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United Nations Development Programme

Project title: Derisking sustainable off-grid lighting solutions in Nigeria		
Country: Nigeria	Implementing Partner: Rural Electrification Agency (REA)	Management Arrangements : National Implementation Modality (NIM)
UNDAF/Country Programme Outcome: By 2022, Nigeria achieves environmental sustainability, climate resilience and food security through efficient management of its cultural and natural resources.		
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): 00119777		Atlas Output ID (formerly Project ID): 00116153
UNDP-GEF PIMS ID number: 5691		GEF ID number: 9743
Planned start date: 1 January 2021		Planned end date: 31 December 2025
PAC meeting date: To be decided		
Brief project description: The UNDP-GEF project is designed to develop a private sector-led technology value for making off-grid renewable energy technologies, such as solar lanterns and solar home systems, available 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 Rural Electrification Strategy and Implementation Plan (2016) and the energy access targets in the SE4All Investment Prospectus. 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) putting in place appropriate policies, programmes and regulations that address policy, awareness and financial barriers to facilitate investment in sustainable off-grid lighting solutions and corresponding business models; (ii) off-grid lighting providers are operating and have access to working capital and equipment; and (iii) good practices, lessons learned, market assessments, demand-supply surveys, delivery models and business models are documented to support replication and scaling-up of project results. The number of direct project beneficiaries is expected to be around 96,380 persons, of which approximately 47,540 women.		
The lifetime global environmental benefits that will accrue from the adoption of off-grid solar technologies is estimated at ~108 ktCO _{2e} . Consequential emission reductions amounting to ~5,644 ktCO _{2e} are expected between 2020 and 2029 predominantly through the replication of the sustainable technology value chain. The project yields a GEF abatement cost of 0.46 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 2,639,726
UNDP (Grant)		USD 300,000
(1) Total Budget administered by UNDP		USD 2,939,726
PARALLEL CO-FINANCING (all other co-financing that is not cash co-financing administered by UNDP)		
World Bank (loan)		USD 75,000,000

Government/REA (grant)	USD 2,916,666
Government/REA (in-kind)	USD 1,500,000
Government/Federal Ministry of Environment (in-kind)	USD 300,000
Government/Energy Commission of Nigeria (in-kind)	USD 200,000
Private sector (equity/debt)	USD 2,900,000
(2) Total co-financing	USD 82,816,666
(3) Grand-Total Project Financing (1)+(2)	USD 85,756,392
SIGNATURES	
Signature: print name below Jonah Stanley	Agreed by Government Date/Month/Year: 30/11/2021
Signature: print name below Ahmad Salihijo	Agreed by Implementing Partner Date/Month/Year: 10/12/2021
Signature: print name below Mohamed Yahya	Agreed by UNDP Date/Month/Year: 24-Dec-2021

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LIST OF ACRONYMS

BOP	Base-of-pyramid
CCAC	Climate and Clean Air Coalition
CREDC	Community Research and Development Centre
CO ₂	Carbon Dioxide
DREI	Derisking Renewable Energy Investment
ESMP	Environmental and Social Management Plan
FME	Federal Ministry of Environment
FMP	Federal Ministry of Power
FSP	Full Sized Project
GAP	Gender Action Plan
GoN	Government of Nigeria
GDP	Gross Domestic Product
GEF	Global Environment Facility
GEFSEC	Global Environment Facility Secretariat
GHG	Greenhouse Gas
GIS	Geographic Information System
IEC	International Electrotechnical Commission
ktCO ₂	Kilo tonne carbon dioxide
LED	Light Emitting Diode
M&E	Monitoring and Evaluation
MNO	Mobile Network Operator
MRV	Measurement, reporting and verification
MSME	Micro, Small and Medium Enterprise
MtCO ₂	Mega tonne carbon dioxide
MTR	Mid-Term Review
NGN	Nigerian Naira
NGO	Non-Governmental Organisation
NREEP	National Renewable Energy and Energy Efficiency Policy
PAYG	Pay-As-You-Go
PIF	Project Identification Form
PIR	GEF Project Implementation Report
PM	Project Manager
POPP	Programme and Operations Policies and Procedures
PPG	Project Preparation Grant
PREEEN	Promoting Renewable Energy and Energy Efficiency in Nigeria
PSC	Project Steering Committee
PV	Photovoltaic
REA	Rural Electrification Agency
REF	Rural Electrification Fund
RESIP	Rural Electrification Strategy and Implementation Plan
RET	Renewable Energy Technology

RUWES	Rural Women’s Energy Security
SAC	Saving and Credit Association
SEP	Stakeholder Engagement Plan
SESP	Social and Environmental Screening Procedure
SDG	Sustainable Development Goals
SHS	Solar Home System
SL	Solar Lantern
SON	Standards Organisation of Nigeria
STAP	GEF Scientific Technical Advisory Panel
TA	Technical Assistance
TE	Terminal Evaluation
ToC	Theory of Change
ToR	Terms of Reference
TOT	Training of Trainers
TWG	Technical Working Group
UNDP-GEF	UNDP Global Environmental Finance Unit
WCFF	Working Capital Finance Facility

II. DEVELOPMENT CHALLENGE

1. With a population of 193.4 million, Nigeria is the most populous country in Africa and the 7th most populous country in the world. The rural population accounts for 53% of the total population¹; 43% of the population is considered multi-dimensionally poor while an additional 17% are vulnerable to sliding into multi-dimensional poverty. Nigeria's Human Development Index (HDI) value for 2015 is 0.514, which is in the 'Low Human Development' category and positions the country at 152 out of 187 countries and territories.²
2. In 2012, an estimated 93 million people did not have access to the electricity grid in Nigeria and an additional 24 million people had very unreliable and intermittent electricity access, suffering from frequent power outages that can last for several hours.³ It is estimated that 70% of Nigerians that live in rural areas currently do not have access to the power grid.⁴ The Council for Renewable Energy of Nigeria estimates that power outages cause an annual loss to the economy of \$984 million.⁵
3. The intermittent electricity supply forces a large portion of industry, businesses and households to rely on diesel and petrol generators as a primary or back-up source of electricity. It is estimated that 2.6 GW of decentralised diesel generator capacity is currently installed in Nigeria with approximately 60 million decentralized power generators in operation. The majority of companies (85%) operate their own diesel generator.⁶ According to the IEA, Nigeria accounts for 75% of diesel back-up power generation in Africa.⁷ Annual fuel costs are estimated to be around \$5 billion, of which 20% are attributed to the residential sector.⁸ Furthermore, a large part of the generated energy is wasted due to inefficient and outdated technologies. Apart from a huge income loss, the extensive use of these back-up generators has also resulted in health hazards due to the exposure to black carbon and other local pollutants, in addition to GHG emissions.
4. Nigerians, therefore, make use of a combination of standalone generators and kerosene lamps, to an increasingly less degree, for lighting purposes. When generators are used, households are able to also power inefficient electrical appliances such as TV set, fridge, radio and mobile phone chargers (**Annex SA1**).⁹ According to a recent UNDP assessment¹⁰, an estimated 35 million households in Nigeria likely rely on kerosene for lighting purposes. The study assessed kerosene consumption in 18 high-impact countries, with Nigeria consuming 2,471,000 tonnes of kerosene in 2013, which made up 5.2% of the global kerosene consumption. According to Power for All,¹¹ around 17% of the total population used kerosene for household lighting in 2018.¹² One of the drivers that may have caused a shift away from kerosene lamps for lighting in rural households is the significant rise of kerosene prices over the past few years following fuel subsidy reforms.¹³

¹ <http://data.worldbank.org/country/nigeria>

² http://hdr.undp.org/sites/all/themes/hdr_theme/country-notes/NGA.pdf

³ https://www.iea.org/publications/freepublications/publication/WEO2014_AfricaEnergyOutlook.pdf

⁴ Ministry of Power (2015) The Renewable Energy and Energy Efficiency Policy.

⁵ Council for Renewable Energy, Nigeria (CREN) (2009) Nigeria Electricity Crunch. Available at www.renewablenigeria.org

⁶ <https://www.giz.de/de/downloads/giz2014-en-nigerian-energy-sector.pdf>

⁷ IEA, Africa Energy Outlook 2014: A Focus on Energy Prospects in Sub-Saharan Africa

⁸ https://www.iea.org/publications/freepublications/publication/WEO2014_AfricaEnergyOutlook.pdf

⁹ http://unep.org/pdf/OGL_NGA.pdf

¹⁰ UNDP, 2016: Kerosene Consumption: An Assessment of Selected High-Impact Countries

¹¹ <http://www.offgridnigeria.com/power-for-all-campaign-end-use-kerosene-nigeria-gains-steam/> - accessed 15 April 2019.

¹² Private investors and social entrepreneurs participating in the validation workshop held on 14 February 2019 mentioned that, on average, on around 20% of rural households used kerosene lamps. It was also mentioned that there has been a shift towards the use of hand-held dry battery-powered torches.

¹³ Field surveys (Annex SA1) have shown that kerosene (NGN 230/L) was much more expensive than gasoline (NGN 145/L), and equally expensive as diesel oil (NGN 250/L). Also, the Government of Nigeria removed subsidies on petrol and gasoline following subsidy reforms proposed by the IMF - <https://allafrica.com/view/group/main/main/id/00040638.html> - accessed 24 April 2019.

5. Nevertheless, the use of kerosene lamps for lighting comes with far-reaching negative socio-economic and development impacts for their users. Their use creates black carbon,¹⁴ while meeting poor illumination and efficiency standards at high costs and safety concerns. Kerosene lamps also pose significant health impacts, due to chronic illness resulting from inhalation of fumes and risk of injury due to fire. Commonly reported health impacts include respiratory effects and pulmonary damage. Safety risks related to kerosene usage is a major concern, as in Nigeria thousands of people are maimed each year by kerosene lamp explosions and fires.
6. A promising substitute for kerosene-based lighting products and standalone generators is the use of sustainable off-grid lighting solutions such as solar-powered portable lights and solar home kits as they offer a better and safer service at lower cost. A 2016 report by Bloomberg New Energy Finance and Lighting Global on the market trends of off-grid lighting estimates that the annual lighting-related expenses in a Nigerian household are, on average, about \$144 per year.¹⁵ Compared with the costs of purchasing and running a simple wick kerosene lantern, the study estimates that the purchase of a \$13 solar lantern has a payback period of only 4 months. Assuming a product lifetime of 2-3 years for a typical light from a reputable manufacturer, customers can enjoy lighting at no cost for approximately 1.5 – 2.5 years before replacement. The report further states that solar is also competitive compared with candles and battery-powered torches. The use of decentralised solar technologies is also squarely aligned with national policies, strategies and action plans for promoting rural electrification (**Table 1**).

Table 1. Selected goals for off-grid renewables in national policies, strategies and action plans.

Strategic Goal	Specific Goals
1. <u>Rural Electrification Strategy and Implementation Plan (RESIP)</u> ¹⁶	▪ Establishing the Rural Electrification Fund (REF) under the aegis of the Rural Electrification Agency (REA) ▪ 75% of total population electrified by 2020; 90% access by 2030; universal coverage by 2040 ▪ 75% electrification will require between NGN317.8 billion¹⁷ and NGN 525.8billion for administration and project costs combined ▪ Using decentralised solar technologies (e.g. solar home systems and mini-grids) to supply off-grid communities with clean electricity more affordably ▪ Financial incentives¹⁸ offered by the Rural Electrification Fund (REF) as capital grants to reduce economic barriers to the entry of decentralised PV technologies in full accountability and transparency
2. <u>National Renewable Energy and Energy Efficiency Policy (NREEP) 2015</u> ¹⁹	▪ To extend electricity to rural and remote/off-grid areas, through the use of solar home systems and ultimately promote solar photovoltaic and solar thermal applications to ensure that solar energy can be used for production of electricity ▪ Establishing micro-credit facilities for entrepreneurs, especially for women groups, for the establishment and operation of commercial solar energy facilities in remote and off-grid areas

¹⁴ In 2012, black carbon emissions from kerosene lamps in Nigeria were estimated at 63,400 tonnes, whereas black carbon produced by kerosene for cooking purposes amounted to 0.9 tonnes in the same year.

¹⁵ https://www.lightingglobal.org/wp-content/uploads/2016/03/20160301_OffGridSolarTrendsReport.pdf

¹⁶ Federal Ministry of Power, Works and Housing. 2016. Rural Electrification Strategy and Implementation Plan.

¹⁷ As of 1 May 2019, the official UN exchange rate is 1 USD = NGN 360.4.

¹⁸ FGN intends to use subsidies for rural electrification as a tool for social justice and for alleviating poverty in rural areas.

¹⁹ Federal Ministry of Power. 2015. National renewable Energy and Energy Efficiency Policy.

-
- Organizing systematic public enlightenment campaigns on the benefits of using solar home systems
 - Create appropriate motivation for increasing the local content of value added in the activities of energy sector industries
 - Establish a Special Task Force within the Nigerian Customs Service to stream-line the cumbersome process inherent in importing renewable energy (RE) and energy efficiency (EE) goods into the country
-

7. While decentralised renewable energy (RE) can play an important role in rural energy access and in providing basic services, 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: Energy market: Uncertainty regarding the credibility of electrification and renewable energy targets slows the progress of market mechanisms for efficient off-grid lighting products and systems despite offering safer, more reliable and cheaper long-term solutions.

Barrier #2: Social acceptance: Among the Nigerian population, there is a low level of awareness of solar power and, where it exists, the reputation of solar technology is often low, also due to high system failure rates of 'give-away' programmes in the past.

Barrier #3: Technology and hardware: Insufficient standard-setting has led to an uptake of low-cost generic products such as no-names, copycats or counterfeits, representing a major risk to the market as lower-quality products undermine customer satisfaction and trust. Current import clearing processes for importing sustainable off-grid lighting hardware and components lead to delays in delivery and increased costs for solar technology providers.

Barrier #4: Digital platform and Telecoms sector: Although Nigeria has a competitive mobile network operator (MNO) market, a national 2G coverage of 87.2 % and 86 million people who own a mobile phone, there are only 13 million mobile money accounts in the country. MNOs are not allowed to provide financial services and need to partner with banks, which results in under-investment in mobile money by MNOs. A high rate of financial illiteracy with respect to mobile money exacerbates this problem.

Barrier #5: Developer and energy service providers: Due to the limited activities in the solar off-grid market in Nigeria, there is little experience with private companies' capabilities to effectively plan, design, install, maintain, operate and monitor their sustainable off-grid lighting products and services.

Barrier #6: Payment: A lack of information on customer creditworthiness, such as customer credit data, makes it particularly difficult for pay-as-you-go (PAYG) service providers to attract longer-term consumer financing capital as lenders require historical track records which are not yet available.

Barrier #7: Financing: A combination of high capital costs and credit lines with tight payment terms from suppliers represents a major barrier to obtain shorter-term working capital to finance operations along the supply and distribution chains

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 available to base-of-pyramid (BOP) market segments in rural areas in the Nigeria. 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 ToC is the focus of Section IV.

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, 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 BOP market segment. The results of the derisking analyses for SHS are summarised in **Annex SA3**.
9. Geographical coverage: It is estimated that 70% of Nigerians that live in rural areas currently do not have access to the national electricity power grid. These communities are typically found in:²⁰
 - i. The far North-East and far North-West, up to the border with Niger Republic and Cameroun;
 - ii. The coastal areas of the Niger-Delta;
 - iii. The highlands of the South-West, up the border with the Republic of Benin; and
 - iv. The mountainous regions of the South-East, up to the border with Cameroun.

The locations that are suitable for SHS are shown in small circles in **Figure 1**, while the big circles show the coverage of the national grid. As discussed in Section IV, the UNDP-GEF project will provide complementary support to existing initiatives in the baseline that cover the four geographical ranges across.
10. 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.
11. 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, especially following fuel subsidy reforms; (2) the ambitious policies to deliver rural modern energy access using a combination of on-grid and off-grid solutions, especially while there is no demonstrable business model to reach a growing BOP market segment; and (3) a political commitment to the Sustainable Development Goals (SDGs),²¹ including climate change mitigation.

²⁰ Ministry of Power (2015), pg. 18.

²¹ The Presidency of Nigeria (2015) Nigeria's Road to SDGs: Country Transition Strategy; <https://www.undp.org/content/dam/nigeria/docs/InclusiveGrwth/Nigeria%20transition%20strategy%20to%20SDGs.pdf> – accessed 20 May 2019.

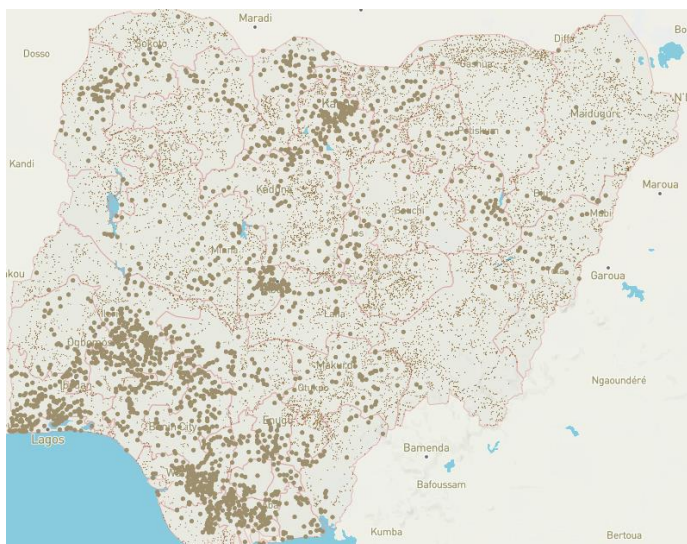


Figure 1. Map of Nigeria showing geographical locations appropriate for off-grid solar technologies (small dots). The large dots represent communities that are connected to the national grid.²²

12. The internal drivers are reflected by the activities proposed under the different outcomes and outputs discussed in the next section. The main internal drivers of the project are: (1) private investors are capacitated to make the business case for off-grid solar RETs, using market intelligence generated by the project and partners; (2) financial facility and appropriate schemes developed for catalysing private investments in rural communities; for sustainability this will be complemented by capacity building of financial institutions to understand business models for targeting rural communities and to develop appropriate financial packages taking the lead on the Working Capital Financing Facility (WCFF) that the GEF-financed project will establish under the REF; (3) ascertaining BOP consumer demand in order to justify technology transfer and supply through market research and capacity building on the uses and benefits of off-grid solar-powered technologies; (4) supporting private investors to reduce transaction costs of doing business by setting national standards for off-grid solar products, streamlining customs procedures, and supporting bulk purchasing of equipment to increase economies of scale, and (5) institutional and human capacity building that will enhance coordination between all market actors.
13. 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;
 - Willingness of private companies to participate in the project;
 - Reliable and accurate data is available for establishing demand for off-grid RETs, as well as for carrying out effective monitoring and evaluating of the project;
 - Domestication and enforcement of quality standards for off-grid RETs; and
 - Financial literacy of women-led groups will result in a 'savings culture' that will enhance the capacity to pay and creditworthiness of rural households.
14. 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 business models and financial schemes, and accompanying derisking instruments are appropriate for addressing the energy needs of BOP rural households in a way that can be sustained beyond the project lifetime and scaled-up;

²² Map generated using database of the Rural Electrification Agency at database.rea.gov.ng – accessed 7 December 2018.

- Increasing prices of fossil fuels, combined with ongoing government policy to reform 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.
15. The assumptions relating to the intermediate goal are as follows:
 - Private companies are sufficiently stimulated by the 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.
 16. Affordability and net savings: The sustainability of market development for off-grid RETs is premised on the affordability of the proposed solar technologies (solar lanterns, SLs; solar home systems, SHS) to BOP households. Besides the derisking analyses in **Annex SA3**, financial analysis has been carried out to ascertain the cost-effectiveness of the 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 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.
 17. 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 at the base-of-pyramid. The commitment of key project stakeholders (**Section IV** and **Annex F**) has been ensured through a rigorous stakeholder engagement process.
 18. 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 (**Annex F**).

²³Typically, baseline energy sources are dry battery-powered hand-held torches or kerosene lamps and standalone diesel-powered generators.

19. 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, Outcome 3 seeks to capture and disseminate lessons learned and best practices within Nigeria. This Outcome will also develop a replication strategy and action plan for scaling up the private-sector led business model in other regions of Nigeria. The project will also capitalise on and promote South-South cooperation through knowledge management. The development and application of the MRV mechanism for GHG emission reductions will be institutionalised by integrating the project MRV system within the broader framework for carrying out national GHG inventories under the aegis of the Ministry of Environment. The UNDP-GEF project will also establish a mechanism for measuring and reporting the SDG Impacts of investments in off-grid RETs. The Standards Organisation of Nigeria (SON) and the Nigeria Customs Service will be supported in carrying out market surveillance of off-grid renewable energy technologies (RETs) through the application of international quality standards of solar lanterns and SHS developed by the Lighting Africa initiative and carrying out conformity tests.²⁴ Further, the results of the project will be integrated into the curriculum of vocational institutions that will have the responsibility to train technicians for the installation and maintenance of SHS. The most effective communication and outreach strategy for rural households will be developed based on detailed gender-differentiated assessments of the information needs of target communities.
20. As discussed above, the design of the UNDP-GEF project has been informed using UNDP's derisking approach, the quantitative details of which are given in Annex SA3. The derisking approach is also a central part of the TOC underlying the proposed project. While the project will generate knowledge products based on lessons learned during implementation, its design has drawn from lessons learned and best practices on the development and application of UNDP's derisking approach. The first is the application in 2016 of the derisking approach for designing the UNDP-GEF project in Nigeria entitled 'Derisking Renewable Energy NAMA for the Nigerian Power Sector'.²⁵ Further, the present project has benefitted from the use of knowledge tools and resources developed for derisking investments in off-grid electrification using decentralised solar technologies (Annex SA3).²⁶
21. The project will develop several knowledge products under Component 3. The target audience for each knowledge product will be as follows:
- Lessons learned report: This report that will capture lessons learned across all project outcomes will be applicable to a broad range of audiences, namely public, private organisations and off-grid communities that are interested in using a private sector led model for enabling off-grid electrification using decentralised solar technologies. In particular, this knowledge product will be useful for replication and scaling up investments decentralised solar technologies in Nigeria and off-grid communities elsewhere in the world;
 - State of the Energy Access Report for Nigeria: This knowledge product will be used mainly by public institutions like the Federal Ministry of Power and the Rural Electrification Agency for reporting on progress made regarding rural electrification. In addition, this document can be used for mobilising additional financial and technical resources for scaling up renewable energy investments in the off-grid sector. This report will also account for the SDG impacts of investments in rural electrification; and
 - Replication Plan: The replication plan will make use of the lessons learned to develop a road map for scaling up private investments in off-grid electrification using decentralised solar technologies. Hence, it will be useful for guiding public electrification policy and strategy; providing guidance to private investors in terms of market potential; and rural communities in terms of future off-grid electrification perspectives.

²⁴ Discussions with Lighting Africa programme in Nigeria (Annex SA1) and <https://www.lightingafrica.org/products/> - accessed 24 October 2018. As discussed in Section IV, DfID's ACE programme will support SON to set up conformity testing laboratories.

²⁵ <https://www.thegef.org/project/de-risking-renewable-energy-nama-nigerian-power-sector> - accessed 1 August 2019.

²⁶ https://www.undp.org/content/undp/en/home/librarypage/environment-energy/low_emission_climateresilientdevelopment/derisking-renewable-energy-investment.html - accessed 1 August 2019.

IV. RESULTS AND PARTNERSHIPS

22. **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 shown in Error! Reference source not found.. 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) provide the enabling conditions for technology suppliers to link with base-of-pyramid (BOP) customers that is premised on stimulating demand for solar lanterns and SHS in rural areas, and that this need is met with the most appropriate technologies in terms of affordability, quality, and gender appropriateness, among others; (2) make financing more accessible, and financial schemes more attractive to private investors through the Rural Electrification Fund (REF); and (3) support the scaling up of rural electricity access for the sustainable development of communities through a sound and robust knowledge management framework.
23. **Project objective:** *To promote private sector investment in sustainable off-grid lighting technologies by establishing a sound policy environment that facilitates the creation of a self-functioning and sustainable market in Nigeria.*
24. 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 shown that there were no longer subsidies on fuels, implying that the three outputs related to overcoming subsidies on kerosene proposed in the PIF were no longer applicable. Also, these outputs did not reflect the expectations of Outcome 3 on knowledge management and scale-up strategy. Table 2 summarises the changes brought to Outcome 3.

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

Changes made	Reasons for change
The three outputs proposed in the PIF under Outcome 3 (shown below) have been removed. 3.1: <i>National kerosene lighting displacement plan developed</i> 3.2: <i>Support to establishing a Lighting Transition Fund provided</i> 3.3: <i>Support to a kerosene subsidy transition strategy provided</i>	There are three reasons justifying this change: 1. Subsidies on fuel, and, in the present case, kerosene were phased out by the end of 2016 due to a combination of factors, including fuel scarcity, high-priced black market sales and a record crash in the price of oil on the international market;²⁷ Given the checkered political economy of subsidy reforms in Nigeria since 1999, it is probably still early to pronounce categorically on the success of latest reforms. Nevertheless, at the time of formulating the Project Document, the price of kerosene was reflective of unsubsidised prices, and the three drivers of subsidy reforms mentioned earlier were still at play; 2. Baseline assessments (Annex SA1) have shown that rural households used little and increasingly less kerosene for lighting purposes. It was observed that households were turning to dry-battery powered hand held torches and standalone generators; and 3. The outputs proposed in the PIF did not tally with the objective of the outcome to effect knowledge management and scaling-up; For the above reasons, it was decided to leave out the three outputs that were proposed in the PIF.
Output 1.1 (<i>Support to the Government to continue recent efforts of phasing-out kerosene subsidies</i>) proposed in the PIF has been removed.	This output has been removed for the reasons given above. It was also a duplication of outputs proposed under Outcome 3 in the PIF, and, therefore, redundant in the first place. In line with stakeholders' requests, the following new output has been proposed instead: Output 1.1: Business case developed for off-grid decentralised solar technology delivery model
New outputs introduced under Outcome 3 based	The following three outputs have been included:

²⁷ O. Osunmuyiwa and A. Kalfagianni (2017) The Oil Climax: Can Nigeria's fuel subsidy reforms propel energy transitions? Energy Research & Social Science 27, 96-105.

on the results of stakeholder engagements and the Inception Workshop (Annex SA1)	Output 3.1: Lessons learned report produced based on project experience. Output 3.2: Creation of knowledge network between universities and research institutions. Output 3.3: Development of a replication and scaling up plan based on the derisking approach.
Output 2.2: The institution responsible for proposing financing schemes for off-grid solar products has been changed from 'Lighting Africa Initiative' to 'Rural Electrification Fund'	There are two reasons justifying this change, namely: (1) the Lighting Africa Initiative has been extended until June 2020, without any visibility regarding its possible continuation. Consequently, while the UNDP-GEF project will build on the achievements of the Lighting Africa Initiative, it cannot rely on its possible renewal for implementing project activities, and, more importantly, (2) while the REF, operating under the aegis of the REA, had the mandate to develop appropriate financing mechanisms, it now also has the operational capacity to package and implement these schemes.
Output 2.3: The institution responsible to support the purchase of SHS equipment using a combination of capital grants, debt and equity financing has been changed from 'Energy Research Council' to the 'Rural Electrification Fund'	The rationale for this change is that the REF has the mandate and operational capacity to carry out activities related to this output. Also, being predominantly a research-based organisation, the ERC did not have the expertise and operational capacity to implement this output (Annex SA1).

25. **Component 1: Policy derisking of sustainable off-grid lighting solutions in Nigeria:** Component 1 centres on creating conducive conditions for private sector investments in the off-grid decentralised solar technology (solar lanterns and SHS) market by addressing policy, awareness and financial barriers. These barriers underlie the risks faced by private sector investors as discussed in **Annex SA3**. The expected outcome from outputs proposed in Component 1 is *"Appropriate policies, programmes and regulations are in place that address policy, awareness and financial barriers to facilitate investment in sustainable off-grid lighting solutions and corresponding business models"*, and it will address Barriers #1 through to #6. The following outputs will contribute to that outcome:

Output 1.1: Business case developed for off-grid decentralised solar technology delivery model
Output 1.2: Quality standards for sustainable off-grid lighting products in place and enforced
Output 1.3: Customs procedures and import requirements streamlined
Output 1.4: Linkages between the telecoms and energy service sectors, policies and regulations established
Output 1.5: Customer awareness of sustainable off-grid lighting increased
Output 1.6: End-customers' ability to pay for sustainable off-grid lighting products strengthened
Output 1.7: Domestic financial sector's (debt/equity) experience and familiarity with financing sustainable off-grid lighting business models and products strengthened

26. Output 1.1: Business case developed for off-grid decentralised solar technology delivery model. 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 Error! Reference source not found.. One of the main constraints faced by local companies is cost recovery that can take multiple forms, such as (1) direct cash payment; (2) lease-to-own using pay-as-you-go (PAYG) with either mobile money or cash transactions; or (3) fee for service. It would therefore be useful to make the business case for these different options. Further, the business case will depend on market demand for off-grid technologies. Gathering market intelligence in rural areas bears a high transaction cost for companies. 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 technologies, as well as increasing affordability of products. This will also be aligned with government policy in local content. For the technology delivery model to be sustainable, it will propose measures for the environmentally-sound collection, storage

and disposal of electronic waste, including rechargeable batteries, associated with off-grid RETs at the expiration of their useful lives. The following activities will be carried out:

- Act 1.1.1: Carrying out market intelligence for demand of products. 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).²⁸ 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 also incorporate an assessment of the risk posed by the impacts of climate change on the livelihoods of rural communities. This information can be used to build resilience in rural household's ability to pay over time through formulation of sound adaptation measures. Market intelligence will be carried out in Year 1 (prior to Act 1.2.3) and also in Year 3.
- Act 1.1.2: Carrying out GIS-based modelling of least-cost technology options for rural energy access. This activity will complement the work that has been carried out by the GIZ in 5 States (Sokoto, Niger, Plateau, Ogun, Cross River), and support Act 1.1.3. Technical assistance will be provided to REA to carry out GIS-based mapping of least-cost technology options for rural energy access in an additional 8 states from the four broad geographical areas discussed in Section III. The results will serve policy-decision making as well as provide visibility and market intelligence (supporting Act 1.1.1) to guide private sector investments in the off-grid energy market, as well as reinforce the central data management system that is being operationalised in the Federal Ministry of Power (FMP). This activity will contribute towards the overall aim of FGN to develop a single national, sector wide roadmap that identifies the least-cost electrification solution for every community.²⁹
- Act 1.1.3: Supporting companies to develop business plans for serving BOP energy market. Using the results of Act 1.1.1 and 1.1.2, the project will support companies to develop business plans for serving the off-grid energy market, especially regarding decentralised solar products (solar lanterns and solar home systems). Potential companies will be invited to participate in this activity through a two-step process combining sequentially a call for expressions of interest and a call for proposals for short-listed companies. This activity will serve to increase competitiveness in the rural energy market for off-grid RETs. With these business plans, potential companies will be linked with financial institutions (Output 2.2).
- Act 1.1.4: Develop and advocate for Strategy and Action plan for local assembly and manufacturing of off-grid RETs. Decentralised solar technologies are currently imported into Nigeria. The FGN has a policy to increase the local content and local participation in the technology value chain from materials, manufacture, construction and operation.³⁰ This activity will identify which products can be assembled or produced locally. The project will link the REA with local industry actors to help them identify which products can be assembled or produced locally. A long-term strategy to enhance local assembly and/or manufacturing of off-grid solar technologies is consistent with the objective of increasing the affordability of off-grid renewable electricity.
- Act 1.1.5: Take-back, storage and safe disposal of product components. The social and environmental screening procedure (SESP) has revealed that electronic and electrical waste related to batteries, control electronics and electrical appliances of off-grid RETs at the end of product lifetime will become an increasingly more severe issue as investments in these technologies for enhancing clean rural energy access is catalyzed. It will be dealt with in two ways, namely: (1) one eligibility criterion for private companies / entrepreneurs to participate in the REF Call for Submissions that will allow them to access working capital grants under the Working Capital Finance Facility to be established under REF will be a product take-back clause at the end of product lives; and (2) developing a Environmental and Social Management Plan (ESMP) in collaboration with the Federal Ministry of Environment (and the Federal Environmental Protection Agency) on the environmentally-sound

²⁸ The sample size will include at least 2 States for each of the 6 geopolitical zones in Nigeria. Also, caution will be exercised that at least 50% of respondents are women.

²⁹ RESIP (2016), pg.9.

³⁰ RESIP (2016), pg.20.

collection, storage and disposal of all electronic and electrical waste, including rechargeable batteries, associated with off-grid RETs. The ESMP will be developed in Year 1.

27. Output 1.2: Quality standards for sustainable off-grid lighting products in place and enforced. In close collaboration with the World Bank Group's Lighting Africa initiative and DfID's Africa Clean Energy (ACE) programme in Nigeria,³¹ the GEF-financed project will provide support to SON to carry out market surveillance of pico- and solar home systems, as well as to enforce the application of domesticated standards in collaboration with the Nigeria Customs Service. The suite of technical assistance and collaboration with the aforementioned initiatives will translate into the availability of quality products, backed with appropriate product warrantee, to end-users.
- Act 1.2.1: Support market surveillance of off-grid solar technologies: Following the domestication of international Quality Standards for selected off-grid RETs (Pico-PV Quality Standards and SHS Kits Quality Standards) by the Lighting Africa – Nigeria programme, and the setting up of testing facilities by DfID's ACE programme in Nigeria, there will be a need to strengthen the capacity of SON to apply the domesticated standards in carrying out market surveillance.³² The project will provide technical assistance to SON, in collaboration with the Nigeria Customs Service (Act 1.2.2), to develop a proactive protocol to carry out market surveillance of pico- and solar home systems in Nigeria. This process will span over the first three years of the project lifetime.³³
 - Act 1.2.2: Reinforcing institutional cooperation between the Nigeria Customs Service and SON for enforcing national standards: Before being cleared for release for sales, Nigeria Customs Service must ensure that imported technologies are certified to meet the national standards developed under Act 1.2.1. The project will therefore provide technical assistance for reinforcing institutional cooperation between the Nigeria Customs Service and SON by putting in place simple but succinct operational guidelines for customs clearance of imported technologies covering the role and responsibilities of SON in the process of enforcing national standards for off-grid solar products.
28. Output 1.3: Customs procedures and import requirements streamlined. Analyse current customs procedures and import requirements and provide support to harmonising import requirements for sustainable off-grid lighting products and their components, and develop detailed implementation strategies for streamlining customs processes and import requirements. Activities under this output will be:³⁴
- Act. 1.3.1: Develop a HS-Code (Harmonised System Code) for off-grid solar products: There is currently no coherent HS-Code for all types of off-grid solar products. The project will support the Nigeria Customs Service to adopt the international HS-Code for off-grid solar products in close consultation with technology importers in order to understand their needs and concerns.
 - Act. 1.3.2: Capacity building of stakeholders on new HS-Code for off-grid solar products: Training will be provided to main stakeholders, including officers in the customs clearance unit under the direct supervision of the Comptroller General, importers of off-grid RETs, and officers of SON, regarding the new HS-Codes for off-grid solar technologies. The training will cover both the classification methodology and the duties, fees and any incentives associated with each product HS-Code classification.
29. Output 1.4: Linkages between the telecoms and energy service sectors, policies and regulations established. There is a need for government to establish a mechanism to link energy service providers to telecommunication infrastructures and regulate such linkage. This process will increase the breadth of payment options, including mobile money that technology suppliers can use for cost recovery. Also, there is a

³¹ <https://devtracker.dfid.gov.uk/projects/GB-1-204637> - accessed 8 May 2019.

³² <https://www.lightingglobal.org/quality-assurance-program/our-standards/> - accessed 27 April 2019.

³³ The domestication process is a seven-step process, covering: (1) planning for Technical Committee (TC)(2 weeks); (2) circulate international standards for comments (2-4 weeks); (3) TC meeting to declare whether to adopt (NIS-IEC) or adapt (NIS) standards; (4) editorial of NIS; (5) draft NIS sent to Standards Council for approval (3 months); (6) publication of domesticated standards (1 month); and (7) official launch of standards.

³⁴ NREEP (2015), pg.40.

need to advocate for the availability of minimum mobile telephony coverage in all communities. The following activities will be pursued:

- Act 1.4.1: Develop mechanism for linking energy service providers to telecommunication infrastructure: The project will work with the Nigerian Communication Commission (NCC) to develop a mechanism that will allow off-grid RETs to use telecommunication infrastructure to better localise customer payment options using mobile money as a means to increase effectiveness of cost recovery. The mechanism will be explicit about the conditions and terms of carrying out such monetary exchanges. In particular, the project will capitalise on recent regulatory reforms that now allow telcos to collect deposits, carry out payments and remittances, issue debit and pre-paid cards, provide financial advisory services and invest in government and central bank securities, in order to promote mobile payment for off-grid RETs while working with energy service providers such as Solar Sisters among others.³⁵ The project will ensure that the views and needs of BOP off-grid RET suppliers are taken into account.
 - Act 1.4.2: Advocacy for minimum telecommunication coverage in rural communities: Using the business models developed under Act 1.1.3, the project will develop a strategy for advocating minimum mobile telephony coverage in all rural communities in order to promote the use of mobile money. The main stakeholder will be the NCC, telco service providers, and financial institutions.
30. Output 1.5: Customer awareness of sustainable off-grid lighting increased. 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 1.5.1: Carry out a gender-differentiated assessment of information needs for target communities, including most effective communication 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 of BOP rural communities.
 - Act 1.5.2: Carry out training of trainers (TOT). For cost-effectiveness, a minimum of 120³⁶ trainers will be trained to carry out large scale rural community outreach activities. The target communities will be decided based on the results of Act 1.1.1. Of these 120 trainers, some 75% will be women living in the project sites.³⁷ The training will also cover the communication strategies that will be outlined under Act 1.5.1.
 - Act 1.5.3: 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. It is expected that each trainer trained under Act 1.5.2 will train a further 12 local technology champions or agents, who in turn are expected to reach 35 households each. Hence, at least 50,400 households will be targeted using this approach.
 - Act 1.5.4: Assess evolving information needs of households with changes in market dynamics. While Act 1.1.1 will generate market intelligence at the beginning of the project to establish the scale and scope of market for off-grid solar technologies, it will be important to track changes in market dynamics as consumer needs evolve with increasing knowledge of technologies and energy needs. A bottom-up approach making use of the field agents or technology champions trained under Act 1.5.3

³⁵ <https://www.euromoney.com/article/b1cmtgtzyrglb9/regulators-give-mobile-money-in-nigeria-a-boost> - accessed 20 May 2019.

³⁶ This assumes at least 10 trainers in 12 States – i.e. a minimum of 2 States in each of the 6 geopolitical zones of Nigeria.

³⁷ Solar Sisters has developed training materials for supporting local entrepreneurs market and sell pico-solar and solar home systems. This is done within a larger training programme having 12 modules (one module covered each month) that seeks to create mainly women entrepreneurs who create demand for off-grid solar products (through marketing and customer awareness activities), and act as last-mile intermediaries in the technology supply chain. The entrepreneurs also act as fee collection agents, which is a good approach where financial literacy is low and access to mobile payment limited or not available. The project could collaborate with Solar Sisters for replication of its ongoing training programme. Further, the UNDP-GEF project will leverage the results achieved under Component 3 of the Lighting Africa programme for creating customer awareness.

will be used as an adaptive approach to assess this evolving information and energy needs. The results of this activity will be used to deliver business models (Act 1.1.3) and financial models (Act 1.7.2 and Act 2.2.1) to meet changing energy needs of rural communities. These results will also inform the knowledge management activities under Output 3.1.

31. *Output 1.6: End-customers' ability to pay for sustainable off-grid lighting products strengthened.* Provide support for the formulation and implementation of policies that facilitate the growth of the consumer credit industry including TA to assess, identify and transfer best practices from other countries such as Government-sponsored bank accounts.
 - Act 1.6.1: Assessment carried out and Strategy and Action Plan for deploying alternative payment mechanisms. While pay-as-you-go (PAYG) using mobile money has been demonstrated to be effective and efficient in promoting off-grid solar RETs, 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. This activity will be developed in parallel with Act 1.1.2 on cost recovery methods underlying business models.
 - Act 1.6.2: Capacity building of rural communities and technology suppliers on use and benefits of alternative payment mechanisms. As a complementary activity to Act 1.5.2, 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 most appropriate payment mechanisms depending on capacity to pay and access to infrastructure (e.g. mobile money, proximity of financial institutions, or use of agent model).
 - Act 1.6.3: Advocacy for Government-sponsored bank accounts: The project will engage the Ministry of Finance in discussions concerning the piloting (design, implementation, and monitoring and evaluation) of Government-sponsored bank accounts in selected communities served under Act 1.1.1 with the aim of increasing the financial literacy and nurturing a savings culture among rural communities, both of which are means to increasing the creditworthiness of households.
32. Provide TA to build capacity and facilitate knowledge exchange for the domestic financial industry on providing long-term, end-customer financing for businesses specialised in the sustainable off-grid solar power and lighting market. Provide TA for educating the banking sector about the peculiarities of sustainable off-grid lighting business models and projects, their risk-return profiles, and support the design of, and training in, specific due diligence tools. Further, this output will support 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 output is complementary to Output 2.2.
 - Act 1.7.1: Capacity building of financial institutions to design and implement financial schemes. While the WCFF (Act 2.1.1) and its pilot financial scheme (Act 2.2.1) will be used to support early market development and especially to support base-of-pyramid markets that would otherwise not be served by existing market actors, it is important to support the development of a competitive and risk-taking financial sector that will provide capital for scaling up the diffusion of off-grid solar technologies. This is a crucial element of sustainability for a market-led diffusion and scaling up of off-grid RETs. Using international best practices and project-supported examples (e.g. UNDP's derisking approach under Act 2.2.2), support will be provided to the Government and partnering financial institutions on the design of public loan schemes and guarantee mechanisms to complement commercial lending, ultimately assisting project developers to gain access to capital and additional funding.
 - Act 1.7.2: 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. 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 Nigeria. 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.

33. **Component 2: Financial de-risking of sustainable off-grid lighting solutions in Nigeria.** Following on from the policy derisking component, Component 2 will focus on transferring residual risks and barriers that cannot be fully mitigated under the first component and thus involves close collaboration and coordination with existing public and private financial actors, financing initiatives and future partners including the World Bank National Electrification Programme (NEP). The main focus of this component is to ensure that financing for sustainable off-grid lighting (service) providers in Nigeria is catalysed most efficiently and cost-effectively. The expected outcome from outputs proposed in Component 2 is *"Sustainable off-grid lighting (service) providers in Nigeria are operating and have access to working capital and equipment."* The following outputs, which will address Barrier #6, will contribute to that outcome:

- Output 2.1: Working Capital Finance Facility for sustainable off-grid lighting companies established and capitalised with co-financing from the Government and development partners
- Output 2.2: Appropriate financing schemes for sustainable off-grid lighting product lending in place through the Rural Electrification Fund
- Output 2.3: Equipment and services provided to MSMEs through a competitive procurement process conducted by the Rural Electrification Fund

34. This component will incorporate, collaborate with and build upon Government policies and existing or planned funding schemes, especially the REF that has the mandate and operational capacity to launch Calls for Proposals to catalyse investments in off-grid energy access using decentralised solar technologies using a combination of capital grants, and debt and equity financing.

35. Output 2.1: Working Capital Finance Facility for sustainable off-grid lighting companies established and capitalised with co-financing from the Government and development partners. In close collaboration with the Rural Electrification Agency (REA), a working capital support facility will be established under the Rural Electrification Fund (REF) targeting private sustainable off-grid lighting providers. The Facility will be used to mobilise financial resources in the form of capital grants, debt and equity financing in order to catalyse private investments in off-grid RETs. TA will be used to establish the facility, define its mode of operation and for building local (i.e. REF) capacity to manage the facility, and in the process acquiring experience to demonstrate the feasibility of financing sustainable off-grid lighting investments and for supporting the facility in leveraging additional financing for the capitalization of the fund. The activities to support achievement of this output will be:

- Act 2.1.1: Setting up the Working Capital Finance Facility under the REF for investments in SHS: A set of Operational Guidelines³⁸ will be developed for the WCFF through joint dialogue and agreement between the REF and UNDP, so that the least cumbersome and yet transparent procedures are developed to guide the operation of the WCFF. No GEF financing will be used to capitalise the WCFF. Instead, GEF funding has been used to mobilise additional grant (from REA) and debt (from FCMB) financing to capitalise the fund. Also, eligible companies operating in the off-grid market for decentralised solar products benefiting from financing through the WCFF will bring their own equity (such as Solar Sisters). The main aim of the WCFF, in conjunction with the results of Output 2, will be to support multi-tier energy access in rural communities through private investments (i.e. a financially sustainable market-led mechanism).
- Act 2.1.2: Capacity building of REF staff to operationalise the WCFF: Selected staff of the REF will be trained on applying the Operational Guidelines of the WCFF, as well as having the necessary technical skills to evaluate bids resulting from Act 2.3.1. The selected staff will also be trained on business delivery models for decentralised off-grid solar products, and for engaging with potential private financiers and donors for capitalising the WCFF as per Act 2.1.3.

³⁸ The approach will be similar to that used to establish a joint GIZ-REF funding window under the REF dedicated for financing mini-grids in Nigeria.

- Act 2.1.3: Diversifying the sources of capitalisation for the WCFF: The project will continue to support REF to leverage further financial resources through diversifying the sources of WCFF capitalisation of the WCFF in various forms (e.g. grants from Nigerian companies wishing to invest Corporate Social and Environmental Responsibility funds to alleviate poverty through clean energy access, debt or equity financing). As a start, the First City Monument Bank (FCMB)³⁹ has agreed provide debt financing, while Solar Sisters will bring equity financing.⁴⁰
36. Output 2.2: Appropriate financing schemes for sustainable off-grid lighting product lending in place through the Rural Electrification Fund. In close collaboration with the domestic banking and financial sector, the GEF-financed project will facilitate and support the design of financing products for sustainable off-grid lighting and solar power use business models, ultimately promoting a mass market and a significant scale-up for these technologies, products and services. It is pointed out that the rural energy market is multi-tiered and that different financial schemes may be required to service the different segments.
- Act 2.2.1: Designing and piloting financial schemes under the REF. In order to achieve the objectives set by the Federal Government of Nigeria (FGN) to increase clean energy access as a means of alleviating poverty, a suite of financial schemes will be required to serve different segments of the rural and (peri) urban energy markets. Different financial schemes are also required to allow the participation of non-traditional operators, including community-based organisations, cooperatives, women entrepreneurs and small and medium enterprises in the energy market.⁴¹ The project will start by developing a financial scheme for servicing the base-of-pyramid rural households with off-grid solar technologies (SL and SHS), as this market segment is one of the riskiest for private entrepreneurs. Following discussions with REF and FCMB, a proposal has been made for piloting a financial scheme for SHS composed of 40% capital grant, 40% debt, and 20% equity. This package and other schemes will be finalised during project implementation.
 - Act 2.2.2: Investigating the cost-effectiveness of alternative financing schemes using UNDP's derisking approach: A preliminary derisking renewable energy investment (DREI) study has been conducted during PPG stage for SHS, and the preliminary results are shown in Annex SA3. Activity 2.2.2 will build on the results in Annex SA3 to: (i) carry out capacity building of selected REF staff in the use of the derisking approach; and (ii) carry out modelling on the cost-effectiveness of alternative financing schemes. The results of derisking will be carried out in Year 1, Year 3 and Year 5 in order to ensure that changes in private investors' risk profile is adequately monitored, and that the most appropriate financing schemes are developed with changing risk profile and off-grid RET market dynamics. The results of Act 2.2.2 will be used in Act 1.7.1.
37. Output 2.3: Equipment and services provided to MSMEs through a competitive procurement process conducted by the Rural Electrification Fund. This output will complement the previous two by addressing the issue of hardware cost and targeting households that may otherwise not be served using a purely market-based mechanism or other baseline initiatives. In order to reach the last-mile and riskiest rural households energy service companies require support for market entry and retail expenses. The procurement of equipment and services will address these specific needs by ensuring that high quality products are procured and by building the capacity of off-grid lighting service providers. Procuring quality products will help to develop a common expectation for quality from manufacturers in the solar lighting market. Further, bulk purchasing of equipment through a competitive procurement action performed by the REF is expected to reduce hardware costs for investors, especially micro, small and medium enterprises (MSMEs). All these measures seek to increase the

³⁹ The project will partner with FCMB that has one of the most extensive networks of micro-finance outlets in Nigeria. Its customers are predominantly involved in agriculture, and micro-financing is used to increase agricultural productivity, and, in turn, increase the creditworthiness of rural communities that practice mainly agriculture for income generation. The project will work with FCMB to target its existing base-of-pyramid (BOP) rural clients on the adoption of off-grid RETs. In this case, the purchase of off-grid RETs would be through a secondary loan secured through income on enhanced agricultural productivity and agricultural activities.

⁴⁰ Please see letters of co-financing in Annex J.

⁴¹ RESIP (2016), pg.16.

affordability of off-grid RETs to last-mile end users. Two types of Calls for Proposals are envisaged under this output, namely (1) for private companies to access funding under the WCFF, and (2) for bulk purchasing of hardware as explained earlier.

- Act 2.3.1: REF capacitated to launch transparent and accountable Calls for Proposals. According to the Electricity Power Sector Reform Act (2005), objective and transparent criteria must be developed in order to allow REF to carry out geographical allocation of financial resources. The UNDP-GEF project will provide technical support to REF to develop an open, competitive and transparent procedure, including establishing Eligibility and Selection Criteria,⁴² for launching calls for proposals inviting entrepreneurs to invest in SHS in rural communities. The Calls for Proposals will be the instrument through which private investors will access capital grants, debt and equity financing (Output 2.2) through the WCFF (Act 2.1.1). It is proposed to have two Calls for Proposals; one each in Year 2 and Year 3. The stepped approach will allow for learnings from the first round of proposals to be integrated into the 2nd Call for Proposals.
- Act 2.3.2: Capacity building of private entrepreneurs to respond to Calls for Proposals. A significant technical barrier faced by entrepreneurs in the SHS base-of-pyramid market is the lack of commercial and financing skills in putting together investment worthy projects.⁴³ A capacity building programme will be tailored for investors in the rural SHS market to develop these skills with the ultimate aim to better prepare them for responding to the Calls for Proposals, as well as financial models (and business models under Output 1.1) to attract equity and debt financing for complementary investments in SHS.
- Act 2.3.3: Carrying out bulk purchase of SHS equipment. One of the challenges that private entrepreneurs operating in the base-of-pyramid market for SHS face is the lack of economies of scale in procuring imported SHS units. Under this activity the project will support energy service providers to carry out bulk purchase of SHS units through a Call for Proposal to international technology suppliers. This approach will carry two significant advantages, namely: (1) lower per units costs will translate into more affordable products for the end-user, and (2) decreasing the overall transaction time involved in customs clearance. This activity will form part and parcel of REA's strategy to reduce equipment costs as proposed in the Rural Electrification Strategy and Implementation Plan (RESIP) 2016. Collaboration of energy service providers will be galvanised through Act 3.2.1. To kick start the bulk procurement process through the REA, GEF investments will be used to leverage additional financing in order to serve last-mile rural households that would otherwise not be served. All technology procured will be accredited to international standards. Once tested, the bulk procurement process will be used to reducing hardware cost for servicing all rural energy market segments.

38. **Component 3: Knowledge management and scale-up strategy.** The third component addresses outreach and dissemination of results. The expected outcome is *"Good practices, lessons learned, market assessments, demand-supply surveys, delivery models and business models are documented and scale-up guidelines are produced"*. The following outputs will contribute to that outcome:

Output 3.1: Lessons learned report produced based on project experience.

Output 3.2: Creation of knowledge network for promoting off-grid solar technologies.

Output 3.3: Development of a replication and scaling up plan based on the derisking approach.

39. 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

⁴² According to RESIP, the idea is to offer funding to developers of RE schemes that require the least-cost subsidy for the maximum community benefit. As such, applicants will be required to demonstrate their total project costs and funding requirements, as well as the project design and population served. In order to ensure the maximum benefit from Government and donor funds, applicants will also have to demonstrate the financial viability and sustainability of their schemes, covering all operation and maintenance costs.

⁴³ RESIP (2016), pg.13.

provincial authorities, and a workshop will be organised to discuss key findings and recommendations to inform the subsequent deployment of renewable energy technologies.

- Act 3.1.1: Develop MRV mechanisms for GHG emission reductions. Since the overarching objective of the project is the reduction of GHG emissions, while also delivering sustainable development benefits to local communities, the project will develop MRV mechanisms to track emission reductions accruing from off-grid solar technologies as well as the sustainable development co-benefits. 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.
 - Act 3.1.3: Publish and disseminate results of lessons learned to all stakeholders. The lessons learned will be published and disseminated to all project stakeholders and made available to a broad public inside and outside Nigeria 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.
40. Output 3.2: Creation of knowledge network for promoting off-grid solar technologies. The project will cooperate with research institutions and universities regarding research and development of sustainable energy solutions for rural households.
- Act 3.2.1: Supporting the setting up of a network of off-grid decentralised energy service providers: To foster knowledge network, the UNDP-GEF project will support the establishment of a community of practice (CoP) for off-grid decentralised service providers under the local Chapter of the African Mini-grid Developers Association (AMDA). The institutional arrangement of the CoP is expected to take the form of a sub-committee of the local Chapter of AMDA.⁴⁴ This activity will support achievement of the results of Act. 2.3.3.
 - Act 3.2.2: Identify and establish linkages with partnering technical institutions. As per **Annex F**, the project will partner will qualified research, technical and training institutions for outreach activities and providing technical support on research and development of off-grid RETs. Potential partners have been identified as the Energy Commission of Nigeria (ECN), and further due diligence will be carried out at project implementation start to choose the most appropriate institutions for partnership agreements.
41. Output 3.3: Development of a replication and scaling up plan based on the derisking approach. In order to support scaling up of off-grid decentralised solar technologies in Nigeria, a replication plan will be developed based on two main activities, namely the application of UNDP's derisking approach to mini-grids, and the development of a report on the State of Rural Energy Access in Nigeria.
- Act 3.3.1: Carry out DREI analyses for mini-grids. The DREI analyses for SHS carried out under Act 2.2.2 will be completed with a detailed DREI analysis for mini-grids. The DREI analyses for mini-grids, together with the application of GIS-based least cost off-grid energy technological options (Act 1.1.2), will pave the way for developing a replication plan for scaling up off-grid solar technologies country-wide. This activity will be completed in Year 4.
 - Act 3.3.2: Develop a State of the Energy Access Report for Nigeria. This activity will complement the lessons learned from the UNDP-GEF project under Output 3.1. This will be a country-wide study of all activities carried out in off-grid energy access, especially regarding off-grid solar technologies. The State of the Energy Access Report will be conducted in Year 5, and will form the baseline assessment for the replication plan in Act 3.3.3.
 - Act 3.3.3: Develop a replication plan for off-grid solar energy access. Using the results of Output 3.1, Act 2.2.2, Act 2.3.1 and Act 2.3.2, a replication plan will be developed for scaling up the sustainable

⁴⁴ This has been proposed by off-grid service providers that participated in the baseline analysis, and iterated during the validation workshop.

diffusion of off-grid solar technologies, including elements of enhanced local assembly and manufacturing of technologies in Nigeria (Act 1.1.4).

42. **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**.⁴⁵

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

Technology ⁴⁶	Year 1	Year 2	Year 3	Year 4	Year 5	Total
SL (3 W)	0	2000	2500	967	0	5467
SHS (15 W)	0	2,000	3,700	2,075	0	7,775
SHS (50 W)	0	1,030	2,240	1,030	0	4,300

43. The detailed calculations of emission reductions are given in **Annex SA4**. The results are summarised in **Table 4**. Total cumulative emission reductions during the project lifetime are estimated at ~108,250 tCO_{2e}. Consequential GHG benefits during the 10-year influence period of the project have been estimated at ~5,644 ktCO_{2e}. The unit abatement cost is estimated at about \$0.46/tCO_{2e}.

Table 4. Cumulative GHG emission reductions during project lifetime.

Technology	Year 1	Year 2	Year 3	Year 4	Year 5	Total
SL (3 W)	0	211	687	1,265	1,844	4,008
SHS (15 W)	0	1,878	7,230	14,529	21,829	45,466
SHS (50 W)	0	2,256	9,420	18,841	28,261	58,778
Total	0	4,346	17,337	34,635	51,934	108,252

44. **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 the subsequent market development of decentralised renewable energy. Knowledge management as a pillar of the project strategy is discussed in Section III.
45. **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** Error! Reference source not found. 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
Rural Electrification Fund (REF) operating	The REF is the implementing partner for the UNDP-GEF project. Its Executive Director (ED) will be the Chair of the Project Steering Committee (PSC) and the Special Adviser to	→ Output 2.1: Working Capital Finance Facility for sustainable off-grid lighting companies established and capitalised with co-financing from the Government

⁴⁵ It has been assumed that solar lanterns will be used to substitute for glass-covered kerosene lamps. However, an alternative baseline for solar lanterns could be the replacement of dry-battery powered flashlights. In this case, substitution with solar lanterns will not result in direct GHG emission reductions. Instead, the local environmental benefit will be avoiding approximately 1,848,000 pairs of AA-type batteries from being used and eventually open dumped in close proximity to human settlements.

⁴⁶ 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.

Stakeholder	Contributions	Relevant project outputs
under the aegis of the Rural Electrification Agency (REA)	the ED will be Project Director. Apart from providing project oversight, the REF will be directly involved in the implementation of all three outputs under Component 2 on financial derisking of investments in off-grid decentralised solar products. The REF will also be involved in the development of business and financial models for promoting off-grid RETs, as well as in advocacy activities related to enhancing the capacity of the domestic financial sector to engage in the rural energy market. The REF will lead and coordinate all DREI analyses.	and development partners → Output 2.2: Appropriate financing schemes for sustainable off-grid lighting product lending in place through the Rural Electrification Fund → Output 2.3: Equipment and services provided to MSMEs through a competitive procurement process conducted by the Rural Electrification Fund → Output 1.1: Business case developed for off-grid decentralised solar technology delivery model → Output 1.7: Domestic financial sector's (debt/equity) experience and familiarity with financing sustainable off-grid lighting business models and products strengthened → Output 3.3: Development of a replication and scaling up plan based on the derisking approach
Ministry of Power	The Ministry of Power is responsible for providing policy guidance regarding rural energy access in Nigeria. The policy guidance and accompanying regulations then provide the framework for the operation of REA and REF. Consequently, the Ministry will be interested in all the outputs under Component 1, and particularly in the development of the spatial mapping of least cost rural energy access technologies. The mandate of the Ministry will also be leveraged to engage the Ministry of Finance to support Government-sponsored bank accounts as a means to increase the financial literacy and creditworthiness of rural communities, and the Nigerian Communications Commission regarding mobile coverage and mobile money facility in rural communities.	→ Output 1.1: Business case developed for off-grid decentralised solar technology delivery model → Output 1.4: Linkages between the telecoms and energy service sectors, policies and regulations established → Output 1.6: End-customers' ability to pay for sustainable off-grid lighting products strengthened
Ministry of Environment	The Ministry is the Focal Point for Climate Change. In this capacity, it has the responsibility to coordinate and develop national GHG inventories, as well as systems for measuring, reporting and verification (MRV) of GHGs. Hence, the Ministry will be directly involved in developing a project-level MRV mechanism for tracking direct GHG emission reductions arising from the project.	→ Output 3.1: Lessons learned report produced based on project experience (Act 3.1.1)
Standards Organisation of Nigeria (SON)	SON will be responsible for the domestication of international standards for pico-solar and SHS technologies. It will establish testing laboratories for conformance testing of technology components and systems, and collaborate with the Nigeria Customs Service to ensure enforcement of standards.	→ Output 1.2: Quality standards for sustainable off-grid lighting products in place and enforced
Ministry of Finance	The Ministry of Finance will be involved in the DREI analyses on SHS and mini-grids at an early stage. This will be done to ensure that any government incentives (financial/economic) are designed in order to ensure affordability of products for BOP	→ Output 2.2: Appropriate financing schemes for sustainable off-grid lighting product lending in place through the Rural Electrification Fund → Output 3.3: Development of a replication and scaling up plan based on the derisking approach

Stakeholder	Contributions	Relevant project outputs
	customers and most cost-effectively. At the same time, having the collaboration of the Ministry will make it easier to advocate for policy and financial derisking instruments. It is pointed out here that the Ministry of Finance provides supervisory oversight to the Nigeria Customs Service. The Ministry will also be involved in the process of informing and training financial institutions on alternative financing schemes to promote private investments in off-grid RETs	→ Output 1.7: Domestic financial sector's (debt/equity) experience and familiarity with financing sustainable off-grid lighting business models and products strengthened
Nigeria Customs Service (NCS)	The NCS is under the supervisory oversight of the Ministry of Finance, and it will be directly involved in the streamlining of customs procedures and harmonisation of HS Codes for off-grid decentralised solar products. The NCS will also collaborate with SON regarding the enforcement of off-grid RET quality standards.	→ Output 1.3: Customs procedures and import requirements streamlined → Output 1.2: Quality standards for sustainable off-grid lighting products in place and enforced (Act 1.2.3)
National and international sustainable off-grid lighting (service) providers	Key collaborators for the risk analyses in the project design phase, including the identification of appropriate policy and financial derisking instruments under Components 1 and 2. As mentioned in Annex SA3, a total of 6 private investors have participated in the SHS DREI analyses in the PPG. Private investors will also be involved in DREI analyses on mini-grids. Sustainable off-grid service providers will also be key partners for establishing and implementing the working capital finance facility under Component 2, and in linkages with telecom operators, the regulator, and financial institutions.	→ Output 1.3: Customs procedures and import requirements streamlined → Output 1.4: Linkages between the telecoms and energy service sectors, policies and regulations established → Output 2.2: Appropriate financing schemes for sustainable off-grid lighting product lending in place through the Rural Electrification Fund → Output 2.3: Equipment and services provided to MSMEs through a competitive procurement process conducted by the Rural Electrification Fund → Output 3.1: Lessons learned report produced based on project experience → Output 3.2: Creation of knowledge network between universities and research institutions
Financing Institutions	National and international finance institutions, such as the FCMB and FCMB Microfinance Bank, will be key collaborators for identifying, analysing and implementing the most appropriate financial de-risking instruments under Component 2, as well as receiving appropriate training on financial schemes for promoting rural clean energy access. Micro finance institutions will also be engaged in enhancing rural households' credit worthiness through setting up bank accounts for individuals and/or increasing access to credit.	→ Output 1.6: End-customers' ability to pay for sustainable off-grid lighting products strengthened → Output 1.7: Domestic financial sector's (debt/equity) experience and familiarity with financing sustainable off-grid lighting business models and products strengthened → Output 2.2: Appropriate financing schemes for sustainable off-grid lighting product lending in place through the Rural Electrification Fund
Communities / Civil Sector and NGOs	Several local communities have participated in the baseline analysis summarised in Annex SA1. Rural communities in at least 12 States representative of the 6 geopolitical regions of Nigeria will be involved in the project as direct beneficiaries. These communities will also provide information to establish robust energy use baselines for GHG emission reduction calculations and for DREI analyses, as well as for studying the changing market	→ Output 1.1: Business case developed for off-grid decentralised solar technology delivery model → Output 1.5: Customer awareness of sustainable off-grid lighting increased → Output 1.6: End-customers' ability to pay for sustainable off-grid lighting products strengthened → Output 2.3: Equipment and services provided to MSMEs through a competitive procurement process conducted by the Rural Electrification Fund

Stakeholder	Contributions	Relevant project outputs
	dynamics in energy use with the introduction of off-grid RETs. Their experience with distribution channels and issues in rural areas will also be an important component to build business development capacity. Lastly, NGOs such as Solar Sisters will be closely engaged in promoting social and productive uses by the provision of alternative off-grid energy solutions and will provide support to ensuring the inclusion of marginalized groups of the population including women. It is pointed out that Solar Sisters participated in the DREI analyses presented in Annex SA3.	→ Output 3.1: Lessons learned report produced based on project experience
Energy Commission of Nigeria (ECN)	The ECN is an apex body for energy sector planning and policy implementation and promoting the diversification of energy resources. With the growing interest in the development and application of renewable energy resources, the Commission has been undertaking research and development activities in various aspects of renewable energy utilisation, especially in the rural areas of Nigeria. The ECN will collaborate with the UNDP-GEF project for knowledge management of rural energy needs. The ECN will also be involved in advocating for the policy and financial derisking instruments emanating from DREI analyses.	→ Output 3.2: Creation of knowledge network for promoting off-grid solar technologies → Output 3.1: Lessons learned report produced based on project experience

46. The following associated baseline projects represent the most important initiatives that are currently being or have been implemented in the field for sustainable off-grid lighting and rural electrification:

- Lighting Africa is a key component of the Global Lighting and Energy Access Partnership (Global LEAP), an initiative of the Clean Energy Ministerial, which is a voluntary forum that brings together governments, the private sector and development partners to share knowledge and best practices and encourages self-sustaining commercial markets for energy access solutions. The main activities of Global LEAP are product quality assurance, finance across the supply chain, market intelligence, consumer education, and policy. Global LEAP also supported the development of a global standard for solar LED lanterns within the framework of the International Electrotechnical Commission (IEC). The Lighting Africa programme will end in June 2020 and being granted a 1-year extension.⁴⁷
- Between September 2016 and September 2018, UNEP and UNDP implemented a project funded by the Climate and Clean Air Coalition (CCAC), the 'Reducing Black Carbon Emissions by Transitioning to Clean and Sustainable Lighting' project. The objective of the project is to overcome specific barriers to an uptake of alternative lighting technologies by providing a detailed assessment of estimated economic and environmental savings that would be generated from transitioning the off-grid lighting sector, technical assistance for policy reform and a regulatory framework on kerosene subsidies, capacity building to support the implementation of Minimum Energy Performance Standards (MEPS) for sustainable off-grid lighting solutions, an advocacy campaign to raise awareness on low-carbon energy technologies and a demonstration project in Nigeria.
- The NGO, Solar Sisters, is promoting the uptake of solar and clean cooking technologies by leveraging a women-led direct sales network to remote communities in rural Nigeria and other countries in Africa such as Uganda and Tanzania. The NGO provides women with a start-up kit containing inventory, training and

⁴⁷ Discussions with the Lighting Africa Programme Manager (Annex SA1).

marketing support. Up until now, the project has supported around 2,500 entrepreneurs, reaching a total of around 700,000 people who are now benefitting from solar lights.

- The REA, through a US\$ 350 million World Bank loan, will implement the Nigerian Electrification Project (NEP) between 2019 and 2024. The stand-alone SHS component will be implemented to the tune of US\$75 million with the objective to enable millions of underserved Nigerian households and micro enterprises access better energy services at lower average cost by supporting the private-led market development for stand-alone solar systems. The loan will be used: (1) to establish a Output-based Fund (US\$60 million) for providing a fixed-incentive payment per system installed; and (2) to establish a Market Scale-up Challenge Fund (US\$15 million) that will provide lump-sum grants against strongest business plans and other co-financing. The latter is analogous to the Working Capital Finance Facility to be established using GEF-funding, but the complementarity will be in markets served. The UNDP-GEF project will make investments solely in BOP rural market segments. For instance, this will translate in the UNDP-GEF project providing a higher share of capital grant (i.e. 40%) to make off-grid RETs more affordable in BOP rural market segments (as opposed to between 20-30% under the NEP). Also, the NEP will provide incentives for the adoption of stand-alone solar technologies larger than 50Wp, and even larger than 350Wp for productive uses, which are outside the scope of the UNDP-GEF project. Finally, the NEP will carry out market intelligence, and REA will coordinate between the NEP and UNDP-GEF project to ensure complementarity in terms of target States and communities.
- As an extension of the work completed by Lighting Africa Nigeria, the Lighting Africa Global Programme has teamed up with DfID to develop the Africa Clean Energy (ACE) programme.⁴⁸ ACE will work in Nigeria to address the barrier related to the lack of quality standards that has resulted in markets being flooded by low quality products thus undermining consumer confidence. In particular, the ACE programme will support SON establish adequate laboratories for carrying out performance testing of off-grid RETs to verify conformity with international Standards that are expected to be domesticated by the Lighting Africa Nigeria project before its closure by June 2020.
- The Shell foundation has funded the Nigeria Off-grid Market Accelerator Programme (NoMAP) that has identified 300 economic clusters that are viable for SHS solutions. Further, NoMAP is piloting off-grid payment systems for last-mile collection for SHS companies. The UNDP-GEF project will peruse these results to inform its market intelligence activities and cost-effective cost recovery mechanisms.⁴⁹

47. **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 ‘high’ risk project, and **Table 6** summarises only the moderate and high 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.

<i>Risk Description</i>	<i>Risk Rating</i>	<i>Mitigation Measures</i>
Political Despite political will and commitment to tackle the lack of electricity access in Nigeria, political instability or a change of Government could lead to potential policy reversals that may impact energy policy and discourage private investment.	Moderate	The project is designed and based on the national commitments and targets on electrification and renewable energy that have been adopted at the highest possible level, as well as in consultation with communities and local governance institutions ensuring that it is bottom-up and demand-driven. Any proposed revisions in the policies, as well as support on new policies and regulations by the project, will also have to secure the highest level of approval based on actual needs and realities at the ground level (communities and households).

⁴⁸ <https://devtracker.dfid.gov.uk/projects/GB-1-204637> - accessed 7 May 2019.

⁴⁹ <https://offgridmap.ng/aboutus/> - accessed 20 May 2019.

Economic International oil prices have fallen significantly over the past year and are expected to continue fluctuating with a tendency to increase again in the medium and long term. The sustainable off-grid lighting solutions proposed in this project may not be economically competitive compared to baseline energy sources.	Medium	This has been an important problem in the past when energy prices in Nigeria have been very low but since January 2016 energy prices in Nigeria have increased as a result of Government policy to eliminate subsidies on liquid fuels, and it is unlikely that this policy would be reverted. Although this risk falls outside the control of the project, Components 1 and 2 of the project aim precisely at achieving these goals and levelling the playing field for sustainable energy alternatives.
Technical The domestic supply and value chains and capacities of sustainable off-grid lighting service providers in Nigeria are very limited. The global threat of generic products to the sector exacerbates this problem nationally. As a result, this may cause an inadequate implementation of sustainable off-grid lighting projects, leading to sub-optimal performance, malfunctioning, etc.	Moderate	Components 1 and 2 of the proposed project are 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 adopting and enforcing domestic quality certification standards or by providing procurement support for equipment and services to off-grid lighting businesses to avoid distribution and sales shortages that could, otherwise, lead to a switch to alternative off-grid products, including low-quality generics.
Climate Change Climate change is expected to change Nigeria's biomass production, accelerate land degradation, and modify hydrological systems. There is also a risk of an intensified frequency and scale of natural disasters threatening infrastructure, including sustainable off-grid lighting products and distribution channels. In addition, the projected rise in temperatures will increase the power demand for air conditioning.	Moderate	The project will put most emphasis on promoting sustainable off-grid lighting solutions through solar PV powered system kits, which are less likely to be affected by climate change and therefore represents a viable climate adaptation alternative to the Nigerian power sector (which currently depends for 30% of its capacity on hydropower generation). Other potential impacts will be assessed in detail during the inception stage, and appropriate measures will be identified for incorporation of adaptation measures in the investment programme.
Security Political tensions in the Niger Delta between foreign oil corporations and a number of ethnic minorities seeking a share of oil profits have led to numerous violent attacks on oil infrastructure and staff in the last 20 years. The risk exists that a similar situation	Moderate	While it is not possible to fully mitigate security risks within the framework of the proposed project, the participation of local communities has been sought in selected project sites. An advocacy campaign under Component 1 (Output 1.5) will raise awareness and secure buy-in for the proposed sustainable off-grid solutions. Additionally, market intelligence to be carried out under Output 1.1 will provide geographic information regarding security risks. Finally, Nigeria has such a large underserved rural communities that the project can be impactful without having to invest in communities that pose significant security risks that are beyond its control.

could happen to sustainable off-grid lighting solution providers and users from groups with vested interests or stakeholders along the kerosene supply chain.		
Environmental SESP has revealed that electronic and electrical waste related to batteries, control electronics and electrical appliances of off-grid RETs at the end of product lifetime will become an increasingly more serious issue as investments in these technologies for enhancing clean rural energy access is catalyzed. This is especially so given the poor institutional arrangements and infrastructure for waste collection, storage and disposal in rural areas.	High	This risk is under the full control of the project and it will be dealt with in two ways, namely: (1) one eligibility criterion for private companies / entrepreneurs to participate in the REF Call for Submission that will allow them to access working capital grant under the Working Capital Finance Facility to be established under REF will be a product take back clause at the end of product lives; and (2) developing an Environmental and Social Management Plan (ESMP) in collaboration with the Federal Ministry of Environment (and the Federal Environmental Protection Agency) on the environmentally-sound collection, storage and disposal of all electronic and electrical waste, including rechargeable batteries, associated with off-grid RETs. The Plan will also provide the measures required for supporting State and Local Governments in discharging their roles and responsibilities in the sound management of these wastes. All institutional and regulatory frameworks will also be reviewed in the process for formulating the Strategy and Action Plan. An essential element of the ESMP will be to propose technologically and socio-economically viable means for developing a circular economy around off-grid RETs that will generate jobs and economic development in addition to being environmentally sound.

48. 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, which was coordinated by the Federal Ministry of Environment that appointed a dedicated staff – namely the GEF Desk Officer - to accompany the PPG Team during field visits. All stakeholder engagements in communities were carried out through prior coordination with officials of the Federal Government and traditional Chiefs in villages and communes. A matrix of stakeholder importance in terms of interest 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 consultations, field visits, interviews and surveys, and project committees) to target each category of project stakeholders has been developed. A SEP timeline of activities and budget totalling US\$297,343 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.
49. 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 (

50. 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.

Existing Gender Gaps (From Gender Analysis)	Action	Expected Result	Indicator	Responsible Institution/Party	Timelin es	Budget (USD)
Component 1: Policy De-risking of sustainable off-grid lighting solutions in Nigeria						
Low level of awareness among the Nigerian public especially women in rural communities on the availability, use and benefits of off-grid decentralised solar power.	Conduct massive advocacy with women's groups and campaigns to raise awareness about the benefits and value of sustainable off-grid lighting (including showcasing returns on investment). Activity 1.5.2, 1.5.3 and 1.5.4 (GEF Table Annex SA6)	Enhanced knowledge and acceptance of solar power and its effectiveness as a lighting solution among rural communities.	<u>Baseline:</u> 0 <u>Indicator:</u> (1) Number of women targeted in community outreach activities; (2) Number of trainers trained for outreach activities <u>Target:</u> (1) 90,800 women ⁵⁰ capacitated on the availability, use and benefits of off-grid RETs; (2) at least 60 trainers are women	PMU, UNDP	Year 2-5	72,420
	Investigate and find out what is the best communications strategy to apply to women on project sites. Activity 1.5.1 (GEF + UNDP Tables Annex SA6)	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.	<u>Baseline:</u> 0 <u>Indicator:</u> % participants in the consultations who are women. <u>Target:</u> At least 50% of participants of consultations are women and express their communication needs to best understand the usage benefits of clean energy technologies.	PMU, UNDP.	Year 1-4	27,120
The gender-differentiated energy needs of rural communities at the BOP energy market are not well established. In order to set up a viable (private-sector led) off-grid RET value chain for	Carry out gender-sensitive market intelligence in rural communities at BOP. Activity 1.1.1 (GEF Table Annex SA6)	At least 50% of all persons surveyed during market intelligence are women.	<u>Baseline:</u> 0 <u>Indicator:</u> % women and men participants in market intelligence surveys. <u>Target:</u> At least 50% of participants in surveys are women.	PMU	Year 1-2	60,120

⁵⁰ The project expected to target 31,200 rural households; rural household size = 5.9 persons; percentage of women in population = 49.3% (World Development Indicators, 2019).

the BOP energy market, the energy needs of consumers need to be established						
Women's minimal access to capital/credit (corresponds with lack of collateral) to finance installation of off-grid lighting solutions	Advocacy and capacity building for the domestic financial industry to waive stringent requirements for credit to facilitate women's access. Advocacy for special grants to female entrepreneurs and capacity building of women's cooperatives to access grants/loans. Activity 1.7.1 (GEF Table Annex SA6)	Enhanced knowledge of gender-differentiated approach to debt and equity access among financial institutions	<u>Baseline:</u> 0 <u>Indicator:</u> Number of financial institutions capacitated on gender-related access to debt/equity <u>Target:</u> 10 institutions	PMU	Year 3-4	26,600
Component 2: Financial De-risking of sustainable off-grid lighting solutions in Nigeria						
A combination of high capital costs and credit lines with tight payment terms represents a major barrier for cash sales and specialised PAYG off-grid lighting companies to obtain short-term financing for their supply and distribution chains and working capital. Women's minimal access to capital/credit is a huge barrier.	Establish a Working Capital Finance Facility for sustainable off-grid lighting companies. Advocacy for affirmative action to facilitate women's access to finance/ Mainstream gender in all financing products supported by the project. Involve Solar Sisters and other women-led enterprises to showcase best practices in delivering off-grid lighting solutions for women in 'last-mile communities' in Nigeria and elsewhere. The Solar Sister's model offers women the opportunity, training, and resources necessary to set up a clean energy business. These entrepreneurs spread clean power in communities that many others do not reach because they do not present lucrative profits due to remoteness, sparse populations, purchasing power challenges, and gaps in trained local workforce.	Increase in the number of women who have access to capital/credit to set up a clean energy business.	<u>Baseline:</u> 0 <u>Indicator:</u> (1) Percentage of capital grants that are allocated to women-led private entrepreneurs in off-grid RETs; (2) Percentage of business development support provided to women-led enterprises. <u>Target:</u> (1) at least 30% of capital grants (Year 2, 3 and 4 budgets for Activity 2.1.1) are allocated to women-led private entrepreneurs in off-grid RETs; (2) at least 30% of technical assistance is allocated to women-led bidders	REF, and all institutions providing debt and equity financing to the Working Capital Finance Facility; Project team	Year 2-4	1. 417,633 2. 10,689

	Solar Sister sources high quality clean energy products on wholesale and delivers them to entrepreneurs in last-mile communities. Through their local networks and markets, entrepreneurs market and sell solar lamps and clean stoves to communities in need, while earning retail mark up. Activity 2.1.1 (GEF Table Annex SA6) – Indicator 1 Activity 2.3.2 (GEF Table Annex SA6) – Indicator 2					
Component 3: Knowledge Management Scale-up Strategy						
Low level of awareness of policy-makers, Government and community stakeholders on sustainable off-grid lighting alternatives, and best practices and tools to achieve a transition while protecting the poor and marginalised population especially poor rural illiterate women.	Produce lessons learned report based on project experience Activity 3.1.2, 3.1.3 and 3.2.1 (GEF Table Annex SA6) + Project Manager's contributions to review of indicators and GAP (\$25,000 as per Table 10) + MTR & TE (\$59,050 as per Table 10)	Report prepared to discuss key findings and recommendations related to subsequent deployment of renewable energy technologies. 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 project interventions	<u>Baseline:</u> 0 <u>Indicator:</u> % of personnel from ministries and provincial authorities that participate in the lessons learned and knowledge management activities who are women. <u>Target:</u> At least 50% of stakeholders are women. Sex disaggregated and gender responsive results and targets included in Results Framework and other monitoring and evaluation formats at various levels.	UNDP	Year 1, Q4 – Year 5, Q4	184,003
At present, available electricity and renewable energy policies do not adequately mainstream gender. They are either gender blind or mention	Conduct a participatory gender audit of the electricity sector especially regarding rural clean energy access. Provide support to mainstream gender into electricity and related	Electricity and renewable energy related policies and regulatory frameworks have explicit gender transformative provisions/objectives,	<u>Baseline:</u> 0 <u>Indicator:</u> State of Energy Access Report and Replication Plan with recommendations on gender-sensitive policies and strategies for off-grid	PMU, REA, Ministry of Power and Energy Commission of Nigeria	Year 5, Q3 and Q4	106,680

gender in passing – a welfarist/tokenist approach rather than a gender transformative approach.	policies and regulatory framework in the off-grid lighting space, including specific gender targets as an integral part of the State of Energy Access Report: Nigeria and Replication Plan Activity 3.3.2 and 3.3.3 (GEF Table Annex SA6)	approaches and targets.	RETs. <u>Target:</u> 2 reports that propose policies and regulatory frameworks having explicit gender transformative provisions/objective; approaches and targets.			
In general, women have not been adequately involved in consultations and policy formulation. Though the National Gender Policy mentions access to energy as an intervention to engender economic empowerment, there is no evidence that policy makers in the electricity sector know about or consult this document as a reference point for policy formulation, project design and budgeting	Ensure that all work groups or committees adopt the 35% affirmative action clause recommended by the National Gender Policy or the 40% project commitment.	Increased visibility and participation of women in policy review, project implementation, and monitoring and evaluation.	<u>Baseline:</u> 0 <u>Indicator:</u> Percentage of women on project committees and work groups. <u>Target:</u> At least 40% of stakeholders are women on all project committees and work groups.	UNDP, PSC, PMU	Year 1 - 5	No cost

51. South-South and Triangular Cooperation (SSTrC): The project will promote South-South cooperation through knowledge management. Further, the lessons learned and replication plan that will be captured under Output 3.1 and Output 3.3 will be shared with as large a number of countries as possible through both printed and electronic media.
52. 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. This will be supported by the domestication of international standards on pico-solar and SHS products and an institutional structure and operational guidelines for enforcing quality standards of imported products; 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 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 financing schemes and cost recovery mechanisms with a view to scalability. In particular, the financing schemes will be tailored to different market tiers in terms of energy needs and capacity to pay, and for catalysing private investments in off-grid decentralised solar technologies without requiring the need for financial incentives. This is an integral part of the post-project financial sustainability. Also, the WCFF will be capitalised from different sources including grants, equity and debt financing so that all market tiers can be served. 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.
53. Scaling Up: In general, sustainable off-grid energy markets, and in particular PAYG-based markets, have seen a significant increase and more than \$240 million has been invested in the PAYG market over the past three years. Despite the advantages of PAYG models, it is argued that countries with a relatively rich population but low electricity access levels and a highly unreliable grid (such as Nigeria) can see greater potential for direct cash sales instead of innovative energy service business models. However, 80 million people in Nigeria lack access to the electricity grid and have a daily income of less than \$2 per day. This, in combination with poor end-customer financing channels, makes upfront capital financing for off-grid lighting/energy technologies from reputable manufacturers difficult. In addition, an estimated 70 million people have access to Global System for Mobile Communications (GSM) coverage but do not have access to electricity. However, the number of mobile money accounts in Nigeria has seen rapid growth within a year, from 5.7 million in December 2013 to 8.9 million in December 2014. These figures show that the market potential is beginning to grow and machine-to-machine connections (M2M) – connecting machines, devices and appliances wirelessly via a variety of [mobile] communications channels – are expected to grow at CAGR 23% from 2016 to 2019 reaching over 4 million connections. Thus, the market for PAYG business models in Nigeria is potentially huge and some companies in the sector recently raised financing, such as Nova Lumos (\$15 million) or Solynta Energy which recently obtained long-term financing from the Bank of Industry for the installation of off-grid solar home systems in over 1,000 homes. This means that at least some investors see potential in this market. In addition, and this also applies to cash sales business models, under the baseline, the market for solar PV systems and other sustainable off-grid lighting solutions is likely to grow, as the IEA projects that, by 2040, a total of 530 million people in Africa will have no access to the electricity grid. According to the IEA's projection, the largest share of the un-electrified population in Africa will be located in Nigeria where, by 2040, an estimated 93 million people will not have access to the grid and 24 million are projected to have highly unreliable and intermittent grid connections. Based on the derisking studies and lessons learned from the project, a replication plan will be developed for scaling up the overarching objective of the project to support rural clean energy access.

V. PROJECT MANAGEMENT

54. **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 SL (3 W) and SHS (15 W and 50 W). The calculations are given in **Annex SA5**. It is assumed that a SL will replace hurricane kerosene lamps (glass-covered), while SHS will substitute standalone diesel-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. 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 15% to 25% and a monthly repayment equal to avoided energy cost, products can be repaid between 3.5 to 6 months. These results demonstrate the cost-efficiency of off-grid products to a rural household, and demonstrate the cost-effectiveness of using GEF funding for delivering technologies at an affordable price to rural households.

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

Technology type	Cost (NGN)	Payback time (month)	Period for 'free' energy ⁵¹ (month)	Net savings on energy bill during product lifetime (NGN)	Household payment modality		
					Upfront payment (% of cost)	Monthly repayment (NGN)	Repayment period (month)
3 W SL	9,210 (US\$ 30) ⁵²	3.5	20.5	24,783 (~US\$ 81)	25%	1,328 (~US\$ 4.3)	5.2
15 W SHS	46,050 (US\$ 150)	2.3	57.7	403,950 (~US\$ 1,316)	15%	6,733 (~US\$ 22)	5.8
50 W SHS	153,500 (US\$ 500)	6.0	42.0	766,389 (~US\$ 2,496)	15%	15,966 (US\$ 52)	8.2

55. **Project management:** The Project Management Unit (PMU) that will host the Project Manager (PM) and the Administrative Assistant (AA) will be housed in REF. 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.
56. **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 Policy⁵³ and the GEF policy on public involvement.⁵⁴

⁵¹ This is given by the difference between product lifetime and payback period.

⁵² 1US\$ = 307 NGN.

⁵³ See http://www.undp.org/content/undp/en/home/operations/transparency/information_disclosurepolicy/.

⁵⁴ 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: <i>By 2022, Nigeria achieves environmental sustainability, climate resilience and food security through efficient management of its cultural and natural resources.</i>					
<i>Indicator 9.1: CO₂ emission per unit of value added; baseline: No baseline; target: No target</i>					
This project will be linked to the following output of the UNDP Strategic Plan:					
<i>Output 1.5.1: Solutions adopted to achieve universal access to clean, affordable and sustainable energy</i>					
	Objective and Outcome Indicators	Baseline ⁵⁵	Mid-term Target ⁵⁶	End of Project Target	Data Collection Methods and Risks/Assumptions ⁵⁷
Project Objective: <i>To promote private sector investment in sustainable off-grid lighting technologies by establishing a sound policy environment that facilitates the creation of a self-functioning and sustainable market in Nigeria.</i>	<u>Mandatory Indicator 1:</u> Number of households benefitting from clean, affordable and sustainable energy access (project will target rural households only)	0	4,727 rural households; 2,330 women-headed (100% households in rural areas; 49.3% households headed by women)	16,335 rural households; 8,053 women-headed (100% households in rural areas; 49.3% households headed by women)	<i>The number of beneficiary households was estimated based on total uptake of SHS units (assumed to be one unit per household) plus 90% of total units of solar lantern – i.e. 10 % of households buy both a SHS and SL.</i>
					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 or enforcement thereof; Assumptions: The targets have not taken into account population dynamics, and used demographic statistics of number of rural household for 2017 derived from the World Development Indicators 2019 for the entire project duration; percentage households can be updated during MTR and TE using latest

⁵⁵ 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.

⁵⁶ Target is the change in the baseline value that will be achieved by the mid-term review and then again by the terminal evaluation.

⁵⁷ 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.

					available population statistics; the technology adoption pattern of households remain valid during project implementation (assumptions to be reviewed at MTR and TE)
	<u>Mandatory Indicator 2</u> (Lifetime direct project GHG emissions mitigated): <i>Direct project CO₂ emission reductions, metric tCO_{2e}.</i>	0	10,700	108,250	<i>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. Emission reduction from SHS was calculated from avoided diesel in baseline multiplied by emission factor of gasoline (IPCC default value); emission reduction from SL was calculated from avoided kerosene in baseline multiplied by emission factor of kerosene (IPCC default value).</i> 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 or enforcement thereof. Assumptions: Market demand for technologies is as expected, and technology supply chain has been established with adequate level of private sector participation in the form of high response to REF calls for submission; all project partners are committed to support the development of the technology supply chain; methodologies for calculating GHG emission reductions are appropriate
	<u>Mandatory indicator 3: # of direct beneficiaries disaggregated by gender.</u>	0	27,890 persons of which 13,760 women and 14,130 men	96,380 persons of which 47,540 women and 48,840 men	<i>The number of persons per household and percentage of women in rural Nigeria. Statistics derived from World Development Indicators 2019.</i> 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 or enforcement thereof; 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; high response from private companies to REF call for submissions; the estimated cross ownership of different technologies by households is valid
Outcome⁵⁸ 1 <i>Appropriate policies, programmes and regulations are in place that address policy, awareness and financial barriers to facilitate investment in sustainable off-grid lighting solutions and corresponding business models</i>	<i>Indicator 4: Number of rural households capacitated in appropriate use of off-grid technologies and having access to technologies and after-sales services</i>	0	7,200	31,200	<i>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</i>
					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: 120 trainers will be trained by the project, and each is expected to train 10 agents giving a total of 1,200 agents for community outreach activities. At mid-term, each agent would have reached 6 households; thereafter each agent will reach out to 10 households.
	<i>Indicator 5: Percentage of households making use of mobile money payment when purchasing 50 W SHS</i>	0	15%	50%	<i>Discussions with private investors have shown that the use of mobile payment is virtually non-existent among BOP rural communities. Solar Sisters has started piloting mobile payment in some communities and the project will build on this case to enhance the uptake of mobile payment in this market segment.</i>

⁵⁸Outcomes 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.

					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 3 technologies (e.g. those proposed in the ProDoc)	1 business case report covering at least 6 technologies (based on market development)	The inventory of the types and quantity of technologies sold 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 Sustainable off-grid lighting (service) providers in Nigeria are operating and have access to working capital and equipment.	Indicator 7: Number of Working Capital Facility established and operational	0	1	1	The setting up of the Working Capital Facility for supporting investments in SL / SHS will be accounted for in the project reports, and will be subject to project audit.
					Risks: Lower levels of debt and equity financing than expected hinders the operationalisation of the Working Capital Facility under REF Assumptions: Once set up, the Working Capital Facility will be able to use GEF seed grant financing to attract debt and equity financing
	Indicator 8: Number of financing schemes developed and operationalised	0	1	3	Project records, lessons learned investigations and project audits

					Risks: Lower than expected BOP consumer capacity and willingness to pay, coupled with inability of project to increase the financial literacy of rural households, result in locking of proposed initial financial scheme at 40% capital grant to 40% debt to 20% equity, or that a 40% working capital grant is insufficient to catalyse the BOP market segment. Assumptions: The linking of off-grid RET purchase with income generating agricultural activities will be sufficient for BOP households to invest in off-grid RETs when a 40% or lower capital grant financing structure is made available to the private investor.
	<i>Indicator 9: Number of debt and equity partners capitalising the Working Capital Facility</i>	0	At least 3	At least 6	<i>The capitalisation of the Working Capital Facility by type of financing (grant, equity and debt) will be accounted for in the project reports, and will be subject to project audit.</i>
					Risks: Lower than expected interest of financing partners to invest debt and equity in the Working Capital Facility as the BOP market for off-grid decentralised RETs is perceived as being too risky; sustainability of grant financing is not assured for ongoing mobilisation of debt and equity financing Assumptions: Business case for debt and equity investments in BOP market segment is demonstrated, and GEF grant seed funding proves to be a useful attractor for such types of funding.
Outcome 3 <i>Good practices, lessons learned, market assessments, demand-supply surveys, delivery models and business models are documented and scale-up</i>	<i>Indicator 10: Number of knowledge networks created</i>	0	1	3	<i>The project will establish partnerships with research, technical and training institutions that will receive technical assistance to support research on the market development of off-grid RETs in Nigeria. The setting up of a local Chapter of AMDA will be supported at the beginning of the project implementation.</i>

guidelines are produced					Risks: Low interest shown by member of AMDA to set up sub-committee on SHS; cumbersome administrative hurdles in public sector delays partnerships with publicly institutions; lower than expected market development for off-grid renewable energy products has detrimental impact on demand for collaborative partnerships. Assumptions: Private companies and public institutions such as ECN are already active in off-grid rural energy access using decentralised solar technologies, and hence a high interest is latent for setting up partnerships.
	Indicator 11: Lessons learned report to capture project experience	0	2	5	<i>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.</i> Risks: Lack of sufficient time and financial resources available to investigate lessons learned in details; Assumptions: Lessons learned studies will cover issues such as effectiveness of business 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	0	0	1	<i>The project records and M&E framework will be used to keep track of all project deliverables, including the replication plan.</i>

	<i>Nigeria (based on lessons learned)</i>				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 RETs by making same technologies available free of charge
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VII. MONITORING AND EVALUATION (M&E) PLAN

57. 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 policies⁵⁹.
58. 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.⁶⁰
59. **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 A, 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.

⁵⁹ See https://www.thegef.org/gef/policies_guidelines

⁶⁰ 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).

60. 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.
61. 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.

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 Project Manager, the UNDP Country Office, and the UNDP-GEF Regional Technical Advisor will provide objective input to the annual GEF PIR covering the reporting period July (previous year) to June (current year) for each year of project implementation. The Project Manager will ensure that the indicators included in the project results framework are monitored annually in advance of the PIR submission deadline so that progress can be reported in the PIR. 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 UNDP Country Office will coordinate the input of the GEF Operational Focal Point and other stakeholders to the PIR as appropriate. 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 Policy⁶¹ and the GEF policy on public involvement⁶².

62. 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 ⁶³ (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 (REA)	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
Lessons learned and knowledge generation	Project Manager	USD 125,253	None	Annually
Monitoring of environmental and social risks, and corresponding management plans as relevant	Project Manager UNDP Country Office	<i>To be carried out as part of the Annual Work Plan's</i>	None	On-going

⁶¹ See http://www.undp.org/content/undp/en/home/operations/transparency/information_disclosurepolicy/

⁶² See https://www.thegef.org/gef/policies_guidelines

⁶³ 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 ⁶³ (US\$)		Time frame
		GEF grant	Co-financing	
		<i>preparation.</i>		
Monitoring activities related to the Stakeholder Engagement Plan	Project Manager UNDP Country Office	<i>To be carried out as part of the Annual Work Plan's preparation.</i>	<i>None</i>	On-going
Monitoring activities related to the Gender Action Plan	Project Manager UNDP Country Office UNDP GEF team	USD 10,000	<i>None</i>	On-going
Addressing environmental and social grievances	Project Manager UNDP Country Office	USD 5,000	<i>None</i>	On-going
Project Board meetings	Project Board UNDP Country Office Project Manager	<i>add</i>	<i>None</i>	At minimum annually
Supervision missions	UNDP Country Office	None ⁶⁴	<i>None</i>	Annually
Oversight missions	UNDP-GEF team	None ⁶⁴	<i>None</i>	Troubleshooting as needed
GEF Secretariat learning missions/site visits	UNDP Country Office and Project Manager and UNDP-GEF team	None	<i>None</i>	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	<i>None</i>	<i>Before mid-term review mission takes place.</i>
Independent Mid-term Review (MTR) and management response	UNDP Country Office and Project team and UNDP-GEF team	USD 25,350	<i>None</i>	<i>Between 2nd and 3rd PIR.</i>
Terminal GEF Tracking Tool to be updated by External Consultants	Project Manager and External Consultants	To be completed as part of the TE	<i>None</i>	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 33,700	<i>None</i>	At least three months before operational closure
Translation of MTR and TE reports into English	<i>Not applicable</i>	<i>None</i>	<i>None</i>	<i>As required. GEF will only accept reports in English.</i>
TOTAL indicative COST Excluding project team staff time, and UNDP staff and travel expenses		USD 219,303		

⁶⁴ The costs of UNDP Country Office and UNDP-GEF Unit's participation and time are charged to the GEF Agency Fee.

VIII. GOVERNANCE AND MANAGEMENT ARRANGEMENTS

63. 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 Federal Government of Nigeria, and the Country Programme. The **Implementing Partner** for this project is the Rural Electrification Agency (REA). The Implementing Partner is responsible and accountable for managing this project, including the monitoring and evaluation of project interventions, achieving project outcomes, and for the effective use of UNDP resources.
64. 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:

- 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 systemsRisk 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.
65. 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 responsible for the Project Assurance role of the Project Board/Steering Committee.
66. The project organisation structure is as shown in Figure 2.

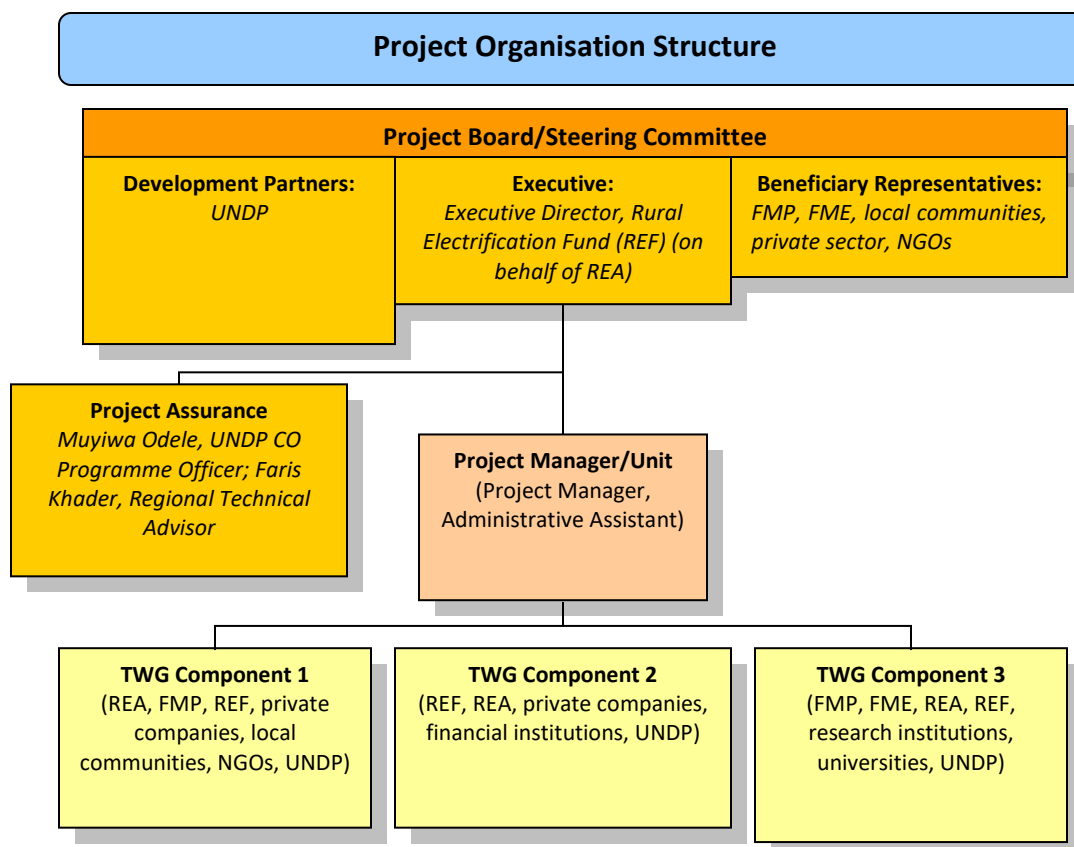


Figure 2. Project organisational structure.

67. **Project Board:** The Project Board (also called Project Steering Committee) is responsible for making by consensus, management decisions when guidance is required by the Project Manager, including recommendations for UNDP/Implementing Partner approval of project plans and revisions, and addressing any project level grievances. 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. 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.

68. **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 Executive Director of the Rural Electrification Fund.

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 cost-conscious approach to the project, balancing the demands of beneficiary and supplier.

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.

69. **Development Partner(s):** Individuals or groups representing the interests of the parties concerned that provide funding and/or technical expertise to the project. The Development Partner(s) is: 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.

70. **Beneficiary Representatives:** Individuals or groups representing the interests of those who will ultimately benefit from the project. Their 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: the Federal Ministry of Power, Federal Ministry of Environment, local communities, private sector, and NGOs.

The Beneficiary Representative(s) 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.

71. **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;
72. **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.
73. **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 **Figure 2**, 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.
74. **Project extensions:** 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 during the extension period must be covered by non-GEF resources.

IX. FINANCIAL PLANNING AND MANAGEMENT

75. The total cost of the project is *USD 85,756,392*. This is financed through a GEF grant of *USD 2,639,726* and *USD 83,116,666* 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.

76. 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
UNDP	Cash (grant)	300,000	→ Output 1.1: Business case developed for off-grid decentralised solar technology delivery model → Output 1.2: Quality standards for sustainable off-grid lighting products in place and enforced → Output 1.3: Customs procedures and import requirements streamlined → Output 2.2: Appropriate financing schemes for sustainable off-grid lighting product lending in place through the Rural Electrification Fund → Output 3.1: Lessons learned report produced based on project experience → Output 3.3: Development of a replication and scaling up plan based on the derisking approach	The risk is low since the grant financing will come from UNDP TRAC budget that has been earmarked for this project.	None
World Bank	Loan	75,000,000	→ Output 1.1: Business case developed for off-grid decentralised solar technology delivery model → Output 1.4: Linkages between the telecoms and energy service sectors, policies and regulations established → Output 1.6: End-customers' ability to pay for sustainable off-grid lighting products strengthened	Low level of cooperation between institutions at national and local levels, and weak coordination and information exchange mechanism between REA and REF having different priorities.	The Project Manager will ensure the implementation, as well as the effectiveness of the communication management strategy for the project and parallel interventions (according to SEP in Annex F).

			→ Output 1.7: Domestic financial sector's (debt/equity) experience and familiarity with financing sustainable off-grid lighting business models and products strengthened → Output 2.1: Working Capital Finance Facility for sustainable off-grid lighting companies established and capitalised with co-financing from the Government and development partners → Output 2.2: Appropriate financing schemes for sustainable off-grid lighting product lending in place through the Rural Electrification Fund	Risk – Low (the project is fully funded through a loan from the World Bank (NEP))	
National Government	Grant	2,916,666	→ Output 2.1: Working Capital Finance Facility for sustainable off-grid lighting companies established and capitalised with co-financing from the Government and development partners → Output 2.2: Appropriate financing schemes for sustainable off-grid lighting product lending in place through the Rural Electrification Fund	Same as above (cash co-financing is drawn from planned REF capital grant)	Same as above
National Government	In-kind	2,000,000	→ As Implementing Institution, in-kind co-financing from REA will be across all outputs → The contributions of ECN and Ministry of Environment will be mainly dedicated to Output 3.1 and Output 3.2	Same as above	Same as above
Private Sector	Cash (debt and equity financing)	2,900,000	→ Output 2.1: Working Capital Finance Facility for sustainable off-grid lighting companies established and capitalised with co-financing from the	Risk – medium The co-financing is an important component of the finance structure (i.e.	The FCMB and Solar Sisters have been engaged in consultations with REF and the PPG Team

			Government and development partners → Output 2.2: Appropriate financing schemes for sustainable off-grid lighting product lending in place through the Rural Electrification Fund	40% debt to match 40% of GEF capital grant, and 20% equity) that the WCFF will pilot to ensure that private investments would flow to service BOP rural households. There is a risk that FCMB finds alternative investment opportunities for its funding pledged as co-financing to the UNDP-GEF project. The amount pledged by Solar Sisters would in any case be invested in deployment of SHS as this is its core business.	throughout the project development stage, and same will continue during implementation. FCMB and Solar Sisters will be enrolled as a member of the TWG working on Component 2.
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77. **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).

78. 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 and UNDP Country Office will seek the approval of the UNDP-GEF team to ensure accurate reporting to the GEF: a) Budget re-allocations among components in the project with amounts involving 10% of the total project grant or more; b) Introduction of new budget items/or components 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).

79. **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.

80. 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 of 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.
81. 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 file⁶⁵. The transfer should be done before Project Management Unit complete their assignments.
82. 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 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).
83. 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.
84. 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.

⁶⁵ See https://popp.undp.org/_layouts/15/WopiFrame.aspx?sourcedoc=/UNDP_POPP_DOCUMENT_LIBRARY/Public/PPM_Project%20Management_Closing.docx&action=default.

X. TOTAL BUDGET AND WORK PLAN

Atlas Proposal of Award ID:	00119777	Atlas Primary Output Project ID:	00116153	Atlas Business Unit:	NGA10
Atlas Primary Output Project Title:	Derisking sustainable off-grid lighting solutions in Nigeria				
UNDP-GEF PIMS no.:	5961				
Implementing Partner:	Rural Electrification Agency (REA)				

Table 12. Budget allocation.

GEF Outcome/Atlas Activity	Responsible Party/Implementing Agent	Fund ID	Donor Name	Atlas Budgetary	ATLAS Description	Budget	Amount Year 1 (US\$)	Amount Year 2 (US\$)	Amount Year 3 (US\$)	Amount Year 4 (US\$)	Amount Year 5 (US\$)	Total (US\$)	Budget Note
				Account Code									
OUTCOME 1: Appropriate policies, programmes and regulations are in place that address policy, awareness and financial barriers to facilitate investment in sustainable off-grid lighting solutions and corresponding business models.	REA	62000	GEF	71200	International Consultants		26,000	50,800	49,600	6,400	0	132,800	1
				71300	Local Consultants		53,140	93,560	64,960	36,000	32,800	280,460	2
				72200	Equipment and Furniture		0	2,500	2,500	2,500	0	7,500	3
				72500	Office supplies		3,900	1,400	1,400	1,300	1,300	9,300	4
				71600	Travel		10,910	20,200	26,620	11,360	3,650	72,740	5
				74200	Audio Visual&Print Prod Costs		2,875	2,200	1,600	900	0	7,575	6
				75700	Workshops and Meetings		6,500	12,000	23,600	16,000	13,000	71,100	7
					sub-total GEF		103,325	182,660	170,280	74,460	50,750	581,475	
	UNDP	4000	UNDP	71200	International Consultants		40,000	0	0			40,000	8
				71300	Local Consultants		12,000	14,400	4,200	4,400	0	35,000	9
				71600	Travel		13,600	5,640	2,160	2,160	0	23,560	10
				74200	Audio Visual&Print Prod Costs		1,000	2,500		0		3,500	11

				75700	Workshops and Meetings	3,000	6,000				9,000	12
					Sub-total UNDP	69,600	28,540	6,360	6,560	0	111,060	
					sub-total outcome 1	172,925	211,200	176,640	81,020	50,750	692,535	
OUTCOME 2: Sustainable off-grid lighting (service) providers in Nigeria are operating and have access to working capital and equipment.	REA	62000	GEF	71200	International Consultants	0	12,000	16,000	0	20,000	48,000	13
				71300	Local Consultants	9,600	32,400	33,200	11,200	9,600	96,000	14
				71600	Travel	0	7,030	7,840	1,880	4,790	21,540	15
				74200	Audio Visual&Print Prod Costs	810	1,000	1,000	1,000	1,000	4,810	16
				75700	Workshops and Meetings	500	500	2,500	0	2,500	6,000	17
				72100	Contractual Services - Companies		350,000	700,000	342,111	0	1,392,111	18
					sub-total GEF	10,910	402,930	760,540	356,191	37,890	1,568,461	
					sub-total outcome 2	10,910	402,930	760,540	356,191	37,890	1,568,461	
OUTCOME 3: Good practices, lessons learned, market assessments, demand-supply surveys, delivery models and business models are documented and scale-up guidelines are produced.	REA	62000	GEF	71200	International Consultants	10,880	16,320	48,000	28,800	48,000	152,000	19
				71300	Local Consultants	10,400	20,000	25,600	23,200	18,000	97,200	20
				72500	Office supplies	990	1,990	1,990	1,990	984	7,944	21
				71600	Travel	4,910	8,070	18,070	11,460	13,110	55,620	22
				74200	Audio Visual&Print Prod Costs	1,600	1,260	1,400	1,315	1,250	6,825	23
				75700	Workshops and Meetings	11,500	5,000	6,000	8,000	10,000	40,500	24
				72200	Equipment	4,000	0	0	0	0	4,000	25
					sub-total GEF	44,280	52,640	101,060	74,765	91,344	364,089	
					sub-total outcome 3	44,280	52,640	101,060	74,765	91,344	364,089	
PROJECT MANAGEMENT UNIT	REA	62000	GEF	71400	Contractual Services - Individual	19,860	19,860	19,860	19,860	19,860	99,300	26
				71600	Travel	1,280	1,280	1,280	1,280	1,281	6,401	27

				74100	Professional Services (Audit)	4,000	4,000	4,000	4,000	4,000	20,000	28
					sub-total GEF	25,140	25,140	25,140	25,140	25,141	125,701	
		4000	UNDP	71400	Contractual Services - Individual	37,788	37,788	37,788	37,788	37,788	188,940	29
					Sub-total UNDP	37,788	37,788	37,788	37,788	37,788	188,940	
					Total Project Management Costs	62,928	62,928	62,928	62,928	62,929	314,641	
					PROJECT TOTAL GEF	183,655	663,370	1,057,020	530,556	205,125	2,639,726	
					PROJECT TOTAL UNDP	107,388	66,328	44,148	44,348	37,788	300,000	
					PROJECT TOTAL	291,043	729,698	1,101,168	574,904	242,913	2,939,726	

Budget Notes:

OUTCOME 1	
1	In Year 1, US\$ 6,000 and US\$ 20,000 have been budgeted for international consultancy fees related to HS Code harmonization (Act 1.3.1) and the setting up of a SDG Impact Framework (Act 1.7.2). In Year 2, US\$24,000 is earmarked for developing spatial model of least-cost off-grid electrification technologies; US\$18,000 for HS Code harmonisation and US\$4,800 for capacity building in use of HS Codes. In Year 2, a further US\$4,000 is earmarked for Output 1.6. In Year 3, the following is budgeted for: (1) US\$16,800 for developing strategy and action plan for local assembly and manufacturing of off-grid RETs; (2) US\$14,400 for developing mechanism for linking telcos to the off-grid technology value chain; (3) US\$12,000 for developing a strategy for the most appropriate alternative cost recovery/payment options; and (4) US\$6,400 for the capacity building of financial institutions on alternative financing schemes for off-grid RETs, with the same amount replicated in Year 4 US\$ 6,400.
2	All the four activities mentioned in budget note 1 will be supported with local expertise for a total of US\$280,460. The basic premise of the project design is to make use of and capacitate local expertise as much as possible in order to ensure sustainability of the project after its 5-year lifetime.
3	In order to support market surveillance by SON and Nigeria Customs Service, a budget of US\$7,500 (divided equally over Year 2, 3 and 4) has been provided for the purchase of SL and SHS products off the market for laboratory testing, in order to measure conformity with national Standards for pico-solar and SHS products. The samples will be procured from the products that will be partially funded by the REF using GEF funding in Year 2, 3 and 4.
4	Out of the US\$9,300 earmarked for Office Supplies, a total of US\$7,500 will be dedicated to laboratory supplies for SON to carry out conformity testing of off-grid RETs as follows: Year 1 – US\$3,500, and US\$1,000 for the remaining 4 years. The difference of US\$1,800 will be for partial operational cost of the PMU.
5	The travel costs totalling US\$72,740 are for covering the international airfare, local travel cost, and accommodation and living expenses for the work to be carried out by the international and national consultants. The major components of travel costs in Year 2 to 4 are related to traveling to at least 12 States for carrying out market surveillance.

6	In Year 1, US\$2,875 will be used to cover the printing expenses for the strategy and action plan for local assembly / manufacturing of off-grid RETs and for printing the Harmonised HS Codes for off-grid RETs; In Year 2, US\$1,800 will be used for printing TOT course materials and the remaining US\$400 for printing market surveillance reports/conformity test reports; In Year 3, US\$1,200 is used to update the strategy and action plan on local assembly and manufacturing of off-grid RETs, and US\$400 is for publicising the Harmonised HS Codes more widely; In Year 4, US\$900 is used for carrying out advocacy for Government-sponsored bank accounts in order to increase the financial literacy and creditworthiness of rural households.
7	In Year 1, workshops and work meetings will be carried out for (1) developing business plan for private sector support for BOP market segments (US\$2,000); (2) develop HS Code (US\$500); (3) carrying out gender-differentiated assessment of rural households' energy needs using participative approaches (i.e. US\$3,000); (4) market surveillance (US\$500); and (5) developing SDG Impact Framework (US\$500). In each of Year 2, a sum of US\$1,500 is dedicated to setting working group meetings between SON and the Nigeria Customs Service; developing Harmonised HS Codes, and capacity building of users will need stakeholder meetings budgeted at US\$4,000 in Year 2; additional stakeholder engagement sessions for end user energy demand analyses and TOT training in Year 2 will be at US\$6,000; and stakeholder meeting costing US\$500 for developing SDG Impact Framework. In each of Year 3, 4 and 5 at total of US\$12,000 is dedicated for customer awareness raising in end user markets; In Year 3, a further US\$6,100 will be used for dissemination of project results related to GIS-modelling of least cost off-grid electrification options, and measures for promoting local assembly and manufacturing of off-grid RETs; a further US\$1,500 will be used to increase collaboration between SON and Nigeria Customs Services for market surveillance. Also, in each of Year 3 and Year 4, US\$1,000 and US\$3,000 are allocated to Outputs 1.4 and 1.7, respectively. In Year 5, US\$1,000 is used for carrying out advocacy on for minimum telecommunications coverage in all rural communities.
8	UNDP grant co-financing will be used to support several activities, including: (1) the setting up of a take-back and safe disposal of electronic waste emanating from off-grid RETs (Output 1.1); and (2) gender-survey of gender-differentiated needs of BOP households (Output 1.4). For the first activity (Act 1.1.5), US\$40,000 is budgeted for an international consultant in Year 1.
9	The budgets for local consultants for Year 1 (US\$12,000) and Year 2 (US\$14,400) will be to provide technical support to the international consultant covered in budget note 8. National consultancy will be used to support activity 2 described in budget note 8 in Year 3 (US\$4,200) and Year 4 (US\$4,400).
10	The total travel cost associated with the work of international and national consultants working on the two activities described in budget note 8 is expected to be US\$23,560.
11	Printing costs (Year 1 – US\$1,000; Year 2 – US\$2,500) will be associated to activity 1 at note 8 above that will involve printing of the National Strategy and Action Plan on the environmentally-sound take-back, storage and disposal of e-waste associated with off-grid RETs at all levels (Federal, State and Local); printing costs are also accounted for training workshops on the operationalisation of the Strategy and Action Plan at all government levels, and development of the SDG Impact Framework.
12	All workshop costs are related to activity 1 described at note 8 above. At least 12 mini-workshops will be carried out in Year 2 (i.e. one in each of 12 States covering the 6 geo-political zones in Nigeria) at a total cost of US\$6,000. In Year 1, working sessions costing US\$3,000 will be needed to inform the process of formulating the Strategy and Action Plan.
OUTCOME 2	
13	An international consultant is required to carry out SHS DREI analyses in Year 2 (US\$12,000), Year 3 (US\$16,000) and Year 5 (US\$20,000) of the project.
14	In Year 1 (US\$9,600) and Year 2 (US\$4,000), a total of US\$13,600 is needed in national consultancy for operationalising the Working Capital Finance Facility, and training REF staff on the operations of the Facility; In Year 2 (US\$6,000), Year 3 (US\$8,000), and Year 5 (US\$9,600), a national consultant is needed to support DREI analyses; Further, US\$6,000 (Year 2) and US\$8,000 (Year 3) worth of national technical expertise is needed to develop alternative off-grid RETs

	financing schemes that also internalise the SHS DREI results; In Year 2, 3 and 4 when REF will launch Calls for Submission of private proposals for access GEF funding under the Working Capital Fund Facility, a national expert (US\$8,000, US\$14,000, and US\$8,000, respectively) will be used to support interested private entrepreneurs to respond to the calls for proposals. During the three Calls for Submissions, REF staff will be supported to the tune of US\$3,200 per Call using local expertise; In Year 2, local expertise is needed to develop a strategy for hardware cost reduction through bulk procurement (US\$5,200) .
15	The travel budgets are mainly in Years 2 to 5 corresponding to the years in which there will be Calls for Submissions to the Working Capital Finance Facility, and also when SHS DREI analyses will be conducted. The indicated budgets will cover the costs of travel and living expenses for the international and national consultants carrying out DREI analyses and supporting private entrepreneurs respond to Calls for Submissions (national expert only). For the DREI analyses, the travel budgets will be US\$6,680 (Year 2), US\$4,440 (Year 3) and US\$4,790 (Year 5). The budget differences in Year 2 and Year 3 are for covering the travel costs of national consultants to support potential entrepreneurs/companies respond to the Calls for Submissions.
16	Printing costs have been budgeted for the setting up and operation of the Working Capital Financing Facility (WCFF) as follows: US\$810 (Year 1) and US\$1,000 (each of Year 2 to Year 5).
17	Capacity building of REF staff on operationalisation of Working Capital Finance Facility is expected to cost US\$500 in each of Year 1 and Year 2. National workshops are planned in Year 3 (US\$2,500) and Year 5 (US\$2,500) for disseminating the results of the SHS DREI analyses at project mid-term and project end, respectively.
18	GEF funding to the tune of US\$1,392,111 will be used to leverage another US\$2.1 million in co-financing in order to carryout bulk purchasing of off-grid RETs. Bulk purchasing will reduce hardware cost. Further, GEF investments will be used to make these technologies affordable to last-mile rural households that would otherwise remain unserved by the market. A stepped approach driven by learning-by-doing will be adopted; US\$350,000, US\$700,000 and US\$342,111 will be deployed in Year 2, 3 and 4 of the project.
OUTCOME 3	
19	An international consultant is needed to develop the MRV mechanism for tracking project-level GHG emission reductions (Year 1 – US\$10,880; Year 2 – US\$16,320); In Year 3 (US\$20,000), the cost of the mid-term evaluator is covered, and, similarly, US\$28,000 is budgeted for the final evaluator in Year 5; In Year 3 and Year 4, a budget of US\$28,000 and US\$14,400, respectively, is earmarked for the international consultant carrying out the DREI analyses for mini-grids; In Year 4, an international consultant costing US\$14,400 will be used to developing a State of Rural Energy Access Report for Nigeria; the same consultant will then complete the replication plan in Year 5 (US\$20,000).
20	The costs for national consultants will be for supporting the technical work of international consultants described in budget note 19 (except for supporting the work of the mid-term and final evaluators). These budgets are: US\$10,400 (Year 1); US\$12,000 (Year 2); US\$25,600 (Year 3); US\$23,200 (Year 4) and US\$18,000 (Year 5). The only activity requiring national expertise and not covered in budget note 19 is for establishing linkages between the project and technical and research institutions in Year 2 costing US\$8,000.
21	Office supplies including paper, printer cartridges and stationery are budgeted at US\$7,944 covering PMU running cost.
22	The travel costs are associated with the cost of air fares, local travel costs and living expenses for international and national consultants working on the activities described in budget notes 19 and 20. In Year 3 and 5, travel expenses related to mid-term and terminal evaluations are budgeted at US\$6,976 and US\$7,475 respectively.
23	Total printing cost is budgeted at US\$6,825 that is fairly equally spread over the 5 years. Out of this budget, US\$3,000 will be used for disseminating the results of lessons learned investigations that will be carried out on an annual basis.

24	Inception meeting: to assist the project with planning in its inception phase in Year 1, US\$ 5,000, a budget of US\$2,000 per year is budgeted over 5 years for the assembly of the SHS sub-committee of the local Chapter on AMDA; In Year 1, US\$1,500 is budgeted for stakeholder consultations for developing the MRV systems. In Year 3, US\$1500 is used for carrying DREI analyses working sessions, and a national workshop (US\$1,500) per year to disseminate the results of the mini-grid DREI analyses. In Year 5, a national workshop (US\$2,500) is dedicated for disseminating the overall lessons learned and project experiences. Lessons learned exercise will also require a budget of US\$2500 per year. Another national workshop will be dedicated to disseminating the replication plan in Year 5.
25	In Year 1, the project will procure 2 computers each valued at US\$1,500 and one printer valued at US\$1,000 for the PMU.
PROJECT MANAGEMENT COST (PMC)	
26	This budget item relates to 79.5% of the salary of the Project Manager (PM) spread equally over 5 years (US\$19,860 per year). The profile and salary of the PM are given in the terms of references in Annex D. The remaining 20.5% of the salary is covered using UNDP TRAC (see note 30).
27	The budget is for covering the travel costs of the PMU team.
28	An annual budget of US\$4,000 is provided for carrying independent financial audit of the project.
29	UNDP TRAC resources will be used to cover the remaining salary costs of project management staff – i.e. 20.5% salary of PM; 100% salary of Administrative Assistant and 100% salary of Driver). The salaries are given in Annex D, and spread equally over the project lifetime, this budget item amounts to US\$ 37,788 per year.

Summary of Funds:

	Amount Year 1	Amount Year 2	Amount Year 3	Amount Year 4	Amount Year 5	Total
GEF	183,655	663,370	1,057,020	530,556	205,125	2,639,726
UNDP	107,388	66,328	44,148	44,348	37,788	300,000
World Bank (loan)	11,107,500	15,000,000	18,892,500	15,000,000	15,000,000	75,000,000
National Government (grant)	580,000	583,333	586,667	583,333	583,333	2,916,666
National Government (in-kind)	405,000	425,000	410,000	380,000	380,000	2,000,000
Private Sector (cash)	0	725,000	1,450,000	725,000	0	2,900,000
TOTAL	12,383,543	17,463,031	22,440,335	17,263,237	16,206,246	85,756,392

XI. LEGAL CONTEXT

85. This project document shall be the instrument referred to as such in Article 1 of the Standard Basic Assistance Agreement between the Federal Government of Nigeria and UNDP, signed on 12 April 1988. All references in the SBAA to “Executing Agency” shall be deemed to refer to “Implementing Partner. “This project will be implemented by Rural Electrification Agency (REA) (“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.
86. 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

87. Consistent with the Article III of the SBAA [or the Supplemental Provisions to the Project Document], 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.
88. 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.
89. 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.
90. 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.

91. 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.
92. 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>).
93. 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.
94. 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.
95. 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.

96. 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.
97. 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.
98. 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.
99. 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.
100. 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.
101. 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.

102. 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.

103. 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.
104. 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.
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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	Indicat or	Respon sible 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: Appropriate policies, programmes and regulations are in place that address policy, awareness and financial barriers to facilitate investment in sustainable off-grid lighting solutions and corresponding business models.																						
Output 1.1: Business case developed for off-grid decentralised solar technology delivery model																						
Output 1.2: Quality standards for sustainable off-grid lighting products in place and enforced																						
Output 1.3: Customs procedures and import requirements streamlined																						
Output 1.4: Linkages between the telecoms and energy service sectors, policies and regulations established																						
Output 1.5: Customer awareness of sustainable off-grid lighting increased																						
Output 1.6: End-customers’ ability to pay for sustainable off-grid lighting products strengthened																						
Output 1.7: Domestic financial sector’s (debt/equity) experience and familiarity with financing sustainable off-grid lighting business models and products strengthened																						
Outcome 2: Sustainable off-grid lighting (service) providers in Nigeria are operating and have access to working capital and equipment.																						
Output 2.1: Working Capital Finance Facility for sustainable off-grid lighting companies established and capitalised with co-financing from the Government and development partners																						
Output 2.2: Appropriate financing schemes for sustainable off-grid lighting product lending in place through the Rural Electrification Fund																						
Output 2.3: Equipment and services provided to MSMEs through a competitive procurement process conducted by the Rural																						

[illegible]

Annex B: GEF Core Indicators 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: \$2,500/month	60 months	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: \$1,638/month	60 months	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	60 months	A full time driver will be recruited to carry out all logistics and transportation support related to project activities.
For Technical Assistance		
Outcome 1		
Local / National contracting		
Market Intelligence Specialist Rate: \$400/day	119 days / over year 1 and year 2	- Carrying out market intelligence in 12 States (2 in each of the 6 geo-political zones in Nigeria) for establishing energy demand needs of rural communities, and to map out the profile of communities in terms of economic activities and credit worthiness; a gender-differentiated approach will be used - Making the business case for off-grid RETs based on market profiling Inputs: GEF financing resources + support of TWG for Component 1 Outputs: (1) Business case for off-grid RETs report that also captures the market intelligence
Local GIS expert Rate: \$400/day	20 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 1 Outputs: (1) Spatial model of least-cost options for off-grid electrification in Nigeria
Mobile money expert Rate: \$400/day	109 days / Years 2-5	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

Consultant	Time Input	Tasks, Inputs and Outputs
		- Advocacy for minimum telecommunications infrastructure in all rural communities to support mobile payment The national consultant will also carry out advocacy for Government-sponsored bank accounts - 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; (3) advocacy for Government-sponsored bank accounts among rural communities
Electronic Waste disposal expert Rate: \$400/day	66 days / Year 1 & 2	- Developing a mechanism for the environmentally-sound recovery, storage and disposal of all electronic waste associated with pico-solar and SHS products - Capacity building of project stakeholders at the federal, state and local levels Inputs: GEF financing resources + support of TWG for Component 1 - Outputs: (1) Report detailing mechanism for the environmentally-sound recovery, storage and disposal of all electronic waste; (2) report of stakeholder capacity building
Off-grid RET expert (training and sensitisation) Rate: \$400/day	96 days / Year 1-5	- Carrying out gender-differentiated awareness needs of rural communities - Carrying Training of Trainers course for 120 trainers - Developing training materials for sensitisation of rural household - Monitoring of changing information needs of communities with changes in market dynamics Inputs: GEF financing resources + support of TWG for Component 1 - Outputs: (1) Report on information needs of rural communities on off-grid RETs; (2) training provided for 120 trainers; (3) report on the evolving energy demand of rural households and corresponding changes in demand for off-grid RETs
National Expert on Customs Procedures Rate: \$ 400/day	86 days / Year 1-5	The national consultant will support the international consultant with the following: - Developing Harmonised HS Codes for off-grid RETs - Capacity building of Nigeria Customs Service on application of Harmonised HS Codes Inputs: GEF financing resources + support of TWG for Component 1 - Outputs: (1) Harmonised HS Codes for off-grid RETs developed and implemented; (2) Report on training completed for selected staff of the Nigeria Customs Service on use of Harmonised HS Codes for off-grid RETs
Off-grid RET specialist Rate: \$400/day	47 days / over 5 years	- Supporting international consultant to develop SFG Impact Framework - Annual reporting on SDG impacts of project investments in off-grid RETs Inputs: GEF financing resources + support of TWG for Component 1 Outputs: (1) SDG Impact Framework and Tools; (2) Annual reports on SDG impacts of project investments in off-grid RETs
International / Regional and global contracting		
Expert on GIS-based modelling of least cost options for off-grid electrification	30 days / Year 2	- Carrying out spatial modeling of least-cost options for off-grid electrification Inputs: GEF financing resources + support of TWG for Component 1 - Outputs: (1) Spatial model of least-cost options for off-grid electrification in Nigeria

Consultant	Time Input	Tasks, Inputs and Outputs
<i>Rate: \$ 800/day</i>		
<i>International e-money payment expert Rate: \$ 800/day</i>	<i>20 days / Year 2 & 3</i>	- 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 - Advocacy for minimum telecommunications infrastructure in all rural communities to support mobile payment <i>Inputs: GEF financing resources + support of TWG for Component 1</i> <i>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</i>
<i>International e-waste management expert Rate: \$ 800/day</i>	<i>50 days / year 1</i>	- Formulating Strategy and Action Plan for the environmentally-sound take-back, storage and disposal of e-waste associated with off-grid RETs - Capacity building of public project stakeholders at all levels (federal, state and local) on the Strategy and Action Plan <i>Inputs: GEF financing resources + support of TWG for Component 1</i> <i>Outputs: (1) Strategy and Action Plan for environmentally-sound management of off-grid RETs e-waste; (2) Report on training completed for federal, state and local stakeholders</i>
<i>Industry Specialist on assembly & manufacturing of off-grid RETs Rate: \$ 800/day</i>	<i>21 days / Year 3</i>	- 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 <i>Inputs: GEF financing resources + support of TWG for Component 1</i> <i>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</i>
<i>International HS Coding Expert, especially regarding renewable energies Rate: \$ 800/day</i>	<i>26 days / Year 1 & 2</i>	- Developing Harmonised HS Codes for off-grid RETs - Capacity building of Nigeria Customs Service on application of Harmonised HS Codes <i>Inputs: GEF financing resources + support of TWG for Component 1</i> <i>Outputs: (1) Harmonised HS Codes for off-grid RETs developed and implemented; (2) Report on training completed for selected staff of the Nigeria Customs Service on use of Harmonised HS Codes for off-grid RETs</i>
<i>SDG Impact Framework Expert Rate: \$ 800/day</i>	<i>25 days / Year 1</i>	- Developing SDG Impact Framework and tools for reporting the SDG impacts of investments in off-grid RETs - Training national consultant to collect and measure SDG impacts of private investments in off-grid RETs <i>Inputs: GEF financing resources + support of TWG for Component 1</i> <i>Outputs: (1) SDG Impact Framework and Tools; (2) training delivered to national consultant</i>
Outcome 2		
Local / national contracting		
<i>Local Finance / DREI Expert</i>	<i>80 days / Year 2, 3 and 5</i>	The national consultant will support the International DREI Expert in updating SHS DREI analyses and report at mid-term and project end

Consultant	Time Input	Tasks, Inputs and Outputs
Rate: \$400/day		Developing alternative financing schemes based on DREI results Inputs: GEF financing resources + support of TWG for Component 2 Outputs: (1) SHS DREI modeling; (2) SHS DREI reports; (3) report on most cost-effective financing schemes for off-grid RETs
Business development expert Rate: \$400/day	94 days / Year 1 and 2	- Business plan development assistance to private entrepreneurs responding to REF Calls for Submissions - Support to REF on launching Calls for Submissions - Support to REF for appraising proposals from private entrepreneurs Inputs: GEF financing resources + support of TWG for Component 2 Outputs: (1) business development support to bidders; (2) support to REF for launching Calls for Proposals and reviewing private sector proposals
National Funding Mechanisms Expert Rate: \$400/day	30 days / Year 1 and 2	- Developing Operational Guidelines for the Working Capital Finance Facility - Training provided to REF staff on the administration of the Working Capital Finance Facility Inputs: GEF financing resources + support of TWG for Component 2 Outputs: (1) Operational Manual for Working Capital Finance Facility; (2) report on training delivered to REF staff
International / Regional and global contracting		
International DREI Expert Rate: \$ 800/day	60 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
Outcome 3		
Local / national contracting		
Off-grid specialist RET Rate: \$400/day	54 days / over 5 years	- Supporting the International off-grid RET MRV Expert to develop a MRV system for tracking GHG emission reductions from off-grid RETs - Annual measurements of GHG emission reductions accruing from investments in off-grid RETs Inputs: GEF financing resources + support of TWG for Component 3 Outputs: (1) MRV system in place; (2) Annual reports on emission reductions
Lessons learned expert Rate: \$400/day	125 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 sustainability 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
Local Finance / DREI Expert Rate: \$400/day	33 days / Year 3 and 4	The national consultant will support the International DREI Expert in carrying out mini-grid DREI analyses and report at mid-term Inputs: GEF financing resources + support of TWG for Component 2 & 3 Outputs: (1) mini-grid DREI modeling; (2) mini-grid DREI report

Consultant	Time Input	Tasks, Inputs and Outputs
Stakeholder Engagement Expert Rate: \$400/day	17 days / Year 2	Developing linkages between the project, and technical/research institutions Inputs: GEF financing resources + support of TWG for Component 3 Outputs: (1) partnerships developed for learning and knowledge management
International / Regional and global contracting		
Off-grid RET MRV Expert Rate: \$ 800/day	30 days / Year 1 & 2	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
International DREI Expert Rate: \$ 800/day	35 days / Year 3	Carrying out mini-grid DREI analyses and report at mid-term Inputs: GEF financing resources + support of TWG for Component 2 & 3 Outputs: (1) mini-grid DREI modeling; (2) mini-grid DREI report
International Learning and Knowledge Management Expert Rate: \$ 800/day	30 days / Year 4 & 5	- Developing State of the Energy Access Report for Nigeria - Formulating and disseminating replication plan for sustainability beyond project lifetime Inputs: GEF financing resources + support of TWG for Component 3 Outputs: (1) State of the Energy Access Report: Nigeria; (2) Replication Plan

Annex D: Terms of Reference

Guidance to project developer: *The following template includes example text to help guide the completion of this template for the project in question.*

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 supplier.

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 Supplier 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 Manager

Background

The Project Manager (PM), will be locally recruited following either UNDP or REA 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 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 GoN 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*

Annex E: UNDP Social and Environmental Screening Procedure

Annex F: Stakeholder Engagement Plan

Annex G: Gender Analysis and Action Plan

Annex H: UNDP Risk Log

#	Description	Date Identified	Type	Impact & Probability	Countermeasures / Mgmt response	Owner	Submitted , updated by	Last Update	Status
1	Despite political will and commitment to tackle the lack of electricity access in Nigeria, political instability or a change of Government could lead to potential policy reversals that may impact energy policy and discourage private investment.	Risk was identified at PIF formulation on 20 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. There has been a Presidential election in 2019 and the results have not been contested. The incumbent has been re-elected implying continuation of Government policies and strategies over the project implementation period. Further, multilateral and bilateral partners have invested much larger amounts of funding than the GEF in off-grid electrification using RETs, which shows confidence in political support. P = 2 I = 2 (Risk = Low)	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 1.1, 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 after the election on 5 May 2019	Risk status lower than at PIF stage

					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	The domestic supply and value chains and capacities of sustainable off-grid lighting service providers in Nigeria are very limited. The global threat of generic products to the sector	Risk was identified at PIF formulation on 20 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.	Output 1.2 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 market surveillance and	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 in September 2018 and February 2019. It was observed that several private investors are already	decreasing

	exacerbates this problem nationally. As a result, this may cause an inadequate implementation of sustainable off-grid lighting projects, leading to sub-optimal performance, malfunctioning and low payment recovery by private investors.			P=3 I=3 Moderate	Harmonisation of HS Codes used by Nigeria Customs Service for off-grid RETs. In preparing the request for proposals for the selection of suppliers (Output 2.3), 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 1.5), including the issue of product quality assurance and minimum performance. In sum, the derisking			procuring technologies that have international quality certification. Also, IFC's Lighting Africa programme has been supporting SON in the domestication of international quality standards, as well as creating consumer awareness regarding quality issues related to off-grid RETs. However, there is still lack of capacity for carrying out conformity tests and market surveillance.	
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					instruments proposed by the project will enhance the affordability of quality products.				
3	Risk arising from lack of awareness and resistance in communities to sustainable energy products, including solar-powered lanterns and kits. Among the Nigerian population, there is a low level of awareness of solar energy.	Risk was identified during PPG Stage in September -October 2018	Social accept ability	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 Moderate	First, community engagement was carried out during ProDoc formulation as summarised in Annex SA1. Even when product knowledge is low, rural communities seem open and interested to invest on off-grid RETs. Further, community engagement will be a key principle of the project to ensure community ownership and acceptance of the clean technologies and products.	Project Manager	Submitted by: PPG Team Leader	Status of risk was checked during field surveys carried out during the PPG stage on 3 July 2018.	decreasin g

					Under Output 1.1, market intelligence will be carried out to establish market demand and select the most appropriate technologies. Output 1.5 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 solar home systems. To avoid this, the				
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					project will carry in-depth capacity building in communities on the appropriate use of technologies under Output 1.5. It is also expected that a market-based mechanism for procuring technologies will increase care and responsibility in technology usage. Increasing prices of fossil fuels is also expected to increase demand of solar products. Further, the technology review and screening, which has been carried out during the PPG, will be updated during project				
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					implementation under Output 1.1, whereby all issues related to social and cultural acceptability will be taken into account.				
4	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 20 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=1 I=3 Low	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 private sector and financial institutions.	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 to obtain letters of co-financing (May 2019).	decreasing
5	Prolonged droughts or intense floods, which are expected to occur with greater frequency due	Risk was identified at PIF formulation on 20 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	The project is designed to increase the affordability of off-grid decentralised solar products through a	Project Manager	Submitted by: UNDP Regional Technical Advisor Updated: PPG Team	Status of risk was revisited during PPG state (September 2018)	No change

to climate change according to the NAPA, will adversely affect communities in Nigerian States, who are heavily dependent on natural resources and agriculture for their livelihoods. This in turn could affect their willingness and capacity to pay for clean lighting technologies. At the same time, more extreme weather events could negatively impact infrastructure, including sustainable off-grid lighting products and distribution			extremely weather events. The project will put most emphasis on promoting sustainable off-grid lighting solutions through solar PV powered system kits, which are less likely to be affected by climate change and therefore represents a viable climate adaptation alternative to the Nigerian power sector (which currently depends for 30% of its capacity on hydropower generation). P=2 I=3 Moderate	combination providing capital grants on products, 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 and rely mostly on agricultural activities for their livelihoods. At the same time, off-grid solar PV systems represent a viable climate adaptation alternative to		Leader		
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	channels. In addition, the projected rise in temperatures will increase the power demand for air conditioning.				the Nigerian power sector, which depends significantly on hydropower generation.				
6	International oil prices have fallen significantly over the past year and are expected to continue fluctuating with a tendency to increase again in the medium and long term. The sustainable off-grid lighting solutions proposed in this project may not be economically competitive compared to baseline energy sources.	Risk was identified at PIF formulation on 20 March 2017	Market / economic	The effect of this risk is expected to be moderate since the recent elimination of fuel subsidies and the rising price of oil on the world market will make off-grid RETs more affordable. Stakeholders have mentioned that this is not a significant risk P=2 I=4 Moderate	This has been an important problem in the past when energy prices in Nigeria have been very low but since January 2016 energy prices in Nigeria 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.	Project Manager	Submitted by: UNDP Regional Technical Advisor Updated: PPG Team Leader	Status of risk was revisited during PPG stage, when it was announced that Government 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. Also, the world market price for crude oil has increased by more than USD25 per barrel between	decreasing

								March 2017 and October 2018. ⁶⁶ (9 October 2018)	
7	Political tensions in the Niger Delta between foreign oil corporations and a number of ethnic minorities seeking a share of oil profits have led to numerous violent attacks on oil infrastructure and staff in the last 20 years. The risk exists that a similar situation could happen to sustainable off-grid lighting solution providers and users from groups with vested	Risk was identified at PIF formulation on 20 March 2017	Social / Security	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. 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 Moderate	While it is not possible to fully mitigate security risk within the framework of the proposed project, the participation of local communities has been sought in selected project sites. An advocacy campaign under Component 1 (Output 1.5) will raise awareness and secure buy-in for the proposed sustainable off-grid solutions. Additionally, market	Project Manager	Submitted by: UNDP Regional Technical Advisor Updated: Gender Specialist, PPG Team	Status of risk was revisited during PPG stage when the SESP was finalised (September 2018)	No change

⁶⁶ <https://tradingeconomics.com/commodity/crude-oil> - accessed 9 October 2018.

	interests or stakeholders along the kerosene supply chain.				intelligence to be carried out under Output 1.1 will provide geographic information regarding security risks. Finally, Nigeria has such a large underserved rural communities that the project can be impactful without having to invest in communities that pose significant security risks that are beyond its control.				
8	The proposed project might entail issues related to gender equality and women's empowerment	Risk was identified at PPG Stage during finalisation of SESP on 27 September 2018	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 Nigerian 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	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	Project Manager	Submitted by: Gender Specialist, PPG Team	This risk was identified during community visits that were carried out during the PPG stage and on finalising the SESP (27 September 2018)	No change

				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 Nigerian society. P=3 I=3 Moderate	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 1.5). 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				
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					emphasize the key role of women in community-based projects and households. These issues will be addressed directly under Output 1.1 and Output 1.5. 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				
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					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.				
9	SESP has revealed that	Risk was identified	Environment	The scaling up of off-grid RETs will inevitably produce electronic	This risk is under the	Project Manager	Submitted by: PPG	This risk was identified	No change

electronic and electrical waste related to batteries, control electronics and electrical appliances of off-grid RETs at the end of product lifetime will become an increasingly more serious issue as investments in these technologies for enhancing clean rural energy access is catalyzed. This is especially so given the poor institutional arrangements and infrastructure for waste collection, storage and disposal in rural areas.	at PPG Stage during finalisation of SESP between September and November 2018	al	wastes, including used rechargeable batteries, which, if not managed effectively, will most probably be disposed in open dumps in the vicinity of local communities. Also, the uptake of off-grid RETs in instances such as displacement of kerosene lamps with solar lanterns will result in e-waste being produced when it was not present in the baseline. Given the inadequate institutional capacity and physical infrastructure to deal with solar waste in general, this risk is considered high. P = 3 I = 4 High	control of the project and it will be dealt with in two ways, namely: (1) one eligibility criterion for private companies / entrepreneurs to participate in the REF Call for Submission that will allow them to access working capital grant under the Working Capital Facility to be established under REF will be a product take back clause at the end of product lives; and (2) developing a Strategy and Action Plan in collaboration with the Federal Ministry of Environment (and the Federal		Team Leader	during community visits that were carried out during the PPG stage and on finalising the SESP (1 and 2 September 2018)	
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					Environmental Protection Agency) on the environmental sound collection, storage and disposal of all electronic and electrical waste, including rechargeable batteries, associated with off-grid RETs (Output 1). The Action Plan will also provide the measures required for supporting State and Local Governments in discharging their roles and responsibilities in the sound management of these wastes. All institutional and regulatory frameworks will also be reviewed in the process for formulating the				
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					Strategy and Action Plan. An essential element of the Strategy and Action Plan will be to propose technologically and socio-economically viable means for developing a circular economy around off-grid RETs that will generate jobs and economic development in addition to being environmentally sound.				
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Annex I: Results of the capacity assessment of the project implementing partner and HACT micro assessment

Annex J: Additional agreements