and competitive bidding process will be employed to identify new companies willing to carry out demonstration projects and commit to mobilize adequate co-financing.

In addition, the Commercial and Investment Bank (BCI) will support replication projects under Component 3 through a catered credit line for the development of RE projects for productive uses in rural areas. The criteria for the selection of replication projects will be defined by BCI and the Project Steering Committee (PSC). The process to implement and monitor replication projects is the following: (1) project developers present their projects in line with the selection criteria to BCI; (2) BCI presents a portafolio of projects to the PSC; (3) the PSC endorses the projects presented; (4) UNIDO enters into contractual arrangements with BCI to transfer GEF funds to co-finance the selected replication projects; (5) BCI transfers the funds to the project developers; (6) project developers report every six months to BCI; (7) BCI presents the progress attained through the replication projects to the PSC. Figure 12 shows schematically how the replication projects will be supported through the financial mechanism developed under Output 3.2.1.

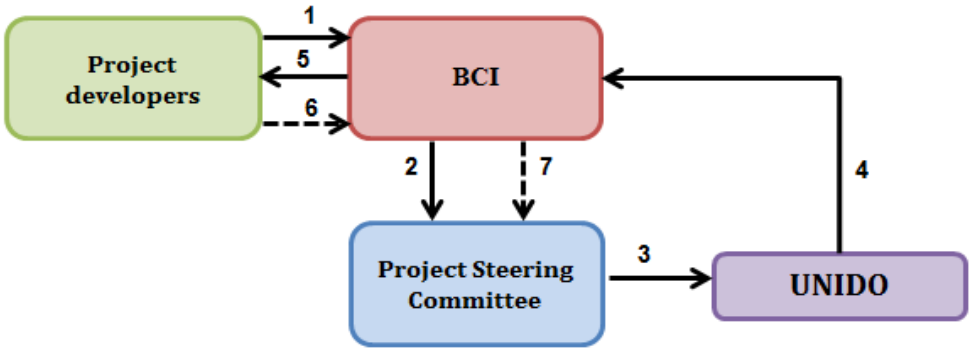


Figure 12: Replication projects financing

The project will be managed at the institutional and project levels. Each level implies the involvement of different stakeholders who are engaged in the execution of the project and have different responsibilities and/or share several activities. At institutional level, the main project counterpart will be MITADER, which is also the chairperson in the Project Steering Committee (PSC). At the project level, the Project Management Unit (PMU) will be based in Mozambique and will be responsible for the project at the local level. Figure 13 shows schematically how the project counterparts relate to each other at each level.

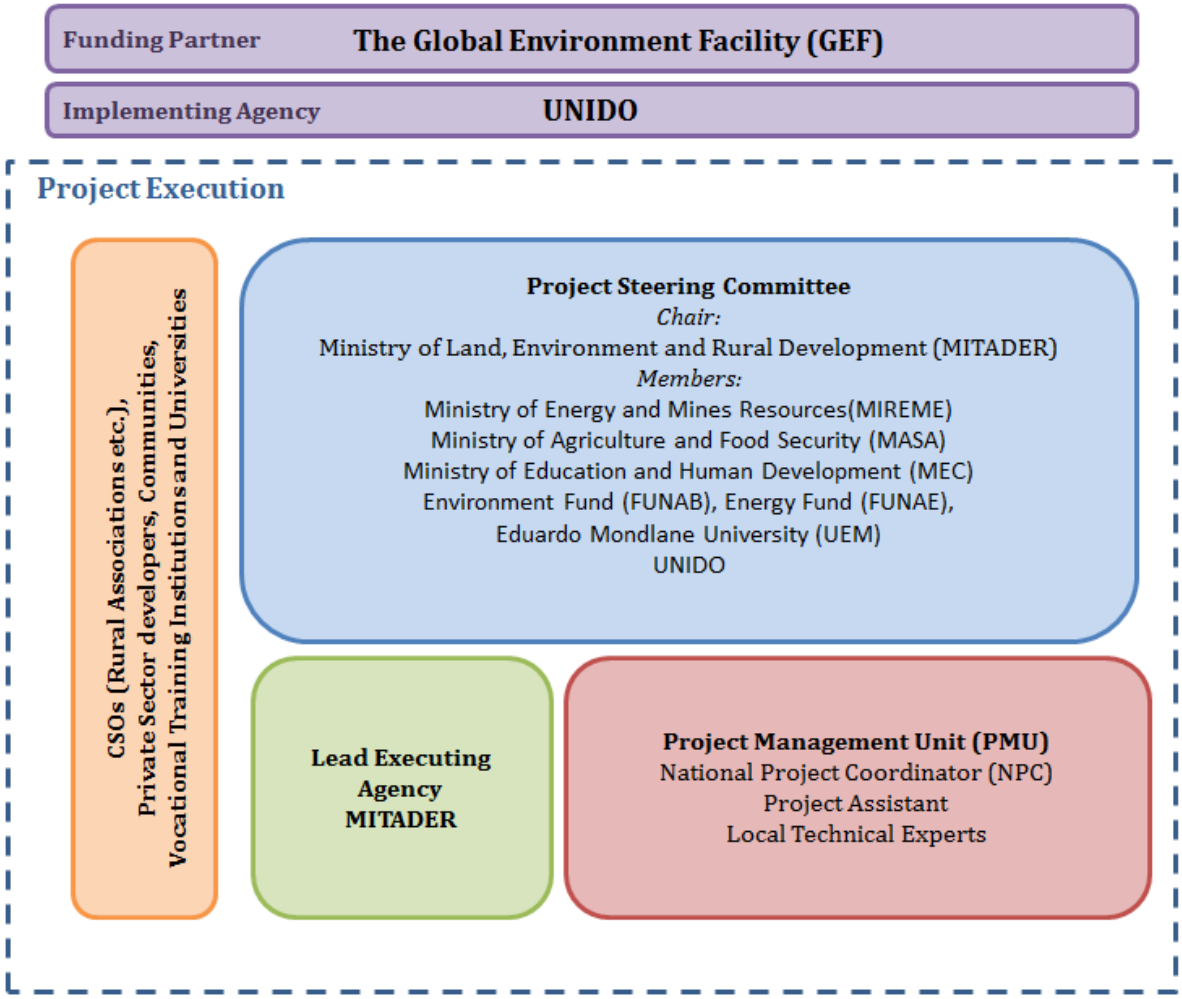


Figure 13: Project Implementation Arrangement

Project Steering Committee

A PSC will be established at the inception of the project to monitor the project progress, to guide its execution and to support the project in achieving its listed outputs and outcomes. The PSC will consist of representatives from the Ministerial directorates (MITADER, MIREME, MASA, MEC), FNDS, FUNAE, UEM and UNIDO. Other members can be suggested to be part of the PSC if approved during the inception workshop. As such, the final list of PSC members will be finalized and presented in the Inception Report. Other members can be invited by the decision of the PSC on ad hoc basis but taking care that the PSC remains operational. The PSC will be chaired by the MITADER, which will be responsible for coordinating the efforts of all government bodies involved to achieve the project's objective. The PSC responsibilities include:

- Revision and approval of annual work plans and budgets;
- Revision and approval of annual GEF reporting;
- Revision and approval of project amendments in accordance with the GEF Council Document C.39/Inf.3;
- Provide guidance on strategic issues and activities, as per approved project document.

Project Management Unit (PMU)

A PMU will be set up to ensure adequate organizational structure and systems to facilitate implementation. The physical location of the PMU will be decided after close consultations with all project partners. To ensure national ownership, the main executing partners will designate senior officials as Project Focal Points (PFP). Adequate numbers of technical experts in different disciplines and project management experts/consultants with expertise in project, finance, energy, legal matters, etc. will be associated on a longer-term or short-term basis depending upon the work load. Requirement of additional support staff will be assessed and experts will be engaged on contract/assignment basis as per requirement. As such, the specific requirements for each staff position will be defined by the PSC in due time.

UNIDO will employ a National Project Coordinator (NPC). In collaboration with the Project Manager who is responsible for the project at UNIDO HQs, the NPC will be responsible for the overall coordination of the project, including: (i) coordinating the project activities with the stakeholders; (ii) certifying that the expenditures are in line with approved budgets and work-plans; (iii) facilitating, monitoring, and reporting on the procurement of inputs and delivery of outputs; and (v) reporting to UNIDO on project delivery and impact. Exact details will be described in the contractual arrangements with the NPC.

Main activities to be conducted	**Responsibility**
Ensure the overall implementation of the project	UNIDO
Convene the PSC responsible for project coordination and execution	MITADER
Establishment of a PMU and selection of staff including the NPC	UNIDO
Day to day coordination, management and monitoring of all project activities	PMU –NPC
Engagement with strategic partners when necessary	PMU – NPC

Coordination with other relevant GEF-financed projects and other initiatives

The project has synergies and complements/contributes to the following GEF funded initiatives:

- The "Energy Reform and Access Project" completed in 2011 which had among other objectives to accelerate in a commercially viable manner the use of electricity for economic growth and improved quality of life in underserved areas through promotion of renewable energy;
- The on-going project "Preparation of the NAPA for Mozambique" as a contribution to attainment of Objective 1: identification of priority activities that would address the vulnerable situation of Mozambique, with emphasis on highly vulnerable communities, systems and sectors;
- The project "Strengthening Capacities of Agricultural Producers to Cope with Climate Change for Increased Food Security through the Farmers Field School Approach" at CEO Endorsement phase, to be executed by MASA and MITADER;
- The "4th Operational Phase of the GEF Small Grants Programme (RAF2)" which promotes global environmental benefits in biodiversity and climate change focal areas secured through community-based initiatives and actions in Mozambique as one of the benefiting countries.

Besides, UNIDO is currently implementing several projects in Mozambique that have a synergetic relationship with this project. For instance, UNIDO established the MNCPC, whose activities seek to promote sustainable industrial production and consumption. This project will benefit from the networks, the capacity building activities as well as from the regulatory and policy interventions conducted by the MNCPC. Moreover, UNIDO is implementing a project to support Mozambique's SMEs in increasing local production and competitiveness. The project will also build on the capacity building activities, networks and tools developed under the project. Apart from collaborating on specific projects, this project will coordinate with other UNIDO departments which are conducting activities in the country; namely the Environment, Agri-business Development, Trade, Investment and Innovation departments.

A.7 *Benefits.* Describe the socioeconomic benefits to be delivered by the project at the national and local levels. How do these benefits translate in supporting the achievement of global environment benefits (GEF Trust Fund) or adaptation benefits (LDCF/SCCF)?

The envisaged project fits into national strategies to promote cleaner production technologies, enhance sector productivity and competitiveness, preserve natural resources, protect the local and global environment and diversify the energy mix by increasing the share of renewable energies. The project is expected to deliver tangible socioeconomic benefits for Mozambique by integrating cleaner technologies, better waste management and treatment activities. By adopting renewable technologies, farms and agro industries will reduce their production costs by means of avoiding the purchase of expensive fossil fuels. It is expected that these industries will increase their competitiveness in the national and international market fostering economic growth. At the national level, the project will contribute to reducing the economic dependence on fossil fuel imports through strengthening the energy mix diversification strategy. The following table summarizes some of the socio-economic benefits that the project will yield.

Benefits	**Description**
Investment leverage	The total amount that the GEF will provide for this project is approximately USD 2.9 million leveraging a total co-financing amount of approximately USD 10.7 million from other sources.
Jobs created	As the local interest in RE technologies grows and the political and economic scenario slowly improves, there is a high potential to generate the following jobs: • Local workers for the construction, operation and maintenance of Waste-to-Energy plants and solar water pumping systems; • Teachers/trainers providing courses on low-carbon/RE technologies in local educational

Benefits	Description
	institutions (universities and vocational training institutions) and/or organisations, such as local NGOs that may provide capacity building; • Local or foreign low-carbon/RE technology providers such as distributors of imported goods (e.g. PV pumping systems) and local technicians or engineers servicing the installation, operation and maintenance of the retailed RE systems. • Local consultancy service providers that work on low-carbon/RE systems design and feasibility; • Foreign companies opening local offices due to the growth of the low-carbon/RE market employing local workforce for their operations including technical and administrative staff.
Positive impacts for rural households	Rural households benefiting from energy generated from biomass demonstration and scaling up projects will have an independent supply of energy thus reducing the use of diesel generators and fuels.
Private sector involvement	The project developers will be able to independently produce energy through RE energy sources. The energy produced will be used for productive uses avoiding the reliance on intermittent electricity supply and/or the purchase of expensive fossil fuels. By doing so, the private will become more profitable and competitive as the production costs will decrease.
Positive impacts on environment and health	The demonstration and replication projects will have several positive impacts on the local and global environment and health: • Reduction of direct GHG emissions of about 7,760 tCO_2e over projects' lifetime (20 years) and other associated air pollutants (CO, NOx, SO_2, particulate matter) derived from fossil fuel combustion; • Emission and waste reductions from fossil fuel production (upstream and downstream), distribution and transport to the consumption site. Although, it is expected that the production, transportation, installation and maintenance of low carbon/renewable energy technologies will produce some emissions, they will be very low in comparison to the emissions that would have been produced from fossil fuel-based systems. • Particularly in the case of cashew shells and animal residues, there will be an important waste reduction as these by-products are normally left to naturally decay in the nearby plantations, water bodies, soil or facility's surroundings. • The use of PV pumps for irrigation instead of traditional fossil fuel pumps has economic benefits for the populations and the release of GHGs. • With an increased access to reliable electricity, the families will reduce the use of other sources of energy used for lighting and cooking that pollute the indoor air and compromises their health, such as candles, fossil fuel burners, etc. • The use of RE as a source of energy for lighting and communication (radio) can in some cases reduce the use of batteries, which are considered an environmental pollutant if they are not disposed correctly after use. • Avoidance of potential fuel leaks that could occur if storage tanks or containers are not properly handled. Fossil fuel leaks can pollute the soil and water sources.
Competitiveness of renewable energy to diesel	Although it is well known that low carbon/renewable energy projects need a higher upfront investment in comparison to diesel-based systems, the potential reduction in operation and maintenance costs that would be generated throughout their lifetime makes these technologies more

Benefits	Description
generation	attractive. Moreover, the exploitation of indigenous resources (solar, biomass, hydro, etc.) reduces the country's dependency on external sources of energy, i.e. imported fossil fuels, promoting energy security and independence. In addition, the implementation of renewable energy projects generates positive environmental impacts, in comparison to diesel-based generation systems which produce a high amount of GHG emissions and other air pollutants.
Addressing gender issues	Women will be encouraged to participate in the different project activities and their participation will be tracked to make sure that the targeted percentage of women involvement in renewable energy initiatives is reached. Male and female workers are expected to have socioeconomic benefits from the implementation of biogas-based energy supply and other low-carbon technologies. Nevertheless, it is expected that women will benefit more from certain activities as they often have a predominant role in the provision of energy sources in rural areas.

A.8 *Knowledge Management.* Elaborate on the knowledge management approach for the project, including, if any, plans for the project to learn from other relevant projects and initiatives (e.g. participate in trainings, conferences, stakeholder exchanges, virtual networks, project twinning) and plans for the project to assess and document in a user-friendly form (e.g. lessons learned briefs, engaging websites, guidebooks based on experience) and share these experiences and expertise (e.g. participate in community of practices, organize seminars, trainings and conferences) with relevant stakeholders.

The project will work with various stakeholders, including the newly established SACREEE to develop different knowledge materials that will be disseminated in Mozambique and other countries of the region. SACREEE Status Report, the first edition of which was released in 2015 aims to reinforce regional and national efforts to strengthen data collection and knowledge sharing by providing a comprehensive regional review of renewable energy and energy efficiency developments, market trends and related activities, evolving policy landscapes, investments in renewable energy, and improvements in energy access. The project will take the opportunity of this publication to share knowledge on the various aspects related to renewables use in rural areas of Mozambique.

Under Component 1, the project will work with institutions like SACREEE, UEM, FUNAE, FNDS, MITADER, CDC, EDM, DNE, MIREME, DINA to develop a strategy for setting up standards and guidelines. In addition, Component 2 will develop training manuals that will be readily available for different institutions on demand. The project will also assist local training institutions to adapt these training manuals into their institutions curriculum. In this way, the knowledge generated from the project will be integrated into the formal education system. Under Component 3 and once stable operating conditions are achieved, results of the demonstration projects will be widely disseminated choosing the most appropriate means to reach a large number of current and potential stakeholders. The aim is to target potential technology private users, private sector actors which could profit from supporting, servicing and maintaining the renewable technology including spare parts manufacturers, banks, and local technicians, etc. As well as government officials from other provinces and districts whom might be interested in integrating renewable energy technologies in their districts/provinces. To assist in the general process of knowledge dissemination, the project will make available web-based guidelines to assist farms and industries in selecting the most appropriate technologies for their business. Business partnerships will also be encouraged to replicate the demonstration projects in other rural areas of Mozambique.

Information on the project status, results and reports will be compiled and made publicly available on website dedicated to the project. Also the NPC will attend conferences and workshops on the RE sector to create awareness on the project and disseminate its results. It must be noted that all publications developed under this project will comply with GEF and UNIDO communication policies.

B. DESCRIPTION OF THE CONSISTENCY OF THE PROJECT WITH:

B.1 *Consistency with National Priorities.* Describe the consistency of the project with national strategies and plans or reports and assessments under relevant conventions such as NAPAs, NAPs, ASGM NAPs, MIAs, NBSAPs, NCs, TNAs, NCSAs, NIPs, PRSPs, NPFE, BURs, INDCs, etc.:

The project is fully in line with the energy and climate policy of Mozambique:

- The Agenda 2025 identifies the lack of access to energy as one of the principal challenges to the attainment of the development objectives of the country. It also recognizes the provision of electricity to industries in remote areas as key in opening up the country to more investment. The Quinquennial Government Programme 2015-2019 emphasizes the importance of increased access to energy to support economic transformation as well as the linkages between environment, land and rural development issues. Moreover, the Country Strategy Paper recognizes its comparative advantage in agriculture and agro-food processing and the need to provide sustainable energy to those industries to improve SMEs competitiveness, promote economic cooperation, foreign direct investment, and technology transfer.
- In the National Energy Strategy 2015-2024 the Government highlights its commitment to promote sustainable development through the adoption of renewable and environmentally friendly energy technologies throughout the country. The strategy establishes objectives towards increasing the total energy capacity from both renewable energy (3600 MW hydro, 200 MW small hydro, 150 MW wind, 50 MW solar, 50 MW biomass) and also from fossil fuels (800 MW natural gas, 500 MW coal).
- The deployment of low-carbon solutions (e.g. renewable energies, use of cleaner fuels for cooking, etc.) in rural areas is mentioned as a vehicle to improve socioeconomic development in rural areas in several plans, programmes and strategies. Solar energy is mentioned as key energy resource to be exploited for on-grid and off-grid applications highlighting those with an associated productive use (e.g. irrigation). As such, solar energy is crucial in several policies and strategies including Energy Policy, Energy Strategy 2015-2024, NAPA, PARP, Quinquennial Government Programme 2015-2019, Policy on the Development of New and Renewable Energy, among others. Moreover, the Energy Strategy 2015-2024 highlights the need to encourage private sector participation and the need to develop incentive mechanisms accordingly (e.g. PPP approach with EDM or FUNAE). On the other hand, the use of biomass is seen as an option to increase energy supply, reduce carbon emissions and promote socioeconomic development. It is also mentioned in several policies, strategies including Energy Policy, National Adaptation Programme of Action (NAPA), Policy on the Development of New and Renewable Energy, among others.
- Mozambique has ratified the United Nations Framework Convention on Climate Change (UNFCCC) and is eligible to receive financial support for adaptation and mitigation interventions. The energy sector is considered as a priority sector for GHG emission reductions. The up-scaling of renewable energy and related technology transfer is an important climate change mitigation and adaptation measure which will have a significant impact in poverty reduction. The proposed GEF project will contribute to the targets and priority actions outlined in the Initial National Communication to the UNFCCC in Mozambique (2003). In particular, the report outlines how climate change will exacerbate already existing vulnerabilities in the country and how renewable energy technologies could support both mitigation and adaptation efforts. In 2014, Mozambique participated in the second Phase of the Technical Needs Assessment (TNA) which promotes a set of actions in the energy sector including: enhancing access to renewable energy, compliance with regulations and standards for GHG emissions originating from extractive industry activities and the promotion of low-carbon urbanization. In 2015, Mozambique submitted its Intended Nationally Determined Contributions (INDC) which seeks to reduce climate change vulnerability and improve the wellbeing of Mozambicans through the implementation of concrete measures for adaptation and climate risk reduction, promoting mitigation and low-carbon development, aiming at sustainable development, with the active participation of all stakeholders in the social, environmental and economic sectors. Considering Mozambique's low GHG emissions, the national efforts will concentrate in creating adaptive capacity in the following priority sectors: energy (electricity production, transports and other – residential, commercial and institutional), land use, land use change and forestry (REDD+) and waste (solid waste disposal and treatment). The recently developed Sustainable Energy for All Action Plan and Investment Strategy stresses the need for business model to promote the dissemination of decentralized renewable energy systems. Rural energy applications are part of the country's PARP. More

specifically, the recent Renewable Energy Readiness Assessment identified that for rural areas the focus has been on providing renewable energy for social services. Given the limitation of funding, the government is now keen to develop a more private sector led approach to mobilise further funding and ensure sustainability.

C. DESCRIBE THE BUDGETED M &E PLAN:

Project M&E will be conducted in accordance with established UNIDO and GEF procedures as defined under Component 4. The overall objective of the M&E process is to ensure successful and quality implementation of the project by: i) tracking and reviewing project activities execution and actual accomplishments; ii) providing visibility into progress as the project proceeds so that the implementation team can take early corrective actions if performance deviates significantly from original plans; and iii) adjusting and updating project strategy and implementation plan to reflect possible changes on the ground, results achieved and corrective actions taken. A detailed monitoring plan for tracking and reporting on project time-bound milestones and accomplishments will be prepared by UNIDO in collaboration with the PMU and project partners at the beginning of project implementation and then periodically updated, if needed. By making reference to the impact and performance indicators defined in the project results framework, the monitoring plan will track, report on and review project activities and accomplishments in relation to:

- Low carbon/renewable energy generation and GHGs emission reductions directly generated by the UNIDO GEF project. These will include the type and the number of small to medium scale low carbon/renewable energy projects developed and implemented.
- Low-carbon/renewable energy generation and GHGs emission reductions indirectly generated by the UNIDO GEF project. These will include type and number of small to medium scale renewable energy projects developed and implemented due to the increased capacity and conducive environment supported by the project.
- Low-carbon/renewable energy investment generated by the UNIDO GEF project, directly and indirectly.
- Development of policy, legislative and regulatory frameworks promoting low-carbon/ renewable energy
- Level of awareness and technical capacity for small to medium scale low-carbon/ renewable energy systems within relevant institutions, in the market and within enterprises.
- Private sector contribution to the implementation of the project.
- Overall socio-economic impacts of the project to include increase in productive capacities, etc.
- Project impact on gender related issues by means of tracking gender-specific indicators throughout project.

M&E of direct and consequential GHG emission reductions will make use of the GEF Tracking Tool, which will be submitted to the GEF Secretariat three times during the duration of the project: at CEO Endorsement, at mid-term, and at project closure. M&E of the demonstration projects with respect to energy generation, technical performance, commercial viability and GHGs emission reduction, and related information will be an integral part of the evaluation under Component 3. The NPM will be responsible for continuous monitoring of project activities execution, performance and track progress towards milestones while the UNIDO project manager will be responsible for tracking the overall project milestones and progress towards the attainment of the set project outputs. In addition, the UNIDO project manager will be responsible for narrative reporting to the GEF. The final project evaluation will be carried out months before the operational completion of the project. The following table provides the tentative budget for the evaluation.

M&E Activity Categories	Feeds into	Time Frame	Responsible Parties	GEF Grant Budget	Co-Financing Budget
Measurement GEF Tracking Tool specific indicators	Mid-term Review and Terminal Evaluation Reports	Continuous	PMU and UNIDO PM	$60,000	0
Monitoring of project impact indicators (as per	Project management; Semi-annual progress	Continuous			

Log frame)	report; Annual GEF PIR				
Periodic Progress Reports (PIRs)	Project management; Annual GEF PIR	Semi-annually			
Independent Terminal Evaluation	Terminal Evaluation Review (TER) conducted by UNIDO EVA and/or GEF IEO	Project completion	Independent evaluator, PMU, UNIDO PM, and UNIDO Evaluation Group	$14,000	$152,000
			Subtotal	$74,000	$152,000
			TOTAL		**$226,000**

UNIDO as the implem**e**nting agency will involve the GEF Operational Focal Point and project stakeholders at all stages of project monitoring and evaluation activities in order to ensure the use of the evaluation results for further planning and implementation. According to the M&E policy of the GEF and UNIDO, follow-up studies like Country Portfolio Evaluations and Thematic Evaluations can be initiated and conducted. All project partners and contractors are obliged to (i) make available studies, reports and other documentation related to the project and (ii) facilitate interviews with staff involved in the project activities.

Legal Context.

The Government of the Republic of Mozambique agrees to apply to the present project, mutatis mutandis, the provisions of the Standard Basis Assistance Agreement between the United Nations Development Programme and the government signed and entered into force on 15th September, 1976.

PART III: CERTIFICATION BY GEF PARTNER AGENCY(IES)

A. GEF Agency(ies) certification

This request has been prepared in accordance with GEF policies[27] and procedures and meets the GEF criteria for CEO endorsement under GEF-6.

Agency Coordinator, Agency Name	Signature	Date (MM/dd/yyyy)	Project Contact Person	Telephone	Email Address
Mr. Philippe R. Scholtès, Managing Director, Programme Development and Technical Cooperation, UNIDO-GEF Focal Point		07/18/2017	Alois Posekufa Mhlanga, Industrial Development Officer, Department of Energy, UNIDO 	+431260265169	a.mhlanga@unido.org

[27] GEF policies encompass all managed trust funds, namely: GEFTF, LDCF, SCCF and CBIT

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).

Results	Indicators	Baseline and Targets	Means of Verification	Assumptions and Risks
Objective				
To promote market-based dissemination of integrated renewable energy systems for productive uses in rural areas of Mozambique	Incremental avoided or reduced CO_2eq emissions (tonnes of CO_2eq)	**Baseline**: No emissions reductions would occur if the current practices are not changed in Mozambique, which are mainly based on the use of fossil fuels. **Target**: 7,760 tons of CO_2eq emissions avoided or reduced during the technology lifetime.	• GEF climate change mitigation tracking tool • Demonstration site's assessments	A: Data to calculate CO_2eq emission reductions are available A: Current support and interest from private sector in developing integrated RE systems in productive sectors of rural areas is sustained R: Economic, financial or political crisis threaten the sustainability of the project and prevent the development of integrated RE systems in rural areas
Component 1 Establishment of a conducive policy and regulatory environment				
Outcome 1.1. Policy and regulatory environment promoting integrated renewable energy systems in rural areas established	Number of modified, updated and/or new policies for private sector engagement in the integration of RE systems in rural areas developed and proposed by the Taskforce Number of new RE standards adopted by INNOQ	**Baseline:** Current policies and regulations are insufficient to incentivise the integration of RE systems in rural areas and to promote the involvement of the private sector in this type of projects **Target:** Policies and regulations are improved in order to incentivise the integration of RE systems in rural areas with the involvement of the private sector	• Developed and approved policies, regulations, guidelines and standards available in the Official Bulletin of Mozambique or similar official publications • Final Project Evaluation	A: Sustained government support to agreed activities and involvement of government bodies including MITADER, MIREME, FUNAE, FNDS, CNELEC (future ARENE), and DINA, among others R: Economic and political instability threatens the development of the project and the creation of new policies and regulations
Outputs:				
Output 1.1.1. Policy framework for private sector engagement integrated renewable energy systems in rural areas adapted and presented for adoption	Number of established "Policy and Regulatory Taskforces" Number of Workshops conducted on Policy and Regulatory Framework	**Baseline:** Currently there is no team specifically dedicated to the development of policies and regulations aiming at the integration of RE systems in rural areas with the engagement of the private sector.	• Official communications from the Government on the creation of the Taskforce	A: Sustained government support for the creation of the Taskforce and interest from the several government bodies in being part of it including MITADER, MIREME, FUNAE, FNDS, CNELEC (future ARENE), and

Results	Indicators	Baseline and Targets	Means of Verification	Assumptions and Risks
	Modification Number of women participating in the Taskforce	**Targets:** A Taskforce is established One Workshop conducted At least 40% of the Taskforce should be women	• Workshop reports or meeting minutes • Interviews to MITADER	DINA, among others R: Economic and political instability threatens the development of the project R: Lack of interest from some government bodies to participate in the Taskforce R: Lack of interest from women to participate in the Taskforce
Output 1.1.2. Guidelines on private sector involvement in renewable energy projects in rural areas developed and adopted	Number of consultation campaigns conducted Number of consulted private sector actors Number of modified, updated and/or new guidelines on private sector involvement in RE projects in rural areas developed and presented to authorities	**Baseline**: No specific guidelines to address the private sector involvement in RE projects in rural areas exist **Target**: At least 1 consultation campaign conducted considering gender dimensions At least 10 private sector actors should be approached during the consultation campaign At least 1 guideline should be generated considering gender dimensions	• Findings from the consultation campaign to private sector actors • Issued guidelines to be used by private sector actors	A: There is interest from the private sector to get involved in RE projects in rural areas R: Insufficient resources to conduct a consultation campaign R: Low response from private sector actors during consultation campaign reduces the collected data
Output 1.1.3. Standards for typical integrated renewable energy systems for rural areas developed and adopted	Number of modified, updated and/or new standards for typical integrated RE systems for rural areas developed and presented Number of dissemination workshops	**Baseline**: Only one specific standard for on-grid PV systems has been developed but not yet approved by INNOQ **Target**: At least one Standard should be developed for the integration of RE systems in rural areas At least one workshop for the dissemination of new standards and information on the integration of RE in rural areas should be conducted	• INNOQ's published list of standards • Workshops • Website	A: There is enough knowledge and capacity to develop standards in Mozambique and there is willingness from INNOQ to analyse and approve the standards, if appropriate. R: Insufficient human resources to develop the needed standards either within INNOQ or other involved institutions

Results	Indicators	Baseline and Targets	Means of Verification	Assumptions and Risks
Component 2 Capacity building and knowledge management				
Outcome 2.1. Capacity of key players strengthened and information available for market enablers and players	Number of key players with enhanced capacity on specific areas of RE technologies	**Baseline**: Insufficient capacity and knowledge among key players **Targets**: Selected key government institutions, financial institutions as well as universities and vocational training institutions have the required knowledge to analyse, promote, develop and facilitate RE projects.	• Training sessions registries and records • Government websites, library or records • Final Project Evaluation	A: There is interest from the GoM in receiving tailor-made training and knowledge on RE R: Limited resources from local institutions to provide support to carry out the capacity building in terms of infrastructure, space, training materials and tools.
Outputs				
Output 2.1.1. Five training sessions for fifty (50) government officials at both national and provincial levels on RE integrated systems conducted	Number of training sessions delivered to government officials on RE integrated systems Number of attendees (government officials at both national and provincial levels) Percentage of women attending the training sessions for government officials	**Baseline**: Insufficient capacity and knowledge among government officials on RE integrated systems **Target:** Five (5) training sessions delivered to fifty (50) government officials at both national and provincial levels on RE integrated systems. At least 40% of participants should be women	• Training sessions registries and records • Interviews to targeted government officials	A: There is interest from the GoM in receiving tailor-made training and knowledge on RE related information R: Insufficient infrastructure or tools to successfully deliver the training sessions
Output 2.1.2. Ten training sessions targeting 250 participants from financial institutions, and private sector organisations on integrated renewable energy systems conducted	Number of training sessions delivered on RE integrated systems addressed to financial institutions and other private sector organisations Number of attendees from financial institutions Number of attendees from other private sector organisations Percentage of women	**Baseline**: Insufficient capacity and knowledge of financial institutions and other private sector organisations on RE integrated systems **Target**: Ten (10) training sessions targeting two hundred and fifty (250) participants from financial institutions and other private sector organisations on integrated RE systems At least 20% of participants should be women	• Training sessions registries and records • Interviews to targeted financial institutions and other private sector organisations	A: There is interest from the financial institutions and other private sector organisations in receiving tailor-made training and knowledge on RE R: Insufficient infrastructure or tools to successfully deliver the training sessions

Results	Indicators	Baseline and Targets	Means of Verification	Assumptions and Risks
	attending the training sessions from financial institutions or other private sector organisations			
Output 2.1.3. Training of universities and vocational training institutions staff (25) on various aspects of integrated RE systems on a train-the-trainer basis conducted	Number of training sessions delivered on RE integrated systems addressed to universities and vocational training institutions Number of trainers trained from universities Number of trainers trained from vocational training institutions Number of women trainers trained.	**Baseline**: Insufficient capacity and knowledge of universities and vocational training institutions on RE integrated systems **Target**: Ten (10) training sessions targeting twenty five (25) academicians from universities and vocational training institutions on integrated RE systems At least 40% of participants should be women	• Training sessions registries and records • Interviews to targeted financial institutions and other private sector organisations	A: There is interest from universities and vocational training institutions in receiving tailor-made training and knowledge on RE R: Insufficient infrastructure or tools to successfully deliver the training sessions
Component 3 Technology demonstration and scaling up				
Outcome 3.1. Integrated RE systems demonstrated	Number of demonstration projects that integrate RE systems, in rural areas Number of scaled-up projects in rural areas Percentage women using the financial mechanism	**Baseline**: No demonstration projects showing the bankability of RE integrated systems in rural areas exist **Target**: At least four (4) demonstration projects successfully conducted Install solar water pumping systems for irrigation Installing biogas digesters for agro-food processing in rural areas Gender-sensitive financial mechanism is used by women	• Evaluating reports of demonstration projects • Project Reports or information from MITADER / MIREME • Final Project Evaluation	A: There is interest from project developers and co-financers in carrying out demonstration projects R: Economic and political instability threatens the development of the demonstration projects
Outputs				
Output 3.1.1. Demonstration projects on integrated renewable energy systems with about 250kW of installed capacity implemented in selected productive sectors	Number of demonstration projects on integrated RE systems installed in rural areas	**Baseline**: No demonstration projects exist to show the bankability of integrated RE systems in productive sectors of rural areas	• Project Reports or information from MITADER / MIREME	A: There is interest from project developers and co-financers in carrying out the demonstration projects in productive sectors of rural areas

Results	Indicators	Baseline and Targets	Means of Verification	Assumptions and Risks
with high visibility and replication potential		**Target**: Install demonstration projects focusing in RE systems in productive sectors of rural areas to achieve 250kW of capacity		R: Delays in demonstration projects commissioning R: Economic and political instability threatens the development of the demonstration projects
Outcome 3.2. Investments in integrated RE systems scaled up	Number of financial mechanisms established to support the installation of projects in rural areas	**Baseline**: No appropriate financial mechanism is in place to drive the installation of solar water pumping systems or biogas digesters in rural areas **Target:** At least 1 financial mechanism established to support the installation of RE systems in rural areas	• Financial institutions products offering	A: There is interest from financial institutions to offer financial services to customers in rural areas R: High perceived risk hinders the active involvement of financial institutions
Outputs				
Output 3.2.1. Financial mechanism established to support the installations of solar water pumping systems for irrigation and Waste-to-Energy projects for agro-food processing in rural areas to achieve 1.2MW of installed capacity	Number of solar water pumping installations for irrigation in rural areas Number of biogas digesters for agro-food processing installed in rural areas Gender-sensitive financial mechanism developed	**Baseline**: No appropriate financial mechanism is in place to drive the installation of solar water pumping systems or biogas digesters in rural areas **Target**: Install thirty (30) solar water pumping systems and thirty (30) biogas digesters for agro-food processing in rural areas to achieve 1.2MW of capacity The financial mechanism design include a gender approach	• Financial institutions products offering • Project Reports or information from MITADER / MIREME	A: There is interest from financial institutions and sufficient promotion from the GoM to participate in the establishment of a financial mechanism A: Local capabilities to operate the financial mechanism are established R. Lack of interest from the private sector in investing in RE projects R: Economic and political instability threatens the development of the financial mechanism
Outcome 3.3. Increased confidence and awareness of technical feasibility and commercial viability of integrated RE systems	Percentage of project's results disseminated	**Baseline**: No demonstration projects exists to show the bankability of integrated RE systems in productive sectors of rural areas **Target**:	• Dissemination campaign strategy and report	A: After being informed, relevant stakeholders are interested and confident on the benefits of integrating RE systems in rural areas

Results	Indicators	Baseline and Targets	Means of Verification	Assumptions and Risks
		100% of projects' results are publicly disseminated through at least 1 dissemination campaign		R: Information is not the main barrier for the development of RE systems in rural areas.
Outputs				
Output 3.3.1. Demonstration and investment projects are independently evaluated and results widely disseminated	Percentage of evaluated projects (number of evaluated projects over total number projects installed) Percentage of projects whose evaluated results were publicly disseminated (by any means of communication) Number of dissemination campaigns	**Baseline**: No demonstration projects exists to show the bankability of integrated RE systems in productive sectors of rural areas **Target**: 100% of installed projects are evaluated 100% of projects' results are publicly disseminated At least 1 dissemination campaign is conducted with a workshop/meeting specifically targeting rural women	• Results from evaluating processes • Project Reports or information from MITADER / MIREME • Dissemination Campaign • Media (radio, TV, billboards, etc.)	A: At least one demonstration project is installed R: Economic and political instability threatens the development and installation of projects
Component 4 Monitoring and Evaluation				
Outcome 4.1. Project progress towards objectives continuously monitored and evaluated	Number of progress and evaluation reports	**Baseline**: No baseline exists **Target:** Project effectively monitored and evaluated	• Project progress reports, mid-project evaluation and project terminal evaluation reports	A: Continued support by the project stakeholders to successfully monitor and evaluate the project R: Economic and political instability threatens the development and installation of projects
Outputs				
Output 4.1.1. Mid-term review and terminal evaluation carried out	Number of evaluation reports carried out	**Baseline**: No baseline exists **Target:** 1 mid-term review and one terminal evaluation conducted	• Mid-project evaluation and project terminal evaluation reports	A: Continued support by the project stakeholders to successfully evaluate the project R: Economic and political instability threatens the development and installation of projects
Output 4.1.2. Project progress monitored, documented and	Number of progress reports developed	**Baseline**: No baseline exists. **Target:**	• Project progress	A: Continued support by the project stakeholders to

Results	Indicators	Baseline and Targets	Means of Verification	Assumptions and Risks
recommended actions formulated		At least a progress report developed once a year	reports	successfully monitor the project R: Economic and political instability threatens the development and installation of projects

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).

STAP comment raised during PIF review	Answer to the comment
III. Further guidance from STAP:	
The aim of this project is to develop a policy framework to encourage renewable energy deployment in rural areas, capacity building for government officials and financiers, and 5 demonstration projects and dissemination. In addition it will establish a financial mechanism for 30 solar water pumping systems and 30 biogas plants for agri-food processing wastes. (Note, Figure 1 data does not match these numbers as shown in sections 3.1 and 3.2 of Table B).	The correct figures for the 3 demonstration projects and the projects to be developed under the financial mechanism -30 solar water pumping systems and 30 biogas plants / biomass projects for agri-food processing facilities- have been homogenized throughout the document.
Hydro power plants are operating but transmission and distribution is constrained so only 18% of the population are grid-connected and a further 11% off-grid; mainly solar PV but with poor maintenance services. Traditional biomass dominates the energy supply and costly diesel pumping and diesel power generation is common in remote areas. The project aims to overcome policy, technology, operation and financial benefits to achieve greater cost-effective RE project deployment.	Indeed, the aim of the project is to promote market-based dissemination of integrated renewable energy systems for productive uses in rural areas by overcoming policy, technology, capacity and financial challenges that are currently hindering the dissemination of integrated renewable energy technologies in the country.
The baseline for biogas is that most potential organic feedstocks from agri-food plants are dumped. Additional biomass resources, such as animal manures, arise on farms, but how they might be best utilised in a central biogas plant (after collection and sale) needs analysis. Will the biogas plants be manufactured locally or imported? Useful state-of-the-art information can be found at Task 37 of IEA Bioenergy http://www.ieabioenergy.com/task/energy-from-biogas/	The Pre-feasibility Report included in Annex J describe state-of-the-art technologies for manure treatment and biogas generation. Detailed information ("step by step" approach) describing the bio digestion process is included in the Pre-feasibility studies which has used well-known sources such as the US Environmental Protection Agency, Biogas Energy Council, IRENA. It is difficult to say at Pre-feasibility stage if the biogas plants will be manufactured locally or imported because it depends on the local availability of the technology at the time of implementation and on its cost. Nevertheless using a conservative approach, it has been assumed that the technology will be imported.
Only around 1 MW of solar PV has been installed to date in Mozambique. As agricultural production is projected to increase, energy demand in rural areas will grow. For food processing this may include demand for heat (for drying, sterilising, bulk cooking etc.) so it is good to see the useful heat from biogas-fuelled engines for power generation has at least been recognised (bottom of page 9). Use of the effluent after digestion for soil conditioning and nutrient recycling should be integrated, and its monetary value, method of transport to the fields, and distribution need consideration.	A Pre-feasibility study that uses waste biomass (cashew shells) as energy source for heat generation in the form of water steam has been included as part of one demonstration project. Furthermore, the potential use of the digestate (co-product of the bio digestion process) as soil fertilizer has been considered in the Pre-feasibility studies. It will be applied in the farm/s where it is generated so there is no need to transport it to other location. In small farms synthetic fertilizers are not the common practice. In fact, farmers tend not to use any kind of fertilizers. If a market for the commercialization of bio fertilizers arises, a deeper analysis on its selling potential should be conducted. For information purposes, a study from the Washington State University shows that market values in the US are: 10USD/wet ton of fibre, USD250/dry ton of Ammonia Sulphate, and USD150/dry ton of Phosphorus-rich

STAP comment raised during PIF review	Answer to the comment
	solids[28].
Several initiatives to expand RE supply exist, both through expansion of the grid and off-grid generation systems but these have been slow, so a market-based approach to attract private investment is envisaged.	Currently, private sector has had a limited role in the provision of energy services in Mozambique. As such, during the PPG phase, efforts have been made to design a project that promotes the dissemination of integrated renewable energy systems through market mechanisms targeting the active involvement of the private sector.
Component 2 refers to capacity building activities for government officials, finance institutions and other private stakeholders. Though it will presumably be specific to conditions in Mozambique, this type of training has been done throughout the developing world by donors such as USAID â€“ see for example the Energy Sector Technical Leadership task run by Engility Corp. in the US (http://www.engilitycorp.com/serviceofferings/specialized-technical-consulting/international-development/energy-sector-technical-leadership/). Organizers should seek to utilize existing information and expertise in order to maximize cost and efficiency. This is also a good opportunity to foster South-South exchange (discussed as one of the ways in which this project is innovative) since many countries face similar challenges (e.g. lack of access to energy in rural areas, reliance on fuelwood, charcoal production, diesel generators, etc.).	International best-practices and available information will be taken into consideration for the design and implementation of the capacity building component in order to avoid the duplication of efforts and data. In addition, experiences from neighbouring Southern Africa countries (SADC), under a South-South Cooperation model, could be shared by invited international experts. This is important to disseminate information on technologies which were tested and validated in similar environments.
The demonstration projects for medium scale installations (50-500kW) appear a good approach to encourage greater deployment over time, though it is not clear what criteria will be used to select the locations. It is good to see that gender issues will be included. For solar water pumping for irrigation, locations need both a good solar resource and proximity to crops suitable for increasing productivity from irrigation. Climate change may increase water shortages in this region, so gaining greater experience with irrigation systems could be critical in the future.	A set of criteria to select the most appropriate sites has been included in the description of Output 3.1.1 of this document. The criterion includes energy demand, solar global irradiation levels, available waste resources, and available land area, among others. Gender targets to track gender related issues have been included in the project results framework, whenever relevant.
It is not clear why micro-hydro or wind generations systems are not included (though the local wind resource may be insufficient).	Apart from the fact that wind resources are not as good as solar or biomass in Mozambique, wind at small scale is more expensive than other RE options and technologically is more difficult to control. We included as part of the Pre-feasibility study of ADPP a combination of solar PV pumping with water dams on the river, for irrigation. If eligible projects of this sort are identified throughout project implementation, they could be included as part of the set of project to be funded by the financial mechanism.
Costs of technologies are provided but sources not referenced. Are these based on delivered costs into the rural areas? The financing method through 20% performance related grants appears sound. The current low oil price may impact on the cost-effectiveness of the projects, though the price of diesel delivered to rural areas is likely to still be relatively high (no retail price given).	The costs of the technologies are properly referenced in the Pre-feasibility studies. The source of information used includes UNDP, PV Magazine, etc. Freight costs, import duties have been also included in the estimate assuming that the equipment would be imported.

[28] http://ses.wsu.edu/wp-content/uploads/2015/03/FPTI-present_Jessup-fertilizer.pdf

STAP comment raised during PIF review	Answer to the comment
Direct and consequential (no longer termed "indirect") emission reductions of 4.4 Mt CO2-eq from diesel fuel substitution, avoidance of deforestation for fuelwood, the avoidance of methane from organic waste decomposition, and based on a replication factor of 15, appears sound.	Currently, the cost of diesel is 1.2 USD/liter (WB data). This is also considered in the calculations of the Pre-feasibility studies. Even if the diesel cost has decreased in the recent years, a long-term analysis shows that the price will tend to increase. During the PPG phase, the direct and consequential emission reductions have been recalculated considering the actual reduction potential of each demonstration project and the replication factor of 15. As such the project is expected to reduce 7,760 tCO2 of direct emissions and 116, 406 tCO2 of consequential emissions over the lifetime of the technologies (20 years). Furthermore, additional GHG emission reductions will be achieved after the financial mechanism becomes operational and further projects start being implemented. Nevertheless, the expected reductions from these projects are difficult to calculate on an ex-ante basis since data and information on potential projects to be undertaken is not sufficient at this stage.
As is mentioned in Section 1.5 on GEBs, when implemented this project will also positively impact forests, biodiversity, water quality, reduced waste, and soil fertility. As these are all issues that fall under GEF's mandate, the benefits should not only be quantified under the PPG phase as stated, but a concerted effort should be made to integrate this project with others in Mozambique related to biodiversity, etc. â€“ this could in fact comprise one of the criteria for selection of location for demonstration projects.	The demonstration projects proposed entail: • Biogas generation from animal manure (Tindzawene, Mabalane) at an animal farm and use of the digestate as soil fertiliser. Biogas replaces fossil fuel burning and the digestate replaces synthetic fertilisers • Application of solar PV pumps for water irrigation reduces fossil fuel burning for pumping • The use of cashew shells as energy source for heat generation reduces the combustion of fossil fuels and the dumping of the shells as waste. • The use of cotton stubble for electricity generation and injection to a microgrid in Titimane village, in replacement of diesel-based generation. The four projects will bring positive impacts to the environment, the biodiversity, the quality of soil and water bodies, as well as the reduction of GHG emissions. In Section 3.1, site selection criteria, a new item involving the evaluation of the impacts on the environment and biodiversity was included.
How does this project relate to GEF Project 1158 administered by the World Bank on energy reform and access?	This new GEF project will build on the experiences and lessons learnt from the already implemented GEF Project 1158. The new project aims to also promote energy reform and provide access to energy through renewable energy systems -with a special focus on PV

STAP comment raised during PIF review		Answer to the comment
		and biomass technologies- and through the involvement of the private sector. Besides, this project has a strong project investment component with installation of demonstration projects and the establishment of a financial mechanism for project replication.

Comments from Belgium, Council member		Answer to the comment
	The development relevance of the proposed project is very high. The project aims to include the development of a policy framework, guidelines and standards for the activities of the private sector in the field of renewable energy in Mozambique. These are essential if the private sector in the medium term will play a significant role in the development of renewable energy in Mozambique. In addition there are five demonstration projects of integrated renewable energy systems set up in production sectors and financial mechanisms established to support solar pumps for irrigation and biogas plants for agro-food processing. Mozambique has significant potential for renewable energy, but so far it has been very difficult to convince private operators (and households) in places not connected to the public grid, to make the transition from the conventional diesel engines and wood burners to new, more efficient and less polluting alternatives. The lack of a policy framework and of clear guidelines here is one of the underlying reasons. This project, which could potentially realize a much greater support than a bilateral development partners (donors), could mean a breakthrough. Feasibility: Quite a few donor-supported projects in the renewable energy sector face sustainability problems, which could be due to a lack of "ownership". The large number of implementing partners involved in this project could be a limiting factor. Second, the main partner is MITADER, the Ministry of Land, Environment and Rural Development, a new player in the rural energy sector, which has in the months since its creation shown a significant dynamism. It should also be noted that the Mozambican private sector in practice does not appear eager to engage in this sector. Several attempts to involve private operators in the production and distribution of renewable energy have generally yielded very little result. However this project seems widely supported. The project is not unrealistically ambitious: development of a legal and regulatory framework, demonstration and capacity building. Sustainability is not completely guaranteed, but every effort is being made to create an optimal framework for involving the private sector. This project proposal is highly complementary with bilateral programs of the Belgian development cooperation in Mozambique: The "Renewable Energy for Rural Development" (RERD) project is since 2010 one of the main components of the Belgian bilateral program in Mozambique. The Mozambican institutional partner is the Fundo Nacional de Energia (FUNAE), one of the implementing partners of the proposed GEF project. The RERD project aims both (off-grid) electrification with renewable energy in (mainly) public	Potential coordination and collaboration between this GEF/UNIDO project and several other bilateral ongoing projects and programs was taken into consideration during the design stage. As part of the project development process, UNIDO contacted all bilateral agencies in Mozambique who have past, ongoing and planned energy projects, including the Belgian Development Agency, to assess the activities, achievement and challenges as part of the baseline situation and also to identify potential synergies between the GEF/UNIDO project and ongoing and future programs. In addition, a national consultative workshop was organized where all development partners and government departments were invited to contribute to the process of designing this project. In addition, once the GEF CEO Endorsement Request document was well developed, a project validation workshop was organized to present the project to all stakeholders. This deliberate consultative approach ensured that the GEF/UNIDO project builds on the wealth of experiences and expertise built over the years by different programs, but also galvanizes actions from all stakeholders to support the project activities in future. The concern on the involvement of several partners was well noted. It was decided that MITADER will be the main focal ministry for this project. The project approach is premised on leveraging actions from the different ministries in areas within their respective mandates. Whereas MITADER will be the focal ministry of this GEF/UNIDO project, the development and eventual sponsorship of the much needed policy framework will be the mandate of the Ministry of Energy and Mines. Likewise, success in dealing with private sector involves in the agriculture sector will hinge upon the close involvement of the Ministry Agriculture and Food Security. The more ministries identifying with the objectives of the project, the higher the chances of sustainability and integration of RE in the policies and programs of these ministries. The perceived lack of interest from private sector as experienced from the RERD and other project is well

Comments from Belgium, Council member		Answer to the comment
	institutions such as schools, dispensaries and administrative posts and the setup of mini-networks for communities where connection to the national network is not feasible. The project continues until the end of 2016. The project also includes a section which aims to involve the private sector in the production and distribution of renewable energy. This last part has little success, mainly due to lack of interest and capacity of the private sector. The absence of an effective legal and regulatory framework for the proposed private sector participation is an important factor. For more information on this project, please contact the embassy of Belgium in Maputo.	noted. Accordingly, this project focuses on bringing in a multilateral approach to developing an effective legal and regulatory framework to catalyze interest from private sector. In addition, the project will work directly with industrial associations to showcase the results of supported demonstration project as part of efforts to overcome the most important barrier, lack of awareness of the technical feasibility and commercial viability of RE projects.

Comments from US, Council member		Answer to the comment
	The United States welcomes this proposal, which has the potential to improve access to electricity in rural villages of Mozambique and to improve rural livelihoods through the provision of co-financing for five off-grid renewable energy systems that will consist of thirty projects solar water pumping systems and thirty biogas digesters for agro-food processing industries and the demonstration of the technical feasibility and market viability of the chosen technologies. We encourage UNIDO to consider the input from the STAP and our comments as the project is further developed we recommend that:	A market based approach for promoting renewable energy integrated systems is considered as an innovative approach for addressing energy access in rural areas of Mozambique and for sustaining this access. The Government approach of grid-extension to rural areas has shown limits, mainly related to the nature of the demand and the ability of target communities to pay for the energy. Integrated solar pumping and biogas systems have proven to be reliable systems, particularly adapted for rural areas, and the intervention within this project should demonstrate their market viability in the context of Mozambique.
	A more detailed cost estimate or further review of the costs for all project components be conducted since a higher than expected cost for the project will impact the affordability of energy to the owners and end users. The selection of the site(s) for the pilot projects may impact the cost for installing the pilot projects, which may be underestimated in Part I of the proposal. The implication is that if the estimates provided are too low, the additional cost for building the pilot renewable energy systems will be provided from diverted funds from other project components.	The concern on the project cost estimates was noted. The actual estimates of the technologies to be installed in the investment component is based on UNIDO's experience in installation of similar technologies, particularly learning from lessons of the joint One UN Programme implemented in Mozambique from 2008 to 2011 that featured the installation of solar water pumping systems in the district of Chicuacuala. The financial mechanism proposed will allow target beneficiaries to finance, operate and maintain the systems, not only the pilots to be installed, but also replication systems that will learn from lessons of this project.
	An Operation and Management Plan that will ensure the systems can be properly maintained and operated throughout their intended useful life be developed. The initial implementation of the pilot projects will contribute to the reduction of GHG emissions in the short-term. However, there is uncertainty regarding the sustainability of the projects in the long-term, which is crucial to demonstrating the technical feasibility and market viability of the technology to potential project developers and end-users. The O&M plan will need to take into consideration the costs for the services of skilled personnel, cost for spare parts and expected and unexpected repairs.	Sustainability of the RE systems through an appropriate management, operation and maintenance is a key aspect of this project. As such, the project intends to invest in policy support and capacity building. The participation of federal and provincial authorities, being involved in the design and execution, will ensure that officials take ownership of the project results and mainstream them through policy action. The involvement of NGOs active in the project target areas will build capacity of beneficiaries and ensure the availability of a local expertise for operation and maintenance of the systems. In addition, by introducing modules related to renewable energy systems in curricula of institutions such as the

		Eduardo Mondlane University, the project will prepare a generation of experts and practitioners who will support the management of these systems across rural areas of Mozambique. The involvement of the private sector is another positive note for sustainability. The market based approach for installation of pilot systems will encourage the establishment of an industry throughout the systems value chain, including the import/manufacture of technologies, the preparation of skilled personnel for installation of systems, their operation and maintenance. Besides, for each demonstration project, O&M costs were considered for the overall budget.
	Global environmental benefits from biodiversity and water related impacts be estimated, in addition to GHG emission reductions.	Indeed, apart from reducing GHG emissions, the project has a number of multiple benefits including the safeguard of biodiversity and river streams. The potential impact of solar pumping systems for irrigation of farms and bio-digesters for powering agro-food processing in target ecosystems was assessed during PPG phase and will be verified once the demonstration projects are operational.
	Renewable Energy Credits (RECs) be considered as a potential funding mechanism for drawing private capital into renewable energy development. Though digesters are a promising technology, they are difficult to design, install, and maintain. The upfront cost of digester technologies is high, and they have become difficult to finance now that oil and gas prices have dropped. Therefore, careful attention must be paid both to policy development and to financing of the technology. The U.S. has been exploring the use of RECs. This policy framework relies on federal or state renewable energy requirements, which can be met by purchasing the rights to renewable energy offsite. As a result, demand for renewable energies in cities can help to finance renewable energy in rural areas.	The concern on bio-digester technology is noted. The project considered during the PPG phase a south-south cooperation model that involves contact and partnerships with designers and operators that have experience with the technologies proposed in rural areas. This model will ensure pilot systems use technologies that have been already tested in an environment similar to that of the project. Also, the financial mechanism to be developed takes into account the ability and willingness to pay of beneficiaries and the possible optimization in design of the existent technology in order to meet market requirements in terms of energy production and costs. As for the green certificates trading, it has been regarded as an interesting idea to explore; however, the set-up of such a mechanism would involve a significant evolution in the actual legislation and strategy for rural electrification in Mozambique. As such, carbon trading has not been included in the document.

Comments from Germany, Council member	**Answer to the comment**
Germany welcomes the PIF no. 9225, Towards Sustainable Energy for All in Mozambique: Promoting Market-Based Dissemination of Integrated Renewable Energy Systems for Productive Activities in Rural Areas. The planned intervention is fully in line with the support of Germany to the goals of SE4All to provide access to modern energy for all by 2030. Germany supports the government of Mozambique in providing access to energy by means of grid extension, micro-hydro-power-stations, picoPV, Solar Home Systems and improved cook stoves via the global Energising Development Programme (EnDev). The planned GEF project to promote the use of	The development of the capacity building activities under this project will also focus on the capacity needs for farmers as it is key. As such, training measures on operation, maintenance, and sound business keeping for farmers were considered at the PPG stage. At the recently concluded South African International Conference, the establishment of SACREEE, which UNIDO is leading, was endorsed as the mechanism for promoting regional cooperation in developing renewable energy and energy efficiency markets in the

	energy through the introduction of solar water-pumping systems and biogas digesters complements the activities by the German Government in the energy sector. The broad capacity building elements foreseen in the proposal will be beneficial to the goals of interventions in the sector. The planned intervention does focus on capacity building interventions on national level (for improvement of the regulatory framework) and technical level (for the dissemination of the two technologies). In order to improve on the sustainability of the intervention, training measures on operation, management and sound business keeping for the farmers using the technologies should be considered. Germany would hence like to request the coordination and harmonization with the Energising Development Programme (EnDev).	SADC region. As such, UNIDO is already discussing with GIZ on opportunities for cooperation between the Energising Development Programme (EnDev) and the SACREEE programme. In this context, this project will collaborate with the EnDEv programme in Mozambique, but also as part of the broader programmatic collaboration between EnDev and SACREEE. In addition, the PPG stage of the GEF project will explore how to build capacities of vocational training institution and farmers associations so that they could provide training services to farmers thereby ensuring sustainability of the capacity building efforts beyond the life of the GEF project.

ANNEX C: STATUS OF IMPLEMENTATION OF PROJECT PREPARATION ACTIVITIES AND THE USE OF FUNDS[29]

A. Provide detailed funding amount of the PPG activities financing status in the table below:

PPG Grant Approved at PIF: $ 82,192			
Project Preparation Activities Implemented	***GETF/LDCF/SCCF/CBIT Amount ($)***		
	Budgeted Amount	***Amount Spent Todate***	***Amount Committed***
Baseline Data Collection	12,800	12,800	474
Stakeholders consultations and validations workshop	18,400	18,400	0
Project design and demonstration projects selection and review	34,892	34,418	0
Project strategy design and implementation detailing	16,100	16,100	0
Total	**$82,192**	**$81,718**	**$474**

[29] If at CEO Endorsement, the PPG activities have not been completed and there is a balance of unspent fund, Agencies can continue to 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. Agencies should also report closing of PPG to Trustee in its Quarterly Report.

ANNEX D: CALENDAR OF EXPECTED REFLOWS (if non-grant instrument is used**)**

Provide a calendar of expected reflows to the GEF/LDCF/SCCF/CBIT Trust Funds or to your Agency (and/or revolving fund that will be set up)

ANNEX E: BUDGET ALLOCATION

Project Components	Financing Type (TA, Inv…)	Expected Outcomes	Expected Outputs	UNIDO Budget Lines		GEF Financing	Co-Financing	Total
				Code	Description	$0	$0	$0
						a	b	c=a+ b
Component 1 Establishment of a conducive policy and regulatory environment	TA	1.1 Policy and regulatory environment promoting integrated renewable energy systems in rural areas established	1.1.1. Policy framework for private sector engagement integrated in renewable energy systems in rural areas developed and presented for adoption	21	Subcontract	$60,000	$146,411	$206,411
					Sub-total 1.1.1	**$60,000**	**$146,411**	**$206,411**
			1.1.2. Guidelines on private sector involvement in renewable energy projects in rural areas developed and adopted	21	Subcontract	$45,000	$79,800	$124,800
					Sub-total 1.1.2	**$45,000**	**$79,800**	**$124,800**

			1.1.3. Standards for typical integrated renewable energy systems for rural areas developed and adopted	21	Subcontract	$34,664	$56,000	$90,664
					Sub-total 1.1.3	**$34,664**	**$56,000**	**$90,664**
					Sub-total Component 1	**$139,664**	**$282,211**	**$421,875**
Component 2: Capacity building and knowledge management	TA	2.1. Capacity of key players strengthened and information available for market enablers and players	2.1.1. Five training sessions for fifty (50) government officials at both national and provincial levels on RE integrated systems conducted	21	Subcontract	$82,300	$149,000	$231,300
					Sub-total 2.1.1	**$82,300**	**$149,000**	**$231,300**

			2.1.2. Ten training sessions targeting 250 participants from financial institutions, and other private sector organisations on integrated RE systems conducted	21	Subcontract	$105,000	$100,000	$205,000
					Sub-total 2.1.2	**$105,000**	**$100,000**	**$205,000**
			2.1.3 Training of universities and vocational training institutions staff (25) on various aspects of integrated RE systems on a train-the-trainer basis conducted	21	Subcontract	$87,300	$150,000	$237,300
					Sub-total 2.1.3	**$87,300**	**$150,000**	**$237,300**
					Sub-total Component 2	**$274,600**	**$399,000**	**$673,600**

Component 3: Technology demonstration and scaling up	Inv	3.1. Integrated RE systems demonstrated	3.1.1. Demonstration projects on integrated renewable energy systems with about 250kW of installed capacity implemented in selected productive sectors with high visibility and replication potential	11	Int'l consultant	$75,000	$0	$75,000
				17	Nat consultant	$0	$27,000	$27,000
				21	Subcontract	$427,132	$891,915	$1,319,047
					Sub-total 3.1.1	**$502,132**	**$918,915**	**$1,421,047**
		3.2. Investments in integrated RE Systems scaled up	3. 2.1. Financial mechanism established to support the installations of thirty solar water pumping systems for irrigation and Waste-to-Energy projects for agro-food processing in rural areas to achieve 1.2MW of installed capacity	11	Int'l consultant	$210,000	$0	$210,000

				17	Nat consultant	$0	$75,000	$75,000
				21	Subcontract	$1,470,208	$8,770,490	$10,240,698
					Sub-total 3.1.2	**$1,680,208**	**$8,845,490**	**$10,525,698**
		3.3. Increased confidence and awareness of technical feasibility and commercial viability of integrated RE systems	3. 3.1. Demonstration and investment projects are independently evaluated and results widely disseminated	11	Int'l consultant	$30,000	$0	$30,000
				17	Nat consultant	$15,000	$0	$15,000
				30	Dissemination Campaign	$0	$150,000	$150,000
					Sub-total 3.3.1	**$45,000**	**$150,000**	**$195,000**
					Sub-total Component 3	**$2,227,340**	**$9,914,405**	**$12,141,745**
4 Monitoring and Evaluation	TA	4.1. Project progress towards objectives continuously monitored and evaluated	4.1.1. Mid-term review and terminal evaluation carried out	11	Int'l consultant	$60,000	$0	$60,000
					Sub-total 4.1.1	**$60,000**	**$0**	**$60,000**
			4.1.2. Project progress monitored, documented and recommended actions formulated	11	Int'l consultant	$14,000	$30,000	$30,000
				21	Subcontract	$0	$8,000	$8,000
				16	Travel	$ 0	$64,000	$78,000
				51	Sundries	$0	$50,000	$50,000
					Sub-total 4.1.2	**$14,000**	**$152,000**	**$166,000**
					Sub-total Component 4	**$74,000**	**$152,000**	**$226,000**
Sub-totals all components 1+2+3+4						**$2,715,604**	**$10,747,616**	**$13,463,220**
Project Management Cost (PMC)						$135,780	$537,381	$673,161
TOTAL PROJECT COST						**$2,851,384**	**$11,284,997**	**$14,136,381**

ANNEX F: ANNUAL BUDGET

					GEF Disbursements (USD)				
Project Components	**Expected Outputs**	**GEF (USD)**	**Co-Finance (USD)**	**Total (USD)**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Execution Modality**
Component 1 Establishment of a conducive policy and regulatory environment	1.1.1. Policy framework for private sector engagement in integrated renewable energy systems in rural areas developed and presented for adoption	$60,000	$146,411	$206,411	$30,000	$15,000	$15,000	$0	Execution Agreement with SACREEE
	1.1.2. Guidelines on private sector involvement in renewable energy projects in rural areas developed and adopted	$45,000	$79,800	$124,800	$30,000	$15,000	$0	$0	Execution Agreement with SACREEE
	1.1.3. Standards for typical integrated renewable energy systems for rural areas developed adopted	$34,664	$56,000	$90,664	$20,000	$14,664	$0	$0	Execution Agreement with SACREEE
Sub-total Component 1		**$139,664**	**$258,400**	**$421,875**	**$80,000**	**$44,664**	**$15,000**	**$0**	

Component 2 Capacity building and knowledge management	2.1.1. Five training sessions for (50) government officials at both federal and provincial levels on RE integrated systems developed and trainings conducted	$82,300	$149,000	$231,300	$48,000	$34,300	$0	$0	Execution Agreement with SACREEE
	2.1.2. Ten training sessions targeting 250 participants from financial institutions, andprivate sector organisations on integrated RE systems conducted	$105,000	$100,000	$205,000	$55,000	$50,000	$0	$0	Execution Agreement with SACREEE
	2.1.3 Training of universitites and vocational training institutions staff (25) on various aspects of integrated RE systems on a train-the-trainer basis conducted	$87,300	$150,000	$237,300	$45,000	$30,000	$12,300	$0	Execution Agreement with SACREEE
Sub-total Component 2		**$274,600**	**$399,000**	**$673,600**	**$148,000**	**$114,300**	**$12,300**	**$0**	

Component 3 Technology demonstration of technologies and scaling up	3.1.1. Demonstration projects on integrated renewable energy systems with about 250kW of installed capacity implemented in selected productive sectors with high visibility and replication potential	$502,132	$918,915	$1,421,047	$251,066	$251,066	$0	$0	Execution Agreement with project developers
	3.2.1 Financial mechanism established to support the installations of solar water pumping systems for irrigation and Waste-to-Energy projects for agro-food processing in rural areas to achieve 1.2MW of installed capacity	$1,680,208	$8,845,490	$10,525,698	$0	$560,070	$560,069	$560,069	Execution Agreement with BCI
	3. 3.1 Demonstration and investment projects are independently evaluated and results widely disseminated	$45,000	$150,000	$195,000	$0	$15,000	$15,000	$15,000	UNIDO provides Admin. Execution Support for the recruitment of

									international and national experts
Sub-total Component 3		**$2,227,340**	**$9,914,405**	**12,141,745**	**$251,066**	**$826,136**	**$575,069**	**$575,069**	
Component 4 Monitoring and Evaluation	4.1.1. Mid-term review and terminal evaluation carried out	$60,000	$0	$60,000	$0	$30,000	$0	$30,000	UNIDO as Implementing Agency
	4.1.2. Project progress monitored, documented and recommended actions formulated	$14,000	$152,000	$166,000	$0	$7,000	$7,000	$0	UNIDO as Implementing Agency
Sub-total Component 4		**$74,000**	**$152,000**	**$226,000**	**$0**	**$37,000**	**$7,000**	**$30,000**	
PMC		135,780	537,381	673,161	$33,945	$33,945	$33,945	$33,945	UNIDO provides Admin. Execution Support for the establishment of a Project Management Unit.
TOTAL PROJECT COSTS		**$2,851,384**	**$11,284,997**	**$14,136,381**	**$513,011**	**$1,056,045**	**$643,314**	**$639,014**	

ANNEX G: WORK PLAN

Activity	Year 1				Year 2				Year 3				Year 4			
	1 Q	2 Q	3Q	4 Q	1 Q	2 Q	3 Q	4 Q	1 Q	2 Q	3 Q	4 Q	1 Q	2 Q	3 Q	4 Q
Component 1: Establishment of a conducive policy and regulatory environment																
Output 1.1.1. Policy framework for private sector engagement integrated renewable energy systems in rural areas developed and presented for adoption																
Activity 1.1.1.1. Establishment of a Policy and Regulatory Taskforce																
Activity 1.1.1.2. Gap analysis on policy and regulatory frameworks																
Activity 1.1.1.3. Policy and regulatory framework workshops and reporting																
Output 1.1.2. Guidelines on private sector involvement in renewable energy projects in rural areas developed and presented to authorities																
Activity 1.1.2.1. Consultation with private sector actors																
Activity 1.1.2.2. Development and dissemination of guidelines for private sector engagement																
Output 1.1.3. Standards for typical integrated renewable energy systems for rural areas developed and presented to authorities																
Activity 1.1.3.1. Information analysis about Standards at international and regional levels																
Activity 1.1.3.2. Improvement/development of the national standards, publication and dissemination																
Component 2: Capacity development and knowledge management																
Output 2.1.1.Five training sessions for (50) government officials at both national and provincial levels on RE integrated systems conducted																
Activity 2.1.1.1. Identify capacity and knowledge gaps of government officials for defined regions/institutions																

Activity	Year 1				Year 2				Year 3				Year 4			
	1 Q	2 Q	3Q	4 Q	1 Q	2 Q	3 Q	4 Q	1 Q	2 Q	3 Q	4 Q	1 Q	2 Q	3 Q	4 Q
Activity 2.1.1.2. Develop selection process for training targeting government officials																
Activity 2.1.1.3. Develop training programme, training team and implementation plan																
Activity 2.1.1.4. Develop training materials																
Activity 2.1.1.5. Conduct trainings																
Output 2.1.2. Ten training sessions targeting 250 participants from financial institutions, and other private sector organisations on financing integrated renewable energy systems in rural areas conducted																
Activity 2.1.2.1. Identify key financial institutions (FIs) to be trained																
Activity 2.1.2.2. Assess capacity of the identified FIs' staff in RE																
Activity 2.1.2.3. Develop selection process for training of FIs																
Activity 2.1.2.4. Develop and present outline for training programme																
Activity 2.1.2.5. Develop training materials																
Activity 2.1.2.6. Conduct trainings																
2.1.3 Training of universities and vocational training institutions staff (25) on various aspects of integrated RE systems on a train-the-trainer basis conducted																
Activity 2.1.3.1. Identify key universities and vocational training institutions to be trained																
Activity 2.1.3.2. Assess capacity of the identified institutions in RE																
Activity 2.1.3.3. Develop selection process for training universities and vocational training institutions																

Activity	Year 1				Year 2				Year 3				Year 4			
	1 Q	2 Q	3Q	4 Q	1 Q	2 Q	3 Q	4 Q	1 Q	2 Q	3 Q	4 Q	1 Q	2 Q	3 Q	4 Q
Activity 2.1.3.4. Develop and present outline for training programme																
Activity 2.1.3.5. Develop training materials																
Activity 2.1.3.6. Conduct trainings																
Component 3 Demonstration of technologies and scaling up																
Output 3.1.1. Demonstration projects on integrated renewable energy systems (250kW capacity) installed in selected productive sectors with high visibility and replication potential																
Activity 3.1.1.1. Implementation of demonstration projects																
Output 3.2.1. Financial mechanism established to support the installations of solar water pumping systems for irrigation and Waste-to-Energy projects for agro-food processing in rural areas to achieve 1.2 MW of installed capacity																
Activity 3.2.1.1. Design of the most suitable financial mechanism for Waste-to-Energy (biogas or biomass) and solar PV water pumping systems																
Activity 3.2.1.2. Workshop for FIs sector on applicable financial mechanisms																
Activity 3.2.1.3. Identify and implement replication projects																
Output 3.3.1. Demonstration and investment projects are independently evaluated and results widely disseminated																
Activity 3.3.1.1 External project evaluation																
Activity 3.3.1.2 Project dissemination campaign																
Component 4: Project Monitoring and Evaluation (M&E)																
Output 4.1.1. Mid-term review and terminal evaluation carried out																
Activity 4.1.1.1. Mid-term review																
Activity 4.1.1.2. Terminal evaluation																
Output 4.1.2. Project progress monitored, documented and recommended actions formulated																
Activity 4.1.2.1. Design M&E framework																

Activity	Year 1				Year 2				Year 3				Year 4			
	1 Q	2 Q	3Q	4 Q	1 Q	2 Q	3 Q	4 Q	1 Q	2 Q	3 Q	4 Q	1 Q	2 Q	3 Q	4 Q
Activity 4.1.2.2. M&E Framework implementation																
Activity 4.1.2.2.a) Project Management, Monitoring and Evaluation																
Activity 4.1.2.2.b) Steering Committee Meetings																
Activity 4.1.2.3. Establishment and maintenance of the project website																

ANNEX H: ABBREVIATIONS AND ACRONYMS

ACORD	Agency for Cooperation and Research in Development
AD	Anaerobic Digestion
ADA	Austrian Development Agency
ADPP	Ajuda de Desenvolvimento do Povo para o Povo
AfDB	African Development Bank
AICAJU	Associação Dos Industriais Do Caju (Industrial Association of Cashew Producers)
APAMO	Associaçao dos Produtores de Açúcar de Mozambique (Mozambique Sugar Association)
ARENE	future CNELEC
ATMs	Automated Teller Machine
BCI	Banco Comercial e de Investimentos (Commercial and Investment Bank)
BoM	Bank of Mozambique
CAPEX	Capital Expenditure
CCM	Climate Change Mitigation
CDC	Council for Development of Mozambique
CEE-UP	Centro de Estudos de Engenharia from the Eduardo Mondlane University
CEP	Conselho Empresarial Provincial
CHP	Combined Heat and Power
CNELEC	National Council of Electricity (Conselho Nacional de Electricidade)
CSOs	Civil Society Organisations
DFID	Department for International Development (UK)
DINA	Direcção Nacional de Agricultura e Silvicultura (National Directorate of Agriculture)
DNE	Direcção Nacional de Energia (National Directorate of Energy)
DNENR	Direcção Nacional de Energias Novas e Renováveis (National Directorate of New and Renewable Energy)
DNA	Direcção Nacional de Ambiente (National Directorate for the Environment)
EDF	European Development Fund
EDM	Electricidade de Mocambique (Electriciy of Mozambique, national utility)
EIA	Environmental Impact Assessment
EU	European Union
EUEI PDF	EU Energy Initiative Partnership Dialogue Facility
FA	Focal Area
FIs	Financial Institutions
FiT	Feed-in-Tariff
FNDS	National Sustainable Development Fund
FUNAE	Fundo de Energia (National Energy Fund)
GDP	Gross Domestic Product
GEEW	Gender Equality and the Empowerment of Women
GEFTF	Global Environment Facility Trust Fund
GHG	Greenhouse gases
GHI	Global Horizontal Irradiation
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GNI	Gross National Income
GoM	Government of Mozambique

HCFC	Hydro chlorofluorocarbon
ICS	International Classification for Standards
IEA	International Energy Agency
IMF	International Monetary Fund
INNOQ	Instituto Nacional de Normalização e Qualidade (National Institute for Standardization and Quality, Mozambique)
IPCC	Intergovernmental Panel on Climate Change
IPP	Independent Power Producers
IRENA	International Renewable Energy Association
IRR	Internal Rate of Return
ISO	International Organisation for Standardization
JFS	João Ferreira dos Santos S.A.
KfW	Kreditanstalt für Wiederaufbau
LCOE	Levelised Cost of Energy
LDCF	Least Developed Countries Fund
M&E	Monitoring and Evaluation
MASA	Ministério da Agricultura e Segurança Alimentar (Ministry of Agriculture and Food Security)
MEAs	Multilateral Environmental Agreements
MEC	Ministério da Educação e Desenvolvimento Humano
MFIs	Microfinance Institutions
MICOA	Ministério para a Coordenação da Acção Ambiental (Ministry for Co-Ordination of Environmental Affairs)
MIREME	Ministério dos Recursos Minerais e Energia (Ministry of Energy and Mineral Resources)
MITADER	Ministerio de Terra, Ambiente e Desenvolvimento Rural (Ministry of Land, Environment and Rural Development)
MNCPC	Mozambique's National Cleaner Production Center (Mozambique's Centro Nacional de Produção Mais Limpa)
NA	Not Applicable
NAPA	National Adaptation Programme of Action
NEPs	National Energy Plans
NGO	Non-Government Organisation
NPM	National Project Manager
O&M	Operation and Management
ODP	Ozone Depleting Potential
ODS	Ozone Depleting Substances
OPEX	Operational Expenditure
PARP	Plano de Acção para a Redução da Pobreza (Poverty Reduction Action Plan)
PC	Project Component
PIF	Project Identification Form
PMU	Project Management Unit
POPs	Persistent Organic Pollutants
PPA	Power Purchase Agreements
PPG	Project Preparation Grant
PPP	Public Private Partnership
PUE	Productive Uses of Energy
PV	Photovoltaics
RAGA	Rapid Assessment and Gap Analysis

RE	Renewable Energy
REASAP	SADC Regional Energy Access Strategy and Action Plan
RECP	Africa-EU Renewable Energy Cooperation Programme
RECs	Renewable Energy Certificates
REFiT	Renewable Energy Feed-in-Tariff
REN21	Renewable Energy Policy Network for the 21st Century
RPS	Renewable Portfolio Standards
SACREEE	SADC Centre for Renewable Energy and Energy Efficiency
SADC	Southern Africa Development Community
SC	Steering Committee
SCCF	Special Climate Change Fund
SE4All	Sustainable Energy for All
SEIA	Simplified Environmental Impact Assessment
SMEs	Small and Medium Enterprises
SNV	Netherlands Development Organisation
TA	Technical Assistance
TAF	Technical Assistance Facility
TORs	Terms of Reference
TVET	Technical and Vocational Training and Education
UEM	Universidade Eduardo Mondlane
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific, and Cultural Organization
UNEVOC	International Centre for Technical and Vocational Education and Training
UNFCCC	United Nations Framework Convention on Climate Change
UNIDO	United Nations Industrial Development Organisation
WB	World Bank

ANNEX I: BASELINE REPORT

ANNEX J: PRE-FEASIBILITY STUDIES

Name of the file “ANNEX J Pre-feasibility_Studies” (pdf file)

ANNEX K: CO-FINANCING LETTERS

Name of the file “ANNEX K Co-financing letters” (pdf file)