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United Nations Development Programme

Project title: Promoting sustainable energy access for rural communities in South-Eastern Angola		
Country: Republic of Angola	**Implementing Partner:** Ministry of Culture, Tourism and Environment	**Management Arrangements :** National Implementation Modality (NIM)
UNDAF/Country Programme Outcome*:* Guarantee of the basic necessities for development and the positioning of a competitive Angola in the international context. Promotion of growth and economic diversification, national business, job creation (including the integration of youth in active life) and the reinforcement of the positioning of Angola in the regional and international context, in particular in SADC and the African Union.		
UNDP Strategic Plan Output: Output 1.5.1: Solutions adopted to achieve universal access to clean, affordable and sustainable energy		
UNDP Social and Environmental Screening Category: Moderate	**UNDP Gender Marker:** 2	
Atlas Project ID (formerly Award ID): 00107121	**Atlas Output ID (formerly Project ID):** 00107508	
UNDP-GEF PIMS ID number: 5989	**GEF ID number:** 9810	
Planned start date: 1 August 2021	**Planned end date:** 31 July 2026	
PAC meeting date: to be decided		
Brief project description: The UNDP-GEF project is designed to develop a private sector-led technology value chain for making off-grid renewable energy technologies, such as solar lanterns and solar home systems to base-of-pyramid rural households who would not be electrified at least until after 2025. The project will directly support the implementation of the Renewable Energy Strategy and Energy Action Plan 2018-2022. The project rationale is underpinned by a novel approach to derisk private sector investments in the market for rural decentralised renewable energy access. This will be achieved through three outcomes: (i) creating the enabling environment for private sector investment in decentralised renewable energy; (ii) establishing a successful household-level energy service delivery model for replication nationally; and (iii) capturing and disseminating lessons learned and experience from project interventions to support replication and scaling-up of project results. The number of direct project beneficiaries is expected to be around 81,000 persons, of which approximately 42,000 women. The lifetime global environmental benefits that will accrue from the adoption of off-grid solar technologies is estimated at ~100 $ktCO_{2e}$. Consequential emission reductions amounting to ~2,217 $ktCO_{2e}$ are expected between 2019 and 2028 predominantly through the replication of the sustainable technology value chain. The project yields a GEF abatement cost of 1.53 US$/$tCO_2e$.		
FINANCING PLAN *(only cash transferred to UNDP bank account and budgeted under the same GEF project should be included under this section (1), all others should be included under section (2).*		
GEF Trust Fund *or LDCF or SCCF*	USD 3,540,468	
(1) Total Budget administered by UNDP	**USD 3,540,468**	
PARALLEL CO-FINANCING (*all other co-financing that is not cash co-financing administered by UNDP)*		
Government/Ministry of Culture, Tourism and Environment (in-kind)	USD 500,000	
Government/MINEA (loan)	USD 20,000,000	
NGO/LWG-Angola (grant)	USD 500,000	

(2) Total co-financing	**USD 21,000,000**	
(3) Grand-Total Project Financing (1)+(2)	**USD 24,540,468**	
SIGNATURES		
Signature: print name below	**Agreed by Government**	**Date/Month/Year:**
Signature: print name below	**Agreed by Implementing Partner**	**Date/Month/Year:**
Signature: print name below	**Agreed by UNDP**	**Date/Month/Year:**

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LIST OF ACRONYMS

ADPP	Ajuda Desenvolvimento de Povo Para Povo
BOP	Base of Pyramid
CO2	Carbon Dioxide
DREI	Derisking Renewable Energy Investment
FSP	Full Sized Project
GAP	Gender Action Plan
GDP	Gross Domestic Product
GEF	Global Environment Facility
GEFSEC	Global Environment Facility Secretariat
GHG	Greenhouse Gas
GIS	Geographic Information System
IANORQ	Angolan Institute for Standardisation and Quality
ktCO2	Kilo tonne carbon dioxide
LUCF	Land Use Change and Forestry
LWF	Lutheran World Federation
MINEA	Ministry of Energy and Water
MINFAMU	Ministry of Family and the Promotion of Women
MRV	Measurement, reporting and verification
MtCO2	Mega tonne carbon dioxide
NGO	Non-Governmental Organisation
PIF	Project Identification Form
PIR	GEF Project Implementation Report
POPP	Programme and Operations Policies and Procedures
PPG	Project Preparation Grant
PV	Photovoltaic
REA	Rural Electrification Agency
RET	Renewable Energy Technology
SAC	Saving and Credit Association
SEP	Stakeholder Engagement Plan
SHS	Solar Home System
STAP	GEF Scientific Technical Advisory Panel
SVP	Solar Village Programme
ToC	Theory of Change
ToR	Terms of Reference
TOT	Training of Trainers
UNDP-GEF	UNDP Global Environmental Finance Unit

II. DEVELOPMENT CHALLENGE

1. Although Angola is classified as an upper middle income country[1], its human development index, which takes into account socio-economic development such as health and education, places it in the Low Human Development category. The poverty headcount ratio stands at 36.6%. More than 15 million Angolans, or nearly 60% of the population, do not have access to electricity. In rural areas, only 18% of the population has access to electricity, and this can be as low as 6% in areas like Moxico Province.[2] The need to diversify the economy is often cited as one of the country's main development challenges. Oil production and related activities contribute about 50% of GDP, more than 70% of Government revenue and more than 90% of the country's exports.[3]

2. Much of Angola's electricity infrastructure was damaged during the 27-year civil war that ended in 2002 when population growth expanded and demand for electricity services increased significantly. Demand for electricity has been growing by as much as 15% per year.[4] As a result, blackouts and energy shortages are a common occurrence where the grid is able to provide. Two-thirds of Angolan businesses are estimated to rely on their own stand-by generators, which greatly increases production costs.[5] In 2014, Angola experienced ~650 hours of outages resulting in ~8.5% loss in sales.[6] Those households that can afford to also run their own backup generation supplied by diesel, to make up for unreliable or in some cases non-existent public electricity services. Improving access to modern, reliable and affordable energy services is essential for Angola's economic and human development.

3. The ongoing COVID-19 pandemic has had substantial impacts on Angola. At the time of writing, Angola has recorded more than 30,000 COVID-19 cases, with more than 655 deaths[7]. In Angola, as in other African countries, there is a concern that hard earned development gains could be reversed. UNDP's Socio-Economic Impact of COVID-19 report[8] notes, for Angola, that the "pandemic is expected to create a tremendous challenge for the most vulnerable groups and the weak social services". At the macro level, the country also suffered from the decline in oil prices, further straining the economy, which is heavily reliant on oil exports. Furthermore, unemployment and underemployment are expected to increase, disproportionately affecting women, youth and poor households. These impacts are likely to increase the level of energy poverty in Angola. The IEA estimates that across Africa, COVID-19 has pushed 30 million people back into energy poverty.

4. At the project level, if the vaccine program in Angola is delayed or if variants emerge that can escape the existing vaccines, this could lead to knock-on effects in advancing key activities. Specifically, carrying out assessment of demand and ability to pay for off-grid renewable energy technologies could prove difficult if communities or entire regions are subject to renewed COVID-19 related restrictions such as lockdowns or travel restrictions. In the same vein, carrying out in-person training activities or outreach to rural communities where physical presence is preferable could also prove difficult if some sanitary risks materialize. This project document considers that at this stage, COVID-19 risks to the project are moderate and contains some mitigation measures to minimize any potential disruption. Furthermore, the next section highlights potential opportunities to generate co-benefits in the fight against COVID-19.

5. More than 8 out of 10 households in rural areas live in energy poverty without access to modern energy services. Grid extension will be focused until 2025 on powering the capitals of all Municipalities[9] in Angola.[10]

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[1] As of 1 July 2016, the World Bank defines upper middle income economies as those with a Gross National Income (GNI) per capita between $4,036 and $12,475. Source: http://blogs.worldbank.org/opendata/category/tags/news

[2] Institute of National Statistics (2014) Population Census.

[3] World Bank. Source: http://www.worldbank.org/en/country/angola/overview.

[4] Angola Energy 2025: Power Sector Long Term Vision.

[5] African Development Bank (2012) Private Sector Country Profile.

[6] International Energy Agency (2014) Africa Energy Outlook 2014.

[7] WHO Regional Office for Africa, as of 14 May 2021

[8] https://www.undp.org/content/dam/rba/docs/COVID-19-CO-Response/Socio-Economic-Impact-COVID-19-Angola-Brief-1-UNDP-Angola-April-2020.pdf

[9] Angola has three levels of administrative units: provinces, municipalities and communes. The 18 provinces are divided into

This is reaffirmed in the Energy Action Plan 2018-2022.[11] For most areas of South-Eastern Angola, grid extension is unlikely even in the medium to long-term because the villages are so remote and the population density is so low. The provinces of Cuando Cubango and Moxico in South-Eastern Angola have the lowest population density, with 3 and 4 inhabitants per square kilometre, respectively.[12] Beyond the electrification of public institutions in municipal capitals, providing energy access to households will remain a low priority until at least 2022.[13] According to the Energy and Water Action Plan, only 20 MW of thermal power generation is planned in Moxico up to 2022. Despite the plan to electrify public institutions in municipal capitals, implementation of Phase III of the Solar Village Programme (SVP) will not be implemented in Moxico Province.[14] This implies that an alternative mechanism is needed to provide modern energy access to rural households beyond what is planned in the Energy Action Plan 2018-2022.

6. The Initial National Communication reported greenhouse gas (GHG) emissions for 2000 and 2005.[15] It revealed an increase in carbon dioxide (CO_2) emissions by a factor of 2.2 from 13.2 $MtCO_2$ in 2000. In 2012, Angola's total GHG emissions, including land-use change and forestry, reached nearly 200 million tonnes, placing it within the top 25 GHG emitters among non-Annex I countries.[16] Energy-related GHG emissions stood at 118.8 $MtCO_{2e}$ in 2012, compared to 25.2 $MtCO_{2e}$ in 1990. Approximately 85% of Angola's energy emissions are due to fugitive emissions, which account for 48% of the country's total emissions.[17] As can be seen in **Figure 1**, total GHG emissions (excluding land use change and forestry, LUCF) have increased by 2.9 times between 1990 and 2012. Over the same period, total carbon dioxide emissions (excluding land use change and forestry, LUCF) increased by a factor of 4.5 (~6.46 $MtCO_2$ and ~29.33 $MtCO_2$ in 1990 and 2012, respectively).

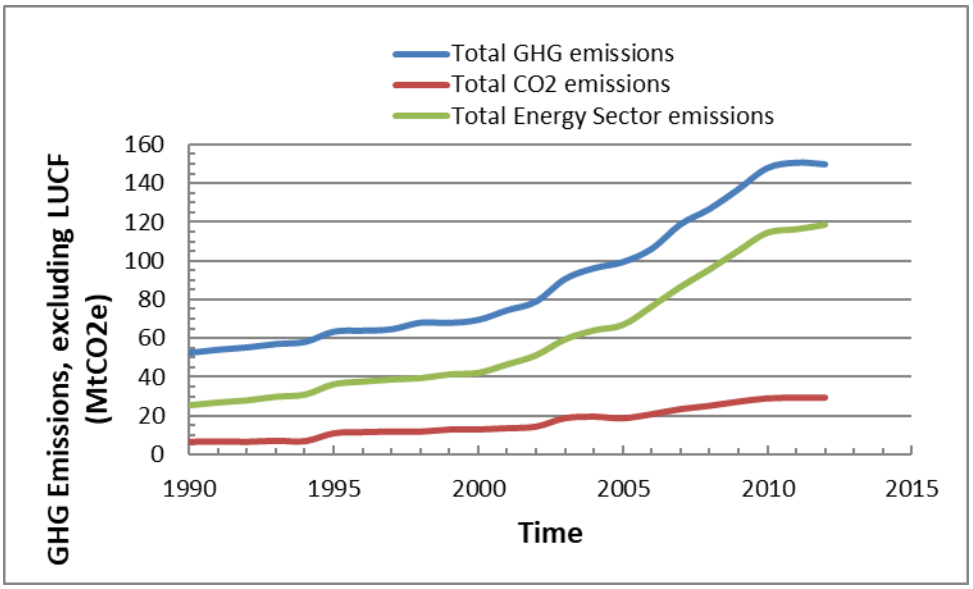


Figure 1. GHG emissions excluding LUCF, $MtCO_{2e}$.

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162 municipalities, which are further sub-divided into 559 communes.

[10] Republic of Angola (2015) SE4ALL Rapid Assessment and Gap Analysis.

[11] Ministry of Energy and Water (2018) Energy Action Plan 2018-2022.

[12] SE4ALL Rapid Assessment and Gap Analysis, September 2015.

[13] Ministry of Energy and Water (2018).

[14] The Solar Village programme has been the main initiative through which government has electrified public institutions in provincial capitals and municipalities since 2012. Please see Supplementary Annex 1 (Annex SA1) for more details on the Solar Village programme.

[15] Republic of Angola (2012) Angola Initial National Communication to the UNFCCC.

[16] World Resources Institute Climate Analysis Indicator Tool (https://www.wri.org/resources/data-sets/cait-country-greenhouse-gas-emissions-data.

[17] USAID Greenhouse Gas Emissions in Southern Africa, 2015. Source: https://www.climatelinks.org/sites/default/files/asset/document/GHG%20Emissions%20Factsheet%20Southern%20Africa_11_17_15%20v2_edited_rev08-18-2016_Clean.pdf.

(Source: Data obtained from https://www.wri.org/resources/data-sets/cait-country-greenhouse-gas-emissions-data; accessed on 23 October 2018)

7. Angola is endowed with substantial renewable energy resource potential. Solar energy constitutes the largest and most uniformly distributed renewable resource of the country. Annual average global horizontal radiation has been measured at between 1,350 and 2,070 kWh/m^2/year,[18] with the highest levels of solar insolation in the south and south eastern parts of the country. The country also has good hydropower, biomass and wind energy resource potential. Key objectives of Angola's Renewable Energy Strategy and the Energy Action Plan 2018-2022 are to improve access to energy services in rural areas based on renewables. **Table 1** below shows some of the key goals for off-grid renewables.

Table 1. Selected Goals for Off-grid Renewables.

Strategic Goal	Specific Goals
1. Renewable Energy Strategy: Improve access to energy services in rural areas based on renewable sources	▪ Establishment of the National Institute for Rural Electrification
	▪ Establishment of 500 "solar villages", involving the installation of solar panels in rural areas, mainly in public buildings
	▪ Private domestic market of 1 MW/year in individual solar systems
	▪ Distribution of 100,000 improved stoves and 500,000 solar lanterns in remote areas where purchasing power is limited
2. Energy Action Plan 2018-2022: Rural electrification and energy access	▪ Increase rate of electrification from 35% to 50% with a minimum of 20% in each province
	▪ 100,000 solar home systems (SHS) imported, distributed or sold
	▪ Rural electrification with renewables (PV) under Solar Village Programme with 1,750 beneficiaries by 2022 (Moxico Province not covered under 3rd Phase)
	▪ Launch of 4th Phase of the Solar Village Programme (Priority 2)[19]
	▪ Increase rate of electrification in Moxico Province from 12% in 2017 to 36% in 2022 (covering provincial capital only)

8. While renewable energy can play an important role in rural energy access and in providing basic services, essential for the socio-economic development of remote areas, several barriers have been identified. The quantitative risks analysis (and underpinned by barriers) faced by private sector investors in the off-grid renewable energy technology (RET) market is detailed in **Annex SA3**. A summary of these barriers are:

Barrier #1: Entry for private sector participation remain high: It remains difficult for the private sector to operate in Angola and the economy remains heavily dependent on public investment. In the World Bank's 2018 Doing Business Survey,[20] Angola ranks 175th out of the 190 economies surveyed. Some of the key challenges identified include starting a business, access to credit and contract enforcement. To address these issues and attract private investment to the local economy, the Angolan Government enacted the New Angolan Private Investment Law ("NPIL") with the approval of Law 14/15, of 11 August 2015, and more recently the Procedural Regulation for Implementation of Private Investments ("Investment Regulation") with the publication of Presidential Decree 182/15, of 30 September 2015. It also established the Angolan Agency for the Promotion of Investments and Exports (APIEX) in 2016, which is responsible for the promotion of potential investments, the legal framework and existing business opportunities in Angola. In addition, there are two further factors that increase the hurdle for private sector participation in the market for off-grid RETs, especially for targeting base-of-pyramid (BOP) customers. These are: (1) lack of market intelligence regarding the energy needs of BOP market segment and demand for off-grid RETs; and (2) linked to the previous factor is the lack of BOP consumer creditworthiness profile. Another issue is the lack of viable systems for fee recovery

[18] Republic of Angola (2015) SE4ALL Rapid Assessment and Gap Analysis.

[19] The Energy Action Plan 2018-2022 classifies projects/programmes into three categories, namely Priority 1, Priority 2, and Priority 3 in decreasing order to priority.

[20] World Bank (2018) Doing Business 2018: Reforming to Create Jobs.

once products have been purchased. For instance, the bank-led mobile money model is constrained in scale and scope in Angola (**Annex SA5**).

Barrier #2: Inadequate institutional framework for rural energy access: In its long-term vision, the Ministry of Energy and Water (MINEA) has set a target for rural electrification of 50% by 2022. While Angola has a robust policy framework in place to promote renewable energy, there are still some gaps in the regulatory and institutional framework. In particular, once the recently approved Rural Electrification Agency (REA) has been operationalised, it can play an important role in implementing the SVP. Nevertheless, the main focus of the REA will be on grid extension and supplying electricity to provincial capitals, leaving out the bulk of rural households, as discussed above. Also, there is no policy, strategy and action plan dedicated to household modern energy access over the entire territory. There is also no national quality or minimum performance for off-grid RETs in Angola, thereby exposing the market to low-quality products.

Barrier #3: Insufficient investments in small-scale decentralised renewable energy: Public investments in renewable energy tend to prioritise large-scale projects above 10 MW. These large projects aim at improving energy services for urban and the most active economic areas. Further, the transaction costs for serving rural and dispersed communities are too high for private companies. Until now, there have been few investments in small-scale renewable energy for rural, remote and low population density areas.

Barrier #4: Last mile distribution challenge: In Moxico Province, the last mile distribution challenge – the challenge of reaching dispersed consumers at the base of the income pyramid who have limited product awareness – is especially pronounced. The lack of an appropriate business model or sustainable technology supply chain for supporting rural energy access remains one of the main impediments to private sector engagement in rural energy access.

Barrier #5: Limited awareness of clean lighting alternatives: By and large, consumers in Moxico Province have limited awareness and knowledge of the clean lighting solutions that are available in the international market. In many cases, they are subsistence farmers who focus their attention on day-to-day agricultural activities.

Barrier #6: Limited human resource capacity in the sector: Given Angola's fairly limited experience thus far with small-scale renewables, there is limited human resource capacity in the sector and therefore significant training and capacity building needs. For example, there is a limited supply of technicians who are able to adequately operate and maintain renewable energy systems.

III. STRATEGY

7. The Theory of Change (ToC) diagram for the GEF-financed and UNDP-supported project shown in **Annex SA2** captures the linkages between the developmental challenges discussed in Section II and its causes and drivers (**Annex SA3**). It also shows how the project interventions at the level of three project outcomes address the root causes of the problems related to the development of a private sector led sustainable technology supply chain for making off-grid RETs (**Figure 2**) available to BOP market segments in rural areas in the Province of Moxico. The value chain will be supported by access to finance to market players, and institutional and human capacity building. The detailed discussion of the project outcomes and outputs supporting the operationalisation of the value chain is the focus of Section IV.

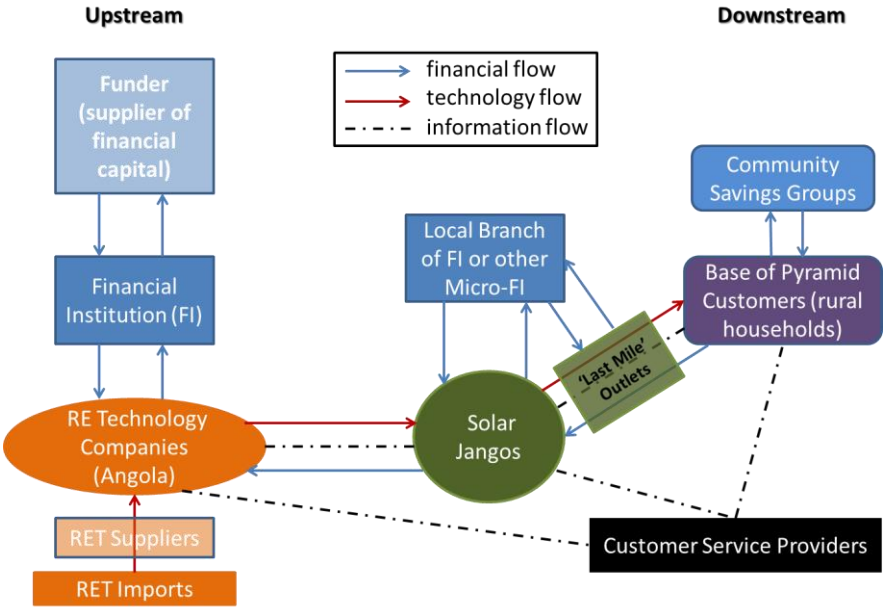


Figure 2. Technology supply chain to be operationalised by project.

8. The ToC is underpinned by derisking private sector investments in off-grid RETs through quantification of risks faced by private companies in the supply chain. Higher risks lead to higher cost of capital (debt and equity), thereby requiring a higher rate of return on investments. In turn, the cost of products reaching the BOP market segment is higher, therefore, decreasing affordability to the end user. The derisking approach proposes a combination of public (policy and financial) derisking instruments – i.e. the activities and outputs under each outcome - that seek to reduce and/or transfer the risks faced by the private sector investor. Lower risks, underpinned by removal of barriers, result in lower cost of capital, and eventually increase the affordability and uptake of off-grid, standalone RETs to the BOP market segment. The results of the derisking analyses for SHS are summarised in **Annex SA3**.

9. Geographical coverage: The project will be implemented in Moxico Province in rural communities initially located within a distance of ~300 km from the capital Luena as shown in **Figure 3**. The main target areas will cover the communes and villages located around Tjitali, Lucusse, Cassamba, Lumbala and Cagamba to the south of Luena; Camgumbe to the west of Luena; and Luea and Lumeje to the east of Luena. These sites have been identified based on the following criteria: (1) priority areas as defined by the Energy Directorate of the Moxico Provincial Government; (2) accessibility especially during the rainy season; and (3) proximity to the capital Luena that will be used as a hub for transporting products to the region. Market dynamics will inform increasing the geographical coverage during project implementation.



Figure 3. Map of Angola showing geographical coverage of project sites in Moxico Province.[21]

10. Over the medium to long term, access to affordable, clean energy will be crucial to support economic recovery. Angola has introduced a comprehensive set of fiscal and monetary measures to support economic activities in response to the COVID-19 pandemic[22], including a credit-stimulus program. The GEF-funded project is very much aligned with this stimulus program, linking access to credit to energy access. At the project level, it is foreseen that targeted communities and households may be more responsive and willing to consider off-grid RETs, provided their livelihoods have not been too severely impacted by the pandemic. To that end, the market assessment to be conducted could seek to document how off-grid energy solutions could have alleviated some of the disadvantages and challenges experienced by households and communities without access to domestic electricity during the first wave(s) of COVID-19 infections. This stocktaking could then be leveraged to encourage more robust participation by key stakeholders. Furthermore, the project could also seek to integrate into the project sites assessment the relative "situational" vulnerability of a given location. Such indicators could help prioritize locations where further infection waves could create barriers that would result in additional direct (access to health, essential commodities, etc.) or indirect (access to markets, income-generating activities, etc.) impacts on these communities.

11. The long-term impact of the project is to achieve GHG emission reductions with strong sustainable development co-benefits through the deployment of off-grid solar-powered solutions for lighting and electrical appliances (Section IV). The long-term outcomes of the project relate to addressing the underlying barriers that are discussed in Section II and in **Annex SA3**, thereby reducing risks for establishing a private-sector led supply chain model for rural energy access that will be both sustainable and replicable.

12. There are different drivers of change and assumptions that come into play at different levels in the ToC, as can be seen in **Annex SA2**. The external drivers are variables that fall outside the control of the project but which exert pressure in the right direction for justifying project interventions. The key external drivers that will have a positive influence on the project logic are: (1) the relatively high levels of energy costs to rural households;

[21] https://www.ezilon.com/maps/africa/angola-maps.html – accessed 24 October 2018.

[22] https://www.imf.org/en/News/Articles/2020/09/18/na-angola-confronting-the-covid-19-pandemic-and-the-oil-price-shock

(2) the increasing pressure to deliver rural modern energy access, especially while there is no demonstrable business model to reach a growing BOP market segment; and (3) a political commitment to climate change mitigation.

13. The main internal drivers of the project are: (1) the identification and demonstration of appropriate context and gender-aligned off-grid RETs; (2) establishing BOP consumer demand in order to justify technology transfer and supply through large scale capacity building on the uses and benefits of off-grid solar-powered technologies; (3) a sustainable technology value chain (**Figure 2**) is established that will link all market actors. Upstream, local companies will be linked with international suppliers of quality off-grid RETs. BOP customers will be linked to local companies in the technology supply chain through the establishment of solar kiosks (thereafter called 'solar jangos') in project sites. The solar jangos will also supply technologies to mini-markets – i.e. last-mile outlets – that already exist in the villages and communes covered by the project; and (3) institutional and human capacity building that will enhance coordination between all market actors. Besides the flow of technology, **Figure 2** shows that market actors will also be linked through financial and information flows. Consequently, all capacity building that will be delivered by the project will directly influence the flows of technology, finance and information. The internal drivers are reflected by the activities proposed under the different outputs and outcomes discussed in the next section.

14. Assumptions: The ToC contains a number of assumptions shown in red boxes in **Annex SA2**. These assumptions are congruent with the ones identified in **Annex H**. At the level of project interventions, the main assumptions are:
    - Political and institutional support received at all levels (national, provincial, municipalities, and communes)
    - Willingness of private companies to participate in the technology supply chain;
    - Reliable and accurate data is available for establishing demand for off-grid RETs, as well as for carrying out effective monitoring and evaluating the project;
    - Domestication and enforcement of quality standards for off-grid RETs; and
    - Financial literacy of women-led savings and credit associations (SACs) will result in a 'savings culture' that will enhance the capacity to pay and creditworthiness of rural households.

15. At the level of the long-term outcomes, the assumptions are:
    - Project trained human resources are retained and operational in partner institutions;
    - Regulatory and institutional frameworks and macro-economic environment are conducive for private sector investments in the technology value chain to supply underserved BOP rural households;
    - The proposed model and accompanying derisking instruments is appropriate for addressing the energy needs of BOP rural households in a way that can be sustained beyond the project lifetime and scaled-up across Moxico and other provinces in Angola;
    - Increasing prices of fossil fuels, combined with ongoing government policy to avoid fuel subsidies, will only increase the attractiveness of off-grid RETs and strengthen the business case for private sector investments in off-grid RET market development.

16. The assumptions relating to the intermediate goal are as follows:
    - Private companies are sufficiently stimulated by derisked environment to connect to and supply target rural communities;
    - Financial institutions are mobilised to provide private finance to all actors in the supply chain, thereby ensuring sustainability of the proposed technology transfer and supply model; and
    - High levels of end-user awareness are created for purchasing and using quality-accredited products.

17. Affordability and net savings: The sustainability of the technology value chain illustrated in **Figure 2** is premised on the affordability of off-grid, solar powered technologies such as solar lanterns and SHS to BOP households. Besides the derisking analyses in **Annex SA3**, financial analysis has been carried out to ascertain the cost-effectiveness of proposed off-grid RETs based on household capacity to pay. The results show that off-grid RETs can be purchased using the savings accruing from the baseline energy avoided costs.[23] When

[23]Typical, baseline energy sources are dry battery-powered hand-held torches and standalone gasoline-powered generators.

payments are made in instalments, full repayments can be made well within the warranty period of products. One strategy of the project is that the adoption of off-grid RETs do not only pay for themselves, but result in net savings on household energy bills that can be re-invested in socio-economic development.

18. Multi-stakeholder engagement: One aspect of the project strategy is its adoption of a multi-stakeholder process (MSP) that has been used to inform project design and conceptualization, and is planned to continue in combination with partnerships (Section IV) during project implementation, monitoring and evaluation (M&E). With a wide range of project stakeholders (as summarised in **Table 5**) contributing to the outcomes of the project, project activities will not be implemented in a vacuum but, rather, in a context where there are complementary baseline initiatives with which synergies will be forged to deliver maximum benefits productively (efficiently and effectively) to beneficiaries (**Annex F** and **Annex SA1**). Through the MSP, the project will deliver activities that will strengthen the supply and demand sides of off-grid RETs, build ownership and buy-in into the project in order to transform the landscape for rural modern energy access through the operationalisation of a sustainable and scalable off-grid RET value chain in Angola. The commitment of all project stakeholders (**Section IV** and **Annex F**) at different geographical and political levels has been ensured through a rigorous stakeholder engagement process.

19. Gender Transformative. One strategy that is central to this project is its gender transformative orientation, in addition to being gender-targeted. The project design has been guided by a set of guidelines that underpin the Gender Action Plan (**Annex G**) detailed in the next section. These guidelines are:
    - Gender transformation will be ensured through women's participation in the Project Board and Project Management Unit (PMU), and other levels of project governance;
    - To foster the participation of women and decision-making by women, the project will incorporate gender considerations in the implementation procedures that promote the empowerment of women through capacity building, their involvement in planning and management of household-level RETs, and on the fostering of women entrepreneurs in the off-grid sustainable energy technology value chains;
    - The project will adopt the following principles in the day to day management: (i) gender stereotypes will not be perpetuated; (ii) women and other vulnerable groups will be actively and demonstrably included in project activities and management whenever possible, and (iii) derogatory language or behaviour will not be tolerated;
    - The Project Manager will be the designated focal point for gender issues to support development, implementation, monitoring and strategy on gender mainstreaming internally and externally. The PM will be supported by UNDP experts (Country Office and Regional Service Centre) on gender transformation issues; and
    - For regular monitoring and evaluation of the project progress and reporting, the project makes use of gender-disaggregated indicators (Section VI), and will facilitate involvement of women in the M&E and the implementation of Grievance Redress Mechanisms.

20. Knowledge management. Knowledge management has not been retained as a stand-alone component in the project design. Rather, knowledge management, as a means to an end, is a transversal issue that cuts across the project design and conceptualisation. Nevertheless, Output 3.4 seeks to capture and disseminate lessons learned and best practices within Angola. This output will also develop a replication strategy and action plan for scaling up the private-sector led business model within Moxico and other provinces of Angola. Also, since the market for off-grid RETs in Angola is only nascent, Output 1.1 will review all technologies and their transfer and deployment models across the African region (**Annex SA4**) prior to identifying and demonstrating the most appropriate off-grid RETs in Angola while taking into account local specificities and gender issues. The project will therefore promote South-South cooperation through knowledge management. The development and application of the MRV mechanism for GHG emission reductions (Output 3.1) will be institutionalised by integrating the project MRV system within the broader MRV framework for carrying out national GHG inventories under the aegis of the Ministry of Culture, Tourism and Environment. Under Output 2.1, the Angolan Institute for Standardization and Quality (IANORQ) will be supported to domesticate the international quality standards of solar lanterns and SHS developed by the Lighting Africa initiative.[24] Further, the results of

[24] https://www.lightingafrica.org/products/ - accessed 24 October 2018.

the project will be integrated into the curriculum of vocational institutions (Output 3.3) that will have the responsibility to train technicians for the installation and maintenance of SHS. The most effective communications and outreach strategy for rural households will be developed based on detailed gender-differentiated assessments of the information needs of target communities (Output 3.2).

IV. RESULTS AND PARTNERSHIPS

21. Expected Results: Three components and outcomes have been developed to stimulate the uptake of off-grid, decentralised solar technologies, such as solar lanterns and SHS by BOP rural households by establishing and operationalising the private sector-led technology supply chain show in **Figure 2**. UNDP's derisking approach will be adopted to catalyse private sector investments in the off-grid rural energy market. In doing so the activities proposed under the three project outcomes will seek to: (1) operationalise a sustainable technology supply chain between upstream technology suppliers and downstream customers that is premised on stimulating renewable energy demand in off-grid rural areas and this need being met with the most appropriate technologies in terms of affordability, quality, and gender appropriateness, among others. Solar jangos will be established to connect technology suppliers and BOP customers, and effectively tackle the 'last mile' distribution challenge; (2) make financing more accessible to all actors along the technology supply chain; and (3) ensure information flows between all actors in the value chain, which will be accompanied by human and institutional capacity building spanning large scale outreach to rural communities on the use and benefits of off-grid RETs to technical training provided to technicians for the installation and maintenance of SHS to developing market intelligence on off-grid RET demand to connecting local companies to international suppliers of quality-accredited products to the domestication of quality standards for off-grid RETs.

22. **Project objective:** *To catalyse investments in decentralised renewable energy systems to expand energy access for base-of-the-pyramid consumers and to reduce GHG emissions.*

23. An adaptive approach has been used to develop the project document. Changes have been brought to the project design based on more informed baseline assessments (**Table 2**). Baseline assessments have provided ample evidence for focusing the project only on renewable energy for lighting and powering electrical appliances – i.e. leaving out improved cook stoves in the technology mix. This change is accompanied by increased penetration targets for solar lanterns and SHS, and it does not entail any change to the project components and outcomes. Also, the modality for household access to finance and payment systems under Output 1.3 has been changed to reflect the socio-economic reality in project sites.

Table 2. Change brought to the project design due to changes in baseline activities.

Changes made	Reasons for change
Improved cook stoves has been left out of the off-grid technology mix that was proposed in the PIF.	In the project sites, the main source of fuel for cooking is firewood. The inclusion of improved firewood cook stoves in the initial design was based on the assumption that rural households, especially women bore the disproportionate burden of wood collection and they are also the most affected by the air pollution that is generated during cooking. Baseline assessments carried out during the Project Document (ProDoc) formulation have revealed the following facts (**Annex SA1**): 1. The time spent for cooking is relatively small as women spend on average only 1 hour per day for cooking; 2. Consequently, the average time spent for collecting wood is only 15 minutes per day, and the burden is born equally between men and women. The little time spent on wood collection is because little wood is used for cooking in the first place, coupled with an abundance of woody biomass from the Miombo woodlands that surround the rural communities;[25] 3. Cooking is usually done outdoors thereby posing little threat to health. On rainy days, cooking is done in a sheltered hut that has permeable walls to allow aeration and evacuation of smoke. Cooking using firewood is not done indoors; 4. As explained in Section III, one project strategy relates to affordability of proposed off-grid RETs, and the ability for households to pay for new technologies based on the

[25] J. Mendelsohn and B. Weber (2015) An atlas and profile of Moxico, Angola.

	savings accruing from avoided cost of fuel in the baseline. Since firewood is free and time spent collecting fuel wood is quite low, households' willingness to pay for improved firewood cook stoves in too low to make upfront investments cost effective. The results of the financial analyses are summarised in **Annex SA7**; 5. In the prevailing practice, cooking is done on three-stone fires where wood logs (up to 1.5 metres) are burned without being chopped into smaller pieces. End users have voiced their apprehension of the fact that more time will be needed to chop collected logs into smaller pieces for compatibility with the technical design of improved firewood cook stoves. There is, therefore, a high likelihood that this might lead to social acceptability barriers; For the above reasons, it was decided to leave out improved firewood cook stoves from the basket of off-grid RETs that the project will support. Financial analyses have demonstrated the economic case for promoting improved charcoal cook stoves. However, these cook stoves have been left out of the project scope for the following reasons: a) There is limited use of charcoal for cooking in the target project sites; and b) The dissemination of improved charcoal cook stoves is already being carried out under the UNDP-supported, GEF-financed project entitled "Promotion of Sustainable Charcoal in Angola through a Value Chain Approach".
Output 1.3 on "MFIs provide micro-credit to rural communities for the purchase of advanced cook stoves, solar home systems and solar lanterns" has been changed to "Access to finance to rural communities for the purchase of solar home systems and lanterns"	Baseline assessment has revealed that BOP rural households are considered to be too vulnerable economically and hence too risky a market segment for microcredit (**Annex SA5**). This is the main reason why microcredit is limited to lending to groups of persons carrying out trade and commerce. No examples of microfinance to rural households could be observed, not least for the purchase of off-grid solar solutions for household applications. As a precursor to microfinance, the UNDP-GEF project will support the financial literary of rural households and increase their capacity to pay and credit worthiness through the formation of women-led solidarity savings and credit associations (SACs). In particular, the project will partner with the Lutheran World Federation (LWF-Angola) that has pioneered and successfully demonstrated the operations of women-led SACs for community development in Camanongue (one of the project target areas) over the past 9 years. It is pointed out that once established and operational, SACs will have access to conventional microcredit. This will open up the possibility for SACs members to take on secondary loans to purchase off-grid RETs for household applications. Therefore, the proposed change does not alter the central idea of supporting rural households having access to finance; it only changes the modality through which access to finance will be achieved based on the prevailing socio-economic reality of BOP rural market segment.
Output 1.4 on "Mobile payment system expanded to Moxico Province and mobile-based PAYG models established in South-Eastern Angola" has been changed to " Innovative payment systems established to improve customer fee recovery"	The baseline assessments (**Annex SA5**) have shown that the bank-led model of mobile money is very limited in scope and scale in Angola. As discussed in Section II, the lack of an effective fee recovery mechanism is a barrier (Barrier #1) that prevents private sector participation in the off-grid technology supply chain. Given the fact that there are alternative payment systems that can be easier to implement than the existing mobile money system, this output has been broadened in scope without leaving out the mobile payment as an option.
Output 2.1: The scope has been enlarged beyond 'access to finance' to also cover 'and locally appropriate	Payment for purchased products is not limited only by access to finance. It has been found that locally-appropriate payment systems must also be established to support payments.

payment systems'	
Added new Output 3.4: Communication and sensitisation of project at national and provincial scale	Project stakeholders observed that there was no output and activities related to the promotion and publicity of the project at any scale in the PIF submission. Since this was the first systematic project to promote off-grid renewable energy access with long-term sustainability in mind through catalysing private sector investments, project stakeholders proposed the addition of this new output.

24. **Component 1: Policy derisking and finance for decentralised renewable energy:** Component 1 centres on creating conducive conditions for private sector participation and engagement in the small-scale renewables sector by derisking the investment environment. The expected outcome from outputs proposed in Component 1 is *"Enabling environment created for private sector investment in decentralised renewable energy"*, and it will address Barriers #1, #3, and #4. The following outputs will contribute to that outcome:

    Output 1.1: Assessment of successful RET diffusion in the region
    Output 1.2: Business case for clean energy supply chain developed
    Output 1.3: Access to finance to rural communities for the purchase of solar home systems and lanterns
    Output 1.4: Innovative payment systems established to improve customer fee recovery

25. *Output 1.1: Assessment of successful RET diffusion in the region*. There are many examples of successful diffusion of household-level renewable energy technologies in the region, most notably SHS in East Africa. The main technologies and diffusion models were evaluated and are described in **Annex SA4**. They cover the M-KOPA model in Kenya, SNV in Tanzania, and Solar Kiosks, among others, as well as the technologies supported by the Lighting Africa programme. The technology value chain shown in **Figure 2** was designed by drawing on these models, while bearing in mind the local context in Angola and Moxico Province. The following activities will be carried out:
    - Act 1.1.1: Assessment of off-grid RETs and diffusion mechanisms in Sub-Saharan Africa. Since the market for off-grid pico and small solar systems is only nascent in Angola, technologies will be imported initially. In order to inform technology screening and transfer, the project will build on the assessments summarised in **Annex SA4** to keep track of the fast evolving technology and diffusions mechanisms in rural energy access that is enabled by information and communication technologies;
    - Act 1.1.2: Assessment of off-grid RET transfer and diffusion system in Angola. This activity will allow the project to periodically assess the changing local market dynamics that is necessary to ensure project complementarity and to maintain its incremental contribution to baselines initiatives;
    - Act 1.1.3: Develop Technology Transfer Action Plan (TTAP) for technologies prioritised under Output 2.3. Once the local market has been screened (Output 1.1) and technologies identified for transfer (Output 2.3), an action plan for the transfer of prioritised technologies will be carried out. The methodology developed by the GEF-financed Technology Needs Assessment (TNA) project under the aegis of the UNFCCC will be adopted to develop climate change mitigation TTAPs;[26] and
    - Act 1.1.4: Carry out advocacy on TTAPs. The TTAPs will be shared with all project partners, and foremost qualified local private companies, in order to raise awareness on the most appropriate technologies and diffusion mechanisms for Angola, as well as measures to overcome barriers to technology diffusion. The TTAPs will also be used to inform policy decision-making on off-grid rural energy access and for financial resources mobilisation to supplement the GEF-financing to support private sector investments in the market for rural energy access.

26. *Output 1.2 Business case for clean energy supply chain developed*. The sustainability of the project will rely on demonstration of the business case for the active participation of private companies in the technology value chain depicted in **Figure 2**. The business case will depend on market demand for off-grid RETs. Gathering market intelligence in rural areas bears a high transaction cost for companies as indicated in Barrier #1 and Barrier #4 in Section II. Also, local companies will stand to gain more by bringing higher added value on off-grid RETs through local assembly and manufacturing. Increasing local content is also a vital means to developing more indigenous technical expertise on RETs, as well as increasing affordability of products. The following activities will be carried out:

[26] http://www.tech-action.org/ - accessed 25 October 2018.

- Act 1.2.1: Carrying out market intelligence for demand of products prioritised in TTAPs. The project will conduct market intelligence and market research to establish a clear business case for the various technology options (e.g. solar lanterns and solar home systems), especially for prioritised technologies in TTAPs developed in Act 1.1.3. The market research will focus on potential demand and market size, willingness to pay based on current household expenditure on lighting and powering electrical appliances, and the potential technology options. Market intelligence will be carried out in Year 1 (prior to Act 1.2.2) and also in Year 3.
- Act 1.2.2: Operationalisation of technology supply chain with business case made for upstream technology suppliers: Upstream technology suppliers may not necessarily serve the BOP market segment for off-grid RETs because of the barriers discussed in Section II. Financial and economic analyses will be carried out for the operation of upstream suppliers of technologies in order to provide the evidence for local companies to participate in the technology value chain. These analyses will make use of the market intelligence developed under Act 1.2.1 and Output 2.2. This activity is complementary to Act 2.3.3 and will be completed by the end of Year 2. An extension of this activity is to advocate for the local assembly or production of product parts in Year 3 onwards. The project will provide guidance regarding which system parts could be produced or assembled locally.

27. *Output 1.3: Access to finance to rural communities for the purchase of solar home systems and solar lanterns, including for communal use*. The microcredit sector in Angola is still in its infancy, and it is limited to lending to groups of persons carrying out trade and commerce (**Annex SA5**). While the African Development Bank contends that the development of the national microfinance industry can play a key role by helping to increase the supply of credit to the local economy,[27] baseline assessment has revealed that BOP rural households are considered to be too vulnerable economically, and hence too risky a market segment for microcredit. Activities under this output will be:
    - Act 1.3.1: Partnership agreement developed with LWF-Angola for replicating the success in operationalising savings and credit associations (SACs) in Moxico Province. LWF-Angola has pioneered and successfully supported access to finance to rural communities in Camanongue through SACs over the past 9 years. The UNDP-GEF project will formalise a partnership with LWF-Angola for the replication of the SACs model in other project sites. Beyond making finance accessible to rural households for the purchase of off-grid RETs, SACs have the capacity to play a catalytic role in wider community development in the form of increased agricultural productivity and promotion of entrepreneurship as has been demonstrated in Camanongue. Also, SACs will be eligible for conventional microcredit and discussions with KixiCredito have revealed that there can be the possibility for SACs members to take a secondary loan[28] for purchasing off-grid RETs for household applications.;
    - Act 1.3.2: Developing operational guidelines for SACs. Guidelines for the setting up, operation, monitoring and evaluation of SACs will be developed under the partnership with LWF-Angola;
    - Act 1.3.3: Training of trainers (ToT) course delivered. For efficiency, a total of 53 trainers drawn from target communities, and with a focus on women will be trained as trainers for supporting the setting up of SACs. The number of trainers will be scaled in proportion to the number of SACs operationalised. The number of new trainers will be 19, 17 and 17 in Year 1, 2 and 3, respectively;
    - Act 1.3.4: Rural communities trained for the setting up of women-led SACs. A total of 322 women-led SACs will be operationalised in the first 3 years of the project, in partnership with LWF-Angola through the MOU signed in Act 1.3.1.
28. *Output 1.4: Innovative payment systems established to improve customer fee recovery.* Successful examples of PAYG models for solar products in the region, especially in East Africa, have relied on mobile payment. While there is an existing mobile payment platform in Angola, operated by a single commercial bank and that

[27] Ibid.

[28] The loan for purchasing off-grid RETs for household applications will be secondary to a primary loan that will be contracted to SACs members for income generating economic activities in the form of enhanced agricultural production / productivity, and commerce and trade.

requires an interface with a branch, e-Kwanza, the coverage is fairly limited (**Annex SA5**).[29] This output is staggered in time and will be implemented as from Year 3. This is because any model that is put in place will rely on the results of Outputs 1.3 and 2.1. The following activities will be pursued:

- Act 1.4.1: Assessment carried out and Strategy and Action Plan for deploying alternative payment mechanisms, including mobile money in Moxico Province is developed. While pay-as-you-go (PAYG) using mobile money has been demonstrated to be effective and efficient in promoting off-grid solar RETs, baseline assessments carried out during project formulation (**Annex SA4**) have shown that alternative models exist, such as direct money transfer (e.g. model used by SNV in Tanzania) and payments using mobile telephony airtime. This activity will make a detailed assessment of all payment options and mechanisms before developing a Strategy and Action Plan for the most appropriate model, or combination of mechanisms, that will be adopted. Further, GreenTech is putting in place a model in Kwanza Sul whereby customers of off-grid solar products make scheduled payments at the local bank.
- Act 1.4.2: Capacity building of rural communities and technology suppliers on use and benefits of alternative payment mechanisms, including mobile money. As mentioned in the Section III, one emphasis of the project is to carry out capacity building of target communities on the use and benefits, as well as the most cost-effective means of procuring off-grid RETs. Hence, communities will be capacitated on the use of the most appropriate payment mechanisms. This may include the setting up of mobile payment facilities at the solar jangos to facilitate payments.
- Act 1.4.3: Technical assistance provided to banks and telecom service providers to expand and optimise the use of mobile payment systems. As discussed in **Annex SA5**, experience shows that mobile money is best treated as a fast consumer good similar to airtime. This activity will include training and awareness raising for the potential users of existing mobile money platforms (e.g. eKwanza). Further, all countries that have demonstrated successful application of mobile money have adopted a telco-led regulatory framework. In Angola, mobile money is regulated by the National Bank of Angola (NBA) – i.e. using a bank-led model.[30] The project may support the transition to a telco-led mobile money model.

29. **Component 2: Market for off-grid renewable energy systems developed, including solar home systems and solar lanterns.** Following on from the policy derisking component, Component 2 will focus on the technology transfer and dissemination of decentralised renewable energy systems to rural households in Moxico Province. The expected outcome from outputs proposed in Component 2 is *"Successful establishment of a household-level energy service delivery model, which may include community-based systems e.g. in communal jangos, for replication nationally. Around 81,000 beneficiaries have access to sustainable lighting technologies."* The following outputs, which will address Barriers #1, #2, #4, #5 and #6, will contribute to that outcome:

    Output 2.1: Local private companies along the value chain supported, including business development, connection to suppliers and access to finance and locally appropriate payment systems
    Output 2.2: Six solar-powered kiosks procured, providing clean energy products to communities in Moxico Province
    Output 2.3: Technology transfer of decentralised renewable energy systems facilitated
    Output 2.4: Training provided to technicians on installation and maintenance of solar home systems
    Output 2.5: Training and technical support provided to communities on how to choose, use and maintain the clean energy products, including home- and community-based systems

30. GEF funds would be used to establish private sector partnerships for the commercial adoption and dissemination of these technologies, to support business plans for companies willing to engage in the commercialisation of these technologies, and to support training of company technicians, Government

[29] There are currently only 91,000 subscribers to e-Kwanza and almost all of them are traders and commercials enterprises located in urban areas (mainly in Luanda).

[30] Please see the PPG Inception Report in Annex SA1, which mentions that the NBA recognizes this deficit and has started to draft changes to the regulation. The UNDP-GEF project will support this process.

officials and community members. Training will also be an important aspect of this component. Training will be provided to technicians on the installation of solar home systems and to communities on choosing the most appropriate products for either individual, home or communal (e.g. jango) use, as well as the use and maintenance of the clean energy products. The target audience for the community training will put particular emphasis on women (**Annex G**). The aim is to establish a household-level energy service delivery model that may include communal uses (e.g. communal jangos) and that can be replicated nationally.

31. *Output 2.1: Local private companies along the value chain supported, including business development, connection to suppliers and access to finance* and locally appropriate payment systems. The project will support the preparation of business plans by private companies interested in the commercialisation of these technologies and the provision of technical support (installation, maintenance etc.) for the clean energy supply chain. The project will also facilitate partnerships between the local private sector and suppliers and facilitate access to finance from Angolan banks. The activities to support achievement of this output will be:

- Act 2.1.1: Setting up incentive mechanisms for private sector participation in the technology value chain: The market for off-grid solar products for rural energy access is only nascent in Angola. According to the Global Off-Grid Solar Market Report, no off-grid solar product sales were recorded in the country in the first half of 2020 and just under 3,000 sales were reported in 2019.[31] Furthermore, Angola sits at the lower end of the spectrum across the three pillars (demand, supply, enabling environment) that define market attractiveness for the PAYG sector according to the World Bank.[32] Off-grid solar companies operating in Angola face multiple challenges, from a lack of consumer awareness, to gaps in the regulatory and institutional framework and insufficient investments, to name a few. While these barriers affect all actors across the value chain, these tend to be exacerbated downstream at the consumer end and in underserved areas such as Moxico Province where customers are dispersed, and product awareness is low. This makes last-mile distribution logistically challenging and less likely to be commercially viable for operators.

  Access to finance is an issue both for operators in need of working capital and consumers in need of credit solutions to address the product affordability barrier. This barrier could be addressed by local banks and micro-credit institutions. However, at this stage, there is likely a greater need for financing to establish last-mile distribution channels and infrastructure. Setting up and maintaining such networks is both costly and risky as businesses are exposed to uncertain demand from customers often unable or unwilling to pay for products they are not familiar with.

  In order to de-risk such investments and incentivize private sector actors to establish last-mile distribution channels and infrastructure in Angola, the Ministry of Culture, Tourism and Environment will undertake a competitive procurement process to identify local or international providers with a track record in the last-mile distribution of solar home systems in the region or elsewhere in Sub-Saharan Africa, especially those selling such products on a pay-as-you-go basis. UNDP will provide funding for the establishment of such distribution channels in conjunction with the solar jangos. This will ensure a supply of quality products for the solar jangos which will also benefit from the providers' know-how and expertise. Furthermore, by focusing on providers of PAYG solutions, there is an opportunity to address the affordability barrier for BOP customers.

- Act 2.1.2: Developing a spatially-explicit strategy and action plan for off-grid rural energy access. As evidenced in the Energy Action Plan 2018-2022, a policy weakness in Angola is the lack of a detailed strategy and action plan for rural energy access. This translates into a lack of visibility for investments in the off-grid energy market by private companies. To remedy this situation, the project will provide

[31] https://www.gogla.org/sites/default/files/resource_docs/global_off-grid_solar_market_report_h1_2019.pdf

https://www.gogla.org/sites/default/files/resource_docs/global_off_grid_solar_market_report_h22019.pdf

https://www.gogla.org/sites/default/files/resource_docs/global_off_grid_solar_market_report_h1_2020.pdf

[32] https://www.lightingglobal.org/wp-content/uploads/2019/06/PAYGo-MAI-2019-Report.pdf

technical assistance to the MINEA to carry out GIS-based mapping of least-cost technology options for rural energy access. Further, DREI analyses for SHS will be carried out at mid-term and end of project. The DREI analyses provide the perspective of private companies in the value chain. Since the market for off-grid RETs is dynamic, the analyses in **Annex SA2** will be updated at the mid-term and end of project in order to provide up to date perspectives on the risks and effectiveness of policy and financial derisking instruments to support the operationalization of a sustainable private-sector supply chain as shown in **Figure 2**. The results of this activity will serve policy-decision making as well as provide visibility and market intelligence (supporting Act 1.2.1) to guide private sector investments in the off-grid energy market.

- Act 2.1.3: Support to IANORQ for the domestication of quality standards for off-grid solar products. Angola does not yet have quality standards for off-grid solar products, namely solar lanterns and SHS, thereby exposing the country to the importation of cheap, low-quality products that poses risks to the technology supply chain proposed in **Figure 2**. The project will support IANORQ to domesticate product standards developed by the Lighting Global initiative.
- Act 2.1.4: Supporting companies to develop business plans for serving BOP energy market. Using the results of Act 1.1.3 and 1.2.2, the project will support companies to develop business plans for serving the off-grid energy market as upstream players. Further, private companies will be invited to develop business plans to operate solar jangos based on the results of Act 2.2.3. Potential companies will be invited to participate in this activity through a transparent process involving a call for proposals. This activity will serve to increase competitiveness in the rural energy market for off-grid RETs. These business plans will also help to link potential companies with financial institutions (Act 2.1.1).
- Act 2.1.5: Developing a SDG Impact Framework for private investors. The project will support the development of a comprehensive framework for measuring the SDG impacts of private sector investments. The aim of the activity is for the supported SHS developers and investors to establish robust approaches to impact management in their systems and reporting, and ultimately to build confidence in the impact investment asset class for SHS. This activity will cover (i) adoption of a suitable methodology and set of indicators on impacts, both positive and negative, on the impact of SHS operations across the SDGs, (ii) to gather good quality data, and (iii) to then help these actors report on these indicators/data in an accessible way, which collectively builds confidence in impact investment. With this activity, the project will be pilot UNDP's SDG impact product in Angola. The project will be able to draw upon the support of UNDP's SDG Impact platform in providing its ongoing technical assistance. This activity will be carried out over 5 years.

32. *Output 2.2: Six solar-powered kiosks procured, providing clean energy products to communities in Moxico Province*. As rural communities in Moxico are dispersed across a large geographical area, five solar-powered jangos will be procured, which will bridge a vital gap in the technology supply chain by linking technology suppliers that are located in urban centres (e.g. Luanda) and BOP customers. Among the products that will be sold will be solar home systems, and solar lanterns. The solar jangos may also serve as payment points, allowing customers to pay "off-line", once mobile payment systems are established (Act 1.4.2).

- Act 2.2.1: Developing business model for the setting up and operation of solar jango on commercial basis. This activity is complementary to Act 1.2.2, and is a vital cog in demonstrating the sustainability of the technology diffusion chain (**Figure 2**). Economic and financial analyses, together with the operational guidelines developed in Act 2.2.3, will be used to make the business case for developing an entrepreneurship model for the replication of the solar jango model using private investments.
- Act 2.2.2: Siting and establishment of solar jangos. One fixed solar jango will be established in each of the five years of the project, while one mobile solar jango will serve remote communities as explained in Section III, as well as for promoting awareness of solar products for home- and community-based applications. The potential sites for the fixed solar jangos are: Luena, Lucusse, Cangumbe and Tjitali. The final physical location of the jangos will be decided together with the

Energy Directorate of the Moxico Provincial Government. The mobile solar jango will serve the other areas identified in Section III.

- Act 2.2.3: Developing detailed ToR and corresponding procurement process for operation of solar jangos: Once the business case for solar jangos (Act 2.2.1) and their locations (Act 2.2.2) have been completed, the project will develop a detailed ToR for launching a call for proposals inviting private entrepreneurs to bid competitively for the operation of solar jangos. Act 2.2.3 will also detail the procurement modalities, including the scheduling of calls for proposals. In order to increase competition, the procurement modalities will ensure that project-financed solar jangos are not operated under a monopoly. The procurement modalities will also include a monitoring, measurement and verification (MRV) system that the operators will need to implement in order to allow performance of solar jangos to be tracked. The MRV system will be aligned with the broader system to be developed under Act 3.1.1. Further, the procurement process will be applicable to immobile solar jangos only. The mobile solar jango vehicle will be able to reach dispersed communities at the base of the income pyramid in Moxico Province, generating awareness of household-level solar energy products.[33]

33. *Output 2.3 Technology transfer of decentralised renewable energy systems facilitated*. The transfer of off-grid RETs will be facilitated through the operationalisation of the technology supply chain depicted in **Figure 2**. Technology solutions that show promise and could be relevant to the Angolan context are solar-powered lighting, cell phone charging, solar-powered appliances, and solar-powered kiosks that provide access to clean energy services and solar lighting products, while promoting local entrepreneurship and serving as a hub and meeting point for communities. Output 1.1 will identify additional technologies that could be transferred. To support this, the following activities will be implemented:

    - Act 2.3.1: Selection and prioritisation of innovative off-grid technologies. The first step in the technology transfer process will be to prioritise technologies that have been identified based on the results of Act 1.1.1. For congruence, the tools and methodologies developed by the TNA project as discussed under Act 1.1.3 will be adopted for technology prioritisation using multi-criteria analysis coupled with a multi-stakeholder process. The prioritised technologies will be subject to TTAPs in Act 1.1.3.
    - Act 2.3.2: Proof of concept of prioritised technologies demonstrated. Since the technology transfer will focus on innovative technologies, there will be the need to demonstrate their application in rural communities to establish appropriateness according to the needs and specificities of the local rural market. The results of proof-of-concept will serve to build the capacity of upstream private companies on innovative technologies, and will be used in the process of business plan formulation under Act 2.1.4.
    - Act 2.3.3: Private companies linked with technology providers/manufacturers. Since the market for off-grid RETs will initially be an import market, local companies will be linked with providers and manufacturers of products featuring in TTAPs and for which proof-of-concept have been demonstrated. An extension of this activity is to advocate for the local assembly or production of product parts in Year 3 onwards. The project will provide guidance regarding which system parts could be produced or assembled locally (Act 1.2.2).

34. *Output 2.4: Training provided to technicians on installation and maintenance of solar home systems*. An extensive training course will be provided to technicians on the selection of appropriate technologies for each purpose and the installation of solar home systems to ensure the most adequate technologies are chosen as well as quality installation and after-sales service. The aim is to have at least 25% of trained technicians be women.

    - Act 2.4.1: Conducting a technical skills capacity gaps conducted for installation and maintenance of off-grid technologies. A technical skills gaps analysis will be carried out in close collaboration with

[33] The driver of the mobile kiosk will be carrying out essential field activities and will not be supporting the project management unit. The vehicle will not be used for project management purposes.

private companies supplying off-grid RETs and vocational training centres. This assessment will inform the design of the course that will be developed under Act 3.2.3.

- Act 2.4.2: Conduct training for technicians on off-grid solar products. In order to provide pre-sales advice and aftersales services to local communities, a total of 75 electrical technicians will be trained in the criteria of technology selection, installation, trouble shooting and maintenance of off-grid RETs. The trainings will be delivered by partner vocational institutions under Act 3.3.1. Currently, electrical technicians are overwhelmingly men, and the project will ensure that at least 25% of trainees are women.
- Act 2.4.3: Carry out assessment of additional technical skills required with technology evolution, and carry out refresher training for trainers. With increasing innovation in technology, and the changing market dynamics, it is expected that the technical needs will also change. By working with private companies, the changing technical requirements for the installation, troubleshooting and maintenance of off-grid RETs will be tracked, and used to update the training materials that will be developed in Act 3.3.2.

35. *Output 2.5: Training and technical support provided to communities on how to choose, use and maintain the clean energy products, including home- and community-based systems*. Extensive sensitisation and training efforts will be required to expand awareness of rural communities of the benefits of renewable energy and how to use the pico and small solar systems. In alignment with the gender transformative approach of the project, training will target women.

    - Act 2.5.1: Carry out training of trainers (TOT). For cost-effectiveness, 75 trainers will be trained to carry out large scale rural community outreach activities in the identified project areas. Of these 75 trainers, some 65 will be women living in the project sites. The training will use the materials developed under Act 3.2.3.
    - Act 2.5.2: Outreach activities carried out by trainers to reach rural households. One of the levers to drive demand for off-grid RETs is awareness creation on the uses and benefits of technologies, accompanied by hands-on demonstrations. In total, about 25,000 households that constitute ~32% of the total number of rural households in Moxico Province will be targeted using a combination of market fairs, solar caravans using the mobile jango, and demonstrations during SACs meetings.[34] Households will also be supported to choose the most appropriate technologies for installation on communal buildings such as community jango, schools and health centers.
    - Act 2.5.3: Assess evolving information needs of households with changes in market dynamics. Because market dynamics can be expected to change the information needs of rural households regarding off-grid RETs, an adaptive approach to assess this evolving information need will be carried out for input in Act 3.2.4. This assessment will be carried out by trainers delivering outreach activities in Act 2.5.1.

36. **Component 3: Outreach programme and dissemination of results**. The third component addresses outreach and dissemination of results. The expected outcome is "*lessons learned and experience from project interventions support replication and scaling-up of project results*". The following outputs will contribute to that outcome:

    Output 3.1: Lessons learned report produced based on project experience.
    Output 3.2: Cooperation with technical institutes and universities established.
    Output 3.3: Project results incorporated into vocational schools' curriculum.
    Output 3.4: Communication and sensitisation of project at national and provincial scale

37. *Output 3.1: Lessons learned report produced based on project experience*. The project will prepare a lessons learned report based on the experience gained. The report will be shared with relevant ministries and provincial authorities, and a workshop will be organized to discuss key findings and recommendations to inform the subsequent deployment of renewable energy technologies.

[34] Assuming that each SAC has 15 members, a total of 4,830 households will be reached through the 322 SACs that the project will directly support.

- Act 3.1.1: Develop MRV mechanisms for GHG emission reductions. Since the overarching objective of the project is reduction of GHG emissions, while also delivering sustainable development benefits (e.g. SDG impacts) to local communities, the project will develop MRV mechanisms to track emission reductions accruing from off-grid RETs as well as the sustainable development co-benefits. This activity will peruse recent technical assistance that UNDP has provided to the Ministry of Culture, Tourism and Environment towards developing a national MRV framework for monitoring and reporting GHG emissions at the national level.[35] The MRV mechanisms will form an integral part of the M&E of GHG emission reductions targets given in the Results Framework.
- Act 3.1.2: Carry out lessons learned investigations. As part of the adaptive management approach, lessons learned through project activities will be captured on an annual basis, and the results will be used to inform adjustments in annual project work plans.

38. *Output 3.2: Cooperation with technical institutes and universities established*. The project will cooperate with technical institutes and universities regarding research and development of sustainable energy solutions for rural households. The activities will be synchronised with those under Output 2.5.

    - Act 3.2.1: Identify and establish MOU with partnering technical institutions. As per **Annex F** and **Annex SA1**, the project will partner will qualified technical and training institutions for outreach activities and providing technical support on research and development of off-grid RETs. Potential partners have been identified,[36] and further due diligence will be carried out at project implementation start to choose most appropriate institutions for partnership agreements.
    - Act 3.2.2: Carry out gender-differentiated assessment of information needs for target communities, including most effective communications strategies. As listed in the Gender Action Plan, all community outreach activities will be gender-targeted. Hence, the most appropriate means of communication strategies will need to be based on evidence regarding the gender-differentiated needs to BOP rural communities.
    - Act 3.2.3: Develop training materials for TOT course. Based on the results of Act 3.2.2, training materials, including means of delivering outreach activities to rural communities, will be developed in partnership with technical institutes for the TOT course that will be delivered under Act 2.5.1.
    - Act 3.2.4: Development of training materials for sensitisation of rural households. Based on the results of Act 3.2.2, training materials, including means of delivering outreach activities to rural communities, will be developed. These materials will be used in community outreach activities in Act 2.5.2.

39. *Output 3.3: Project results incorporated into vocational schools' curriculum*. Project results will be incorporated into the curriculum of vocational schools in Angola, in order to build the human resource capacity in the renewable energy sector and to stimulate the local production of clean energy products. Under this Output, the project will collaborate with Angolan NGOs. This GEF-financed project will work with training and vocational centres to incorporate renewable energy in their curriculum to help build the future cadre of renewable energy manufacturers, installers and technicians in the country.

    - Act 3.3.1: Identify and establish MOU with vocational training schools in Moxico Province. In order to train technicians on the installation, troubleshooting and maintenance of off-grid RETs, and in particular SHS, partnership agreements are planned with a total of 4 vocational schools or polytechnics. As a matter of priority, the training institutions will be those already found in Moxico Province, namely the Don Bosco Training School and the two public institutions.[37]

[35] MINAMB (2016) Perfil de Emissões de GEE e Proposta Metodológica para definição de Cenários de Emissões.

[36] A non-exclusive list of potential partners have been identified as: (1) the Centro Integrado de Formação Tecnológica (CINFOTEC) in Rangel is a public institution that started delivering professional training on renewable resources in September 2018 (https://tinyurl.com/y7gkfsv6); (2) LTP Energias operates a private training academy on renewable energies in Luanda (http://ltpenergias.co.ao/pt/nossos-formadores/); and (3) ADPP is an NGO that owns and runs a vast network of 15 Teacher Training schools and 8 polytechnics across Angola (http://www.adpp-angola.org/en/projects/education).

[37] With a view to scaling up project activities, discussions have been initiated with ADPP so that the results of the UNDP-GEF project can also be integrated in the curriculum of its 8 polytechnics, starting with the one in Lunda Sul.

- Act 3.3.2: Develop training modules. Once partnership agreements have been secured, and the skills needs gap analysis completed under Act 2.4.1, the project will provide technical assistance to develop training modules on the installation, troubleshooting and maintenance of off-grid RETs. These modules will be integrated in the existing courses for electrical technicians, and will be updated on a needs basis following the results of Act 2.4.3.
- Act 3.3.3: Train existing trainers of electrical installation and wiring courses on technical aspects of off-grid solar technologies. In order to facilitate the delivery of the module on off-grid RETs, the trainers delivering the electrical technicians training courses in the 4 partnering institutions will be trained.
- Act 3.3.4: Upgrading electrical laboratories of vocational schools for installation of off-grid solar technologies. A budget has been dedicated to equip the laboratories of vocational schools and polytechnics with off-grid RETs and any other training equipment for hands-on training on the installation, troubleshooting and maintenance of technologies. The practical laboratories will be upgraded with new equipment with changing market dynamics and technology evolution.

40. *Output 3.4: Communication and sensitisation at national scale*. The results and experience learned will be communicated widely at the national and provincial levels. In as much as the project will learn from regional experiences (e.g. Output 1.1), the project will also share its lessons learned with the region in order to promote South-South cooperation. Communication about the project will increase its visibility, and it will complement the on-the-ground activities to promote off-grid decentralised solar products. This output will be managed by the Communications Department in the Ministry of Culture, Tourism and Environment, which is also host to the climate change Focal Point.

    - Act 3.4.1: Communications to promote the project: The UNDP-GEF project will first assist the Communications Department, Ministry of Culture, Tourism and Environment to develop a communications strategy for publicising the project. Thereafter, it will provide the means for implementing the communications strategy through multiple means including project website, social media platforms, and printed materials, among others.
    - Act 3.4.2: Publish and disseminate results of lessons learned to all stakeholders. The lessons learned captured under Act 3.1.2 will be published and disseminated to all project stakeholders and made available to a broad public inside and outside Angola through a dedicated project website that will be developed under this activity. In-country workshops are also planned to share the lessons learned. Compulsory M&E activities like the mid-term review and terminal evaluation will also form part of this activity.

41. Global Environmental Benefits: For the purposes of estimating the GHG mitigation impacts of the project, the penetration targets for different types of technologies that reflect the needs of BOP customers are as shown in **Table 3**. Solar lanterns do not contribute to GHG emission reductions since they replace hand-held dry-battery powered torches in the baseline (**Annex SA1**). However, they deliver significant reductions in local pollution through the elimination of used dry batteries that are dumped in the open in villages and communes.[38]

    Table 3. Annual penetration targets for off-grid RETs.

Technology[39]	Year 1	Year 2	Year 3	Year 4	Year 5	Total
SL (3 W)	300	600	1000	100	0	2,000
SHS (15 W)	360	720	1,080	2,160	2,880	7,200
SHS (50 W)	330	660	990	1,980	2,640	6,600

42. The detailed calculations of emissions reductions are given in **Annex SA6**. The results are summarised in **Table 4**. Total cumulative emission reductions during project lifetime are estimated at ~100,000 tCO_{2e}.

[38] It has been estimated that each SL would eliminate 244 AA-type batteries over a 2-year lifetime. Typically, all of the used batteries will be dumped in the open in villages and communes.

[39] The description of these products can be found in Annex SA4. In summary, a 3W SL is a hand-held LED lighting solar powered device; a 15 W solar kit is able to power a total of 4 LED lamps and provide mobile phone charging features; a 50 W SHS is able to power 4 LED lamps, an efficient colour TV, a radio set, and mobile phone charging.

Consequential GHG benefits during the 10-year influence period following project implementation will be ~2,217,000 tCO_{2e}. The unit abatement cost is estimated at about \$1.53/tCO_{2e}.

Table 4. Cumulative GHG emission reductions during project lifetime.

Technology	Year 1	Year 2	Year 3	Year 4	Year 5	Total
SHS (15 W)	308	1,231	3,079	6,773	12,931	**24,322**
SHS (50 W)	958	3,834	9,585	21,086	40,256	**75,719**
Total	**1,266**	**5,065**	**12,663**	**27,860**	**53,186**	**100,041**

43. Knowledge Management: Knowledge management has not been retained as a stand-alone component in the project design. Rather, knowledge management, as a means to an end, is a transversal issue that cuts across the project design and conceptualisation. Specifically, Component 3 focuses on outreach and dissemination of results. Under Output 3.1, lessons learned reports will be produced based on an annual basis. The reports will be shared with all project partners in order to inform subsequent market development of decentralised renewable energy. Knowledge Management as a pillar of the project strategy is discussed in Section III.

44. Partnerships: For the project to meet its objectives, a number of project partners have been identified as a part of the project approach to adopt a MSP (Section III). Since the project is operating at several geographical and political levels from the national institutions to the provincial level to rural households, the importance of the MSP approach cannot be overestimated. Through adoption of the MSP, the project will be implemented in a context where there are complementary baseline initiatives with which synergies must be forged to deliver maximum benefits productively (efficiently and effectively) to beneficiaries. **Table 5** provides a listing of key project partners to achieve the intended results of the GEF-financed, UNDP-supported project through output-level contributions. The conditions outlining their participation in the project are directly related to the assumptions given in the ToC. Details of partnerships and stakeholder engagements are provided in **Annex F** (Stakeholder Engagement Plan).

Table 5. Contributions of project partners.

Stakeholder	Contributions	Relevant project outputs
Ministry of Culture, Tourism and Environment	The mission of the Ministry of Culture, Tourism and Environment is to propose, formulate, manage and execute the Government's environment policy, including climate change, with a view to protecting and preserving environmental quality, protected areas, as well as the conservation and rational use of natural resources. The ministry hosts the Climate Change Focal Point, and it coordinates the mainstreaming of climate change issues in sectoral policies, strategies and action plans. The Ministry of Culture, Tourism and Environment is the national implementing institution for the UNDP-GEF project, and it will chair the PSC and host the PMU. It carried out coordination of all stakeholders during the PPG, which will continue during project implementation. It will contribute to the identification and promotion of sustainable energy technologies with focus on the environmental benefits of available technologies, and will contribute to the communications and advertisement of sustainable energy with stakeholders. It will also be an important interface with the provincial Government.	→ Output 1.1: Assessment of successful RET diffusion in the region. → Output 1.2: Business case for clean energy supply chain developed. → Output 2.3: Technology transfer of decentralised renewable energy systems facilitated. → Output 2.5: Training and technical support provided to communities on how to use the clean energy products. → Output 3.1: Lessons learned report produced based on project experience.
Ministry of Energy and Water (MINEA)	MINEA is responsible for energy sector policy development, coordination and oversight. Its objective is to propose, formulate, manage and execute the Government's policy in the areas of energy and water. Among its responsibilities, the Ministry plans and promotes the national policy on rural electrification through a number of means, such as power generation, grid network extension, and the Solar Village Programme. Within MINEA, there are three national	→ Output 1.1: Assessment of successful RET diffusion in the region. → Output 1.2: Business case for clean energy supply chain developed. → Output 2.3: Technology transfer of decentralised renewable energy systems facilitated.

Stakeholder	Contributions	Relevant project outputs
	directorates to implement and supervise the Ministry's policy: the National Directorate of Electric Energy, the National Directorate of Renewable Energy, and the National Directorate of Rural and Local Electrification. MINEA played a key role in the PPG through policy guidance and coordination with the Solar Village Programme. MINEA will take the lead on component 2, and it will chair the corresponding Technical Working Group (TWG). Its provincial department in Moxico will be a key contact to the Provincial Government and local stakeholders. MINEA will also approve all technologies to be imported into the country by the project.	→ Output 3.1: Lessons learned report produced based on project experience.
Provincial Government of Moxico	The Provincial Government is responsible to development provincial development strategies and action plans in order to implement the policies of national government. In effect, the Provincial Government carries out actions that promote the economic, social and cultural well-being of the population residing in its jurisdiction. The Provincial Government of Moxico played an important role in providing guidance on the selection of priority communities and project sites, as well as for coordinating activities at the provincial level. During implementation, it will help in the selection of project sites for the solar-powered kiosks and will play a role of interface with the municipal and communal Governments and the communities themselves, as well as traditional authorities.	→ Output 2.2: Six solar-powered kiosks procured, providing clean energy products to communities in Moxico Province. → Output 2.3: Technology transfer of decentralised renewable energy systems facilitated. → Output 2.5: Training and technical support provided to communities on how to use the clean energy products). → Output 3.1: Lessons learned report produced based on project experience. → Output 3.3: Project results incorporated into vocational schools' curriculum.
Ministry of Family and the Promotion of Women (MINFAMU)	The Ministry, which works towards the improvement of the conditions of women and Angolan families in general, is responsible for the National Support Programme for Rural Women and the National Strategy to Fight Poverty. The National Support Programme empowers rural women in small business management, combating illiteracy, and strengthening local initiatives for generating income. MINFAMU was consulted during the PPG for developing the Gender Action Plan (Annex G). During implementation the ministry will be consulted on how to involve women and girls in the project activities, gender issues related to technology transfer, and it will help with the monitoring of gender impacts. In general, it will support the integration of women in the technology value chain.	→ Output 1.1: Assessment of successful RET diffusion in the region. → Output 1.3: Access to finance to rural communities for the purchase of solar home systems and lanterns. → Output 1.4: Innovative payment systems established to improve customer fee recovery. → Output 2.3: Technology transfer of decentralised renewable energy systems facilitated. → Output 2.4: Training provided to technicians on installation of solar home systems. → Output 2.5: Training and technical support provided to communities on how to use the clean energy products. → Output 3.1: Lessons learned report produced based on project experience.
Local communities, with special attention given to women and	The local communities are the main beneficiaries of the project. They constitute the downstream end of the technology value chain that the UNDP-GEF project will operationalise. Consequently, their needs, interests and perceptions about the technology value chain, as well as the off-grid solar technologies that will be promoted are crucial for	→ Output 1.1: Assessment of successful RET diffusion in the region. → Output 1.2: Business case for clean energy supply chain developed. → Output 1.3: Access to finance to

Stakeholder	Contributions	Relevant project outputs
vulnerable groups	project success. Consequently, effort was spent during the PPG to understand the needs, interests and perceptions of local communities in proposed project sites. In particular, the needs, interests and perceptions of women were captured and integrated in the project design through the Gender Analysis and Gender Action Plan (Annex G). These also informed the UNDP Risk Log given in Annex H. Most project outputs are central to the needs, interests and perceptions of local communities, women and vulnerable groups.	rural communities for the purchase of solar home systems and lanterns. → Output 1.4: Innovative payment systems established to improve customer fee recovery. → Output 2.3: Technology transfer of decentralised renewable energy systems facilitated. → Output 2.4: Training provided to technicians on installation of solar home systems. → Output 2.5: Training and technical support provided to communities on how to use the clean energy products. → Output 3.1: Lessons learned report produced based on project experience. → Output 3.2: Cooperation with technical institutes and universities established. → Output 3.3: Project results incorporated into vocational schools' curriculum.
Private sector (off-grid solar powered technologies)	The technology value chain that the UNDP-GEF project will establish and operationalise will be led by private companies supplying off-grid solar technologies. There will also be private actors participating in the downstream end of the supply chain to complete the last mile distribution. Further, private operators will also be involved in payment transfers through mobile money or direct bank payments (see FIs below). Consequently, private companies constitute the backbone of the proposed value chain. The views and knowledge of products and markets of private companies were gathered through interviews during the PPG (Annex SA1). Selected companies also participated in the SHS DREI analyses (Annex SA3) in order to quantify the risks that they face and to establish the cost effectiveness of policy and financial derisking instruments for reducing and/or transferring risks. The results of the SHS DREI analyses have been used to inform the project design. As shown in Table 3, private companies (especially on the supply side) have a high influence on the project in terms of participation to validate the proposed private sector-led technology value chain model. The private companies will be represented in the PSC, and the SEP makes provision for ongoing coordination with them during project implementation.	→ Output 1.1: Assessment of successful RET diffusion in the region. → Output 1.2: Business case for clean energy supply chain developed. → Output 1.4: Innovative payment systems established to improve customer fee recovery. → Output 2.1: Local private companies along the value chain supported, including business development, connection to suppliers and access to finance. → Output 2.2: Six solar-powered kiosks procured, providing clean energy products to communities in Moxico Province. → Output 2.3: Technology transfer of decentralised renewable energy systems facilitated.
NGOs	NGOs play a central role in local community development initiatives. In particular, there are two NGOs whose long-lasting relationship with communities will be vital to the successful implementation of project outputs related to community development. LWF-Angola has pioneered and successfully supported access to finance to rural communities in Camanongue (Moxico Province) through SACs over the past 9 years. The UNDP-GEF	→ Output 1.3: Access to finance to rural communities for the purchase of solar home systems and lanterns. → Output 2.5: Training and technical support provided to communities on how to use the clean energy products. → Output 3.2: Cooperation with technical institutes and universities

Stakeholder	Contributions	Relevant project outputs
	project will formalise a partnership with LWF-Angola for the replication of the SACs model in other project sites. Beyond making finance accessible to rural households for the purchase of off-grid RETs, SACs have the capacity to play a catalytic role in wider community development in the form of increased agricultural productivity and promotion of entrepreneurship. The ADPP has a long track record in promoting education in rural communities with its own network of 15 schools and 8 polytechnics across Angola. With a view to scaling up project activities related to training of technicians and outreach activities to target communities, it will be useful for UNDP-GEF project to collaborate with ADPP.	established.
Academic, scientific and technical assistance institutions	The project will work with academic, scientific and technical institutions on technical training and outreach activities, among others. A non-exclusive list of potential partners have been identified as: (1) the Centro Integrado de Formação Tecnológica (CINFOTEC) in Rangel is a public institution that started delivering professional training on renewable resources in September 2018; (2) LTP Energias operates a private training academy on renewable energies in Luanda; (3) Don Bosco Training School in Moxico; and (4) two public vocational training schools in Moxico.	→ Output 3.2: Cooperation with technical institutes and universities established. → Output 3.3: Project results incorporated into vocational schools' curriculum.
Financial institutions	The private-sector led technology value chain that will be operationalised by the UNDP-GEF project also takes into account making finance access to all market actors. Financial institutions were engaged during PPG (Annex SA1 and Annex SA3) in order to design the project. During project implementation, FIs will be involved as providers of debt financing to private companies in the value chain, micro-credit to entrepreneurs and women-led SACs, and intermediaries in payment mechanisms that will allow technology suppliers to recover their costs/fees from customers.	→ Output 1.3: Access to finance to rural communities for the purchase of solar home systems and lanterns. → Output 1.4: Innovative payment systems established to improve customer fee recovery. → Output 2.1: Local private companies along the value chain supported, including business development, connection to suppliers and access to finance.
UNDP CO	The UNDP Country Office (CO) has been supporting the Government of Angola with strengthening human and institutional capacity for carrying out evidence-based policy planning for climate change. UNDP will monitor the implementation of the project, review progress in the realisation of the project outputs, and ensure the proper use of GEF funds. Working in close cooperation with the Ministry of Culture, Tourism and Environment, the UNDP CO will provide support services to the project - including procurement, contracting of service providers, human resources management and financial services - in accordance with the relevant UNDP Rules and Regulations, Policies and Procedures and Results-Based Management (RBM) guidelines. The agreement for the delivery of these services is found in **Annex J**. UNDP CO also provides its services through technical advice, facilitating change processes, support to mechanisms for advocacy, networking and partnership building including intermediation for information, expertise and funds, and knowledge development and dissemination.	

45. The market for off-grid solar products for rural energy access is only nascent in Angola, and there are not many initiatives in this area. The only initiative in the baseline is the solar village programme (SVP) that is implemented by MINEA (**Table** 5 and **Annex SA1**). The UNDP-GEF project will build upon and complement the SVP. Whereas the SVP is focused on providing solar energy to public buildings and street lighting in provincial capitals only, the UNDP-GEF project will complement the SVP by operationalising a private-sector and sustainable technology supply model for rural households. Phase 3 of the SVP is not being implemented in Moxico Province (**Annex SA1**).

46. Risks and Assumptions: The risks faced by the project and the countermeasures that have been proposed to reduce or eliminate them are detailed in **Annex H**. The risks include those emanating from the SESP shown in **Annex E**. The project has been rated as being a 'moderate' risk project, and **Table 6** summarises only the moderate risks. As per standard UNDP requirements, these risks will be monitored quarterly by the Project Manager. The Project Manager will report on the status of the risks to the UNDP Country Office, which will record progress in the UNDP ATLAS risk log. Management responses to critical risks will also be reported to the GEF in the annual PIR.

Table 6. Summary of risks rated as moderate.

Risk type	Brief description	Risk mitigation measure
Political: Risk arising from limitations and uncertainties in the off-grid energy market regarding market outlook, market access and competition.	Lack of visibility regarding electrification in project sites, thereby putting at risk the technology targets, direct GHG emission reductions and gender-sensitive number of direct beneficiaries. This risk could be compounded by COVID-related pressures, with competing priorities from government leading to delays or additional challenges.	By focusing on small-scale, household-level systems, the project can benefit from "light touch" regulation, rather than the more complex and still-to-be-elaborated tariff and licensing regime required for village-level mini-grids. Also, under Output 2.1, the project will deploy technical assistance on GIS-based modeling of low-cost rural energy access options that will serve two purposes, namely: (1) supporting policy-decision making in terms of the most cost-effective ways to achieve rural energy access; and (2) providing the private sector with key indicators regarding the geographically-segmented market potential for different off-grid renewable energy technologies (RETs).
COVID-19: If the vaccine program in Angola is delayed or if variants emerge that can escape the existing vaccines, it could lead to knock-on effects in advancing key activities.	The COVID Pandemic is, at the time of writing, at a point of inflection. Variants and second/third waves of infections are emerging worldwide with concomitant reactions from authorities, ranging from mild restrictions on movement and curfews, to strict lockdowns and strict domestic travel restrictions. The most robust forms of restrictions could negatively impact activities requiring the physical presence of team members and stakeholders.	Scheduling of activities such as trainings, market assessments/market intelligence gathering or other activities that may require physical presence in certain localities will be front-loaded, to allow for a buffer in case the sanitary situation deteriorates to the point of preventing the swift realization of these activities. Wherever possible, alternatives could be explored, such as rapidly training interviewers within targeted communities or regions, so that they may be able to conduct basic information gathering (i.e. market intelligence data) in cases where specialist teams and consultants can no longer access the sites of interest for a prolonged period of time. In addition, teleconferencing solutions will be proactively assessed and prepared by the project team and implementing partner in case they become essential later on.
Technical: The domestic supply and value chain and capacities of sustainable energy service providers in	The effect could be significant as the availability of low-quality generic products would undermine the business of the	Component 2 of the proposed project is designed to address this risk and will identify and implement a range of measures that are required for mitigating this risk, such as through the support to

Angola are very limited.	model proposed by the UNDP-GEF project, and ultimately have the detrimental impact of reducing consumer acceptance of the off-grid technologies.	adoption of quality standards for sustainable energy products (Output 2.1). In preparing the request for proposals for the selection of suppliers, special attention will be paid to technical specifications and the quality of the products. Further, the project will invest in the capacity building of rural communities on the benefits and use of off-grid RETs (Output 2.5), including the issue of product quality assurance and minimum performance. Also, under Component 1, the project will make low-cost finance accessible to rural communities (Output 1.3) to purchase quality products. In sum, the derisking instruments proposed by the project will enhance the affordability of quality products.
Financial: There is a risk that customers may not have the willingness or ability to pay for the products or have access to an appropriate method of payment	The proposed value chain model is based on the affordability of off-grid RETs. Lack of willingness and ability to pay will squarely translate in an overestimation of project impacts in terms of direct GHG emission reductions and direct project beneficiaries. This risk could be compounded by COVID-related pressures, with a widening of the affordability gap following COVID socio-economic impacts.	The project has gathered market intelligence on willingness and ability to pay. The data has been used to develop financial models to investigate payment modalities for each RET based on avoided energy costs. The results show that a combination of access to micro-finance and financing through solidary groups should make RETs affordable. All RETs have payback periods much less than capital outlay, with net savings accruing to households. In the second half of the project period, the solar-powered kiosks will serve as payment points, allowing customers to pay "off-line," while the money can then be sent to the private companies via e-Kwanza from the kiosks.
Climate change: Prolonged droughts or intense floods, which are expected to occur with greater frequency due to climate change, will adversely affect communities in Moxico, who are heavily dependent on natural resources and agriculture for their livelihoods.	Extreme climate events could affect BOP consumers' willingness and capacity to pay for off-grid solar technologies.	The design of access to finance (Output 1.3) of the project based on a combination of solidarity savings groups and microcredit, and the payment schedule required by suppliers will take into account the effects of climate change and the potential for climate shocks since the project targets base of the pyramid households who in most cases do not have much savings. One of the criteria used to choose project sites is accessibility during the rainy season when several parts of Moxico Province are inundated. The project has built flexibility to circumvent the accessibility and technology supply chain by making use of one mobile solar jango. At the same time, off-grid solar PV systems represent a viable climate adaptation alternative to the Angolan power sector, which depends heavily on hydropower generation.
Social: The project might have negative impacts on vulnerable groups, as well as their inclusiveness.	There is always a possibility that small vulnerable groups might feel excluded from the project intervention or benefits. Inappropriate skills and restricted management planning for the target communities/groups can potentially exclude stakeholders in decision-making.	The key project strategy to mitigate the potential negative impact of exclusion and restriction of vulnerable groups from the project intervention and related-benefits is to involve poorest and marginalised people in participatory development and implementation of the Stakeholder Engagement Plan (Annex F). Therefore, the project will adopt a participatory approach involving as many local stakeholders and groups as possible, with a specific focus on female-headed households.

		To avoid marginalisation of vulnerable groups and potential tensions over project intervention or benefits, the project will also invest in capacity building of communities in clean energy sources promoted by the project and alternative sources of income for local communities in the project areas (Output 2.5). To mitigate the high risk of human right violation with a focus on domestic violence in the landscape area, the project will include the human rights subject into all training and capacity building programmes in collaboration with governmental and traditional authorities. Strong and independent from the project management Grievance Redress Mechanism will be established in the project areas to address any conflicts related to human rights, resource use, inappropriate planning and benefit sharing on marginalized local people as a risk group (Annex F)
Social: The proposed project might entail issues related to gender equality and women's empowerment.	With the new technologies, such as lighting, women might potentially have an increased workload as they now have the perfect conditions to work at night. Also, according to Angolan customary laws, men are given greater opportunities for decision-making and to engage in capacity building activities. As a result of such, the project can potentially give some advantages in this field to males and potentially discriminate females from participation in the project management, trainings, development and implementation of the community pilot projects on clean energy.	To avoid this potential disequilibrium in the project implementation a Gender Action Plan has been designed to ensure women inclusion in delivery of all project Outputs was carefully developed (Annex G in ProDoc). The key project strategy to empower women is to involve them as well as poorest and marginalised people of the project areas in the planning and management of technology deployment (Output 1.3). Additionally, the project will make sure that women will participate in all trainings and capacity building programmes. Also, gender equality modules will be mainstreamed during these learning exercises to emphasize the key role of women in community-based projects and households. These issues will be addressed directly under Output 1.3 and 2.5. A two-tier Grievance Redress Mechanism (Annex F) will be established in the project area to mitigate potential adverse impact of the project activities on women as a risk group while ensuring that benefits from the project implementation are equally benefitting women. To control appropriate support of the women rights and gender equality during the project implementation all monitoring and evaluation mission for the project will be designed using fully participatory approach with opportunity for women to ensure their voices are heard and taken in account in the project management. In capturing lessons learned, the social effects of introducing the off-grid technologies will be monitored under Outcome 3.

47. Stakeholder engagement plan (SEP): Details of the SEP are found in **Annex F**. Participation plans were developed to ensure that the needs and priorities of stakeholders at all levels, including women, were expressed and taken into account in the formulation and implementation of the project. During the design of the project, stakeholder engagement and dialogue was carried out in coordination with the Ministry of Culture, Tourism and Environment, which appointed a dedicated staff to accompany the PPG Team during bilateral meetings and field visits. All stakeholder engagements in Moxico Province were carried out through prior coordination with officials of the Provincial Government and traditional Chiefs in villages and communes. A matrix of stakeholder importance in and influence on the project was designed based on detailed stakeholder engagements (**Annexes SA1 and SA3**). Using this matrix, a detailed communications strategy (including outreach tools such as market fairs, caravans and exhibitions; project website and social networks; brochures, bulletins and press releases; policy briefs; project monitoring reports) and engagement methodology (including methods such as, general workshops, specific workshops, strategic meetings, expert consultation, field visits, interviews and surveys, and project committees) to target each category of project stakeholders have been developed. A SEP timeline of activities and budget totalling US$292,116 are also provided in **Annex F**. The SEP has been fully integrated in the project activities discussed above in order to ensure stakeholder participation in project implementation as detailed in **Table 5**. **Annex F** also gives the details of the two-tiered grievance redress mechanism (GRM) that the project will use to address the grievances and complaints of project stakeholders.

48. Gender equality: This GEF project can be classified as gender transformative with a strong gender-sensitive approach, whereby gender equality in participation will be incorporated in the project design as per the Gender Action Plan in **Annex G**. The Gender Action Plan (**Table 7**) will guide the project implementation to build project partner capacity to mainstream gender and bring along strategies that empower women as agents rather than as victims of not having access to resources and climate change. This plan will be facilitated by the Stakeholder Engagement Plan (**Annex F**), which outlines the multiple ways in which women will be engaged in the project implementation as well as having recourse to the grievance resolution mechanism.

Table 7. Gender Action Plan.

Objective	Action	Indicator and Targets	Responsible / Institution	Timeline	Allocated Budget (US$)
Component 1: Policy derisking and finance for decentralised renewable energy					
Output 1.3 Access to finance to rural communities for the purchase of solar home systems and lanterns.	Enhance the financial literacy and access to micro-credit to rural communities for the purchase of solar home systems and solar lanterns.	Baseline: 0 Indicator: Number of women trained in financial literacy and able to apply for a micro-credit for the purchase of clean energy. Target: At least 60% of community women and female-headed households organised in associations/groups are financially literate and have access to micro-credit for the purchase of solar home systems and solar lanterns.	UNDP, in partnership with LWF and micro-credit institutions.	Year 1, Q3 – Year 5, Q4	272,200
Output 2: Market for off-grid renewable energy systems developed, including solar home systems and solar lanterns					
Outputs 2.1-2.5 Strengthen women's and men´s capacities	Support capacity building for national, provincial and sectoral	Baseline: 0 Indicator: Number of gender-differentiated	UNDP, in partnership with Min. of Culture,	Year 1, Q3 – Year 5, Q4	50,000

in policy/decision making, management, planning and implementation of clean energy technologies related-policies at all societal levels.	managers and officials on renewable energy technologies related legislation and policy making.	beneficiaries. Target: at least 50% women receiving capacity building and awareness on renewable energy technologies are women. At least 50% women are decision-makers in selecting off-grid RETs according to their household needs.	Tourism and Environment, MINEA, MINFAMU and Moxico provincial government.		
Output 2.4. Enhance capacity skills and competence of women in technical aspects related to the installation of solar home systems, its maintenance and after sales service.	Provide training and other skills development for relevant target groups of women in project areas on the installation of solar home systems to ensure quality installation and aftersales service.	Baseline: 0 Indicator: Number of gender-differentiated beneficiaries Target: At least 25% of community women receive technical training on these devices to ensure quality installation and after-sales service.	UNDP	Year 1, Q3 – Year 5, Q4	105,275
Output 2.5. Provide training and technical support to communities on how to use the clean energy products for greater energy access.	Sensitisation to expand awareness of rural communities of the benefits of renewable energy and how to use the solar systems through women's groups.	Target: At least 50% of trained women belong to women's groups.	UNDP	Year 1, Q3 – Year 5, Q4	165,500
Component 3: Outreach programme and dissemination of results					
Output 3.1: Produce lessons learned report based on project experience	Report prepared to discuss key findings and recommendations related to subsequent deployment of renewable energy technologies in a workshop. Incorporate gender-sensitive indicators and collection of sex-disaggregated data for monitoring and evaluating project results. Monitor and evaluate gender equality and women's participation and their empowerment through	Baseline: 0 Indicator: % of personnel from ministries and provincial authorities that participate in the workshop who are women. Target: At least 50% of the workshop participants and researchers are women. Sex disaggregated and gender responsive results and targets included in Results Framework and other monitoring and evaluation	UNDP	Year 1, Q4 – Year 5, Q4	118,581

	project interventions	formats at various levels.			
Output 3.2. Establish cooperation with technical institutes and universities.	Improve understanding of gender issues related to the off-grid sustainable energy technology value chains, including energy use patterns, capacity building needs of women and policy issues on a ministerial level related to clean energy technologies, among others. This will inform the output on lessons learned and disseminated. Support action research to identify issues related to gender equality and clean energy access so that capacity building and policy interventions can be planned in a specific manner.	Baseline: 0 Indicator: % of project participants who are women. Target: At least 50% of the students and researchers are women.	UNDP, in partnership with CINFOTEC, LTP Energias or ADPP (non-exclusive)	Year 1, Q3 – Year 5, Q4	87,619
Output 3.3. Project results incorporated into vocational schools' curriculum	Project results will be incorporated into the Angolan curriculum of vocational schools to build the human resource capacity in the renewable energy sector and to stimulate the local production of clean energy products.	Baseline: 0 Indicator: % of vocational schools' students who are women. Target: At least 50% of the vocational schools' students are women and complete successfully their studies on renewable energy.	UNDP, in partnership with ADPP, Don Bosco Training School and public vocational training schools in Moxico Province	Year 1, Q3 – Year 5, Q4	93,900
Activity 3.2.2. Investigate and find out what is the best communications strategy to apply to women on project sites.	Undertake consultations for this activity in a gender-responsive manner. Consult with women to learn what their needs are around the best way to raise awareness and knowledge towards the project´s proposed clean energy technologies.	Baseline: 0 Indicator: % participants in the consultations who are women. Target: At least 50% of participants of consultations are women and express their communication needs to best understand the usage benefits of clean energy technologies.	UNDP, in partnership with MINFAMU.	Year 1, Q3 – Year 5, Q4	65,919

49. South-South and Triangular Cooperation (SSTrC): Since the market for off-grid RETs in Angola is only nascent, Output 1.1 will review all technologies and their transfer and deployment models across the African region (**Annex SA4**) prior to identifying and demonstrating the most appropriate off-grid RETs in Angola while taking into account local specificities and gender issues. The project will therefore promote South-South cooperation through knowledge management. Further, the lessons learned that will be captured under Output 3.3 will be shared with as large a number of countries as possible through both printed and electronic media.

50. Sustainability: The factors that will contribute to the sustainability of the initiative include the following: using a private-sector led value chain, the decentralised renewable energy systems will be sold to end-users on a commercial basis without any subsidy; there will be a strong emphasis on quality equipment and installation; the suppliers will provide after-sales service for a specified period in case of any technical issues; the financial literacy of rural households will be enhanced and women-led solidarity groups operationalised to improve the creditworthiness of households; and communities will be trained on how to use the systems. Further, the project will support the development of a comprehensive geospatial map of least-cost technologies for promoting rural energy access. Together with the operationalisation of the value chain in Figure 2 and the derisking approach underpinning the project design (**Annex SA3**), this geospatial map will be used to further catalyse the market for off-grid renewable energy technologies. Cost recovery by upstream private actors in the value chain is essential for the sustainability of off-grid solar product market expansion. The project will investigate and provide proof-of-concept of alternative cost recovery mechanisms with a view to scalability. If the project can successfully lower the barriers and reduce or eliminate or transfer private sector risks to market development as intended, and demonstrate the energy service delivery model for rural communities, the market for small-scale renewables will become self-sustaining.

51. Scaling Up: Under the Government's grid extension plans until 2025, priority will be given to major urban areas such as provincial capitals and municipality capitals, meaning that many rural communes and villages will remain off-grid, particularly in the eastern provinces of Lunda Norte, Lunda Sul, Moxico, and Cuando Cubango. The power sector long-term vision states that localities that do not meet the grid expansion criteria will be considered for off-grid electrification through decentralised generation. Therefore, there will be significant potential to scale-up and replicate project activities in rural areas in other provinces, to which the Government has shown its commitment. The presence of many dispersed rural settlements in Angola means that there is a large market for decentralised renewable energy in the country. It is worth noting that Angola is one of the 'High Impact Countries' under SE4ALL, which signifies that it is among the countries with the highest electricity access deficits. Once the business model has been demonstrated and proven under the GEF-financed project, the model can then be replicated nationally in order to reduce the access deficit.

V. PROJECT MANAGEMENT

52. Cost efficiency and effectiveness*:* The project is designed to remove all identified obstacles and barriers towards achieving GHG emission reductions and strong sustainable co-benefits through the deployment of off-grid solar technologies in rural communities. Financial analyses have been carried out for a hand-held solar lantern (3 W) and SHS (15 W and 50 W). The calculations are given in **Annex SA7**. A solar lantern (SL) will replace hand-held dry battery-powered torches, while SHS will substitute standalone gasoline-powered generators. The calculations have been done on the basis that the payment for SL and SHS should not exceed the monthly avoided household expenditure on the baseline energy technologies. **Table 8** summarises the payback period, duration of 'free' energy compared to baseline technologies, and net savings on energy bill accruing to households during the lifetime of off-grid solar products bought at the solar jango. The analyses show that: (1) the payback periods for all product types are well within the warranty period of products; (2) off-grid technologies deliver positive net savings on household energy bill, implying that these technologies can increase household disposable income that can alternatively be invested in education, health or income generating activities; and (3) with a down payment of 10% to 15% and a monthly repayment equal to avoided energy cost, products can be repaid between 7 to 8 months. These results demonstrate the cost-efficiency of

off-grid products to a rural household, and demonstrate the cost-effectiveness of using GEF funding to set up the value chain in **Figure 2** for delivering technologies at an affordable price to rural households.

Table 8. Results of financial benefits of off-grid solar products.

Technology type	Cost (Kz)	Payback time (month)	Period for 'free' energy[40] (month)	Net savings on energy bill during product lifetime (Kz)	Household payment modality		
					Upfront payment (% of cost)	Monthly repayment (Kz)	Repayment period (month)
3 W SL	13,950 (~US$ 49)[41]	8.5	15.5	25,650 (~US$ 90)	15%	1,500 (~US$ 5.3)	8
15 W SHS	46,500 (~US$ 163)	2.2	57.8	327,750 (~US$ 1,150)	10%	6,000 (~US$ 21)	7
50 W SHS	144,325 (~US$ 507)	5.5	42.5	780,000 (~US$ 2,735)	15%	12,000 (US$ 42)	10

53. Project management: The project will be implemented in the geographical sites depicted in Figure 3 and with details given in paragraph 9. Coordination will be done at both the national and provincial level. The Project Management Unit (PMU) that will host the Project Manager (PM) will be housed in the Ministry of Culture, Tourism and Environment, while the Technical Officer (TO) will be located in Moxico Province where most of the project activities will be implemented. The Administrative Assistant (AA) will be hosted in UNDP CO and be employed by UNDP because he/she needs access to the UNDP Atlas system. The TO will be housed in the Energy Directorate of the Provincial Government. The project will complement ongoing programmes as discussed in Section IV. By drawing from lessons learned from past initiatives and by collaborating with ongoing initiatives, the GEF-financed, UNDP-supported project will ensure cost efficiency.

54. Agreement on intellectual property rights and use of logo on the project's deliverables and disclosure of information**:** To accord proper acknowledgement to the GEF for providing grant funding, the GEF logo will appear together with the UNDP logo on all promotional materials, other written materials like publications developed by the project, and project hardware. Any citation on publications regarding projects funded by the GEF will also accord proper acknowledgement to the GEF. Information will be disclosed in accordance with relevant policies notably the UNDP Disclosure Policy[42] and the GEF policy on public involvement.[43]

[40] This is given by the difference between product lifetime and payback period.
[41] 1US$ = 285 Kz
[42] See http://www.undp.org/content/undp/en/home/operations/transparency/information_disclosurepolicy/.
[43] See https://www.thegef.org/gef/policies_guidelines.

VI. PROJECT RESULTS FRAMEWORK

Table 9. Project results framework.

This project will contribute to the following Sustainable Development Goal (s): SDG 7-Ensure access to affordable, reliable, sustainable and modern energy for all; SDG 13 – Take urgent action to combat climate change and its impacts					
This project will contribute to the following country outcome included in the UNPAF/Country Programme Document: *Guarantee of the basic necessities for development and the positioning of a competitive Angola in the international context. Promotion of growth and economic diversification, national business, job creation (including the integration of youth in active life) and the reinforcement of the positioning of Angola in the regional and international context, in particular in SADC and the African Union.* *RESULT 3.2: ENVIRONMENTAL SUSTAINABILITY CLIMATIC CHANGE AND THE REDUCTION OF RISKS AND DISASTERS: By 2019, environmental sustainability is reinforced through improvement in the management of energy, natural resources, access to green technologies, strategies for climate change, the conservation of biodiversity and plans and systems for risk and disaster reduction.* *Indicator; baseline; target: # Number of safety initiatives related to climate change, biodiversity, desertification, green economy and energy security; an initiative linked to biodiversity (Iona National Park); at least 5 initiatives*					
This project will be linked to the following output of the UNDP Strategic Plan: *Output 1.5.1: Solutions adopted to achieve universal access to clean, affordable and sustainable energy*					
	Objective and Outcome Indicators	**Baseline[44]**	**Mid-term Target[45]**	**End of Project Target**	**Data Collection Methods and Risks/Assumptions[46]**
Project Objective: ***To catalyse investments in decentralised renewable energy systems to expand energy access for base-of-the-pyramid consumers and to reduce GHG emissions.***	Mandatory Indicator 1: Number and proportion of households benefitting from clean, affordable and sustainable energy access (project will target rural households only)	*0*	*3,385 rural households; 1,693 women-headed (100% households in rural areas; 50% households headed by women)*	*14,200 rural households; 7,100 women-headed (100% households in rural areas; 50% households headed by women)*	*The number of beneficiary households was estimated based on total uptake of SHS units (assumed to be one unit per household) plus 20% of total units of solar lanterns.* *The number of rural households in Moxico Province is derived from the Population Census 2014.* Risks: Targets for technology uptake not achieved because of lower than expected social and cultural acceptance; households purchase lower quality, and cheaper products not sold through solar jangos because of lack of national quality standards; time taken to form women solidarity groups is longer than expected, thereby limiting technology adoption Assumptions: The targets have not taken into account population dynamics, and used the official 2014 statistics of number of rural household for the entire project duration; percentage households can be updated during

[44] Baseline, mid-term and end of project target levels must be expressed in the same neutral unit of analysis as the corresponding indicator. Baseline is the current/original status or condition and need to be quantified. The baseline must be established before the project document is submitted to the GEF for final approval. The baseline values will be used to measure the success of the project through implementation monitoring and evaluation.

[45] Target is the change in the baseline value that will be achieved by the mid-term review and then again by the terminal evaluation.

[46] Data collection methods should outline specific tools used to collect data and additional information as necessary to support monitoring. The PIR cannot be used as a source of verification.

					MTR and TE using latest available population statistics; the technology adoption pattern of households remain valid during project implementation (assumptions to be reviewed at MTR and TE)
	Mandatory Indicator 2 (Lifetime direct project GHG emissions mitigated): *Direct project CO_2 emission reductions, metric tCO_{2e}.*	*0*	*8,860*	*100,000*	*Data regarding technologies used for lighting, as well as sources and quantities of fuels used by households were collected during field visits. Number of units of technologies deployed was estimated depending on a combination of population in target communities, target in Energy Action Plan 2018-2022 and project financial resources. Emission reduction from SHS was calculated from avoided gasoline in baseline multiplied by emission factor of gasoline (IPCC default value).*
					Risks: Targets for technology uptake not achieved because of lower than expected social and cultural acceptance; households purchase lower quality, and cheaper products because of lack of national quality standards; time taken to form women solidarity groups is longer than expected, thereby limiting technology adoption Assumptions: Market demand for technologies is as expected, and technology supply chain has been established with adequate level of private sector participation; all project partners are committed to support the development of the technology supply chain; methodologies for calculating GHG emission reductions are appropriate
	Mandatory indicator 3: *# of direct beneficiaries disaggregated by gender*.	*0*	*20,880 persons of which 10,650 women and 10,230 men*	*81,400 persons of which 41,515 women and 39,885 men*	*The number of persons per household and percentage of women in Moxico Province were obtained from the Population Census 2014.*
					Risks: Targets for technology uptake not achieved because of lower than expected social and cultural acceptance; households purchase lower quality, and cheaper products because of lack of national quality standards; time taken to form women solidarity groups is longer than expected, thereby limiting technology adoption Assumptions: Household energy demand is as

					expected based on adequate on-the-ground capacity building coupled with after sales services provided to households; technologies are used appropriately by end-users; the setting up of women solidarity groups and availability of micro-credit finance to these groups is adequate to reach technology targets; the estimated cross ownership of different technologies by households is valid
Outcome[47] 1 ***Enabling environment created for private sector investment in decentralised renewable energy***	*Indicator 4: Number of women-led solidarity groups established and supported by project (to make financial capital accessible to households for purchasing off-grid renewable energy products)*	*0*	*125*	*300*	*The number of SACs that is supported by the project is based on three parameters: (1) SACs composition by number and gender, which is replicated based on the model developed successfully by the LWF in Camanongue; (2) each member of a SAC corresponds to a household; and (3) an assumption that the capacity building and financial support of the project will have a replication factor of at least 10 during the project lifetime in terms of scaling up of SACs. Please note that the women who are members of the SACs are also heads of families, and as such are accounted in the number of direct women beneficiaries of the project as per Mandatory Indicator 3.*
					Risks: Partnership agreement with development partners having experience with setting up, operationalisng, monitoring and evaluation of SACs performance is not put into practice; low interest of women and/or high turnover of SACs members do not allow targets to be met Assumptions: Women are willing to form solidarity groups for self-development; solidarity groups at least use some of their savings to adopt off-grid renewable energy technologies rather than spending on other goods/services
	Indicator 5: Number of households making use of mobile money to purchase off-grid renewable energy products	*0*	*0*	*1,500*	*The only mobile money service is e-kwanza that is supported by BPC. The number of users at project start was around 91,000, and available mainly in urban centres. Statistics on the use of e-kwanza will be obtained from BPC (and other*

[47]Outcomes are short to medium term results that the project makes a contribution towards, and that are designed to help achieve the longer term objective. Achievement of outcomes will be influenced both by project outputs and additional factors that may be outside the direct control of the project.

					mobile money services/platforms from their respective providers).
					Risks: Low commitment of service providers to participate in the project and to extend their mobile money platforms to rural areas; the bank-led pay-as-you-go model prevails thereby constraining the usefulness and reach of mobile money Assumptions: Capacity building leads to better understanding of the benefits, and hence uptake of mobile money; providers of mobile money make their platforms available in rural areas
	Indicator 6: Financial and economic analyses to demonstrate the business case for off-grid technologies	*0*	*1 business case report covering at 4 technologies (e.g. those proposed in the ProDoc)*	*1 business case report covering at least 10 technologies (based on market development)*	*The inventory of the types and quantity of technologies sold or dispensed through the solar jangos will be logged and audited by the project.*
					Risks: Suppliers are not willing or show low commitment to participate in the project; the quality of products supplied do not meet the minimum standards established by the project Assumptions: There is adequate demand for off-grid renewable energy products, and a reliable supply of technologies meeting minimum quality standards
Outcome 2 ***Successful establishment of a household-level energy service delivery model for replication nationally. Around 81,000 beneficiaries have access to sustainable lighting technologies***	*Indicator 7: Number of solar jangos established and operational*	*0*	*2 permanent & 1 mobile*	*5 permanent and 1 mobile*	*The number of solar jangos will be accounted for in the project reports, and will be subject to project audit.*
					Risks: Lower than expected demand for off-grid renewable energy products and/or insufficient interest from suppliers to participate in the project lead to the need for fewer solar jangos; the model proposed to run the solar jangos is not sustainable because of inadequate performance of partnership agreements Assumptions: Once set up, the solar jangos will be operational during and after the project lifetime; continued commitment of the Provincial Government to support solar jangos

	Indicator 8: Number of rural households capacitated in appropriate use of off-grid technologies and having access to technologies and after-sales services	*0*	*6,000*	*25,000*	*Project records of the contact details of every person participating in trainings, as well as surveys carried out under Outcome 3 for capturing lessons learned*
					Risks: Lower than expected interest in off-grid renewable energy technologies from rural households; delays in capacity building of trainers and technicians to support outreach activities to rural households Assumptions: The number of technology adopters will be between 70% and 75% of households reached and capacitated
	Indicator 9: Number of local companies linked to base of pyramid consumers and supplying products that meet minimum standards	*0*	*4*	*12*	*Companies will be selected for supplying off-grid renewable energy technologies through solar jangos based on pre-established criteria (as detailed in Section IV under Output 2.1). Solar jangos will hold a register of these accredited suppliers, as well as the number and type of products supplied and sold by each supplier.*
					Risks: Lower than expected interest of private companies to serve base of pyramid consumers; demand for off-grid renewable energy products lower than gauged during project design leading to uncompetitive market; suppliers not able or willing to meet minimum product quality and performance standards set by the project Assumptions: Pricing mechanism employed by suppliers is close to those used during project design to demonstrate the financial viability of off-grid renewable energy technologies; technology suppliers willing to move towards a PAYG/lease to own model for technology supply; providers of mobile money services partner with project to increase the visibility and benefits of mobile money as a viable means of promoting commerce in rural areas
Outcome 3 ***Lessons learned and experience from project interventions support replication and scaling-up of project results***	*Indicator 10: Number of vocational training schools in rural areas delivering training on off-grid renewable energy products*	*0*	*2*	*3*	*The project will establish memorandum of understanding (MOU) with vocational training schools. The training schools will receive technical assistance to develop and integrate training modules in their curriculum, as well as receiving assistance to set up necessary laboratories for hands-on training. The number of MOUs signed together with the record to*

					number of trained technicians by vocational training schools will be used as statistics.
					Risks: Low interest shown by vocational training schools to develop new modules on off-grid renewable energy technologies because of the lack of understanding of their benefits and potential market demand; cumbersome administrative hurdles in public sector delays partnerships with publicly-owned vocational training schools (at least in Moxico Province); lower than expected market development for off-grid renewable energy products has detrimental impact on demand for technicians, resulting in vocational training schools dropping the new training modules Assumptions: Vocational training schools already have a course such as electrical wiring and installation of electrical and electronic devices and appliances that can be used to graft training on the installation and maintenance of off-grid renewable energy products;
	Indicator 11: Lessons learned report on setting up, operationalization and efficacy of technology, finance and information flows value chain proposed by project	*0*	*2*	*4*	*The project records and M&E framework will be used to keep track of all project deliverables, including the lessons learned reports. It is proposed that a stocktaking study be carried out at the MTR in order to inform any adjustments of the technology supply chain model. This will also be the opportunity to review in detail all the assumptions made during project design.*
					Risks: Lack of sufficient time and financial resources available to investigate lessons learned in detail; Assumptions: Lessons learned studies will cover issues such as effectiveness of model proposed to promote off-grid renewable energy products using a private sector-led approach; effectiveness of derisking instruments to catalyse private sector investments in off-grid renewable energy technologies; technology adoption dynamics by rural households, including the gender transformative role of project

	Indicator 12: Number of replication plan, including detailed budget, for scaling up the deployment of off-grid technologies in Angola (based on lessons learned)	*0*	*0*	*1*	*The project records and M&E framework will be used to keep track of all project deliverables, including the replication plan.* Risks: The lower than expected quality of lessons learned reports jeopardizes the quality and meaningfulness of replication plan; lack of enforcement of minimum quality and performance standards of off-grid renewable energy technologies undermines replication efforts because of market flooding with cheap and unreliable products erodes social acceptance of these technologies; rural access and adoption of mobile money remains lower than expected thereby limiting the scaling up rate of off-grid renewable energy systems Assumptions: Government policy, strategy and action plan on rural electrification remains coherent and transparent so that the geographical relevance of off-grid renewable energies is visible to private investors; project partners, especially government and NGOs, do not undermine the private-sector led model for deploying off-grid renewable energy technologies by making same technologies available free of charge

VII. MONITORING AND EVALUATION (M&E) PLAN

55. The project results as outlined in the project results framework will be monitored annually and evaluated periodically during project implementation to ensure the project effectively achieves these results. Supported by Outcome 3 (Lessons learned and experience of from project interventions support replication and scaling up of project results), the project monitoring and evaluation plan will also facilitate learning and ensure knowledge is shared and widely disseminated to support the scaling up and replication of project results. Project-level monitoring and evaluation will be undertaken in compliance with UNDP requirements as outlined in the UNDP POPP and UNDP Evaluation Policy. The UNDP Country Office will work with the relevant project stakeholders to ensure UNDP M&E requirements are met in a timely fashion and to high quality standards. Additional mandatory GEF-specific M&E requirements (as outlined below) will be undertaken in accordance with the GEF M&E policy and other relevant GEF policies[48].

56. In addition to these mandatory UNDP and GEF M&E requirements, other M&E activities deemed necessary to support project-level adaptive management will be agreed during the Project Inception Workshop and will be detailed in the Inception Report. This will include the exact role of project target groups and other stakeholders in project M&E activities including the GEF Operational Focal Point and national/regional institutes assigned to undertake project monitoring. The GEF Operational Focal Point will strive to ensure consistency in the approach taken to the GEF-specific M&E requirements (notably the GEF Tracking Tools) across all GEF-financed projects in the country. This could be achieved for example by using one national institute to complete the GEF Tracking Tools for all GEF-financed projects in the country, including projects supported by other GEF Agencies.[49]

57. **M&E Oversight and monitoring responsibilities:**

Project Manager: The Project Manager is responsible for day-to-day project management and regular monitoring of project results and risks, including social and environmental risks. The Project Manager will ensure that all project staff maintain a high level of transparency, responsibility and accountability in M&E and reporting of project results. The Project Manager will inform the Project Board, the UNDP Country Office and the UNDP-GEF RTA of any delays or difficulties as they arise during implementation so that appropriate support and corrective measures can be adopted.

The Project Manager will develop annual work plans based on the multi-year work plan included in Annex, including annual output targets to support the efficient implementation of the project. The Project Manager will ensure that the standard UNDP and GEF M&E requirements are fulfilled to the highest quality. This includes, but is not limited to, ensuring the results framework indicators are monitored annually in time for evidence-based reporting in the GEF PIR, and that the monitoring of risks and the various plans/strategies developed to support project implementation (e.g. ESMP, gender action plan, stakeholder engagement plan etc..) occur on a regular basis.

Project Board: The Project Board will take corrective action as needed to ensure the project achieves the desired results. The Project Board will hold project reviews to assess the performance of the project and appraise the Annual Work Plan for the following year. In the project's final year, the Project Board will hold an end-of-project review to capture lessons learned and discuss opportunities for scaling up and to highlight project results and lessons learned with relevant audiences. This final review meeting will also discuss the findings outlined in the project terminal evaluation report and the management response.

Project Implementing Partner: The Implementing Partner is responsible for providing all required information and data necessary for timely, comprehensive and evidence-based project reporting, including results and financial data, as necessary. The Implementing Partner will strive to ensure project-level M&E is undertaken by national institutes, and is aligned with national systems so that the data used and generated by the project supports national systems.

[48] See https://www.thegef.org/gef/policies_guidelines
[49] See https://www.thegef.org/gef/gef_agencies

UNDP Country Office: The UNDP Country Office will support the Project Manager as needed, including through annual supervision missions. The annual supervision missions will take place according to the schedule outlined in the annual work plan. Supervision mission reports will be circulated to the project team and Project Board within one month of the mission. The UNDP Country Office will initiate and organize key GEF M&E activities including the annual GEF PIR, the *independent mid-term review* and the independent terminal evaluation. The UNDP Country Office will also ensure that the standard UNDP and GEF M&E requirements are fulfilled to the highest quality.

The UNDP Country Office is responsible for complying with all UNDP project-level M&E requirements as outlined in the UNDP POPP. This includes ensuring the UNDP Quality Assurance Assessment during implementation is undertaken annually; that annual targets at the output level are developed, and monitored and reported using UNDP corporate systems; the regular updating of the ATLAS risk log; and, the updating of the UNDP gender marker on an annual basis based on gender mainstreaming progress reported in the GEF PIR and the UNDP ROAR. Any quality concerns flagged during these M&E activities (e.g. annual GEF PIR quality assessment ratings) must be addressed by the UNDP Country Office and the Project Manager.

The UNDP Country Office will retain all M&E records for this project for up to seven years after project financial closure to support ex-post evaluations undertaken by the UNDP Independent Evaluation Office (IEO) and/or the GEF Independent Evaluation Office (IEO).

58. UNDP-GEF Unit: Additional M&E and implementation quality assurance and troubleshooting support will be provided by the UNDP-GEF Regional Technical Advisor and the UNDP-GEF Directorate as needed.

59. **Additional GEF monitoring and reporting requirements:**

Inception Workshop and Report: A project inception workshop will be held within two months after the project document has been signed by all relevant parties to, amongst others:

a) Re-orient project stakeholders to the project strategy and discuss any changes in the overall context that influence project strategy and implementation;
b) Discuss the roles and responsibilities of the project team, including reporting and communication lines and conflict resolution mechanisms;
c) Review the results framework and finalize the indicators, means of verification and monitoring plan;
d) Discuss reporting, monitoring and evaluation roles and responsibilities and finalize the M&E budget; identify national/regional institutes to be involved in project-level M&E; discuss the role of the GEF OFP in M&E;
e) Update and review responsibilities for monitoring the various project plans and strategies, including the risk log; SESP, Environmental and Social Management Plan and other safeguard requirements; project grievance mechanisms; the gender strategy; the knowledge management strategy, and other relevant strategies;
f) Review financial reporting procedures and mandatory requirements, and agree on the arrangements for the annual audit; and
g) Plan and schedule Project Board meetings and finalize the first year annual work plan.

The Project Manager will prepare the inception report no later than one month after the inception workshop. The inception report will be cleared by the UNDP Country Office and the UNDP-GEF Regional Technical Adviser, and will be approved by the Project Board.

GEF Project Implementation Report (PIR): The annual GEF PIR covering the reporting period July (previous year) to June (current year) will be completed for each year of project implementation. Any environmental and social risks and related management plans will be monitored regularly, and progress will be reported in the PIR. The PIR submitted to the GEF will be shared with the Project Board. The quality rating of the previous year's PIR will be used to inform the preparation of the subsequent PIR.

Lessons learned and knowledge generation: Results from the project will be disseminated within and beyond the project intervention area through existing information sharing networks and forums. The project will identify and participate, as relevant and appropriate, in scientific, policy-based and/or any other networks, which may be of benefit to the project. The project will identify, analyse and share lessons learned that might be beneficial to the design and implementation of similar projects and disseminate these lessons widely. There

will be continuous information exchange between this project and other projects of similar focus in the same country, region and globally.

GEF Core Indicators:
The GEF Core indicators included as Annex will be used to monitor global environmental benefits and will be updated for reporting to the GEF prior to MTR and TE. Note that the project team is responsible for updating the indicator status. The updated monitoring data should be shared with MTR/TE consultants prior to required evaluation missions, so these can be used for subsequent ground truthing. The methodologies to be used in data collection have been defined by the GEF and are available on the GEF website. If relevant to the project: The required Protected Area Management Effectiveness Tracking Tool (METTs) have been prepared and the scores included in the GEF Core Indicators.

Independent Mid-term Review (MTR):

The terms of reference, the review process and the final MTR report will follow the standard templates and guidance for GEF-financed projects available on the UNDP Evaluation Resource Center (ERC).

The evaluation will be 'independent, impartial and rigorous'. The evaluators that will be hired to undertake the assignment will be independent from organizations that were involved in designing, executing or advising on the project to be evaluated. Equally, the evaluators should not be in a position where there may be the possibility of future contracts regarding the project under review.

The GEF Operational Focal Point and other stakeholders will be actively involved and consulted during the evaluation process. Additional quality assurance support is available from the BPPS/GEF Directorate.

The final MTR report and MTR TOR will be publicly available in English and will be posted on the UNDP ERC by (add date included on cover page of this project document). A management response to MTR recommendations will be posted in the ERC within six weeks of the MTR report's completion.

Terminal Evaluation (TE):
An independent terminal evaluation (TE) will take place upon completion of all major project outputs and activities. The terms of reference, the evaluation process and the final TE report will follow the standard templates and guidance for GEF-financed projects available on the UNDP Evaluation Resource Center.

The evaluation will be 'independent, impartial and rigorous'. The evaluators that will be hired to undertake the assignment will be independent from organizations that were involved in designing, executing or advising on the project to be evaluated. Equally, the evaluators should not be in a position where there may be the possibility of future contracts regarding the project being evaluated.

The GEF Operational Focal Point and other stakeholders will be actively involved and consulted during the terminal evaluation process. Additional quality assurance support is available from the BPPS/GEF Directorate.

The final TE report and TE TOR will be publicly available in English and posted on the UNDP ERC by *(add date included on cover page of this project document)*. A management response to the TE recommendations will be posted to the ERC within six weeks of the TE report's completion.

Final Report: The project's terminal GEF PIR along with the terminal evaluation (TE) report and corresponding management response will serve as the final project report package. The final project report package shall be discussed with the Project Board during an end-of-project review meeting to discuss lesson learned and opportunities for scaling up.

Agreement on intellectual property rights and use of logo on the project's deliverables and disclosure of information**:** To accord proper acknowledgement to the GEF for providing grant funding, the GEF logo will appear together with the UNDP logo on all promotional materials, other written materials like publications developed by the project, and project hardware. Any citation on publications regarding projects funded by the GEF will also accord proper acknowledgement to the GEF. Information will be disclosed in accordance with relevant policies notably the UNDP Disclosure Policy[50] and the GEF policy on public involvement[51].

60. **Mandatory GEF M&E Requirements and M&E Budget:**

Table 10. GEF M&E requirements and M&E budget

GEF M&E requirements	Primary responsibility	Indicative costs to be charged to the Project Budget[52] (US$)		Time frame
		GEF grant	Co-financing	
Inception Workshop	UNDP Country Office	USD 5,000	*None*	Within two months of project document signature
Inception Report	Project Manager	None	None	Within two weeks of inception workshop
Standard UNDP monitoring and reporting requirements as outlined in the UNDP POPP	UNDP Country Office	None	None	Quarterly, annually
Risk management	Project Manager Country Office	None	None	Quarterly, annually
Monitoring of indicators in project results framework *(Min. of Culture, Tourism and Environment)*	Project Manager	Per year: USD 3,000	*None*	Annually before PIR
GEF Project Implementation Report (PIR)	Project Manager and UNDP Country Office and UNDP-GEF team	None	None	Annually
Monitoring of environmental and social risks, and corresponding management plans as relevant	Project Manager UNDP Country Office	*To be carried out as part of the Annual Work Plan's preparation.*	*None*	On-going
Monitoring activities related to the Stakeholder Engagement Plan	Project Manager UNDP Country Office	*To be carried out as part of the Annual Work Plan's preparation.*	*None*	On-going
Monitoring activities related to the Gender Action Plan	Project Manager UNDP Country Office UNDP GEF team	USD 10,000	*None*	On-going
Addressing environmental and social grievances	Project Manager UNDP Country Office	USD 10,000	*None*	On-going

[50] See http://www.undp.org/content/undp/en/home/operations/transparency/information_disclosurepolicy/

[51] See https://www.thegef.org/gef/policies_guidelines

[52] Excluding project team staff time and UNDP staff time and travel expenses.

GEF M&E requirements	Primary responsibility	Indicative costs to be charged to the Project Budget[52] (US$)		Time frame
		GEF grant	Co-financing	
Project Board meetings	Project Board UNDP Country Office Project Manager	*Add*	*None*	At minimum annually
Supervision missions	UNDP Country Office	None[53]	*None*	Annually
Oversight missions	UNDP-GEF team	None[53]	*None*	Troubleshooting as needed
GEF Secretariat learning missions/site visits	UNDP Country Office and Project Manager and UNDP-GEF team	None	*None*	To be determined.
Mid-term GEF Tracking Tool to be updated by External Consultants	Project Manager and External Consultants	To be completed as part of the MTR	*None*	*Before mid-term review mission takes place.*
Independent Mid-term Review (MTR) and management response	UNDP Country Office and Project team and UNDP-GEF team	USD 46,500	*None*	*Between 2nd and 3rd PIR.*
Terminal GEF Tracking Tool to be updated by External Consultants	Project Manager and External Consultants	To be completed as part of the TE	*None*	Before terminal evaluation mission takes place
Independent Terminal Evaluation (TE) included in UNDP evaluation plan, and management response	UNDP Country Office and Project team and UNDP-GEF team	USD 64,960	*None*	At least three months before operational closure
Translation of MTR and TE reports into English	*UNDP Country Office*	*None*	*None*	*As required. GEF will only accept reports in English.*
TOTAL indicative COST Excluding project team staff time, and UNDP staff and travel expenses		USD 151,460		

VIII. GOVERNANCE AND MANAGEMENT ARRANGEMENTS

61. Roles and responsibilities of the project's governance mechanism: The project will be implemented following UNDP's national implementation modality, according to the Standard Basic Assistance Agreement between UNDP and the Government of Angola, and the Country Programme. The **Implementing Partner** for this project is the Ministry of Culture, Tourism and Environment.

62. The Implementing Partner is the entity to which the UNDP Administrator has entrusted the implementation of UNDP assistance specified in this signed project document along with the assumption of full responsibility and accountability for the effective use of UNDP resources and the delivery of outputs, as set forth in this document.

    The Implementing Partner is responsible for executing this project. Specific tasks include:

[53] The costs of UNDP Country Office and UNDP-GEF Unit's participation and time are charged to the GEF Agency Fee.

- Project planning, coordination, management, monitoring, evaluation and reporting. This includes providing all required information and data necessary for timely, comprehensive and evidence-based project reporting, including results and financial data, as necessary. The Implementing Partner will strive to ensure project-level M&E is undertaken by national institutes and is aligned with national systems so that the data used and generated by the project supports national systems.
- Risk management as outlined in this Project Document;
- Procurement of goods and services, including human resources;
- Financial management, including overseeing financial expenditures against project budgets;
- Approving and signing the multiyear workplan;
- Approving and signing the combined delivery report at the end of the year; and,
- Signing the financial report or the funding authorization and certificate of expenditures.

UNDP: UNDP is accountable to the GEF for the implementation of this project. This includes oversight of project execution to ensure that the project is being carried out in accordance with agreed standards and provisions. UNDP is responsible for delivering GEF project cycle management services comprising project approval and start-up, project supervision and oversight, and project completion and evaluation. UNDP is also responsible for the Project Assurance role of the Project Board/Steering Committee

63. The project organisation structure is as shown in Error! Reference source not found..

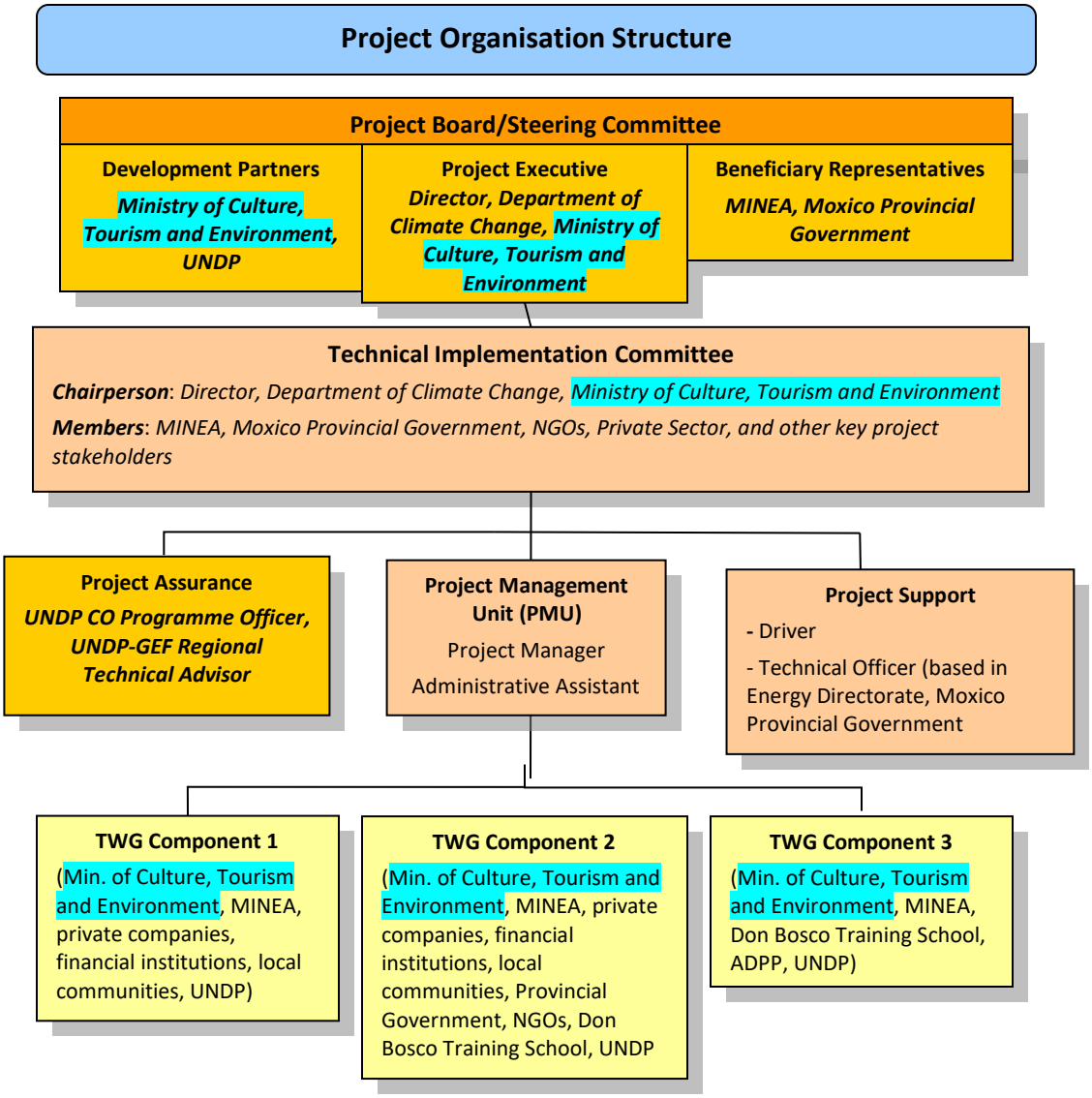


Figure 4. Project organisational structure.

64. Project Board: The Project Board (also called Project Steering Committee) is responsible for taking corrective action as needed to ensure the project achieves the desired results. In order to ensure UNDP's ultimate accountability, Project Board decisions should be made in accordance with standards that shall ensure management for development results, best value money, fairness, integrity, transparency and effective international competition.

65. In case consensus cannot be reached within the Board, the UNDP Resident Representative (or their designate) will mediate to find consensus and, if this cannot be found, will take the final decision to ensure project implementation is not unduly delayed.

Specific responsibilities of the Project Board include:

- Provide overall guidance and direction to the project, ensuring it remains within any specified constraints;
- Address project issues as raised by the project manager;

- Provide guidance on new project risks, and agree on possible mitigation and management actions to address specific risks;
- Agree on project manager's tolerances as required, within the parameters set by UNDP-GEF, and provide direction and advice for exceptional situations when the project manager's tolerances are exceeded;
- Advise on major and minor amendments to the project within the parameters set by UNDP-GEF;
- Ensure coordination between various donor and government-funded projects and programmes;
- Ensure coordination with various government agencies and their participation in project activities;
- Track and monitor co-financing for this project;
- Review the project progress, assess performance, and appraise the Annual Work Plan for the following year;
- Appraise the annual project implementation report, including the quality assessment rating report;
- Ensure commitment of human resources to support project implementation, arbitrating any issues within the project;
- Review combined delivery reports prior to certification by the implementing partner;
- Provide direction and recommendations to ensure that the agreed deliverables are produced satisfactorily according to plans;
- Address project-level grievances;
- Approve the project Inception Report, Mid-term Review and Terminal Evaluation reports and corresponding management responses;
- Review the final project report package during an end-of-project review meeting to discuss lesson learned and opportunities for scaling up.
- Ensure highest levels of transparency and take all measures to avoid any real or perceived conflicts of interest.

The composition of the Project Board must include the following roles:

66. Executive: Is an individual who represents ownership of the project and chairs the Project Board. The Executive is normally the national counterpart for nationally implemented projects. The Project Executive is the Director of the Department of Climate Change, Ministry of Culture, Tourism and Environment.

The Executive is ultimately responsible for the project, supported by the Beneficiary Representatives and Development Partners. The Executive's role is to ensure that the project is focused throughout its life cycle on achieving its objectives and delivering outputs that will contribute to higher level outcomes. The executive has to ensure that the project gives value for money, ensuring a cost-conscious approach to the project, balancing the demands of beneficiary representatives and development partners.

Specific Responsibilities: (as part of the above responsibilities for the Project Board):

- Ensure that there is a coherent project organisation structure and logical set of plans;
- Set tolerances in the AWP and other plans as required for the Project Manager;
- Monitor and control the progress of the project at a strategic level;
- Ensure that risks are being tracked and mitigated as effectively as possible;
- Brief relevant stakeholders about project progress;
- Organise and chair Project Board meetings.

67. Development Partners: Individuals or groups representing the interests of the parties concerned that provide funding and/or technical expertise to the project. The Development Partners are the Ministry of Culture, Tourism and Environment and UNDP.

Specific Responsibilities (as part of the above responsibilities for the Project Board):

- Make sure that progress towards the outputs remains consistent from the development partner perspective;

- Promote and maintain focus on the expected project output(s) from the point of view of development partner management;
- Ensure that the development partner resources required for the project are made available;
- Contribute development partner opinions on Project Board decisions on whether to implement recommendations on proposed changes;
- Arbitrate on, and ensure resolution of, any development partner priority or resource conflicts.

68. Beneficiary Representative(s): The Beneficiary Representative(s) is an individual or group representing the interests of those who will ultimately benefit from the project. The Beneficiary Representative's primary function within the Board is to ensure the realization of project results from the perspective of project beneficiaries. Often civil society representative(s) can fulfil this role. The Beneficiary Representatives are MINEA and the Moxico Provincial Government.

The Beneficiary Representative is responsible for validating the needs and for monitoring that the solution will meet those needs within the constraints of the project. The Beneficiary Representative role monitors progress against targets and quality criteria. This role may require more than one person to cover all the beneficiary interests. For the sake of effectiveness, the role should not be split between too many people.

Specific Responsibilities (as part of the above responsibilities for the Project Board):

- Prioritize and contribute beneficiaries' opinions on Project Board decisions on whether to implement recommendations on proposed changes;
- Specification of the beneficiaries' needs is accurate, complete and unambiguous;
- Implementation of activities at all stages is monitored to ensure that they will meet the beneficiaries' needs and are progressing towards that target;
- Impact of potential changes is evaluated from the beneficiary point of view;
- Risks to the beneficiaries are frequently monitored.

69. Project Manager: The Project Manager has the authority to run the project on a day-to-day basis on behalf of the Project Board within the constraints laid down by the Board. The Project Manager is responsible for day-to-day management and decision-making for the project. The Project Manager's prime responsibility is to ensure that the project produces the results specified in the project document, to the required standard of quality and within the specified constraints of time and cost.

The Implementing Partner appoints the Project Manager, who should be different from the Implementing Partner's representative in the Project Board.

Specific responsibilities include:

- Provide direction and guidance to project team(s)/ responsible party (ies);
- Liaise with the Project Board to assure the overall direction and integrity of the project;
- Identify and obtain any support and advice required for the management, planning and control of the project;
- Responsible for project administration;
- Plan the activities of the project and monitor progress against the project results framework and the approved annual workplan;
- Mobilize personnel, goods and services, training and micro-capital grants to initiative activities, including drafting terms of reference and work specifications, and overseeing all contractors' work;
- Monitor events as determined in the project monitoring schedule plan/timetable, and update the plan as required;
- Manage requests for the provision of financial resources by UNDP, through advance of funds, direct payments or reimbursement using the fund authorization and certificate of expenditures;
- Monitor financial resources and accounting to ensure the accuracy and reliability of financial reports;

- Be responsible for preparing and submitting financial reports to UNDP on a quarterly basis;
- Manage and monitor the project risks initially identified and submit new risks to the project board for consideration and decision on possible actions if required; update the status of these risks by maintaining the project risks log;
- Capture lessons learned during project implementation;
- Prepare the annual workplan for the following year; and update the Atlas Project Management module if external access is made available.
- Prepare the GEF PIR and submit the final report to the Project Board;
- Based on the GEF PIR and the Project Board review, prepare the AWP for the following year.
- Ensure the mid-term review process is undertaken as per the UNDP guidance, and submit the final MTR report to the Project Board.
- Identify follow-on actions and submit them for consideration to the Project Board;
- Ensure the terminal evaluation process is undertaken as per the UNDP guidance, and submit the final TE report to the Project Board;

70. Project Assurance: UNDP performs the quality assurance role and supports the Project Board and Project Management Unit by carrying out objective and independent project oversight and monitoring functions. This role ensures appropriate project management milestones are managed and completed. The Project Board cannot delegate any of its quality assurance responsibilities to the Project Manager. UNDP provides a three – tier oversight services involving the UNDP Country Offices and UNDP at regional and headquarters levels. Project assurance is totally independent of the Project Management function.
71. Governance role for project target groups: The composition of the PSC has been determined so that all target groups are represented in the highest governance structure of the project. While recognising that not all interested target audience can be represented on the PSC, the project makes space for a larger number of individuals from target groups to participate in the project implementation through three technical working groups (TWGs) that will be established for each component of the project. The TWGs, with ToR given in **Annex D**, will be set up to review the operational policies and progress on project outputs, provide project assurance, and provide regular reports to the PSC. In this capacity, the TWGs will support the PSC in monitoring functions and delivery of project outputs, ensuring that the project is on-track towards achieving the overall outcomes. As shown in Error! Reference source not found., different target groups are represented in TWGs depending on their involvement in the project. Also, the TWGs (and PSC) will be constituted from the cohort of stakeholders listed in **Table 5** (Section IV). Additional specific responsibilities of the TWGs will include, but are not limited to, ensuring: beneficiary needs and expectations are being met or managed; risks are being controlled; the project remains viable; internal and external communications are working; quality management procedures are properly followed; and that the PSC decisions are followed and revisions are managed to satisfaction.
72. **Project extensions:** The UNDP Resident Representative and the UNDP-GEF Executive Coordinator must approve all project extension requests. Note that all extensions incur costs and the GEF project budget cannot be increased. A single extension may be granted on an exceptional basis and only if the following conditions are met: one extension only for a project for a maximum of six months; the project management costs during the extension period must remain within the originally approved amount, and any increase in PMC costs will be covered by non-GEF resources; the UNDP Country Office oversight costs in excess of the CO's Agency fee specified in the DOA during the extension period must be covered by non-GEF resources.

IX. FINANCIAL PLANNING AND MANAGEMENT

73. The total cost of the project is *USD 24,540,468.* This is financed through a GEF grant of *USD* 3,540,468 and *USD 21,000,000* in parallel co-financing. UNDP, as the GEF Implementing Agency, is responsible for the execution of the GEF resources and the cash co-financing transferred to UNDP bank account only.

74. Parallel co-financing: The actual realization of project co-financing will be monitored during the *mid-term review* and terminal evaluation process and will be reported to the GEF. The planned parallel co-financing will be used as follows:

Table 11. Co-financing and risk mitigation measures.

Co-financing source	Co-financing type	Co-financing amount	Planned Activities/Outputs	Risks	Risk Mitigation Measures
National Government	Loan	20,000,000	→ Output 2.3: Technology transfer of decentralised renewable energy systems facilitated. → Output 2.5: Training and technical support provided to communities on how to use the clean energy products.	Low level of cooperation between institutions at national and local levels, and weak coordination and information exchange mechanism between ministries having different priorities. Risk – Low (the SVP is fully funded through a loan and cash co-financing is drawn from planned ministerial capital and recurrent budget)	The Project Manager will ensure the implementation, as well as the effectiveness of the communications management strategy for the project and parallel interventions (according to SEP in Annex F).
National Government	In-kind	500,000	→ Output 3.1: Lessons learned report produced based on project experience.	Same as above. The in-kind financing is expected to come in the form of staff time and office space.	No action needed.
NGO	Grant	500,000	Output 1.3: Access to finance to rural communities for the purchase of solar home systems and lanterns.	Low level engagement with the project. Risk – Low The source of co-financing is	The partnership with LWF-Angola will be formalised through a MOU. Also, the SEP will form the basis for engaging and

				based on the recent history of LWF-Angola in resources mobilization for activities of similar scope to those in the UNDP-GEF project.	communicating with key project stakeholders in order to maintain their buy-in and contributions towards achieving project objectives.

75. Budget Revision and Tolerance: As per UNDP requirements outlined in the UNDP POPP, the project board will agree on a budget tolerance level for each plan under the overall annual work plan allowing the project manager to expend up to the tolerance level beyond the approved project budget amount for the year without requiring a revision from the Project Board.

    Should the following deviations occur, the Project Manager/CTA and UNDP Country Office will seek the approval of the BPPS/GEF team to ensure accurate reporting to the GEF:

    a) Budget re-allocations among components in the project budget with amounts involving 10% of the total project grant or more;

    b) Introduction of new budget items that exceed 5% of original GEF allocation.

    Any over expenditure incurred beyond the available GEF grant amount will be absorbed by non-GEF resources (e.g. UNDP TRAC or cash co-financing).

76. Audit: The project will be audited as per UNDP Financial Regulations and Rules and applicable audit policies. Audit cycle and process must be discussed during the Inception workshop. If the Implementing Partner is an UN Agency, the project will be audited according to that Agencies applicable audit policies.

77. Project Closure: Project closure will be conducted as per UNDP requirements outlined in the UNDP POPP. All costs incurred to close the project must be included in the project closure budget and reported as final project commitments presented to the Project Board during the final project review. The only costs a project may incur following the final project review are those included in the project closure budget.

78. Operational completion: The project will be operationally completed when the last UNDP-financed inputs have been provided and the related activities have been completed. This includes the final clearance of the Terminal Evaluation Report (that will be available in English) and the corresponding management response, and the end-of-project review Project Board meeting. **Operational closure must happen with 3 months after posting the TE report to the UNDP ERC**. The Implementing Partner through a Project Board decision will notify the UNDP Country Office when operational closure has been completed. At this time, the relevant parties will have already agreed and confirmed in writing on the arrangements for the disposal of any equipment that is still the property of UNDP.

79. Transfer or disposal of assets: In consultation with the Implementing Partner and other parties of the project, UNDP is responsible for deciding on the transfer or other disposal of assets. Transfer or disposal of assets is recommended to be reviewed and endorsed by the project board following UNDP rules and regulations. Assets may be transferred to the government for project activities managed by a national institution at any time during the life of a project. In all cases of transfer, a transfer document must be prepared and kept on file[54]. The transfer should be done before Project Management Unit complete their assignments.

80. Financial completion (closure): The project will be financially closed when the following conditions have been met: a) the project is operationally completed or has been cancelled; b) the Implementing Partner has

54 See https://popp.undp.org/_layouts/15/WopiFrame.aspx?sourcedoc=/UNDP_POPP_DOCUMENT_LIBRARY/Public/PPM_Project%20Management_Closing.docx&action=default.

reported all financial transactions to UNDP; c) UNDP has closed the accounts for the project; d) UNDP and the Implementing Partner have certified a final Combined Delivery Report (which serves as final budget revision).

the project will be financially completed **within 6 months of operational closure or after the date of cancellation**. Between operational and financial closure, the implementing partner will identify and settle all financial obligations and prepare a final expenditure report. The UNDP Country Office will send the final signed closure documents including confirmation of final cumulative expenditure and unspent balance to the BPPS/GEF Unit for confirmation before the project will be financially closed in Atlas by the UNDP Country Office.

81. Refund to GEF: Should a refund of unspent funds to the GEF be necessary, this will be managed directly by the BPPS/GEF Directorate in New York. No action is required by the UNDP Country Office on the actual refund from UNDP project to the GEF Trustee.

X. TOTAL BUDGET AND WORK PLAN

Atlas Proposal of Award ID:	00107508	**Atlas Primary Output Project ID:**	00107121	**Atlas Business Unit:**	AGO10
Atlas Primary Output Project Title:	Promoting sustainable energy access for rural communities in South-Eastern Angola				
UNDP-GEF PIMS no.:	5989				
Implementing Partner:	Ministry of Culture, Tourism and Environment				

Table 12. Budget allocation.

GEF Outcome/Atlas Activity	Responsible Party/ Implementing Agent	Fund ID	Donor Name	Atlas Budgetary Account Code	ATLAS Budget Description	Amount Year 1 (US$)	Amount Year 2 (US$)	Amount Year 3 (US$)	Amount Year 4 (US$)	Amount Year 5 (US$)	Total (US$)	Budget Note
OUTCOME 1: Enabling environment created for private sector investment in decentralised renewable energy.	Ministry of Culture, Tourism and Environment	**62000**	**GEF**	71200	International Consultants	38,500	38,500	42,400	0	0	119,400	1
				71300	Local Consultants	56,950	0	42,325	3,600	3,600	106,475	2
				72200	Equipment and Furniture	1,500	0	0	2,000	2,000	5,500	3
				72500	Office supplies	1,700	1,700	1,700	1,600	1,600	8,300	4
				71600	Travel	5425	5000	11,900	5,550	5,550	33,425	5
				74200	Audio Visual & Print Prod Costs	3,000	0	1,700	0	0	4,700	6
				75700	Workshops and Meetings	15,000	5000	14,100	15,000	15,000	64,100	7
				72600	Grants	50,900	40,240	54,520	0	0	145,660	8
					sub-total outcome 1	**172,975**	**90,440**	**168,645**	**27,750**	**27,750**	**487,560**	
OUTCOME 2: Successful establishment of a household-level energy service delivery model for replication nationally. Around 81,000 beneficiaries have access to	Ministry of Culture, Tourism and Environment	**62000**	**GEF**	71200	International Consultants	215,000	229,000	23,600	0	23,600	491,200	9
				71300	Local Consultants	30,000	73,600	19,600	17,600	11,600	152,400	10
				71800	Contractual Services - Individ	18,000	58,400	75,600	87,600	99,600	339,200	11
				72200	Equipment and Furniture	25,000	184,060	98,174	137,418	183,348	628,000	12
				71600	Travel	10,690	14,345	8,525	8,550	8,525	50,635	13
				72500	Office supplies	500	2,500	2,500	2,500	2,500	10,500	14
				74200	Audio Visual & Print Prod Costs	2500	2500	2500	0	3,229	10,729	15

sustainable cooking and lighting technologies.				75700	Workshops and Meetings	23,500	26,000	25,000	26,500	27,000	128,000	16
				72100	Contractual Services - Companies	13,200	127,800	189,200	231,210	132,000	693,410	17
					sub-total outcome 2	**338,390**	**718,205**	**444,699**	**511,378**	**491,402**	**2,504,074**	
OUTCOME 3: Lessons learned and experience from project interventions support replication and scaling-up of project results.	Ministry of Culture, Tourism and Environment	**62000**	**GEF**	71200	International Consultants	15,200	0	38,600	0	54,000	107,800	18
				71300	Local Consultants	52,800	8,400	18,800	8,400	21,000	109,400	19
				71800	Contractual Services - Individ	12,000	12,000	12,000	12,000	12,000	60,000	20
				72500	Office supplies	2,080	2,340	2,080	2,080	2,374	10,954	21
				71600	Travel	6,490	5,475	7,207	5,375	7,119	31,666	22
				74200	Audio Visual & Print Prod Costs	5,800	5,400	6,400	4,820	6,000	28,420	23
				75700	Workshops and Meetings	4,500	2,000	2,500	1,000	2,500	12,500	24
				72200	Equipment	8,500	3,000	4,000	4,000	0	19,500	25
					sub-total outcome 3	**107,370**	**38,615**	**91,587**	**37,675**	**104,993**	**380,240**	
PROJECT MANAGEMENT UNIT	Ministry of Culture, Tourism and Environment	**62000**	**GEF**	71800	Contractual Services - Individ	30,600	30,600	30,600	30,600	30,600	153,000	26
				74100	Professional Services (Audit)	3,000	3,000	3,000	3,000	3,000	15,000	27
				75700	Workshops and Meetings	594					594	28
					Total Management GEF	**34,194**	**33,600**	**33,600**	**33,600**	**33,600**	**168,594**	
				PROJECT TOTAL GEF		**652,929**	**880,860**	**738,531**	**610,403**	**657,745**	**3,540,468**	

Budget Note

OUTCOME 1	
1	Outcome 1 covers part of the Professional fee for the Technical Officer (10%) and this budget item will be managed by the Ministry of Culture, Tourism and Environment for total amount of US$ 42,000 that is spread equally between the first two years of the project under Output 1.3. International Professional fee will be used in Yr 3 for: (1) developing a Strategy and Action Plan for local assembly and manufacturing of off-grid solar products under Output 1.2 (US$ 16,800); (2) carrying out baseline assessment and developing a Strategy and Action Plan for alternative technology diffusion mechanisms (e.g. mobile money, direct bank payments, transacting in mobile airtime equivalence, etc …) for scaling up technology uptake (US$ 14,400); and (3) for providing technical assistance for developing and operationalizing a telco-led model for mobile money in Moxico Province (US$ 11,200). Activities (2) and (3) will be undertaken under Output 1.4. And Professional fee of the Technical Officer amounting to US$ 17,500 per year covered under Output 1.3. for Year 1 and Year 2.

2	National consultants will be used in Yr 1 to support the Technical Officer. In Yr 1, budgets allocated to Outputs 1.1, 1.2 and 1.3 are US$ 22,575, US$ 20,500, US$ 13,875, respectively. Since activities will be repeated for updating baselines in Yr 3, the budget allocated for Outputs 1.1 and 1.2 in Yr3 are US$ 21,025 and US$ 14,500, respectively. Also, in Year 3, a budget of US$6,800 is allocated to Output 1.4. A budget of US$ 3,600 has been allocated in each of Yr 4 and Yr 5 for capacity building of rural communities and technology suppliers on use and benefits of mobile money (Output 1.4).
4	Equipment valued at US$ 5,500 will be purchased as follows: (1) 1 computer valued at US$ 1,500 in Yr 1 (Output 1.2); (2) 1 printer valued at US$ 1,000 in Yr 4 (Output 1.4); and (3) printer cartridges worth US$ 3,000 in Yr 4 and Yr 5 (Output 1.4).
4	A total of US$ 8,300 has been included for covering the costs of office supplies over five years (Yr 1 to Yr 3 – US$ 1,700 per year; Yr 4 and Yr 5 – US$ 1,600/ year).
5	A total travel cost of US$ 33,425 is budgeted to cover the travel costs of international (International airfare and in-country travel expenses) and national consultants (travel to Luena and travelling in Moxico Province). In Yr 1, US$ 5,425 will cover travel costs to Luena in the wake of signing a memorandum of understanding (MOU) with the LWF-Angola (Output 1.3); In Y2 US$ 5,000 and Yr 3 US$ 11,900, the travel costs will be for the international consultant who will develop the Strategy and Action Plan for local assembly and manufacturing of off-grid solar products; also it has been accounted for international and local travel for completing activities under Output 1.4. In each of Yr 4 and Yr 5, a total of US$ 5,550 has been earmarked for the local travels of the national consultant who will support capacity building of rural communities and technology suppliers on use and benefits of mobile money.
6	Printing and production costs has been kept to a minimum at US$ 4,700 and allocated as follows: US$ 3,000 in Yr 1 (Outputs 1.1, 1.1 and 1.3), and US$ 1,700 in Yr 3 (for repeating activities related to technology screening (Output 1.1) and development of Technology Transfer Action Plans (Output 1.2)).
7	A total of US$ 64,100 has been allocated for national workshops (1 day or 2 days) and mini-workshops for half- to one-day technical working sessions. In Yr 1 (US$ 15,000) and Yr 3 (US$ 14,100) for carrying out market intelligence for quantifying product demand in rural communities (Output 1.2); for developing Technology Transfer Action Plans (TTAPs), and carrying out advocacy among national, provincial government and development partners on TTAPs (Output 1.1); In each of Yr 4 and Yr 5, a total of US$ 15,000 has been allocated for carrying out around 10 outreach sessions in target communities related to alternative mechanisms (e.g. mobile money, direct bank transfers or equivalent mobile airtime) for purchasing off-grid solar products. In Year 2, a sum of US$ 5000 is earmarked for a mini-workshop related to Output 1.3.
8	Low-value grants will be provided to successful savings and credits associations (SACs) according to operational guidelines that will be developed under Output 1.3. A low-value grant worth US$ 280 will be provided to each women-led SACs as co-financing and for enhancing associative-building base-of-pyramid (BOP) creditworthiness to purchase off-grid solar products. The budgets of US$ 50,900 (Yr 1); US$ 40,240 (Yr 2) and US$ 54,520 (Yr 3) correspond to the setting up of 55,108 and 159 SACs in the first three years of the project, respectively.
OUTCOME 2	
9	A budget of US$ 113,200 has been earmarked for carrying the following technical assistance: (1) developing GIS-based least cost technological options for rural energy access (Output 2.1: US$ 40,000 in Yr 2); (2) updating the SHS DREI analyses in Yr 3 and Yr 5 with each costing US$ 23,600; (3) adopting the SDG Impact Framework and tools (US$ 26,000) in Yr 1. The remaining part of the professional fee for the Technical Officer (90%), which amounts to US$ 378,000. The payment will be spread equally over Yr 1 and Yr 2 under Outputs 2.1 (10%), 2.2 (30%), 2.3 (30%) and 2.4 (20%).
10	In Yr 1, US$30,000 is allocated to deliver Outputs 2.1, 2.2, 2.4, 2.5. In Yr 2, US$ 73,600 has been allocated to national consultants to support the TO and international consultants for carrying out activities under each one of the 5 outputs under Outcome 2 to deliver Outputs 2.1,2.2, 2.3, 2.4, 2.5. In Year 3, US$ 19,600 is allocated to deliver Outputs 2.1 and 2.5. In Year 4, US$ 17,600 is allocated to deliver Output 2.1, 2.3, 2.4, 2.5. In Year 5, US$ 11,600 is allocated to deliver Output 2.2.
11	Outcome 2 covers the salary of solar jango operators and janitors as follows: Year 1: US$18,000; Year 2:US$58,400; Year 3:US$75,600; Year 4: US$87,600; Year 5: US$99,600.
12	The largest investment budget of US$ 628,000 will be used exclusively for establishing and operationalizing fixed and mobile solar jangos. The equipment cost comprises the cost of a truck (US$ 120,000) that will be used as the solar jango, the annual cost of registration, the cost of maintenance and repairs, and the cost of

	fuel, as well as the cost of inventory of equipment housed in solar jangos. The total equipment costs for the mobile jango (without equipment) is US$ 158,515, while the cost of inventory is: Yr 1 – US$ 25,000; Yr 2 – US$ 184,060; Yr 3 – US$ 98,174; Yr 4 – US$ 137,418; Yr 5 – US$ 183,348. Further, under Output 2.3, the project has a dedicated budget to purchase innovative off-grid technologies that will be used for proof-of-concept for supporting technology transfer in Angola.
13	A travel budget of US$ 50,635 has been allocated for enabling the international travels of the international consultants, and the local travel expenses of all international and national consultants. All international travels will be for carrying out activities under Output 2.1, namely for developing SDG Impact Framework, for updating SHS DREI analyses, and for carrying out GIS-based modeling of least-cost technology options for rural energy access.
14	A total budget of US$ 10,500 has been allocated for office supplies, with US$ 500 in Yr 1 and US$ 2,500 in each of Yr 2 to Yr 5.
15	The budget for covering printing costs has been set to US$ 10,729, and will be used mainly for activities to be carried out under Output 2.1, namely: (1) the domestication of international standards for off-grid solar products (US$ 2,500 spread over Yr 1 and Yr 2), and (2) for printing the updated results of DREI analyses for SHS in Yr 3 (US$ 2,500) and in Yr 5 (US$ 3,229).
16	The budget allocated for workshops and meetings is US$ 128,000 and it is the highest of all project outcomes/components. The relatively higher budget is reflected in the type of activities requiring multi-stakeholder engagements that will be carried out under Outcome 2. In particular, outreach activities carried out to sensitize rural households of the use and benefits of off-grid solar technologies (Output 2.5) will absorb a significant part of the budget – i.e. Yr 1 – US$ 23,500; Yr 2 – US$ 26,000; Yr 3 – US$ 25,000; Yr 4 – US$ 26,500; Yr 5 – US$ 27,000.
17	This budget item estimated a total of $693,410, of which US$ 382,800 will be invested in the setting up and operation of solar jangos. The budget increases as the number of operational solar jangos increases from 1 in Yr 1 to 5 in Yr 5 in increments of 1 solar jango per year. In the first year, it is assumed that the solar jango will be operational for only 6 months. A monthly rental fee of US$ 1,000 has been assumed. And amount of US$ 310,610 will be invested under Output 2.1 to set up an incentive mechanism for private sector participation in the technology value chain. This may take the form of a competitive procurement process to identify local or international providers of solar home systems (PAYG companies). This incentives mechanism will be deployed in Years 2, 3 and 4. In addition, the Ministry of Culture, Tourism and Environment will explore solutions to increase access to finance from commercial sources for operators and potential links to micro-credit institutions.
OUTCOME 3	
18	This budget covers the international Professional fee under Output 3.1 for carrying out the mid-term review (US$ 38,600) and terminal evaluation (US$ 54,000) as per M&E requirements. An additional amount of US$ 15,200 is allocated for developing MRV systems for tracking GHG emission reductions and sustainable development benefits of off-grid, standalone solar technologies under Output 3.1.
19	Fees for local consultants have been budgeted at US$ 94,400. Close to 65% of this budget has been allocated in Yr 1 (US$ 52,800) and Yr 2 (US$ 8,400). In Yr 1, the following activities will be covered: (1) Output 3.1: supporting the development of MRV systems (US$ 5,200), and carrying out lessons learned investigations (US$ 7,200); (2) Output 3.2: carrying out gender-differentiated assessments of information needs for target communities (US$ 6,800); developing training materials for TOT course (US$ 5,600); and developing training materials for sensitization of rural households on the use and benefits of off-grid solar technologies (US$ 5,600); (3) developing training modules for training of technicians (US$ 4,800), and training of existing teachers on the technical aspects of off-grid solar technologies (US$ 1,200); (4) developing a project website (US$ 10,000); and (5) US$6,400 has been earmarked in each of Yr 1 and Yr 3 to develop a communications strategy and review same, respectively, in order to communicate and publicise the project. Capturing lessons learned and upgrading the technical skills of teachers on the technical aspects of new off-grid solar technologies will continue at the same funding levels until Yr 4. In Yr 5, US$ 6,000 is allocated for capturing lessons learned. Materials developed for the sensitization of rural households will be updated by local consultants in Yr 3 using an allocated budget of US$ 3,600. The budget includes the cost of a national consultant to support the mid-term review and terminal evaluation processes.
20	This salary component has been allocated to Output 3.2. Output 3.3 covers the entire salary of the project driver that has been spread equally at US$ 12,000 per year.
21	A total budget of US$ 10,954 has been earmarked to cover the cost of office supplies with the bulk spent on communications activities under Output 1.4.

22	Travel budget takes into account the travel costs incurred by the international consultants carrying out mid-term review (Yr 3 - US$ 5,132) and terminal evaluation (Yr 5 – US$ 5,744). Otherwise, the travel budget allocations are commensurate with the technical assistance provided by international and national consultants under Outputs 3.1, 3.2 and 3.3 as outlined under budget notes 20 and 21 as follows: Year 1: US$ 6,490; Year 2: US$5,475; Year 3: US$ 7,207; Year 4: US$ 5,375; Year 5: US$ 7,119).
23	A total budget of US$ 28,600 has been allocated for printing and production costs. A yearly budget of US$ 1,500 has been earmarked for disseminating the results of lessons learned among stakeholders (Output 3.4). In each of Yr 3 and Yr 5, corresponding to the timing of mid-term review and terminal evaluation, the budget is increased to US$ 2,500. The remaining amount will be used for establishing MOUs with partnering technical institutes (Output 3.2), vocational training schools (Output 3.3), and communications activities (Output 3.4)
24	Two 1-day national workshops (each costing US$ 2,500) will be carried out in total for sharing the results of mid-term review (Yr 3) and terminal evaluation (Yr 5). The remaining US$11,500 of the allocated budget for this budget item will be used for coordinating project stakeholders in mini-workshops or technical working sessions for various activities planned under the three outputs as detailed under budget notes 20 and 21. The yearly breakdown is as follows: Year 1: US$4,500; Year 2: US$2,000; Year 3: US$2,500; Year 4: US$1,000 Year 5: US$2,500.
25	Under Output 1.3, the project will also equip the laboratories of vocational training schools with fully wired and functional off-grid solar technologies that will be used to provide hands-on practical training to students undertaking electrical wiring and installation courses. The value of equipment will increase over time to reflect the number of participating vocational training schools as per the targets set in the Results Framework – i.e. Yr 1 – US$ 2,000; Yr 2 – US$ 3,000; Yr 3 – US$ 4,000; Yr 4 – US$ 4,000. In Yr 1, the project will purchase 2 computers worth US$ 1,500 each under Output 3.1, and a printer costing US$ 1,000 under Output 3.4. This brings the total number of computers that will be purchased to three for the benefit of the project management team (PM and Administrative Assistant).
PROJECT MANAGEMENT COST (PMC)	
26	The salary for the Project coordinator spreads equally over five years (US$ 22,000 per year) and the salary for the Administrative Assistant spreads equally over five years (US$ 8,600 per year)
27	A sum of US$ 3,000 per year has been earmarked for independent auditing of the project for each of the five years of the project duration.
28	US$ 594 has been earmarked for organizing the Inception Workshop

Summary of Funds

	Amount Year 1	Amount Year 2	Amount Year 3	Amount Year 4	Amount Year 5	Total
GEF	652,929	880,860	738,531	610,403	657,745	**3,540,468**
National Government (loan)	3,000,000	6,000,000	6,000,000	3,000,000	2,000,000	**20,000,000**
National Government (in-kind)	100,000	100,000	100,000	100,000	100,000	**500,000**
NGO (cash)	75,000	150,000	175,000	50,000	50,000	**500,000**
TOTAL	**3,827,929**	**7,130,860**	**7,013,531**	**3,760,403**	**2,807,745**	**24,540,468**

XI. LEGAL CONTEXT

82. This project document shall be the instrument referred to as such in Article 1 of the Standard Basic Assistance Agreement between the Government of Angola and UNDP, signed on 18 February 1977. All references in the SBAA to "Executing Agency" shall be deemed to refer to "Implementing Partner."
83. This project will be implemented by the Ministry of Culture, Tourism and Environment ("Implementing Partner") in accordance with its financial regulations, rules, practices and procedures only to the extent that they do not contravene the principles of the Financial Regulations and Rules of UNDP. Where the financial governance of an Implementing Partner does not provide the required guidance to ensure best value for money, fairness, integrity, transparency, and effective international competition, the financial governance of UNDP shall apply.
84. The designations employed and the presentation of material on this map do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations or UNDP concerning the legal status of any country, territory, city or area or its authorities, or concerning the delimitation of its frontiers or boundaries

XII. RISK MANAGEMENT

85. Consistent with the Article III of the SBAA (**Annex J**), the responsibility for the safety and security of the Implementing Partner and its personnel and property, and of UNDP's property in the Implementing Partner's custody, rests with the Implementing Partner. To this end, the Implementing Partner shall:
    a) put in place an appropriate security plan and maintain the security plan, taking into account the security situation in the country where the project is being carried;
    b) assume all risks and liabilities related to the Implementing Partner's security, and the full implementation of the security plan.

86. UNDP reserves the right to verify whether such a plan is in place, and to suggest modifications to the plan when necessary. Failure to maintain and implement an appropriate security plan as required hereunder shall be deemed a breach of the Implementing Partner's obligations under this Project Document.

87. The Implementing Partner agrees to undertake all reasonable efforts to ensure that no UNDP funds received pursuant to the Project Document are used to provide support to individuals or entities associated with terrorism and that the recipients of any amounts provided by UNDP hereunder do not appear on the list maintained by the Security Council Committee established pursuant to resolution 1267 (1999). The list can be accessed via http://www.un.org/sc/committees/1267/aq_sanctions_list.shtml.

88. The Implementing Partner acknowledges and agrees that UNDP will not tolerate sexual harassment and sexual exploitation and abuse of anyone by the Implementing Partner, and each of its responsible parties, their respective sub-recipients and other entities involved in Project implementation, either as contractors or subcontractors and their personnel, and any individuals performing services for them under the Project Document.
    (a) In the implementation of the activities under this Project Document, the Implementing Partner, and each of its sub-parties referred to above, shall comply with the standards of conduct set forth in the Secretary General's Bulletin ST/SGB/2003/13 of 9 October 2003, concerning "Special measures for protection from sexual exploitation and sexual abuse" ("SEA").

    (b) Moreover, and without limitation to the application of other regulations, rules, policies and procedures bearing upon the performance of the activities under this Project Document, in the implementation of activities, the Implementing Partner, and each of its sub-parties referred to above, shall not engage in any form of sexual harassment ("SH"). SH is defined as any unwelcome conduct of a sexual nature that might reasonably be expected or be perceived to cause offense or humiliation, when such conduct interferes with work, is made a condition of employment or creates an intimidating, hostile or offensive work environment.

89. a) In the performance of the activities under this Project Document, the Implementing Partner shall (with respect to its own activities), and shall require from its sub-parties referred to in paragraph 4 (with respect to their activities) that they, have minimum standards and procedures in place, or a plan to develop and/or improve such standards and procedures in order to be able to take effective preventive and investigative action. These should include: policies on sexual harassment and sexual exploitation and abuse; policies on whistleblowing/protection against retaliation; and complaints, disciplinary and investigative mechanisms. In line with this, the Implementing Partner will and will require that such sub-parties will take all appropriate measures to:
    i. Prevent its employees, agents or any other persons engaged to perform any services under this Project Document, from engaging in SH or SEA;

    ii. Offer employees and associated personnel training on prevention and response to SH and SEA, where the Implementing Partner and its sub-parties referred to in paragraph 4 have not put in place its own training regarding the prevention of SH and SEA, the Implementing Partner and its sub-parties may use the training material available at UNDP;

    iii. Report and monitor allegations of SH and SEA of which the Implementing Partner and its sub-parties referred to in paragraph 4 have been informed or have otherwise become aware, and status thereof;

    iv. Refer victims/survivors of SH and SEA to safe and confidential victim assistance; and

    v. Promptly and confidentially record and investigate any allegations credible enough to warrant an investigation of SH or SEA. The Implementing Partner shall advise UNDP of any such allegations received and investigations being conducted by itself or any of its sub-parties referred to in paragraph 4 with respect to their activities under the Project Document, and shall keep UNDP informed during the investigation by it or any of such sub-parties, to the extent that such notification (i) does not jeopardize the conduct of the investigation, including but not limited to the safety or security of persons, and/or (ii) is not in contravention of any laws applicable to it. Following the investigation, the Implementing Partner shall advise UNDP of any actions taken by it or any of the other entities further to the investigation.

    b) The Implementing Partner shall establish that it has complied with the foregoing, to the satisfaction of UNDP, when requested by UNDP or any party acting on its behalf to provide such confirmation. Failure of the Implementing Partner, and each of its sub-parties referred to in paragraph 4, to comply of the foregoing, as determined by UNDP, shall be considered grounds for suspension or termination of the Project.

90. Social and environmental sustainability will be enhanced through application of the UNDP Social and Environmental Standards (http://www.undp.org/ses) and related Accountability Mechanism (http://www.undp.org/secu-srm).
91. The Implementing Partner shall: (a) conduct project and programme-related activities in a manner consistent with the UNDP Social and Environmental Standards, (b) implement any management or mitigation plan prepared for the project or programme to comply with such standards, and (c) engage in a constructive and timely manner to address any concerns and complaints raised through the Accountability Mechanism. UNDP will seek to ensure that communities and other project stakeholders are informed of and have access to the Accountability Mechanism.
92. All signatories to the Project Document shall cooperate in good faith with any exercise to evaluate any programme or project-related commitments or compliance with the UNDP Social and Environmental Standards. This includes providing access to project sites, relevant personnel, information, and documentation.
93. The Implementing Partner will take appropriate steps to prevent misuse of funds, fraud or corruption, by its officials, consultants, responsible parties, subcontractors and sub-recipients in implementing the project or

using UNDP funds. The Implementing Partner will ensure that its financial management, anti-corruption and anti-fraud policies are in place and enforced for all funding received from or through UNDP.

94. The requirements of the following documents, then in force at the time of signature of the Project Document, apply to the Implementing Partner: (a) UNDP Policy on Fraud and other Corrupt Practices and (b) UNDP Office of Audit and Investigations Investigation Guidelines. The Implementing Partner agrees to the requirements of the above documents, which are an integral part of this Project Document and are available online at www.undp.org.
95. In the event that an investigation is required, UNDP has the obligation to conduct investigations relating to any aspect of UNDP projects and programmes in accordance with UNDP's regulations, rules, policies and procedures. The Implementing Partner shall provide its full cooperation, including making available personnel, relevant documentation, and granting access to the Implementing Partner's (and its consultants', responsible parties', subcontractors' and sub-recipients') premises, for such purposes at reasonable times and on reasonable conditions as may be required for the purpose of an investigation. Should there be a limitation in meeting this obligation, UNDP shall consult with the Implementing Partner to find a solution.
96. The signatories to this Project Document will promptly inform one another in case of any incidence of inappropriate use of funds, or credible allegation of fraud or corruption with due confidentiality.

    Where the Implementing Partner becomes aware that a UNDP project or activity, in whole or in part, is the focus of investigation for alleged fraud/corruption, the Implementing Partner will inform the UNDP Resident Representative/Head of Office, who will promptly inform UNDP's Office of Audit and Investigations (OAI). The Implementing Partner shall provide regular updates to the head of UNDP in the country and OAI of the status of, and actions relating to, such investigation.

97. UNDP shall be entitled to a refund from the Implementing Partner of any funds provided that have been used inappropriately, including through fraud or corruption, or otherwise paid other than in accordance with the terms and conditions of the Project Document. Such amount may be deducted by UNDP from any payment due to the Implementing Partner under this or any other agreement. Recovery of such amount by UNDP shall not diminish or curtail the Implementing Partner's obligations under this Project Document.

    Where such funds have not been refunded to UNDP, the Implementing Partner agrees that donors to UNDP (including the Government) whose funding is the source, in whole or in part, of the funds for the activities under this Project Document, may seek recourse to the Implementing Partner for the recovery of any funds determined by UNDP to have been used inappropriately, including through fraud or corruption, or otherwise paid other than in accordance with the terms and conditions of the Project Document.

    Note: The term "Project Document" as used in this clause shall be deemed to include any relevant subsidiary agreement further to the Project Document, including those with responsible parties, subcontractors and sub-recipients.

98. Each contract issued by the Implementing Partner in connection with this Project Document shall include a provision representing that no fees, gratuities, rebates, gifts, commissions or other payments, other than those shown in the proposal, have been given, received, or promised in connection with the selection process or in contract execution, and that the recipient of funds from the Implementing Partner shall cooperate with any and all investigations and post-payment audits.
99. Should UNDP refer to the relevant national authorities for appropriate legal action any alleged wrongdoing relating to the project, the Government will ensure that the relevant national authorities shall actively investigate the same and take appropriate legal action against all individuals found to have participated in the wrongdoing, recover and return any recovered funds to UNDP.
100. The Implementing Partner shall ensure that all of its obligations set forth under this section entitled "Risk Management" are passed on to each responsible party, subcontractor and sub-recipient and that all the clauses under this section entitled "Risk Management Standard Clauses" are included, *mutatis mutandis*, in all sub-contracts or sub-agreements entered into further to this Project Document.

XIII. MANDATORY ANNEXES

A. Multi year Workplan
B. GEF Tracking Tool (s) at baseline
C. Overview of technical consultancies/subcontracts (see example template below)
D. Terms of Reference for Project Board, Project Manager, Technical Officer and other positions as appropriate
E. UNDP Social and Environmental and Social Screening Template (SESP) and Environmental and Social Management Plan (ESMP) for moderate and high risk projects
F. Stakeholder Engagement Plan
G. Gender Analysis and Action Plan
H. UNDP Risk Log (to be completed by UNDP Country Office, see template below)
I. Results of the capacity assessment of the project implementing partner and HACT micro assessment (to be completed by UNDP Country Office)
J. UNDP Project Quality Assurance Report (to be completed in UNDP online corporate planning system by UNDP Country Office, does not need to be attached as separate document)

Other Annexes that may be required:

- Please see Supplementary Annexes accompanying this Project Document

Annex A: Multi Year Work Plan

Output	Indicator	Responsible Party	Year 1				Year 2				Year 3				Year 4				Year 5			
			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 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4
Outcome 1: Enabling environment created for private sector investment in decentralised renewable energy																						
Output 1.1: Assessment of successful RET diffusion in the region																						
Output 1.2: Business case for clean energy supply chain developed																						
Output 1.3: Access to finance to rural communities for the purchase of off-grid renewable energy technologies																						
Output 1.4: Mobile payment system expanded to Moxico Province and mobile-based PAYG models established in South-Eastern Angola																						
Outcome 2: Successful establishment of a household-level energy service delivery model for replication nationally. Around 81,000 beneficiaries have access to sustainable cooking and lighting technologies.																						
Output 2.1: Local private companies along the value chain supported, including business development, connection to suppliers and access to finance																						
Output 2.2: Five Solar Jangos procured, providing clean energy products to communities in Moxico Province																						
Output 2.3: Technology transfer of decentralised renewable energy systems facilitated																						
Output 2.4: Training provided to technicians on the installation of SHS																						
Output 2.5: Training and technical support provided to communities on how to use the clean energy products																						
Outcome 3: Lessons learned and experience from project interventions support replication and scaling-up of project results.																						
Output 3.1: Lessons learned report produced based on project experience																						
Output 3.2: Cooperation with technical institutes and universities established																						
Output 3.3: Project results incorporated into vocational schools curriculum																						

Monitoring and Evaluation																						
Monitoring social and environmental risks																						
MTR tracking tool update																						
Final tracking tool update																						
Audits																						
MTR Independent Review																						
Final Project Review																						

Annex B: GEF Core indicator at baseline

Annex C: Overview of Technical Consultancies

Consultant	Time Input	Tasks, Inputs and Outputs
For Project Management / Monitoring & Evaluation		
Local / National contracting		
Project Manager (PM) *Rate: $3,000/month*	*43 weeks / over 5 years*	*The Project Manager (PM), together with the TO will be responsible for the overall management of the project, including the mobilization of all project inputs, supervision over project staff, consultants and sub-contractors. See the full TOR above for details.*
Administrative Assistant (AA) *Rate: $1,500/month*	*43 weeks / over 5 years*	*The AA will manage all aspects related to the good functioning of the PMU in relation to all secretarial activities. The AA will provide administrative backstopping to the project team. See the full TOR for details.*
Driver *Rate: $1,000/month*	*43 weeks / over 5 years*	*A full time driver will be recruited to carry out all logistics and transportation support related to project activities.*
International / Regional and global contracting		
Technical Officer (TO) *Rate: $4,884/week ($17,500/month)*	*43 weeks / over 2 years*	*The TO will be responsible for providing overall technical backstopping and management support to the Project.* *See the full TOR above for details.*
For Technical Assistance		
Outcome 1		
Local / National contracting		
Off-grid RET specialist *Rate: $400/day*	*81 days / Year 1 and 3*	• *Carrying out regional market assessments of off-grid RETs and their market diffusion mechanisms* • *Developing technical transfer action plan (TTAP) for Angola* • *Carrying out advocay for TTAP* *Inputs: GEF financing resources + support of TWG for Component 1* *Outputs: (1) report on regional market assessments and technology transfer mechanisms; (2) TTAP; (3) report on TTAP advocacy*
Market Intelligence Specialist	*65 days / over year 1 and*	• *Carrying out market intelligence in Moxico Province for establishing energy demand needs of rural communities communities, and to map out the profile of communities in terms of economic activities and credit worrthiness; a gender-differentiated appraoch will be used*

Consultant	Time Input	Tasks, Inputs and Outputs
Rate: $400/day	*year 3*	• *Making the business case for off-grid RETs based on market profiling* *Inputs: GEF fianncing resources + support of TWG for Component 1* *Outputs: (1)Business case for off-grid RETs report that also captures the market intelligence*
Mobile money expert *Rate: $400/day*	*17 days / Years 3*	*The national expert will assist the international consultant with the following:* • *Carrying out assessment of how best to better integrate telcos in the off-grid technology value chain in order to support uptake of mobile money payments in rural communities* • *Providing technical assistance for transitioning from a bank-led to a telco-led model of mobile money* *Inputs: GEF financing resources + support of TWG for Component 1* *Outputs: (1) Strategy and Action Plan for mobile money deployment in rural communities; (2) Report on mechanism for integrating telcos in the technology value chain for payment facilities*
Micro-finance expert *Rate: $400/day*	*28 days / Year 1*	• *Developing operational guidelines for women-led savings and credit associations (SACs)* • *Training of 50 trainers for setting up and operationalising SACs* *Inputs: GEF fianncing resources + support of TWG for Component 1* *Outputs: (1) SACs Operational Guidelines; (2) report on 50 trainers trained*
International / Regional and global contracting		
Industry Specialist on assembly & manufacturing of off-grid RETs *Rate: $ 800/day*	*21 days / Year 3*	• *Developing Strategy and Action Plan for the local assembly and manufacturing of off-grid RETs components / systems* • *Capacity building of project stakeholders on the means for actualising any potential for local assembly and manufacturing of off-grid RETs components/systems* *Inputs: GEF financing resources + support of TWG for Component 1* *Outputs: (1) Strategy and Action Plan for local assembly & manufacturing of off-grid RETs components/systems; (2) Report on training completed for project stakeholders potential and means for local assembly and manufacturing of off-grid RETs*
International e-money payment expert *Rate: $ 800/day*	*32 days / Year 3*	• *Carrying out assessment of how best to better integrate telcos in the off-grid technology value chain in order to support uptake of mobile money payments in rural communities* • *Providing technical assistance for transitioning from a bank-led to a telco-led model of mobile money* *Inputs: GEF financing resources + support of TWG for Component 1* *Outputs: (1) Strategy and Action Plan for mobile money deployment in rural communities in Moxico Province; (2) Report on mechanism for integrating telcos in the technology value chain for payment facilities*
Outcome 2		
Local / National contracting		
Local GIS expert *Rate: $400/day*	*13 days / Year 2*	• *The national expert will support the International expert on GIS-based modeling of least-cost options for off-grid electrification* *Inputs: GEF financing resources + support of TWG for Component 2* *Outputs: (1) Spatial model of least-cost options for off-grid electrification in Angola*
Electronic Waste	*12 days / Year*	• *Developing a mechanism for the environmentally-sound recovery, storage and disposal of all electronic waste associated*

Consultant	Time Input	Tasks, Inputs and Outputs
disposal expert *Rate: $400/day*	*2*	*with pico-solar and SHS product* *Inputs: GEF financing resources + support of TWG for Component 2* • *Outputs: (1) Report detailing mechanism for the environmentally-sound recovery, storage and disposal of all electronic waste*
Off-grid RET specialist *Rate: $400/day*	*88 days / Year 1 - 5*	• *Supporting the International DREI consultant to update SHS DREI aanlyes at mid-term and of project* • *Developing Operational Manual for solar jangos* • *Developing business model for solar jango operation* • *Collecting data and tracking SDG impacts of private investments* *Inputs: GEF financing resources + support of TWG for Component 2* *Outputs: (1) SHS DREI modeling; (2) SHS DREI reports; (3) operational manual for solar jangos; (4) report on the business model for operating solar jangos; (5) SDG Impact reporting*
Off-grid RET training specialist *Rate: $400/day*	*52 days / Year 1-3*	• *Carrying out training of 75 trainers* • *Assess the changing information and training needs of communities with changing market / technology dynamics* *Inputs: GEF financing resources + support of TWG for Component 2* *Outputs: (1) report on TOT course; (2) report on the evolving information and training needs of local communities*
Off-grid RET technical specialist *Rate: $400/day*	*15 days / Year 1-2*	• *Carry out training needs analysis* *Inputs: GEF financing resources + support of TWG for Component 2* *Outputs: (1) report on training needs gap analysis*
International / Regional and global contracting		
Expert on GIS-based modelling of least cost options for off-grid electrification *Rate: $ 800/day*	*25 days / Year 2*	• *Carrying out spaital modeling of least-cost options for off-grid electrification* *Inputs: GEF financing resources + support of TWG for Component 2* • *Outputs: (1) Spatial model of least-cost options for off-grid electrification in Angola*
International DREI Expert *Rate: $ 800/day*	*34 days / Year 3 and 5*	• *Updating SHS DREI analyses and report at mid-term and project end* *Inputs: GEF financing resources + support of TWG for Component 2* *Outputs: (1) SHS DREI modeling; (2) SHS DREI reports*
SDG Impact Framework Expert *Rate: $ 800/day*	*20 days / Year 1*	• *Developing SDG Impact Framework and tools for reporting the SDG impacts of investments in off-grid RETs* • *Training of local consultant for collecting data and tracking SDG impacts* *Inputs: GEF financing resources + support of TWG for Component 2* *Outputs: (1) SDG Impact Framework and Tools; (2) training delivered to national consultant*
Outcome 3		
Local / National contracting		

Consultant	Time Input	Tasks, Inputs and Outputs
Off-grid RET specialist *Rate: $400/day*	*13 days / Year 1*	• *Supporting the International off-grid RET MRV Expert to develop a MRV system for tracking GHG emission reductions from off-grid RETs* *Inputs: GEF financing resources + support of TWG for Component 3* *Outputs: (1) MRV system in place;*
Lessons learned expert *Rate: $400/day*	*87 days / Year 1-5*	• *Carrying out lessons learned investigations for whole project* • *Supporting the process of developing the State of Energy Access Report: Nigeria* • *Supporting the development of a Replication Plan for project sustainablity* *Inputs: GEF financing resources + support of TWG for Component 3* *Outputs: (1) annual lessons learned reports; (2) State of Energy Access Report: Nigeria; (3) Replication Plan*
Off-grid RET training specialist *Rate: $400/day*	*53 days / Year 1-3*	• *Establish gap in training needs of communities* • *Develop TOT course materials* • *Develop training materials for communities based on training gap analysis* *Inputs: GEF financing resources + support of TWG for Component 3* *Outputs: (1) report on community training gap analysis; (2) develop TOT course; (3) training materials for community awareness*
Off-grid RET technical specialist *Rate: $400/day*	*24 days / Year 1-4*	• *Develop training modules for training technicians* • *Training of trainers in technical or vocational institutions* *Inputs: GEF financing resources + support of TWG for Component 3* *Outputs: (1) training modules and materials developed; (2) report on training delivered to trainers in technical/vocational institutions*
Communications Expert *Rate: $400/day*	*51 days / Year 1-3*	• *Communication to promote project and its achievements* *Inputs: GEF financing resources + support of TWG for Component 3* *Outputs: (1) project reports capturing all communications carried out on the project; (2) communucation materials*
International / Regional and global contracting		
Off-grid RET MRV Expert *Rate: $ 800/day*	*19 days / Year 1*	• *Developing MRV system for tracking GHG emission reductions from off-grid RETs* *Inputs: GEF financing resources + support of TWG for Component 3* *Outputs: (1) MRV system in place*

Annex D: Terms of Reference

Terms of Reference for the Project Board

The Project Board (PB) will serve as the project's decision-making body. It will meet according to necessity, at least twice each year, to review project progress, approve project work plans and approve major project deliverables. The PB is responsible for providing the strategic guidance and oversight to project implementation to ensure that it meets the requirements of the approved Project Document and achieves the stated outcomes. The PB's role will include:

- Provide strategic guidance to project implementation;
- Ensure coordination between various donor funded and government funded projects and programmes;
- Ensure coordination with various government agencies and their participation in project activities;
- Approve annual project work plans and budgets, at the proposal of the Project Manager;
- Approve any major changes in project plans or programmes;
- Oversee monitoring, evaluation and reporting in line with GEF requirements;
- Ensure commitment of human resources to support project implementation, arbitrating any issues within the project;
- Negotiate solutions between the project and any parties beyond the scope of the project;
- Ensure that UNDP Social and Environmental Safeguards Policy is applied throughout project implementation; and, address related grievances as necessary.

The specific responsibilities of the Project Board include:

- Provide overall guidance and direction to the project, ensuring it remains within any specified constraints;
- Address project issues as raised by the project manager;
- Provide guidance on new project risks, and agree on possible countermeasures and management actions to address specific risks;
- Agree on project manager's tolerances as required;
- Review the project progress, and provide direction and recommendations to ensure that the agreed deliverables are produced satisfactorily according to plans;
- Appraise the annual project implementation report, including the quality assessment rating report; make recommendations for the workplan;
- Provide ad hoc direction and advice for exceptional situations when the project manager's tolerances are exceeded; and
- Assess and decide to proceed on project changes through appropriate revisions.

The composition of the Project Board must include the following roles:

Executive: The Executive is an individual who represents ownership of the project who will chair the Project Board. This role can be held by a representative from the Government Cooperating Agency or UNDP. The Executive is: Add who will represent the Executive for the project.

The Executive is ultimately responsible for the project, supported by the Senior Beneficiary and Senior Supplier. The Executive's role is to ensure that the project is focused throughout its life cycle on achieving its objectives and delivering outputs that will contribute to higher level outcomes. The executive has to ensure that the project gives value for money, ensuring cost-conscious approach to the project, balancing the demands of beneficiary and suppler.

Specific Responsibilities: (as part of the above responsibilities for the Project Board)

- Ensure that there is a coherent project organisation structure and logical set of plans;
- Set tolerances in the AWP and other plans as required for the Project Manager;
- Monitor and control the progress of the project at a strategic level;
- Ensure that risks are being tracked and mitigated as effectively as possible;
- Brief relevant stakeholders about project progress;
- Organise and chair Project Board meetings.

Senior Supplier: The Senior Supplier is an individual or group representing the interests of the parties concerned which provide funding and/or technical expertise to the project (designing, developing, facilitating, procuring, implementing). The Senior Supplier's primary function within the Board is to provide guidance regarding the technical feasibility of the project. The Senior Supplier role must have the authority to commit or acquire supplier resources required. If necessary, more than one person may be required for this role. Typically, the implementing partner, UNDP and/or donor(s) would be represented under this role. The Senior Suppler is: Add who will represent the Senior Supplier for the project.

Specific Responsibilities (as part of the above responsibilities for the Project Board)

- Make sure that progress towards the outputs remains consistent from the supplier perspective;
- Promote and maintain focus on the expected project output(s) from the point of view of supplier management;
- Ensure that the supplier resources required for the project are made available;
- Contribute supplier opinions on Project Board decisions on whether to implement recommendations on proposed changes;
- Arbitrate on, and ensure resolution of, any supplier priority or resource conflicts.

Senior Beneficiary: The Senior Beneficiary is an individual or group of individuals representing the interests of those who will ultimately benefit from the project. The Senior Beneficiary's primary function within the Board is to ensure the realization of project results from the perspective of project beneficiaries. The Senior Beneficiary role is held by a representative of the government or civil society. The Senior Beneficiary is: Add who will represent the Senior Beneficiary for the project.

The Senior Beneficiary is responsible for validating the needs and for monitoring that the solution will meet those needs within the constraints of the project. The Senior Beneficiary role monitors progress against targets and quality criteria. This role may require more than one person to cover all the beneficiary interests. For the sake of effectiveness, the role should not be split between too many people.

Specific Responsibilities (as part of the above responsibilities for the Project Board)

- Prioritize and contribute beneficiaries' opinions on Project Board decisions on whether to implement recommendations on proposed changes;

- Specification of the Beneficiary's needs is accurate, complete and unambiguous;
- Implementation of activities at all stages is monitored to ensure that they will meet the beneficiary's needs and are progressing towards that target;
- Impact of potential changes is evaluated from the beneficiary point of view;
- Risks to the beneficiaries are frequently monitored.

These terms of reference will be finalised during the Project Inception Workshop.

Terms of Reference for the Technical Working Groups (TWG)

The TWGs will provide technical advice and inputs relating to project implementation and will be chaired by institutions having the mandate in the specific area of work with support from the PM. The members of the TWG will consist of representatives from Government Ministry, UNDP, other relevant government agencies, research and educational organizations, NGOs (including WCS), private sector companies and other relevant stakeholders to be agreed by the Project Board. Technical experts may be invited in to discuss specific issues. Indicative Terms of Reference are as follows. These will be reviewed by the Project Board during project inception and may be extended as necessary.

- Review planned activities and ensure that they are technically sound and that, wherever possible, there is integration and synergy between the various project components during planning and implementation;
- Promote technical coordination between institutions, where such coordination is necessary and where opportunities for synergy and sharing of lessons exist;
- Provide technical advice and guidance on specific issues concerning illegal and unsustainable wildlife trade;
- Share information on project progress and lessons learned with related stakeholders at the national level;
- The TWG or a subset of its members may be requested to undertake specific project-related tasks, such as preparing or reviewing analytical reports, strategies and action plans, etc.;
- Other tasks as indicated by the Project Board

Terms of Reference for Key Project Staff

Project Director

Background

The Project Director (PD) is the Director Department of Climate Change in the Ministry of Culture, Tourism and Environment. He will be accountable to the Ministry of Culture, Tourism and Environment and UNDP for the achievement of objectives and results in the assigned Project. The PD will be part of the Project Steering Committee and answer to it. The PD will be financed through national government funds (co-financing), whose appointment will be made by the Principal Secretary of the Ministry of Culture, Tourism and Environment in consultation with the UNDP CO.

Duties and Responsibilities

- Serve as a member of the Project Board.

- Supervise compliance with objectives, activities, results, and all fundamental aspects of project execution as specified in the project document.
- Supervise compliance of project implementation with government policies, procedures and ensure consistency with national plans and strategies.
- Facilitate coordination with other organizations and institutions that will conduct related activities for promoting off-grid rural energy access, similar solar-powered technologies, or same themes from elsewhere in Angola.
- Participate in project evaluation, testing, and monitoring missions.
- Coordinate with national governmental representatives on legal and financial aspects of project activities.
- Coordinate and supervise government staff inputs to project implementation.
- Coordinate, oversee and report on government cofinancing inputs to project implementation.

Project Manager

Background

The Project Manager (PM), will be locally recruited following UNDP procedure, with input to the selection process from the Project partners. The position will be appointed by the project implementing agencies and funded entirely from the Project. The PM will be responsible for the overall management of the Project, including the mobilisation of all project inputs, supervision over project staff, consultants and sub-contractors. The PM will report to the PD in close consultation with the assigned UNDP Programme Manager for all of the Project's substantive and administrative issues. From the strategic point of view of the Project, the PM will report on a periodic basis to the Project Board, based on the PD's instruction. Generally, the PM will support the PD who will be responsible for meeting government obligations under the Project, under the NIM execution modality. The PM will perform a liaison role with the government, UNDP and other UN agencies, CSOs and project partners, and maintain close collaboration with other institutions providing co-financing. The PM will also have the responsibility of overseeing the implementation of the Gender Action Plan, Stakeholder Engagement Plan, and Social and Environmental Safeguards.

Duties and Responsibilities

- Plan the activities of the project and monitor progress against the approved work-plan.
- Supervise and coordinate the production of project outputs, as per the project document in a timely and high quality fashion.
- Coordinate all project inputs and ensure that they are adhere to UNDP procedures for nationally executed projects.
- Supervise and coordinate the work of all project staff, consultants and sub-contractors ensuring timing and quality of outputs.
- Coordinate the recruitment and selection of project personnel, consultants and sub-contracts, including drafting terms of reference and work specifications and overseeing all contractors' work.
- Manage requests for the provision of financial resources by UNDP, through advance of funds, direct payments, or reimbursement using the UNDP provided format.
- Prepare, revise and submit project work and financial plans, as required by Project Board and UNDP.
- Monitor financial resources and accounting to ensure accuracy and reliability of financial reports, submitted on a quarterly basis.
- Manage and monitor the project risks initially identified and submit new risks to the project board for consideration and decision on possible actions if required; update the status of these risks by maintaining the project risks log.
- Liaise with UNDP, Project Board, relevant government agencies, and all project partners, including donor organisations and CSOs for effective coordination of all project activities.
- Facilitate administrative support to subcontractors and training activities supported by the Project.

- Oversee and ensure timely submission of the Inception Report, Project Implementation Report, Technical reports, quarterly financial reports, and other reports as may be required by UNDP, GEF and other oversight agencies.
- Disseminate project reports and respond to queries from concerned stakeholders.
- Report progress of project to the steering committees, and ensure the fulfilment of PSC directives.
- Oversee the exchange and sharing of experiences and lessons learned with relevant community based integrated conservation and development projects nationally and internationally.
- Assist community groups, municipalities, CSOs, staff, students and others with development of essential skills through training workshops and on the job training thereby increasing their institutional capabilities.
- Encourage staff, partners and consultants such that strategic, intentional and demonstrable efforts are made to actively include women in the project, including activity design and planning, budgeting, staff and consultant hiring, subcontracting, purchasing, formal community governance and advocacy, outreach to social organizations, training, participation in meetings; and access to program benefits.
- Assists and advises the Project Implementation Units responsible for activity implementation in the target sites.
- Carry regular, announced and unannounced inspections of all sites and the activities of the Project Implementation Units.
- Monitor progress in implementation of the project Gender Action Plan ensuring that targets are fully met and the reporting requirements are fulfilled;
- Oversee/develop/coordinate implementation of all gender-related work;
- Review the Gender Action Plan annually, and update and revise corresponding management plans as necessary;
- Work with the M&E officer and Safeguards Officer to ensure reporting, monitoring and evaluation fully address the gender issues of the project;

Required skills and expertise

- A university degree (MSc or PhD) in a subject related to climate change mitigation or rural energy access or off-grid solar technologies or environmental sciences.
- At least 8 years of experience in private sector led models for promoting off-grid renewable energy technologies.
- At least 5 years of demonstrable project/programme management experience.
- At least 5 years of experience working with ministries, national or provincial institutions that are concerned with rural energy access.

Competencies

- Strong leadership, managerial and coordination skills, with a demonstrated ability to effectively coordinate the implementation of large multi-stakeholder projects, including financial and technical aspects.
- Ability to effectively manage technical and administrative teams, work with a wide range of stakeholders across various sectors and at all levels, to develop durable partnerships with collaborating agencies.
- Ability to administer budgets, train and work effectively with counterpart staff at all levels and with all groups involved in the project.
- Ability to coordinate and supervise multiple Project Implementation Units in their implementation of technical activities in partnership with a variety of subnational stakeholder groups, including community and government.
- Strong drafting, presentation and reporting skills.
- Strong communication skills, especially in timely and accurate responses to emails.
- Strong computer skills, in particular mastery of all applications of the MS Office package and internet search.

- Demonstrated understanding of the links between sustainable development, social and gender issues;
- Experience in gender responsive capacity building, especially in the area of rural development and rural energy access;
- Excellent command of English and local languages.

Project Administrative Assistant

Under the guidance and supervision of the Project Manager, the Administrative Assistant will carry out the following tasks:

- Assist the Project Manager in day-to-day management and oversight of project activities;
- Assist the M&E officer in matters related to M&E and knowledge resources management;
- Assist in the preparation of progress reports;
- Ensure all project documentation (progress reports, consulting and other technical reports, minutes of meetings, etc.) are properly maintained in hard and electronic copies in an efficient and readily accessible filing system, for when required by PB, TAC, UNDP, project consultants and other PMU staff;
- Provide PMU-related administrative and logistical assistance.
- Keep records of project funds and expenditures, and ensure all project-related financial documentation are well maintained and readily available when required by the Project Manager;
- Review project expenditures and ensure that project funds are used in compliance with the Project Document and GoI financial rules and procedures;
- Validate and certify FACE forms before submission to UNDP;
- Provide necessary financial information as and when required for project management decisions;
- Provide necessary financial information during project audit(s);
- Review annual budgets and project expenditure reports, and notify the Project Manager if there are any discrepancies or issues;
- Consolidate financial progress reports submitted by the responsible parties for implementation of project activities;
- Liaise and follow up with the responsible parties for implementation of project activities in matters related to project funds and financial progress reports.

The Project Administrative Assistant will be recruited based on the following qualifications:

- A Bachelor's degree or an equivalent qualification related to financial management or accounting;
- At least three years of work experience in a similar position, and with familiarity with projects related to rural energy access;
- Previous experience with UN project will be a definite asset;
- Very good inter-personal skills;
- Proficiency in the use of computer software applications especially MS Word and MS Excel.
- Excellent language skills in English (writing, speaking and reading) and in local languages

Technical Officer

The Technical Officer (TO) will be internationally recruited by UNDP and she/he will be responsible for providing overall technical backstopping to the Project. He/she will provide technical support to the Project Manager (PM), including an advisory role to the Project Director (PD) and other government counterparts.

To facilitate his/her functions, she/he will be based predominantly in Luena, Moxico Province. The TO will coordinate the provision of the required technical inputs, reviewing and preparing Terms of Reference, reviewing the outputs of consultants and other sub-contractors. The TO will provide technical backstopping to the Project's Responsible Parties and coordinate the exchange of knowledge and experiences on the setting up of a viable supply chain for off-grid decentralised solar technologies with other countries in the SADC region. He/she will report directly to the Project Director and UNDP.

Duties and Responsibilities

1. Provide technical and strategic assistance for project activities, including planning, monitoring and site operations;
2. Prepare and implement a capacity development plan on climate change mitigation and rural energy access using decentralised solar technologies;
3. Prepare Terms of Reference for consultants and sub-contractors, and assist in the selection and recruitment process;
4. Ensure quality control of interventions/outcomes/deliverables;
5. Support the PM, consultants and sub-contractors to ensure the timely delivery of expected outputs in accordance with international quality standards, and promote synergies among the various sub-contracted activities;
6. Assist the PM by providing technical inputs during the preparation and revision of the Management Plan, Annual Work Plans, periodic reports such as the Combined Project Implementation Review/Annual Project Report (PIR/APR), inception report, technical reports, quarterly reports for submission to UNDP, the GEF, other donors and Government Departments, as required;
7. Assist the PM in other issues related to Climate Change Mitigation, ensuring coordination between national interventions in the sector in liaison with project partners, donor organisations, NGOs and other groups to ensure effective coordination of project activities;
8. Assist in undertaking revisions in the implementation program and strategy based on evaluation results and orientations received from the PD and the PSC;
9. Document lessons from project implementation and make recommendations to the Steering Committee for more effective implementation and coordination of project activities;
10. Provide assistance to set up, review and implement the Project's M&E structures with a view on retrieving verified information on project results and impacts; and
11. Perform other tasks as may be requested by the Project Director.

Annex E: UNDP Social and Environmental Screening Procedure and plans as needed

Annex F: Stakeholder Engagement Plan

Annex G: Gender Analysis and Action Plan

Annex H: UNDP Risk Log

#	Description	Date Identified	Type	Impact & Probability	Countermeasures / Mngt response	Owner	Submitted, updated by	Last Update	Status
1	Risk arising from limitations and uncertainties in the off-grid energy market regarding market outlook, market access and competition. Although the Government has developed electrification and renewable energy targets to 2022, there is to some extent uncertainty regarding the feasibility of achieving these targets.	Risk was identified at PIF formulation on 3 March 2017	Political	The effect could be the lack of visibility regarding electrification in project sites, thereby putting at risk the technology targets, direct GHG emission reductions and gender-sensitive number of direct beneficiaries. However, based on past experience, electrification rate is more likely to be lower than planned, which would not pose a threat to the UNDP-GEF project. In contrast, the target for off-grid SHS could also not be met, thereby impacting the project scaling up negatively. This risk could be compounded by COVID-related pressures, with competing priorities from government leading to delays or additional challenges. P = 3 I = 3	By focusing on small-scale, household-level systems, the project can benefit from "light touch" regulation, rather than the more complex and still-to-be-elaborated tariff and licensing regime required for village-level mini-grids. Also, under Output 2.1, the project will deploy technical assistance on GIS-based modeling of low-cost rural energy access options that will serve two purposes, namely: (1)	Project Manager	Submitted by: UNDP Regional Technical Advisor Updated: PPG Team Leader	Status of risk was checked during PPG stage on 8 October 2018	No change

					supporting policy-decision making in terms of the most cost-effective ways to achieve rural energy access; and (2) providing the private sector with key indicators regarding the geographically-segmented market potential for different off-grid renewable energy technologies (RETs).				
2	If the vaccine program in Angola is delayed or if variants emerge that can escape the existing vaccines, it could lead to knock-on effects in advancing key activities.	Risk was identified at PPG Stage during GEF review process on 24 May 2021	COVID-19	The COVID Pandemic is, at the time of writing, at a point of inflection. Variants and second/third waves of infections are emerging worldwide with concomitant reactions from authorities, ranging from mild restrictions on movement and curfews, to strict lockdowns and strict domestic travel restrictions. The most robust forms of restrictions could negatively impact activities requiring the physical presence of team members and stakeholders.	Scheduling of activities such as trainings, market assessments/market intelligence gathering or other activities that may require physical presence in certain localities will be front-loaded, to	Project Manager	Submitted by: UNDP Regional Technical Advisor	Status of risk was confirmed during GEF review process (24 May 2021)	No change

					allow for a buffer in case the sanitary situation deteriorates to the point of preventing the swift realization of these activities. Wherever possible, alternatives could be explored, such as rapidly training interviewers within targeted communities or regions, so that they may be able to conduct basic information gathering (i.e. market intelligence data) in cases where specialist teams and consultants can no longer access the sites of interest for a prolonged period of time.				

					In addition, teleconferencing solutions will be proactively assessed and prepared by the project team and implementing partner in case they become essential later on.				
3	The domestic supply and value chain and capacities of sustainable energy service providers in Angola are very limited. The global threat of low quality generic products to the sector exacerbates this problem nationally. As a result, this may cause an inadequate implementation of sustainable energy	Risk was identified at PIF formulation on 3 March 2017	Technical	The effect could be significant as the availability of low-quality generic products would undermine the business of the model proposed by the UNDP-GEF project, and ultimately have the detrimental impact of reducing consumer acceptance of the off-grid technologies. Base of pyramid market segment is very price sensitive, especially in the absence of knowledge and understanding of medium-to-long term effects of low-quality products. P=4 I=4	Component 2 of the proposed project is designed to address this risk and will identify and implement a range of measures that are required for mitigating this risk, such as through the support to adoption of quality standards for sustainable energy products (Output 2.1). In preparing the request for proposals for	Project Manager	Submitted by: UNDP Regional Technical Advisor Updated: PPG Team Leader	Status of risk was checked during field surveys carried out during the PPG stage on 3 July 2018. It was observed that there was increasing demand for low-quality generic solar kits in the mini-markets in Lucusse. Evidence was also gathered in Luena where similar kits were being sold in shops and by hawkers.	Increasing

	products leading to sub-optimal performance and malfunctioning, resulting in the long-term erosion of social acceptance for off-grid renewable energy technologies (RETs).				the selection of suppliers, special attention will be paid to technical specifications and the quality of the products. Further, the project will invest in the capacity building of rural communities on the benefits and use of off-grid RETs (Output 2.5), including the issue of product quality assurance and minimum performance. Also, under Component 1, the project will make low-cost finance accessible to rural communities (Output 1.3) to purchase quality products. In				

					sum, the derisking instruments proposed by the project will enhance the affordability of quality products.				
4	Risk arising from lack of awareness and resistance in communities to sustainable energy products, including solar-powered lanterns and kits. Among the Angolan population, there is a low level of awareness of solar energy.	Risk was identified at PIF formulation on 3 March 2017	Social acceptability	The overall effect would be lower penetration levels of technologies, thereby reducing the expected direct global environmental benefits. The proposed business model will not be validated having a detrimental impact on scaling up effects. P=2 I=3	Community engagement will be a key principle of the project to ensure community ownership and acceptance of the clean technologies and products. Under Output 1.2, a market study will be carried out to establish market demand and select the most appropriate technologies as determined under Output 1.1. Under Output 1.3, women-led solidarity	Project Manager	Submitted by: UNDP Regional Technical Advisor Updated: PPG Team Leader	Status of risk was checked during field surveys carried out during the PPG stage on 3 July 2018. It was observed that there was increasing demand for solar kits (albeit of low quality) through sales reported by owner of mini-market in Lucusse. Evidence was also gathered in Luena where similar kits were being sold in shops and by hawkers. This risk is closely linked with the	Decreasing (trend could reverse in medium-to-long term if risk is not mitigated)

					groups will be promoted to provide access to finance for the off-grid technologies, and these groups will be used as a channel for increasing the acceptability of off-grid RETs. Output 2.5 entails training and providing technical support to communities on the benefits and how to use the clean energy products. There is also the risk that access to modern energy, especially to power electrical devices and appliances, may lead household to increase energy demand beyond the capacity of			Technical risk identified above.	

					solar home systems. To avoid this, the project will carry in-depth capacity building in communities on the appropriate use of technologies under Output 2.5. It is also expected that a market-based mechanism for procuring technologies will increase care and responsibility in technology usage. Further, the technology review and screening, which has been carried out during the PPG, will be updated during project implementation under Output 1.1, whereby all issues related				

					to social and cultural acceptability will be taken into account.				
5	There is a risk that customers may not have the willingness or ability to pay for the products or have access to an appropriate method of payment.	Risk was identified at PIF formulation on 3 March 2017	Financial	This is a significant risk to the project, as the business model is based on the affordability of off-grid RETs. Lack of willingness and ability to pay will squarely translate in an overestimation of project impacts in terms of direct GHG emission reductions and direct project beneficiaries. Willingness to pay is closely linked with Social Acceptability risk. P=4 I=4	The project has gathered market intelligence on willingness and ability to pay. The data has been used to develop financial models to investigate payment modalities for each RET based on avoided energy costs. The results show that a combination of access to micro-finance and financing through solidary groups should make RETs affordable. All RETs have payback periods much less than capital	Project Manager	Submitted by: UNDP Regional Technical Advisor Updated: PPG Team Leader	Status of risk was checked during field surveys carried out during the PPG stage on 1 July 2018.	No change

					outlay, with net savings accruing to households. In the second half of the project period, the solar-powered kiosks will serve as payment points, allowing customers to pay “off-line,” while the money can then be sent to the private companies via e-Kwanza from the kiosks.				
6	Co-financing for sustainable energy products and businesses does not materialise due to a lack of private sector interest and/or Government commitment.	Risk was identified at PIF formulation on 3 March 2017	Financial	Lack of co-financing would imply lack of partnerships with national and sub-national initiatives promoted by government and project partners, and project not being approved by the GEF Secretariat. P=2 I=5	Government and private sector co-financing and investment for sustainable off-grid energy businesses and products have been confirmed through signed co-financing letters during the PPG stage, including expressions of interest by the	Project Manager	Submitted by: UNDP Regional Technical Advisor Updated: PPG Team Leader	Status of risk was checked during bilateral meetings with project stakeholders during in-country mission and subsequent communications during the PPG stage (4 October 2018).	dead

					private sector and financial institutions.				
7	Prolonged droughts or intense floods, which are expected to occur with greater frequency due to climate change according to the NAPA, will adversely affect communities in Moxico, who are heavily dependent on natural resources and agriculture for their livelihoods. This in turn could affect their willingness and capacity to pay for more advanced cooking and lighting technologies. At the same	Risk was identified at PIF formulation on 3 March 2017	Climate change	The effects of this risk are expected to be moderate because past climate trends reveal that agriculture and fishing activities are infrequently impacted by lack of precipitation. Also, infrastructures in the targeted geographical areas are relatively sheltered by extremely weather events. P=2 I=3	The design of access to finance (Output 1.3) of the project based on a combination of solidarity savings groups and microcredit, and the payment schedule required by suppliers will take into account the effects of climate change and the potential for climate shocks since the project targets base of the pyramid households who in most cases do not have much savings. One of the criteria used to choose	Project Manager	Submitted by: UNDP Regional Technical Advisor Updated: PPG Team Leader	Status of risk was revisited during PPG state (9 October 2018)	No change

	time, more extreme weather events could negatively impact infrastructure, including sustainable off-grid cooking and lighting products and distribution channels.				project sites is accessibility during the rainy season when several parts of Moxico Province are inundated. The project has built flexibility to circumvent the accessibility and technology supply chain by making use of one mobile solar jango. At the same time, off-grid solar PV systems represent a viable climate adaptation alternative to the Angolan power sector, which depends heavily on hydropower generation.				
8	Decreasing prices for fossil fuel based energies including gasoline and diesel could	Risk was identified at PIF formulation on 3 March 2017	Market	The effect of this risk is expected to be moderate since the elimination of fuel subsidies and the rising price of oil on the world market will make off-grid RETs more affordable.	This has been an important problem in the past when energy prices in Angola have been very low	Project Manager	Submitted by: UNDP Regional Technical Advisor Updated:	Status of risk was revisited during PPG stage, when it was announced that Government	decreasing

	make off-grid renewables less competitive.			P=2 I=4	but since January 2016 energy prices in Angola have increased as a result of Government policy to eliminate subsidies on liquid fuels, and it is unlikely that this policy would be reverted. This risk falls outside the control of the project.		PPG Team Leader	had taken the decision to increase the price of liquid fossil fuels by the end of the year 2018 in line with the framework of the strategy of fiscal consolidation and reduction of expenses.[55] Also, the world market price for crude oil has increased by more than USD25 per barrel between March 2017 and October 2018. [56] (9 October 2018)	
9	The project might have negative impacts on vulnerable groups, as well as their	Risk was identified at PIF formulation on 3 March 2017	Social	Although the project will support access to clean energy for base of the pyramid consumers, there is always a possibility that small vulnerable groups might feel excluded from the project intervention or benefits.	The key project strategy to mitigate the potential negative impact of exclusion and restriction	Project Manager	Submitted by: UNDP Regional Technical Advisor Updated:	Status of risk was revisited during PPG stage when the SESP was finalised	No change

[55] https://macauhub.com.mo/2018/07/05/pt-governo-de-angola-analisa-ajustamento-dos-precos-dos-combustiveis/ - accessed 9 October 2018.
[56] https://tradingeconomics.com/commodity/crude-oil - accessed 9 October 2018.

	inclusiveness			Inappropriate skills and restricted management planning for the target communities/groups can potentially exclude stakeholders in decision-making. During the field study for the PPG, it was learned that domestic violence is usually practiced by men towards their wives, despite the silence that still prevails around it. P=4 I=3	of vulnerable groups from the project intervention and related-benefits is to involve poorest and marginalised people in participatory development and implementation of the Stakeholder Engagement Plan (Annex F). Therefore, the project will adopt a participatory approach involving as many local stakeholders and groups as possible, with a specific focus on female-headed households. To avoid marginalisation of vulnerable groups and		Gender Specialist, PPG Team	(27 September 2018)	

					potential tensions over project intervention or benefits, the project will also invest in capacity building of communities in clean energy sources promoted by the project and alternative sources of income for local communities in the project areas (Output 2.5). To mitigate the high risk of human right violation with a focus on domestic violence in the landscape area, the project will include the human rights subject into all training and capacity building				

					programmes in collaboration with governmental and traditional authorities. Strong and independent from the project management Grievance Redress Mechanism will be established in the project areas to address any conflicts related to human rights, resource use, inappropriate planning and benefit sharing on marginalized local people as a risk group (Annex F)				
10	The proposed project might entail issues related to gender equality and women's	Risk was identified at PPG Stage during finalisation of SESP on	Social	With the new technologies, such as lighting, women might potentially have an increased workload as they now have the perfect conditions to work at night. According to Angolan customary	To avoid this potential disequilibrium in the project implementation a Gender Action Plan has	Project Manager	Submitted by: Gender Specialist, PPG Team	This risk was identified during community visits that were carried out during the PPG	No change

	empowerment	27 September 2018		laws, men are given greater opportunities for decision-making and to engage in capacity building activities. As a result of such, the project can potentially give some advantages in this field to males and potentially discriminate females from participation in the project management, trainings, development and implementation of the community pilot projects on clean energy. During the field study for the PPG, it was learned that women still have little power to say on key matters related to the community and household. That modest participation of women in social gatherings/meetings/household is explained by the sphere of influence that men traditionally have in Angolan society. P=3 I=3	been designed to ensure women inclusion in delivery of all project Outputs was carefully developed (Annex G in ProDoc). The key project strategy to empower women is to involve them as well as poorest and marginalised people of the project areas in the planning and management of technology deployment (Output 1.3). Additionally, the project will make sure that women will participate in all trainings and capacity building programmes. Also, gender			stage and on finalising the SESP (27 September 2018)	

					equality modules will be mainstreamed during these learning exercises to emphasize the key role of women in community-based projects and households. These issues will be addressed directly under Output 1.3 and 2.5. A two-tier Grievance Redress Mechanism (Annex F) will be established in the project area to mitigate potential adverse impact of the project activities on women as a risk group while ensuring that benefits from the project				

					implementation are equally benefitting women. To control appropriate support of the women rights and gender equality during the project implementation all monitoring and evaluation mission for the project will be designed using fully participatory approach with opportunity for women to ensure their voices are heard and taken in account in the project management. In capturing lessons learned, the social effects of introducing the off-grid technologies				

					will be monitored under Outcome 3.				

Annex I: Results of the capacity assessment of the project implementing partner and HACT micro assessment

Annex J: Additional agreements