INDEPENDENT EVALUATION DIVISION
OFFICE OF EVALUATION AND INTERNAL OVERSIGHT

INDEPENDENT TERMINAL EVALUATION

NIGERIA

MINI-GRID BASED RENEWABLE ENERGY (BIOMASS) SOURCES TO AUGMENT RURAL ELECTRIFICATION IN NIGERIA

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Acronyms and abbreviations

Acronym	Meaning
CTA	Chief Technical Advisor
EPSR	Electric Power Sector Reform Act
EUR	Euro
FMEnv	Federal Ministry of Environment
GDP	Gross Domestic Product
GEF	Global Environmental Facility
GHG	Greenhouse Gas
HQ	Headquarters
ISID	Inclusive and Sustainable Industrial Development
M&E	Monitoring and Evaluation
MW	Megawatt
NREEEP	National Renewable Energy and Energy Efficiency Policy
OECD	Organization for economic co-operation and development
PM	Programme / Project Manager
PMU	Programme / Project Management Unit
ProDoc	Project document
PSC	Project support costs
REF	Rural Electrification Fund
REMP	Renewable Energy Master Plan
REPG	Renewable Energy Policy Guidelines
RBM	Results Based Management
SC	Steering Committee
SDG	Sustainable Development Goals
SME	Small and medium-sized enterprises
SOP	Standard Operating Procedure
TC	Technical Cooperation
TCB	Trade Capacity Building
TE	Terminal Evaluation
ToC	Theory of Change
ToR	Terms of Reference
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UNIDO	United Nations Industrial Development Organization
US	United States
VC	Value Chain(s)
WTO	World Trade Organization

Glossary of evaluation-related terms

Term	Definition
Baseline	The situation, before an intervention, against which progress can be assessed.
Effect	Intended or unintended change due directly or indirectly to an intervention.
Effectiveness	The extent to which the development intervention's objectives were achieved or are expected to be achieved.
Efficiency	A measure of how resources/inputs (funds, expertise, time, etc.) are converted to results.
Impact	Positive and negative, intended and non-intended, directly and indirectly, long-term effects produced by a development intervention.
Indicator	Quantitative or qualitative factors that provide a means to measure the changes caused by an intervention.
Lessons learned	Generalizations based on evaluation experiences that abstract from the specific circumstances to broader situations.
Log frame (logical framework approach)	A management tool used to facilitate the planning, implementation, and evaluation of an intervention. It involves identifying strategic elements (activities, outputs, outcome, impact) and their causal relationships, indicators, and assumptions that may affect success or failure. Based on RBM (results-based management) principles.
Outcome	The likely or achieved (short-term and medium-term) effects of an intervention's outputs.
Outputs	The products, capital goods, and services which result from an intervention; may also include changes resulting from the intervention which are relevant to the achievement of outcomes.
Relevance	The extent to which the objectives of intervention are consistent with beneficiaries' requirements, country needs, global priorities, and partners' and donor's policies.
Risks	Factors, generally outside the scope of an intervention, which may affect the achievement of an intervention's objectives.
Sustainability	The continuation of benefits from an intervention, after the development assistance, has been completed.
Target groups	The specific individuals or organizations for whose benefit an intervention is undertaken.
Theory of Change	A set of hypotheses on how and why an initiative works.

Executive summary

This report is an independent terminal evaluation of the project entitled 'Mini-Grid Based Renewable Energy (Biomass) Sources to Augment Rural Electrification' in Nigeria implemented by the United Nations Industrial Development Organisation (UNIDO) with financial support from the Global Environment Facility (GEF) as described in the GEF defining document (ProDoc) in January 2011. The implementing partners at national level are the Energy Commission of Nigeria, the Federal Ministry of Environment (with is also the GEF Operational Focal Point (OFP)) and the Ebonyi State Government.

The terminal evaluation was conducted between March 2020 and October 2021 in two stages that were interrupted by the COVID-19 pandemic that emerged just as the evaluation tasks were starting and caused difficulties in 2020 for travel to Nigeria to interview stakeholders. The evaluation team is composed of an International Evaluation Consultant and Team Leader, Mr. Simon Taylor, and a National Evaluation Consultant, Mr. Jesse Ojobor.

The evaluation report covers the whole duration of the project from 7 August 2011 to the recently proposed (and extended) completion date of 30 December 2021. It assesses the project's performance against suggested criteria; design, relevance, effectiveness, efficiency, sustainability and coherence as well as cross-cutting issues such as the mainstreaming of gender. It also seeks to report on the findings, recommendations and lessons learnt so that UNIDO may improve the design and implementation of similar projects and programs.

The approach that the evaluation team used is independent and in-depth by consulting as many stakeholders as could be interviewed (given the COVID restrictions), liaising with the UNIDO Country Office and involving the Project Manager and Consultant assigned to the project as well as UNIDO's Independent Evaluation Division (IED). In addition, the team used the documentation made available by UNIDO HQ, which included Project Implementation Reports (PIR), financial reports and outputs of the various components.

Key Findings

Reference is made in the findings to the four (4) main components, which are detailed in the Logical Framework in Annex 1:

Component 1 - Development of techno-economic feasibility studies and business plans for identified potential sites to facilitate replication.

Component 2 - Demonstration of techno-economic viability of biomass based mini-grid.

Component 3 - Strengthening of financial and policy environment to support renewable energy based mini-grid systems.

Component 4 - Capacity development for replication of renewable energy (RE) mini-grid technologies.

In summary, across the 11 evaluation criteria by averaging their scores with equal weighting, the overall rating of the project is Moderately Satisfactory. This is a score of 4 and described as a level of achievement with moderate shortcomings (50 – 69% achievement rate).

Progress towards impact – this is defined as effects (direct or indirect, intended or unintended) of the intervention, whether positive or negative, that have redirected the transformation process particularly for any long-term effects produced. Despite awareness being created around the role of biomass waste products to generate electricity through gasification and the capacity built through the preparation of Feasibility Studies and the trainings and exposures given, the lack of finished demonstration projects at this final stage means that the long-term impacts are compromised. In terms of the extent to which the project has overcome barriers identified at preparatory stage (e.g.

lack of data and awareness, lack of policies/regulations, lack of institutional capacity and requirement for private sector financing) the division of the Components and work within them did help address some of those barriers. But overall the evaluation rated the Progress towards Impact as Moderately Satisfactory.

Design – the Logical Framework is the guiding document to evaluate design and this is regarded as clear and fairly realistic with a simple objective and goal and verifiable indicators. Furthermore, the project continues to accord with Nigeria's requirement for more capacity in the power sector, especially in rural areas and by promoting the use of clean fuels. Because the Logframe could benefit from being more SMART (Specific, Measurable, Attainable, Relevant, Trackable) and requires more detail within the sources of verification and verifiable numbers, the design is rated overall as Satisfactory.

Relevance – as was found at the Mid-Term Review, the project is regarded as continuing to be highly relevant and well suited to the priorities of both the target beneficiaries and the GEF. From analysis of the wide range of policies and enablers for development of renewable energy in Nigeria, the project is highly relevant to the nation, not least because of the continued shortages in power and the need to encourage more renewable energy into the distribution grids. The relevance of the project is therefore rated as Highly Satisfactory.

Effectiveness – the evaluation drew from the interviews conducted to ascertain the benefits that may have arisen and whether they would continue in the short to medium term. The benefits as reported were grouped into 10 categories, ranging from awareness generated and trainings conducted, environmental gains, promotion of local economies and uplift of rural incomes, to increased access to energy and lowering of electricity tariffs, then an analysis was made on whether such benefits had been captured in the Logframe. Having gone through each of the 10 outputs across the 4 components, the expected benefits have not accrued for 60% of the planned outputs (this was especially an issue within Component 2) and therefore the effectiveness is rated as Moderately Unsatisfactory.

Efficiency - in terms of the how economically the resources and inputs are converted to results and within the expected timeframe, the evaluation charted the progress of the main activities and the financial flows over the whole project period which included Pre-Feasibility Study, Preparation and GEF approval (2008 – 2011) then Implementation (2012 – 2021). The major concern is that the financial (and to some extent human) resources have had to be stretched over a timeframe that is double what was originally planned (the project original completion was meant to be in 2016) and the most crucial milestone (the completion of demonstration projects) has not yet been delivered. The evaluation of efficiency is therefore also rated as Moderately Unsatisfactory.

Sustainability – in terms of environmental credentials, the project is promoting renewable energy which is clearly sustainable, but more important is whether any benefits will continue after GEF's assistance. The interviews indicated that there is some sustainability (or resilience) built into the project because of the SPV set up in Ebonyi State and the high degree of stakeholder engagement. But there remains the issue that the rice-husk gasification to energy pilot projects have not been completed in Abakaliki and the wood waste pilots proposed in Ondo and Ogun States did not reach financial completion, so the ability of having case studies for technology replication is hindered and UNIDO is still required to support the project going into 2022 and possibly beyond. Therefore the rating for sustainability is evaluated as Satisfactory.

Coherence – the measures the compatibility of the intervention with other initiatives in the renewable energy sector in Nigeria and was determined through the questionnaires to stakeholders. Responses were gathered that because 70% of the country still use biomass for cooking, there are national institutions trying instead to encourage the use of such wastes for modern electricity supply through mini-grids in rural areas that could support SMEs in local economic activities. In Ondo and Ogun there are a huge number of sawmills that generate wood waste as a viable source of biomass

for electricity and this concurs with the objectives of Associations in those areas. In Ebonyi State the project has shown how it can align with the rural population where rice processing is a large industry, and the State Government has remained committed to the development of two biomass plants there, although yet to be completed. Overall, whilst it is laudable that the intervention is well aimed and generally compatible, there are detailed concerns that still need to be addressed to get successful projects off the ground. Therefore the coherence is evaluated as Satisfactory.

Gender Mainstreaming – although gender aspects were not considered in the project design (which is regarded as a mistake and is considered in the evaluation of design), this evaluation nevertheless ascertains the extent to which the project has contributed to better gender equality and parity and whether it has empowered women. This topic was raised in the interviews and nearly all responded that in rice milling and sawmill activities, the majority of agricultural workers are women, and they are dominant in the value chain in Nigeria. Women often recognise the need for better access to electricity more than men because of their leading role in the household. Therefore, women have more to gain from this type of intervention. At the same time there was not parity between men and women for representation within the Project Steering Committee (PSC) or for trainings given and UNIDO did not seek to include gender aspects within the Logframe during the project or report on this aspect. Therefore this cross-cutting aspect is evaluated as Moderately Satisfactory.

Monitoring and Evaluation – this covers whether the indicators made in the Logframe have been referred to in order to measure if the project has been implemented according to the plan (monitoring) and if it is having the desired results (evaluation). Questions were asked to interviewees as to whether the institutions involved did any internal monitoring and if any formal internal assessments or evaluations were done. Respondents indicated that they expected UNIDO to undertake its regular monitoring and no formal evaluations has been done within their organisations. This is despite the requirement for the core project team (UNIDO/PMU, Project Coordinator, PSC and GEF OFP) to actually do such through the duration of the project. Only the Project Implementation Reports of UNIDO captured quite high-level evaluations of each component year-on-year, including reporting on budget and risk assessment. But these evaluations are incomplete for years after 2016 and findings were seen as surprising to the evaluation team, given that the project, which was originally designed to complete in 2016, has been extended at least three times, yet was being reported as Satisfactory in the first 3 years. The reporting of risk seems similarly un-realistic and may have caused the project's delays to not have been properly flagged by the Project Manager and undertake a review as to the causes of this. With regards to UNIDO's reporting, there is not good enough reporting against the output indicators in the Logframe, and generally the lack of detail in the early years reports has not encouraged proper scrutiny and has meant that the project has not been well driven. There is also the question that within the GEF project process the OFP will have to draft an M&E document which should refer to the impact and performance indicators and report against the KPIs. It is not clear when or how this will be done. The evaluation therefore takes all of these assessments and although there is still monitoring to do within Component 2 (when it completes), to date the consistency of reporting data against the indicators in the Logframe and quality of reporting from UNIDO has not been to a high enough standard. Therefore the rating for M&E is Unsatisfactory.

Results-based Management – this involves the assessment of issues relating to results-based planning of the work, the M&E and reporting back, which would naturally fall into UNIDO's responsibility. Because the Logframe has already been assessed, the evaluation of this topic is on how this tool was managed. Interviewees were unanimous in their satisfaction of how UNIDO reported back to them with only the continued concern about the long time for the project's implementation. However, in this evaluation the timeline of activity progress (i.e. Preparation (2008 – 2012), Initiation (2013 – 2015), Mid-Term (2016 – 2018) and Extensions (2019 – 2021)) has been reassessed with respect to how works were reported on and checked against results expected. The findings were found to be mixed with a particular lack of focus in RBM since the mid-term period and as already explained in the previous section, the monitoring has been poorly conducted. The evaluators judgement is that there has not been good enough reporting against the works planned and results of

those works, and the lack of attention given to the serious delays that have occurred in the project means that this criterion is also Unsatisfactory.

Partners Performance – the evaluation assesses the contribution of partners to the project design, implementation, monitoring, reporting, supervision, backstopping and evaluation and concentrates on UNIDO, the National Counterparts and the Donors. With respect to UNIDO, interviewees regarded the Country Office input as positive with the good coordination of capacity building activities, although sometimes international experts were not introduced or their role was not clear. It would have been good to see more national consultants used, to have engendered capacity building. The evaluation notes that in the preparatory and early stages UNIDO performed well and a lot was completed by end of 2013 when an EPC Contract had been agreed in Ebonyi. However, since the decision to not move ahead with the 5 MW plant, the project has been allowed to drag and now has little prospect of being properly complete by the close of 2021. For the National Counterparts, their inputs are considered good and interviews with their representatives showed the enthusiastic work they continue to bring to the project. For the Donors, although there were some disappointments in the journey to finance the expected capacity and range of biomass initiatives, there have been notable inputs particularly from the ESG and UNIDO. Overall the assessment of Partners Performance is rated at Satisfactory.

Key Conclusions

This project was well designed and prepared through a good participatory process at the beginning and it also made a good start in implementation particularly in Component 1, with the feasibility studies dome for Ebonyi, Ondo and Ogun States for a range of different biomass-to-energy technologies. These studies encouraged the key partner and stakeholders (Ebonyi State Government) to continue its journey to support pilot projects using rice-husk as an appropriate feedstock, through the SPV, Abakaliki Power Plant Ltd. However, for a variety of reasons, since 2016, the schemes chosen in Ikwo (1000 kW) and Uburu (500 kW) have not yet been completed and standing rusting with an outstanding snagging list of 20 crucial items at each site.

Despite trying to encourage the capacity of pilot projects to reach the original target of 5 MW, the wood waste schemes proposed on Ondo and Ogun never reached financial closure. Now UNIDO faces the prospect of having to continue supporting the completion of the two plants in Ebonyi, which is the evaluators' opinion will take well into 2022 and possibly beyond.

Within Component 3, a small amount of work was done within the FIT review but not enough was done to encourage the private sector forward, particularly since the economic downturn in 2015 and there were challenges in aligning supportive policy with getting projects actually installed. For Component 4, it is seen that the capacity building was reasonably successful with at least 100 people that have improved awareness, although now most of the trainings, forums and exposure trips took place over 5 years ago. However, what is still missing is the centralised information hub (or one-stop information centre) for how biomass projects can be realised widely in Nigeria, as was targeted in the original Logframe.

Overall, the project remains highly relevant to Nigeria and to the renewable energy sector and has good coherence with other sectors and institutions and is particularly needed in the rural areas where there is huge wastage of biomass resource (rice husks and wood sawdust). There appears to be a reasonable degree of sustainability engendered not least for the institutional and environmental aspects. However, the effectiveness and efficiency have been let down by UNIDO not maintaining the project's alignment with realities in the field as they developed, and ultimately allowing the pilots to be seriously delayed with little prospect of their completion in 2021.

Key Recommendations and Lessons Learnt

The recommendations drawn from this evaluation are that firstly, because the project objective of promoting biomass-based mini-grids as an alternative to diesel-based energy systems has only been partially met and the goal of reducing and avoiding GHG emissions has not yet been met, even after 10 years of implementation, UNIDO need to understand the causes for this, which is partly to do with the lack of continued good monitoring of progress and weak result-based management within UNIDO. Regular follow-ups and missions to support the construction of the biomass power plants should have been given priority by UNIDO when the project plan started to drift off course in 2016, in liaison with the key stakeholders and the Country Office.

The Logical Framework should have been used as an interactive tool and adjusted as the project progressed to capture extra benefits that could arise to beneficiaries and stakeholders and to integrate benefits to gender mainstreaming that have been apparent in the project but not reported on. At the same time, UNIDO's reporting needs to be tighter particularly in clearly accounting for financial flows through the project, including the counterpart funding (the amount of which is not clear to the evaluators), and to make sure that the principles of results-based management are followed.

In trying to resolve the completion of the two demonstration projects in Ebonyi, perhaps a second phase of UNIDO support can now be envisaged through the new Programme Country Partnership (PCP), of which energy is one of the 9 components. If these projects can be finished and operated, they would make excellent case studies so that private sector investors and developers could come forward with similar technology in other areas of Nigeria.

The interviews conducted as part of this evaluation were important in allowing focus on key findings and nearly all made opinions on the continued implementation of the pilot projects and the long duration of the project. Particularly for Component 2, the target outputs were regarded as too ambitious, firstly because Nigeria has had very little experience in biomass technology and supporting policies so the reception and acceptance of the concept took some time and secondly, countries where mini-grids powered by biomass energy have been piloted by UNIDO (for example in Thailand and Philippines) took 3 - 5 years just for the capacity development, excluding any demonstrations. The lesson learnt is that project should perhaps have been done in two phases; one for introduction, mainstreaming and capacity development including important institutions from private sector (2 - 3 years) and the next phase specifically focussed on demonstration projects development (2 - 4 years).

There was almost unanimous response to the need to have physical and visible demonstration projects finished to really appreciate the direct impacts, especially for the longer term. The passing of well over a decade for project implementation means that the original design may not have kept pace with developments in the energy sector and wider Nigerian economy and even if the demonstration projects had reached the original capacity of 5 MW, a project life of 14 years is twice as long as it should be.

1. INTRODUCTION

1.1. Evaluation objectives

As defined in the assignment Terms of Reference (ToR) (Annex 2) the purpose of the evaluation is to independently assess the project 'Mini-Grid Based Renewable Energy (Biomass) Sources to Augment Rural Electrification' in Nigeria to help UNIDO improve performance and results of ongoing and future programmes and projects. The Terminal Evaluation (TE) will cover the whole duration of the project from its starting date in 07 August 2012 to the estimated completion date (originally 31 May 2020 but recently extended to 30 December 2021). The evaluation has two specific objectives:

(i) Assess the project performance in terms of relevance, effectiveness, efficiency, sustainability and progress to impact; and
(ii) Develop a series of findings, lessons and recommendations for enhancing the design of new and implementation of ongoing projects by UNIDO.

The key evaluation questions are the following:

(a) What are the key drivers and barriers to achieve the long-term objectives? To what extent has the project helped put in place the conditions likely to address the drivers, overcome barriers and contribute to the long-term objectives?
(b) How well has the project performed? Has the project done the right things? Has the project done things right, with good value for money?
(c) What have been the project's key results (outputs, outcome and impact)? To what extent have the expected results been achieved or are likely to be achieved? To what extent the achieved results will sustain after the completion of the project?
(d) What lessons can be drawn from the successful and unsuccessful practices in designing, implementing and managing the project?

The evaluation will assess the likelihood of sustainability of the project results after the project completion. The assessment will identify key risks (e.g. in terms of financial, socio-political, institutional and environmental aspects) and explain how these risks may affect the continuation of results after the project ends. The assessment of performance of partners will include the quality of implementation and execution of the GEF Agencies and project executing entities in discharging their expected roles and responsibilities. The assessment will take into account the following:

- Quality of Implementation, e.g. the extent to which the agency delivered effectively, with focus on elements that were controllable from the given GEF Agency's perspective and how well risks were identified and managed.
- Quality of Execution, e.g. the appropriate use of funds, procurement and contracting of goods and services.

The evaluation will finally assess the following topics, for which ratings are not required:

a. **Need for follow-up**: e.g. in instances financial mismanagement, unintended negative impacts or risks.
b. **Materialization of co-financing**: e.g. the extent to which the expected co-financing materialized, whether co-financing was administered by the project management or by some other organization; whether and how shortfall or excess in co-financing affected project results.
c. **Environmental and Social Safeguards**[6]: appropriate environmental and social safeguards were addressed in the project's design and implementation, e.g. preventive or mitigation measures for any foreseeable adverse effects and/or harm to environment or to any stakeholder.

1.2. Evaluation methodology

The Terminal Evaluation is conducted in accordance with the UNIDO Evaluation Policy (2015) and UNIDO Guidelines for Technological Co-operation and Project Cycle (2006), particularly referencing the UNIDO Evaluation Manual (2018). The internationally agreed evaluation criteria will be used, which are based on the OECD/DAC Glossary of Key Terms in Evaluation and Results Based Management, as shown in Table 1, wherein the whole assessment of the project draws from the analysis made in 'project performance' and 'project impact' criteria. An extra criterion is added under Project Performance using the suggestion from the OECD/DAC

Network on Development Evaluation's 'Better Criteria for Better Evaluation' (2019), which is coherence – to better capture project linkages, systems thinking, partnership dynamics, and complexity.

Table 1 – Evaluation criteria

EVALUATION CRITERIA	DEFINITION
Project Impact	Long-term effects (direct or indirect, intended or unintended) produced by a development intervention that are positive and/ or negative, primary and/ or secondary and redirect the trajectories of transformation process.
Project Design	**Formulation of the intervention or plan to achieve a specific purpose**
Overall Design	Assessment of design in general.
Logframe	Assessment of the Logical Framework.
Project Performance	**Functioning of the intervention**
Relevance	The extent to which the activity is suited to the priorities and policies of the target beneficiaries and the donor.
Effectiveness	The extent to which the interventions objectives were achieved or expected to be achieved.
Efficiency	A measure of how economically the resource and inputs (funds, time, expertise, services) are converted to results.
Sustainability	The continuation of benefits from an intervention after major development assistance has been completed. The probability of continued long-term benefits and resilience to the net rise of benefit flow over time.
Coherence	This new criterion measures the compatibility of the intervention with other interventions in the country, sector or institution. Coherence can be measured at both internal and external level, at least one of the two dimensions should be tackled.
Cross cutting issues	**Important criteria that cut across the intervention**
Gender mainstreaming	Although gender aspects were not considered in the design, the extent to which the intervention has contributed to better gender equality, if any.
Monitoring & Evaluation	Refers to all the indicators, tools and processors used to measure if an intervention has been implemented according to the plan (monitoring) and is having/ has the desired results (evaluation).
Results-based management	Assessment of issues relating to results-based works planning, results-based M &E and reporting based on results.
Partners Performance	
- UNIDO - National Counterparts - Donors	Assessment of contribution of partners to project design, implementation, monitoring, reporting, supervision, backstopping and evaluation. The performance of each partner will be assessed individually based on their roles and responsibilities.

In addition, GEF guidelines will be applied, such as 'Conducting Terminal Evaluations for Full-sized Projects' and 'GEF's Monitoring & Evaluation Policy' as well as the GEF documentation such as Project Identification Form (PIF) and Project Preparation Grant (PPG).

1.3. Evaluation approach

The approach the consultants have taken is to be independent, far-reaching and in-depth by consulting all stakeholders and liaising closely with the UNIDO Project Manager and Independent Evaluation Division (IED) and the Nigeria Country Office. The interviews with stakeholders, internal to UNIDO and the PMU and externally to other institutions involved are regarded as central to the approach in order to enrich the consultants' understanding and evaluation of the project. The ToR for the evaluation states that mixed evaluation methods

will be required due to the range of interviewees (from HQ in Austria, to Government Departments in Abuja and Lagos and beneficiaries in Ebonyi, Ogun and Ondo States) and the consultants have ensured that their experience in project analysis is brought through in the reporting. The other approaches used were according to the ToR with respect to data collection, guide questions, evaluation criteria and the rating systems to be used. The final list of interviewees was chosen with assistance from the UNIDO Country Office. The work division between the two consultants broadly followed Table 2.

Table 2 – Division of work by the consultants

International Evaluation Consultant / Team Leader (TL)	• Prepare and submit the Inception Report • Lead on design of interviews • Make schedules for interviews and field work • Undertake interviews together with the NEC • Project initial finding with NEC while in-country • Lead on writing the draft report • Make presentation to UNIDO HQ • Liaise with UNIDO PM and IED and UNIDO Nigeria Office and GEF Operational Focal Point
National Evaluation Consultant (NEC)	• Contribute to the Inception Report • Set up meetings for interviews with UNIDO assistance • Plan and carry out the in-country visits • Undertake interviews together with the TL • Draft initial findings with the TL while in-country • Support the TL in providing the draft report • Co-ordinate with UNIDO IED and Nigeria Office and GEF Operational Focal Point

1.4. Evaluation team and workplan

The team for the Terminal Evaluation is composed of two members; Simon Taylor is the International Evaluation Consultant and Team Leader and Jesse Ojobor is the National Evaluation Consultant. The initial schedule (with list of stakeholders likely to be interviewed) based on the ToR was initially drawn up in mid-March 2020 but had to be updated for the refreshed activities for September 2021 and for the interviews to be undertaken in-country. The evaluation was able to carry out interviews in Nigeria between 15 September and 1 October 2021 with the National Evaluation Consultant present in those meetings and the Team Leader joining via video link in all but 3 sessions (which were recorded and analysed later) so the evaluation gives feedback from those interviews which enrich the conclusions made from the evaluation team. The questionnaire used is in Annex 4 and the final schedule of interviews as conducted is given in Annex 3.

1.5. Limitations to the terminal evaluation

Although the original evaluation was started in March 2020 when the intervention was targeted to have been completed by the end of 2020, the COVID-19 pandemic caused difficulties in conducting the planned interviews at that time due to the local travel restrictions. Despite the consultants' constant communication with the various stakeholders, only one questionnaire was filled and one interview carried out so it was suggested in an Interim Report in July 2020 that the full evaluation report writing be paused and UNIDO decide on how to best to proceed.

In June 2021 UNIDO re-initiated the evaluation but did not allow international staff and consultants to travel to project sites and the Team Leader respected this. A schedule with itinerary was therefore prepared for the National Evaluation Consultant as shown in Annex 3 allowing the team to conduct the originally proposed interviews and meetings with stakeholders in person where possible with on-line support from the Team Leader. In the end most interviews were carried out to the planned schedule with only small disruption by COVID-19 but the evaluation team remained flexible and adapted to the local travel restrictions and respected that's some preferred to be interviewed virtually.

Another limitation is the lack of documentation on detailed and reliable financial data for the period of implementation (2012 – present) particularly for co-financing for which there are only figures from 2015 and these do not match to the amount planned in the GEF document at project launch. Generally, the evaluation found it difficult to penetrate (and therefore report on) the financial management of the project and it would be suggested that a proper audit be carried out on project completion.

2. BACKGROUND

2.1. Findings of the mid-term review

This evaluation builds upon the results of the independent Mid-Term Review (MTR) in September 2015, reporting on the first phase of the project. The overall objective of the MTR was to find out to what extend the project was achieving the expected results (i.e. promotion of biomass-based mini-grids) at the time of the evaluation. The project was found to be very consistent with the focal areas and strategies of the GEF and very relevant to the national development and environmental priorities of the Government of Nigeria and its people. The project was evaluated as having a very good design in line with the national developmental needs considering the power shortfall in the country and based on wide consultations with participatory approach. However, the Logical Framework (Logframe) was judged as having unclear outcomes and outputs with targets and indicators not precise and not SMART (Specific, Measurable, Attainable, Relevant, Trackable). The effectiveness and efficiency seemed to be satisfactory with first period activities complemented but with significant delay with commencement of construction of the biomass plants.

In terms of outcomes although the demo projects were delayed, there were benefits particularly for awareness about the project. There were no issues that posed risk to the sustainability of the project including in financial terms, considering the commitments of the Ebonyi State Government (ESG) and other financiers. For monitoring and evaluation (M&E) the project had a plan (including budgets), a framework for results and annual workplans as well as detailed progress and activity reports but the targets and indicators were not reflective of related outcomes and are not SMART. The project management was successfully conducted by UNIDO, but a National Project Co-ordinator was lacking in the PMU and it was suggested that all stakeholders need to push forward to the implementation and make improvements in management and co-ordination.

Finally it was recommended that i) UNIDO focus on the first payment release at Ebonyi State Government to enable the start of the demo project implementation being led by the Abakaliki Power Plant Limited (APPL); ii) the project be extended for 2 to 3 years; iii) appointment of a National Project Co-ordinator domiciled at the Energy Commission of Nigeria (ECN); iv) objectives and performance indicators need to be SMART; v) stakeholders to show strong commitment to the project and act on their roles and responsibilities.

In the following sections, it will be seen that some of these MTR recommendations were taken up and allowed the project to progress to a reasonable performance albeit with continued delays in the implementation of the demo. projects.

2.2. Country background

With an estimated population of 212 million in 2021 Nigeria has the largest population in Africa, is one of the most densely populated and is a very youthful country with 43% under the age of 14. About 50% of Nigerians live in rural areas although the growth rate of urbanisation is relatively high at 4.3%. The country has a high cultural diversity with over 250 ethnic groups and a large variety of customs and traditions with two major religions, Islam and Christianity. The size of the country means that although located in the tropics it is affected by four (4) climate types moving from south to north; tropical/monsoon, tropical savannah, arid steppe and arid desert, and three (3) main vegetation types; forest, savannah and montane land.

This wide geographical and social diversity is balanced by a strong federal structure with six (6) geo-political zones (based on similar ethnic groups with common political history) and 36 states. The 2015 Presidential election was the first to be won by an opposition candidate, HE Muhammedu Buhari, who won a second 4-year term in February 2019. Within the states elections take place a month later than Presidential and National elections.

Nigeria has the largest economy in sub-Saharan Africa with the most natural gas reserves and is the biggest oil exporter on the continent. Nigeria's manufacturing sector became the largest in Africa in 2013 and it produces a large proportion of goods and services for the West African region. Oil and gas are the main contributor to government revenues but agriculture is the largest contributor to GDP; indeed Nigeria ranks sixth in the world for farm output. Other key sectors are services (banking, private business, tourism) and mining. The growth in the private sector is held back by the high cost of doing business, poor infrastructure (electricity, roads and water) and non-transparent economic decision-making and due process. The country had reasonably strong economic growth (above 5% per annum) between 2000 and 2015 driven by the agricultural, trade, telecommunications and manufacturing sectors but since then GDP growth has been low or negative. In recent years the unemployment rate has increased with reports in 2019 of the overall rate at 25% and an additional

20% underemployment (affecting almost 50 million people) with the rate for the young (15 - 35) at 55%. The situation in 2021 has been further exacerbated by the COVID-19 pandemic.

2.3. Vision 2020

Conceived by former president Olusegun Obasanjo in 2006, Vision 2020 was launched in 2011 in recognition of the enormous human and natural endowments of the nation with the main objective of placing Nigeria among the 20 largest economies of the world with a GDP of US$ 900 billion and a per capita income of at least US$ 4,000 per annum. But in 2020 the vision was not met with Nigeria the 27th largest economy and with GDP only half of the target due to poor growth since 2015 (IMF and World Bank figures). Nigeria now has the highest number of people living in extreme poverty than any other country in the world with an estimated 87 million people living on less than US$ 1 a day and the World Bank putting the incidence of poverty at 40% (2018 data). Despite the huge human and natural resources the country has not been able to reduce poverty, inequality and improve standards of living through access to and quality of health care, education and infrastructure. Increased pressures will come on tackling poverty in the next two decades when Nigeria's population is expected to double.

2.4. Sectoral background

Despite Nigeria having the largest economy in Africa with GDP of more than US$ 400 billion, the limitations in the power sector have constrained economic growth. Information from 2021 gives the installed electricity capacity as over 16,000 MW but the distribution system can only evacuate 5,500 MW of that power. It was noted by UNIDO in 2015 that Nigeria faced a huge task in meeting its electricity needs with a gap between installed capacity and actual delivered power estimated to be 43% and that percentage has actually dropped to 34% in 2021, meaning that investment is urgently needed in the distribution networks to expand access.

According to the 2005 Nigerian Renewable Energy Masterplan (REMP) the national target for biomass set by the Energy Commission of Nigeria (ECN) was 5 MW by 2015, 30 MW by 2020 and 100 MW by 2030, as shown in the table below. The column on the right is the current generation capacity as reported by Africa Power[1] with Gas at 11,972 MW and Diesel/HFO at 2,333 MW.

Table 3 – National targets for renewable energy (REMP) versus actual in 2021

	RE SOURCE	2012 (MW)	2015 (MW)	2020 (MW)	2030 (MW)	Actual in 2021
1	Large Hydro	1,935	4,000	9,000	11,250	2,062
2	Small Hydro	60.18	100	760	3,500	64.2
3	Solar PV	15	300	4,000	30,005	7
4	Solar Thermal	–	300	2,136	18,127	?
5	Biomass	–	5	30	100	?
6	Wind	10	23	40	50	10
TOTAL Elec. Power		**8,700**	**47,490**	**88,698**	**315,158**	**16,448**
% of RE		23.2%	10.0%	18.0%	20.0%	13.0%

As seen in the table above that the penetration of renewables (including large hydro) has actually decreased from 23% in 2012 to 13% currently which is cause for concern for the country's GHG emissions in a year when NDCs have to be presented at the COP 26 in Glasgow in November 2021, which should plan to move away from fossil fuels. The targets for the REMP for 2020 were therefore missed by a large margin including for biomass, where there has been hardy any progress (not counting a few bagasse steam-to-energy plants of about 10 MW[2]).

Access to electricity remains low with the Sustainable Energy for All African Hub estimating the rural connection rate of 41% while in urban areas it is 86% , although an overall rate of 60% is an increase from 48% in 2010[3]. It is well known that Nigeria faces continuous power shortages and that even if the 16.45 GW could

[1] ref. www.usaid.gov/powerafrica/nigeria

[2] data from interview with National Sugar Development Council Director, Mr. Hezekiah Kolawole

[3] www.se4all-africa.org/seforall-in-africa/country-data/nigeria/

be dispatched to all, it would still not satisfy the population's demand. Therefore many in rural areas and industries and businesses that cannot rely on grid-based electricity have to use diesel or petrol generators which is an expensive and nuisance way of supplying power and further pushes up GHG emissions and makes industry and business less competitive.

The Nigerian power sector has many challenges that keep required projects from reaching commercial viability, including enforcing electricity policies in an uncertain regulatory environment, transmission system constraints, poor power sector planning and defaulting to gas for generation. In addition, within the renewable energy sector there are several government institutions involved with overlapping mandates and functions and there is no exclusive licensing procedure for small RE projects which have to pass through the same process as large scale power plants which is unnecessarily complex and a hindrance.

2.5. Policy background

The following table summarises the various policies that are relevant to this project before and during the tenure of its implementation.

Table 4 – Energy policies relevant to the project

Date	Policy	Detail
2001	National Electric Power Implementation Policy (NEPIP)	Since the 1960s there has been constant power shortages and finally in 2000 the Federal Government set up the Electric Power Implementation Committee to advise on reform of the electric power sector; the committee's efforts yielded the NEPIP which stipulates the general framework for Nigeria's agenda on sustainable power distribution with particular focus on efficient distribution and utilisation. (https://thelawreviews.co.uk/title/the-renewable-energy-law-review/nigeria)
2003 updated 2013	National Energy Policy (NEP) of Nigeria	Led by ECN, the NEP establishes guidelines for the protection of the environment in the exploitation of Nigeria's fossil fuels but also emphasizes the exploration of renewable and alternative energy sources, primarily solar, wind and biomass. NEP was recommended by the Electric Power Implementation Committee in 2003 to develop the nation's energy resources and in 2013 was reviewed and updated, which re-emphasised the importance of enforcement and implementation of the sustainable energy goals while decrying the failure of implementation, energy loss, inefficiency and waste in their realisation.
2005	Electric Power Sector Reform Act (EPSR)	Established to provide the general legal framework for the formation of several legal entities to take over the assets and liabilities of the old regulatory body and to establish the NERC (Nigerian Electricity Regulatory Commission) as the new agency for generation, transmission and distribution of electricity in Nigeria.
2006	Rural Electrification Fund (REF)	The REF was established by virtue of the EPSR to provide support for the development of the on and off grid sectors by: 1. Achieving more equitable regional access to electricity. 2. Maximizing the economic, social and environmental benefits of rural electrification subsidies. 3. Promoting expansion of the grid and the development of off-grid electrification. 4. Stimulating innovative approaches to rural electrification, provided that no part of the REF shall be used as subsidies for consumption. Funds are used to promote cost-effective expansion of electricity access in un-electrified rural areas using renewable off-grid and on-grid electrification solutions through partial one-off capital subsidies and technical assistance, with the ultimate goal of improving the living standard, socio-economic and environmental conditions of rural dwellers. To achieve these aims, the Rural Electrification Agency (REA) is to provide access to reliable electric power supply for rural dwellers that would allow for reasonable return on investment through appropriate tariff that is economically responsive and supportive of the average rural customer.

Date	Policy	Detail
2005	Renewable Energy Master Plan (REMP)	The REMP recommends the utilisation of renewable energy and seeks to provide an implementation strategy. It conceptualises Nigeria's renewable energy goals and tries to address the key factors for its attainment. REMP projected that the minimum electricity demand in Nigeria shall be above 315MW by 2030 with a goal is that over 20% of energy supply from renewable sources.
2006	Renewable Energy Policy Guidelines (REPG)	The Ministry of Power's REPG details policy objectives for the development and utilisation of renewable energy, placing premium on RE generation and distribution. REPG maps out a strategy for a cost-effective administration of the Renewable Electricity Trust Fund (RETF) and provides incentives for the utilisation of RE. It recommends a five-year tax holiday as an incentive for investors in the hope that this will encourage the participation of more stakeholders. (https://thelawreviews.co.uk/title/the-renewable-energy-law-review/nigeria)
2015	National Renewable Energy and Energy Efficiency Policy (NREEEP)	The NREEEP is broadly geared at removing barriers that put renewable energy and energy efficiency at economic, regulatory, or institutional disadvantages and providing a conductive political environment that will attract investments into the RE and EE arena. A government-owned utility (which serves as a central counterparty between generators and retail distributors) called Nigerian Bulk Electricity Trading Limited (NBET), has executed power purchase agreements with 14 solar photovoltaic IPP developers. However, implementation of those projects appears to have stalled, with the Federal Government seemingly choosing to focus on promoting off-grid solar projects.
2015	REFIT Regulations	NERC issued the Regulations on Feed-In-Tariff for Renewable Energy Sourced Electricity in Nigeria (REFIT). This applies to energy generated and supplied through the national grid and orders that NBET and electricity distribution companies shall purchase 50% of the renewable energy electricity capacity limit established by the regulations. REFIT also provides a special tariff framework for renewables, in the form of feed-in-tariffs which were designed to be attractive to private investors, approved by NERC. REFIT has its limitations, as it only applies to renewable projects with a capacity of 1 to 30 MW and off-grid renewable projects do not fall within the remit of the regulations.
2017	Mini-Grid Regulations	NERC issued the Mini-Grid Regulations which create a framework for the establishment and operation of mini-grids generating up to 1 MW capacity. A key objective of the Mini-Grid Regulations is to accelerate electrification of unserved areas and underserved areas. To this end, the NERC prescribes a simplified process for the establishment of certain kinds of mini-grids under which projects do not need to be licensed but may simply register. To provide financial relief to developers there is also a compensation mechanism for mini-grid projects to cover the possibility of the national grid eventually extending to cover the area(s) served by the mini-grid. While the Mini-Grid Regulations are not limited to renewable projects in theory, due to a variety of technical and commercial factors the prevailing practice is for mini-grids to be developed as solar powered projects. (https://www.ibanet.org/renewable-energy-nigeria)

2.6. Project background

The origin of this project was from a request made by the ECN and the Federal Ministry of Environment (FMEnv) to support the government in implementing its REMP, particularly with respect to biomass resources. The GEF defining document from January 2011 (the Project Document or ProDoc) estimated that 83 mission tonnes of crop residues and 61 million tonnes of animal wastes are mostly either dumped or burnt, aside from wood waste from the hundreds of sawmills in the country. The project was designed to show how to use these resources for power generation, feeding into mini-grids thereby tackling the shortage of electricity in rural areas while also reducing local environmental and health problems. The project data is shown in the table below.

Table 5 - Project factsheet

Project title	**Mini-Grid Based Renewable Energy (Biomass) Sources to Augment Rural Electrification**
Country(ies)	Nigeria
UNIDO ID	100260
GEF Project ID	3943
Project implementation start date (initial)	7 August 2012
Expected duration	48 months
GEF Focal Areas and Operational Project	GEF-4: Climate Change; Strategic programme CC-SP3 – promoting markets for renewable energy
Implementing agency(ies)	UNIDO
Government coordinating agency	Energy Commission of Nigeria
Executing Partners	• Federal Ministry of Environment • Ebonyi State Government • Federal Ministry of Science and Technology • Federal Ministry of Power • Bank of Industry
UNIDO RBM code	HC32 (Clean energy access)
Project donor(s)	GEF
Donor funding	USD 2,621,800
Project GEF CEO endorsement/ approval date	12/27/2011
Co-financing at CEO Endorsement, as applicable	11,935,000
Total project cost (USD), excluding support cost and PPG	14,556,800
Mid-term review date	May - June 2015

2.7. Project goal and objectives

The project objectives are to promote renewable energy (biomass) based mini-grids as an alternative for diesel-based energy generation systems and reduce and avoid GHG emissions from the energy sector of Nigeria. The project should develop policy and a conducive market environment, particularly by strengthening financial facilities, and build capacity to replicate RE mini-grids for augmenting rural electrification and productive uses. The overarching goal, objectives and their indicators are given in the table below.

Table 6 – Project goal and objective

Project Strategy		**Objectively verifiable indicators**				
		Indicator	**Baseline**	**Target**	**Source of verification**	**Risks and Assumptions**
Goal	To reduce and avoid GHG emission from the energy sector of Nigeria.	Incremental CO2 emission reduction.	CO2 emission due to diesel-based power generation.	1. 5 MW of biomass based mini-grid capacity added during the project period.	1. Physical verification of projects in operation. 2. End of project survey.	Continuous support of all participating organizations, State Government and project investors.
Objective of the project	To promote renewable energy (biomass) based mini-grid as an alternative to diesel based energy generation systems in Nigeria.	1. 5 MW of biomass-based power generation. 2. Investments by financial institutions to biomass projects.	1. No biomass-based power plant and mini-grid exists in Nigeria. 2. No practically workable support schemes available in Nigeria for the promotion of biomass projects.	1. 5 MW of biomass power plant capacity established. 2. Policy, regulatory regime established. 3. Replication potential of biomass projects identified.	1. Physical verification of Implemented project. 2. End of project survey.	1. Sustained government / investor support to the agreed project activities. 2. Commitment of Government agencies in building capacity and making policy changes.

2.8. Project components, outputs, outcomes and logical framework

The project has four (4) main components:

1. Development of techno-economic feasibility studies and business plans for identified potential sites to facilitate replication.
2. Demonstration of techno-economic viability of biomass based mini-grid.
3. Strengthening of financial and policy environment to support renewable energy based mini-grid systems.
4. Capacity development for replication of renewable energy (RE) mini-grid technologies.

Component 1 was the feasibility stage and has two main outputs which were to:

- Prepare techno-economic feasibility studies and business plans for the identified sites.
- Report on existing tax schemes, BoI privileges, required licenses and permits, environmental regulations, proposed government schemes, meteorological, seismic data and other relevant data for the implementation for the biomass project feasibility study sites.

The final identified sites as gathered from the project documents are given in Table 9 later and all the 3 states have been visited in this evaluation.

The outcome of Component 1 was "Preparatory works completed for facilitating replication in the identified potential sites" through feasibility studies, business plans and other support.

The GEF ProDoc included a Logical Framework (Logframe) that was differently aimed with respect to Component 1 which spoke in general terms of the identification of potential sites and a report thereof, whereas the UNIDO Logframe is more specific and requires "Techno-economic feasibility studies and business plans to be developed for 3 sites to facilitate replication". Being a later version, the UNIDO version will take precedence.

Component 2 was the pilot project stage and had three main outputs:

- A biomass-based power plant of 5 MW installed capacity commissioned in the selected site along with mini-grid.
- Capacity on biomass power plant operation and maintenance as well as mini-grid management developed.
- The mini-grid independently monitored, evaluated, lessons learnt and information widely distributed.

In the end two sites in one state have moved forward to installation in Abakaliki within the Ikwo Rice Mill Cluster in Ebonyi State; one (1) unit of 1,000 kW in Ikwo and one (1) unit of 500 kW in Uburu, both developed by APPL as rice husk gasification projects.

Four (4) separate projects of almost 3 MW had been planned but the projects demonstrating sawmill waste wood in Ondo States were both cancelled after not reaching financial closure. There were to have been a 200 kW wood waste to energy project developed by a company called Quintas (Renewable Energy Solutions) in Ofosu and a 1,000 kW biomass gasification plant by Prado Power Limited in Idanre, which were both cancelled in 2021 because they did not reach financial closure. In addition, the wood waste to energy projects in Ogun State were never developed and only ever reached feasibility study level.

There was a fourth output listed in the GEF document (listed as 2.3) which was dropped in the final Logframe on development of five "Sustainability indicators for biomass mini-grids" and this work may be considered as having been integrated into Component 1 reporting.

The Outcome of Component 2 was "Acceptance by stakeholders on the technical and financial viability of selected sites for setting up the biomass based mini-grid for rural electrification and investors ready to invest and agreement signed for implementing the biomass based mini-grid project."

Component 3 was on the regulatory and policy environment and had two main outputs which were:

- To see a Feed-in-Tariff (FIT) for biomass power in place.
- An appropriate financing facility developed for RE projects.

In the GEF document there were two more outputs, one on RPS (a strategic policy tool called Renewable Portfolio Standard) to promote RE and another in strengthening RE institutions, the latter of which is considered to have been taken into Component 4.

The outcome of Component 3 was a "Conducive financing and policy environment for promoting investments in rural mini-grids", with favourable conditions for biomass projects.

Component 4 was the training stage and had four main outputs:

- Local capacity in designing mini-grid developed.
- Experts, planners, and institutions are trained in developing biomass-based energy and mini-grid systems.
- Capacity of RE related and financing institutions strengthened.
- Capacity of local engineering firms and O&M companies developed in operation and maintenance of biomass power plants and mini-grid systems.

These are the same as in the GEF document and the third output reflects the original aim of strengthening institutions in the RE sector through capacity building activities, leaving only the Renewable Portfolio Standard not specifically targeted in the final Logframe.

The outcome of Component 4 was on the "enhancement of capacity of local planners, institutions and experts for RE mini-grids".

2.9. Project budget

Although the UNIDO Open Data Platform (ODP) is available[4] it gives the bare financials for this project but the Grant Development Report (GDR) from 2021 is used for the analysis. The following table shows the original expected expenditure by Component at project outset in 2011 and the divergence from the financial tables in the GDR (which includes disbursements as well as obligations).

Table 7 – Expenditures by component

	GEF Plan 2011 (US$)				UNIDO GDR 2021 (US$)	
	GEF Input	**Co-financing**	**Agency**	**Total**	**GEF Input**	**Difference**
Component 1	100,000	200,000	Min of Env.	300,000	158,024	-58,024
Component 2	2,000,000	1,200,000	Min of Env.	3,200,000	936,535	1,063,465
Comp. 2 equip		9,375,000	Private Sector	9,375,000	?	
Component 3	100,000	200,000	Min of Env.	300,000	663,786	-563,786
Component 4	221,800	500,000	Min of Env.	721,800	263,420	-41,620
Project Mgmt	200,000	60,000	UNIDO	260,000	206,135	-6,135
Project Mgmt		400,000	Min of Env.	400,000		
US$	**2,621,800**	**11,935,000**		**14,556,800**	**2,227,900**	393,900

It is noted that within the GDR is a Support Cost IDC (International Development Cooperation) across each of the components of a total of US$ 244,245.05 (over 10%) which is described as an agency fee and although this is standard for GEF, it is unsure how this spend has contributed to the project. Overall there is an underspend of ~US$ 394,000 which is attributed to the returned GEF grant money for undeveloped pilots. The large differences highlighted in blue indicate that the GEF input to Component 2 (the demo projects) has not all been utilised (1.5 MW will be installed rather than 5 MW) and within Component 3 (the regulatory/policy work) the final budget allocation was not according to the original plan and the overspend actually went into grants awarded to the project developers and not all meetings/workshops, which were originally planned at US$ 100,000. The overspend in the other two components is about US$ 100,000. Due to the unspent grant, 78% of the GEF money has now been spent but what is not known is how UNIDO plans to disburse (if at all) the remaining grant.

The table below shows the year-by-year spend as reported from Project Management Data (which is similar to the ODP) against figures that UNIDO have provided for each year through their Project Implementation Reports (PIRs). The large discrepancies between the data received and the PIRs could in part be due to the financial year of UNIDO being July to June, but generally the records are unclear as to the definitive expenditures year on

[4] https://open.unido.org/projects/NG/projects/100260

year (and from 2016 there has not been any proper reporting) which seems due to a lack of good and systematic financial reporting at UNIDO Headquarters.

Table 8 – Project Management Data and other UNIDO reports of expenditures

	UNIDO Proj. Mgmt. Data		UNIDO PIR	Diff. PMD-PIR
Year	Expenditures (US$)	Cumulative (US$)	as reported assumed cumulative (US$)	(US$)
2012	175,030	175,030		
2013	367,104	542,134	335,417	-206,717
2014	159,558	701,692	676,700	-24,992
2015	1,190,171	1,891,863	820,586	-1,071,277
2016	114,787	2,006,650	1,939,330	-67,320
2017	66,638	2,073,288		
2018	227,058	2,300,346		
2019	156,748	2,457,094	1,146,371*	-1,310,723
2020	79,925	2,537,019	60,000**	
2021	-497,395	2,039,624	60,000**	

* - this figure is unclear as to whether it is expenditure for the year or a mistaken cumulative sum. In the Grant Delivery Report section of the 2019 Progress Report (PIR Template_FY19 (002).doc), the detailed financial tables for the period 7/3/2012 to 30/6/2019 shows that by this time US$ 2,686,690 of the GEF grant had been disbursed but now according to Table 7, the actual disbursed and obligation budget is significantly less at US$ 2,227,900.
** - these figures seem estimates for both years

2.10. Co-financing

The co-financing planned at the CEO endorsement is given in the Table 7 above and was to be US$ 11,935,000 composed of US$ 2,500,000 (cash and in-kind) from the GEF Operational Focal Point (OFP) (the Federal Ministry of Environment), US$ 9,375,000 investment from the private sector and US$ 60,000 from UNIDO for evaluation costs. The 79% targeted from the private sector for the 5 MW plant would work out at a cost of US$1.875 million per MW installed. As mentioned in the Limitations section, the evaluation has only seen figures for 2015 for the various in-cash and in-kind contributions which do not add up to the planned US$ 2.5 million. The FMEnv reported to have given US$ 127,388 in-kind; ECN reported to have given US$ 159,236 in-kind and Ebonyi State Government contributed for infrastructures US$ 1,366,242, totalling US$ 1,652,868.

But what is known is that the private sector cost for the 1.5 MW plant was US$ 1,022,500 for equipment plus Naira 34,338,943 (US$ 95,119) for the port clearing and transportation cost to site. However, this US$ 1,117,619 total was not in the end 'co-financing' from the private sector because UNIDO approved US$ 1 million of GEF money to the ESG to cover most of these costs (assumed to be wrongly captured under Component 3 in Table 7). The present administration in Ebonyi State was first advised that going with modular gasification systems would be cheaper and increase the cumulative power from 5 MW to 9 MW, but they then abandoned the idea of having a single 5 MW co-generation power plant and decided to go with modular gasification power plants built in phases. Hence, the cancellation of the initial grant for the 5 MW, which opened up the opportunity for the other project developers to participate, and the resetting of the GEF grant for the first phase in Ebonyi State.

At the time of the site visits as part of this evaluation there was an outstanding US$ 225,000 requested from UNIDO for the completion of the 2 schemes' installations, but it is understood that the first tranche of this US$ 157,500 was delivered to the ESG in October 2021 for the installation of the 1,000 kW and 500 kW gasification systems. Therefore the counterpart funding for this whole project, which was meant to be a substantial amount of over US$ 11 million is likely to be considerably less, counted only by the contributions from the Ministry of Environment, ECN and ESG, the full amounts which are not disclosed in the documents.

2.11. Project implementation

The project went through the GEF approval process in 2011 with drafting of the request for a Full-Sized Project (FSP) process (the Project Document) and CEO endorsement was achieved on 27 December 2011. The official project start date was 27 August 2012 and although the expected end date was 31 October 2015 by the time of

the MTR this had been extended to 31 October 2017. At the stage of the Terminal Evaluation the project has been further extended several times to now complete on 30 December 2021. While this is partly due to the COVID-19 pandemic throughout 2020 and most of 2021, subsequent sections of this report raise serious concerns of how UNIDO has allowed the delay of the demonstration projects into 2021 (now unlikely to complete by this time) and how this has required the continued extension of the overall project, without proper scrutiny as to the root causes.

As can be seen from the financials, the bulk of the GEF funds (about US$ 2 million or 72%) had been reported as disbursed by 2017 and from review of the outputs it is assumed that most of the activities had been done by that time, especially in Components 1, 3 and 4 as shown in the table below.

Table 9 – Main outputs as found in project documents

	Outputs	**Date**
Component 1	• Techno-economic Studies on Biomass Gasification Plants in Nigeria (TERI) • Techno-Economic Study Report for Potential Biomass Power Plant Sites in Nigeria (Everest) • Site specific Wood Waste Power Plant Business Plan Reports – 2 in Ogun, 4 in Ondo (UNIDO)	Sept 2014 to Dec 2015 March 2016 October 2017
Component 3	• Feed-in-Tariff (FIT) Gap Analysis • Stakeholders' Forum on the Implementation of RE policy/Feed-in-Tariffs in Nigeria: Current Status, Challenges & Way Forward • Workshop on RE Roadmap for Nigeria and Lessons Learned on Deploying Biomass Based Mini-Grid Systems	2014 December 2017 January 2020
Component 4	• APPL sponsor delegates to China (due diligence) • APPL sponsor delegates to India (tecno-commercial) • APPL organise visits to Thailand (exposure trip) • Consultative Expert Group Meeting on EnMS/ISO 50001 (Vienna, Austria) • Sustainable Energy Leadership Programme (SELP) (Delhi, India) • Vienna Energy Forum (Vienna, Austria) • Three personnel attend International Training on Biofuel Technology (Bangkok, Thailand)	July 2013 August 2013 2013 April 2014 Feb 2015 & April 2015 June 2015 June 2018

The serious delays in the project's implementation (now totalling 5 years) can be attributed to the incomplete pilot biomass mini-grid demonstrations in Component 2, originally targeted to be one 5 MW plant. As Component 2 was continually delayed, some activities in other Components were also pushed back because of their association and linkage to the demonstrations, which are effectively the core purpose (and largest financial input) to the project. At the MTR stage in 2015, the delay was attributed to Ebonyi State Government not making the necessary first instalment payment according to the Engineering, Procurement and Construction (EPC) Contract (with Isgec Heavy Engineering for a total of US$ 9,700,000) that had been signed in November 2013, and to start the Special Purpose Vehicle (SPV) established (APPL) on the road to demonstrating the technology.

The original EPC Contract was then reviewed in January 2016 by the new Governor of Ebonyi State and this resulted in the declining of all three previous international bids Isgec (India), Helmbold (Germany) and JMSI/PAM (USA)) and the recommendation that the MoU already signed in September 2016 with Wuxi Tenang Power Machinery Co. Ltd. (China) be taken forward for supply of 1 x 500 kW and 1 x 1000 kW rice husk gasification equipment for US$ 1 million (Phase 1) and later 3 x 1000 kW and 4 x 500 kW rice husk gasification units and 1 x 1000 kW rice husk and wood gasification units for US$ 3.9 million. This total of US$ 4.9 million for 7.5 MW of equipment for biomass to electricity plants (which would have been approximately US$ 7.5 million transported and installed) would have resulted in an installed cost of US$ 1 million per MW, and therefore below the GEF budget estimate and considered reasonable to the shareholders of the project proponent, APPL.

Phase 1 for 1.5 MW was therefore approved and the request for the co-financing from GEF of US$ 1 million was made by the Governor in May 2018 for equipment that had already been shipped to site in March 2018. Because the project reporting since then is thin, it is assumed that a further 2 years was then taken to mobilise Wuxi's engineer to the 2 sites to assemble the equipment. This is borne out by the State Government interviewees referring to the Chinese engineer staying at the site for some time, but him departing prematurely at the start of the COVID-19 pandemic (March 2020). Now 20 months later it was witnessed that the equipment at both

sites has been left in an unfinished state with an urgent need to attend to completions before some of the materials are either stolen or corroded beyond use.

Therefore, the project delays can be mostly attributed to the inability to complete the demonstration projects in Component 2 and at the date of this evaluation it is clear that UNIDO still needs to support the State Government and APPL in Ebonyi to see the two projects to completion (snagging the mechanical items, installing the electrical and control components, then the commissioning, testing and hand-over). At the same time, with the project now open and running for 10 years, there is also a case to finish what is possible as soon as possible and close the project because the UNIDO counterpart through the GEF is basically complete.

2.12. Main stakeholders

The guiding GEF document (ProDoc) envisaged the following arrangements for the implementation of the project with the revisions during implementation as noted:

- Although the project is executed by **UNIDO** in collaboration with the concerned Federal Ministries, State Governments and the private sector, UNIDO has responsibility for overall implementation, delivery of planned outputs and achievement of the expected outcomes as well as procuring (then managing and supervising) any international expertise needed, reporting on the project performance to the GEF and monitoring all technical works (mechanical and electrical) .

- A **Project Management Unit (PMU)** was established with responsibilities of coordination of all activities, having close association with the Ministry of Energy/State Governments, day-to-day management, monitoring and evaluation of activities, organization of seminars and trainings, as well as preparation of monthly communication letters to the Project Steering Committee (PSC). Although foreseen to be within the Energy Commission of Nigeria, the PMU was set within the UNIDO Country Office in Abuja with a field office in Abakaliki. The PMU received necessary management and monitoring support from UNIDO (Country office and HQ) and monetary support from GEF and counterparts.

- A **National Project Manager** was recruited early in the project but was released from duties by the time of the MTR and his role was covered by the UNIDO Country Representative. A lack of coordination and information sharing was identified so it was suggested that a new **National Project Coordinator** should be designated from the ECN, which was done from midway through the project. The co-ordinator should act as a connection between the PSC and the PMU, providing intensive coordination activities and regular updating on project implementation.

- A **Project Steering Committee (PSC)** was also established with purpose to review the progress in project implementation, to facilitate co-ordination among project shareholders and to maintain transparency in ensuring ownership and support the sustainability of the project. The PSC had a balanced representation from key stakeholders including counterpart Ministries, public institutions, private sector representatives and UNIDO. The committee was to be chaired by the GEF Operational Focal Point (OFP) and envisaged to meet twice a year, which has generally not been fulfilled, but SC meetings are at least still taking place. The ECN's Director General was chosen early on to be the Chair of the SC and the ECN was therefore the institution most involved (other than UNIDO).

- The role of the **Federal Ministry of Environment (FMEnv)** cuts across the entire project life cycle from planning to evaluation. As the GEF OFP for Nigeria, the Ministry is responsible for receiving project proposals for GEF funding, screening and selection of proposals, project approvals and endorsement to the GEF Secretariat in Washington. However, the FMEnv has been found to not be as highly engaged as is expected throughout the project which is in part due to the high turn-over of staff (5 individuals have been involved).

The interviews undertaken covered all of these stakeholders and even with the long length of time for implementation, it was encouraging to find continued engagement with the project, notably from UNIDO, ECN, BOI, MAN and key PSC members in the 3 states (Government and local Associations). Although APPL was not interviewed directly, the 8 shareholders in this SPV, as listed in the MTR (Ebonyi State Government, UNIDO, GEF, BOI, ECN, Federal Ministry of Environment and other Federal Departments, Private Millers, Africa Finance Corporation (AFC)) were all interviewed with the exception of AFC, who had not formally come in to the project due to the planned mini-grids not yet reaching installation.

2.13. Summary of risks

The MTR assessed the status of risks originally listed in the GEF document as at mid-2015 and a review of this risk table at the evaluation stage is given below, with emphasis again placed on how risks to project outcomes could affect continuation of (project) benefits after the UNIDO support ends.

Table 10 – Analysis of risks at project conception and at Terminal Evaluation

Component & Risk	Potential impact & Probability	Risk Management	Current status at Terminal Evaluation
Institutional risk Inadequate policy, regulatory and institutional framework	Medium Very low	As the project is designed as independent mini-grid project and is not connected to the national grid, it faces less regulatory issues and hurdles. But all these hurdles are expected to increase the investment and operation cost. Though there are some legal procedures to be followed, they are manageable and do not pose serious implementation risk.	Interviews with the stakeholders showed continued co-operation between the stakeholders and the policy and regulatory framework has not changed very much during the project life therefore the future development of biomass mini-grids are unlikely to be hindered for institutional reasons.
Technical risk Power plant not in operation for its designed life time	High Very low	Internationally accepted best practice project development steps will be carried out in the implementation of mini-grid project. High quality, experienced equipment supplier with proven track record will be considered. A fixed price, time bound contract will be signed with the EPC contractor having adequate performance guarantees and related liquidated damages for noncompliance. Project performance such as gross and net power generation, equipment warranty, etc. will also be managed by selecting the EPC contractor with proven track record.	Until the 2 demonstration projects in Ebonyi State are fully installed and commissioned, the technical risk remains a high impact on the ability to develop future projects. The current condition of the equipment as seen in Sept 2021 is unacceptable and will not encourage the biomass electrification sector to be further developed. The Ebonyi State Government and APPL with UNIDO and other stakeholders support need to move the projects on to technical completion as soon as possible and there are no hindrances, i.e. inspection and verification reports have been compiled with recommended immediate actions and UNIDO has recently fulfilled its financial commitment to next steps.
Market risk No off-takers for the generated electricity	Medium Very Low	The electricity generated from the power plant is supplied to the rice mills and the other customers. The present demand of electricity outstrips the supply and hence there will not be any risk for electricity off-take.	Because the projects have not been commissioned with demonstration of electrifying the rice mills and customers nearby, the replication to other sites (and using other feedstocks such as wood waste) is severely hindered, so the market risk remains at a medium level until such demonstrations are completed.
Financial risk No investors willing to invest in biomass mini-grid	High Low	In Project Component 2, UNIDO will mobilize investors to invest in the biomass mini-grids. During the last four years, UNIDO has conducted several activities related to the biomass power plant projects in Nigeria and already created awareness among the potential investors and lenders. Such activities already carried out by UNIDO in Nigeria is expected to help successful mobilization of financing both in the form of equity investment and loan for the mini-grid projects.	The investors have not come forward as expected, evidenced on two fronts; i) in 2018 the Governor of Ebonyi State wrote to UNIDO stating "some of the challenges (in achieving the biomass plant) were the unwillingness of BOI, Ebonyi Agro Industries Ltd. and Abakaliki Rice Mill Owners Assoc. to pay their counterpart funding and this has left the ESG as the only viable entity for the said project.", ii) 2 wood waste for gasification projects that were to be developed in Ondo State (200 kW in Ofosu and 1000 kW in Idanre) did not reach financial closure. The interview with BOI revealed that there were reasons for not allowing counterpart funding, such as the Ebonyi State Government not being able to find the land fast enough and the hesitancy of a quasi-

Component & Risk	Potential impact & Probability	Risk Management	Current status at Terminal Evaluation
			state institution to help finance a State initiative. Given the clear mandate of BOI, this is a missed opportunity and does not encourage financing of future biomass projects.
Implement-ation risk Failure of project implement-ation	Medium Very Low	UNIDO will mitigate this risk through detailed development of activities plans in close cooperation within country project partners, stakeholders and developers. Agreed and transparent modus operandi will be defined before the start of the project implementation	Five years after the MTR noted the delays in the implementation stage, the demonstration projects are still not finished. However, UNIDO has done all it can within its power to see the projects through to completion, which was recognised in all of the interviews. UNIDO needs to continue supporting the completion of the plants in order to mitigate this implementation risk and allow future projects' developers and investors to learn from the APPL experience.
Sustainability risk Failure to achieve project outcomes and objective after successful delivery of outputs	High Very Low	One of the project components is to train the operators for the sustainable operation of the power plant. Moreover, local industries will be identified and trained in the equipment maintenance activities during the project implementation stage and they will be engaged by project owners for future maintenance activities along the life time of the biomass power plants. The project investors' commercial interest in the project will ensure sustainable operation of the project.	Although interviewees confirmed that there had been at least 10 people trained on the engineering aspects of biomass technology, the Rice Mill Owners Assoc. regard that 4 – 7 people need to be maintained with remuneration within the project, yet only 2 engineers from ESG are employed on very low wages and UNIDO cannot intervene, other than insisting that the outstanding O&M training of 11 engineers by the EPC Contractor should take place. A future training programme could involve APPL because UNIDO has agreements with the SPV and this capacity building is essential for sustainability.

Please note that the 'Climate Change Risk' (i.e. flooding) as listed in the MTR has not needed to be reviewed.

3. ASSESSMENT

As suggested by the UNIDO IED and as is the practice by many development agencies, the following six-point rating system will be applied to this assessment.

Table 11 - Project rating criteria

Score		Definition	Category
6	Highly satisfactory	Level of achievement presents no shortcomings (90% - 100% achievement rate of planned expectations and targets).	SATISFACTORY
5	Satisfactory	Level of achievement presents minor shortcomings (70% - 89% achievement rate of planned expectations and targets).	
4	Moderately satisfactory	Level of achievement presents moderate shortcomings (50% - 69% achievement rate of planned expectations and targets).	
3	Moderately unsatisfactory	Level of achievement presents some significant shortcomings (30% - 49% achievement rate of planned expectations and targets).	UNSATISFACTORY
2	Unsatisfactory	Level of achievement presents major shortcomings (10% - 29% achievement rate of planned expectations and targets).	
1	Highly unsatisfactory	Level of achievement presents severe shortcomings (0% - 9% achievement rate of planned expectations and targets).	

4.1. Progress toward impact

The definition of the first evaluation criterion is to assess any long-term effects (direct or indirect, intended or unintended) of the intervention whether positive or negative that have redirected the transformation process, which in this project is "to provide biomass-based mini-grids as an alternative to diesel electricity thereby reducing the GHG emissions from the energy sector". As the impact of the project is a wide ranging assessment point and runs through the design and performance, reference is made to the effects in the succeeding sections of the report and presented definitively in this section.

Interviews conducted with the project stakeholders posed the question "How would you describe the impact of the project, particularly any long-term effects produced?" and the most common responses varied from the awareness created around the ability of using a waste product (rice husk and sawdust) to generate even small amounts of electricity from gasification, adopting a source of renewable energy to reduce the use of diesel generators and the GHG emissions reductions therein, to the role the technology can play in electrifying businesses and industries that give productivity gains. In terms of indirect impacts, respondents recognised the building of capacity through the formal activities in Components 1 and 4 with potential for scaling up real projects in the future and that the project clearly links to SDG 7 ("Ensure access to affordable, reliable, sustainable and modern energy for all"). But there was almost unanimous response to the need to have physical and visible demonstration projects finished to really appreciate the direct impacts, especially for the longer term.

Although the project was not at the required scale to impact on the use of diesel-based electricity systems in the country and was never designed to be transformative for the energy sector, at least by finishing the 1.5 MW demonstrations, that capacity is at a scale that will be recognised by policy makers and thereby create opportunities for the private sector.

In terms of the extent to which the project has put in place conditions that will help the key drivers and overcome barriers to biomass-based electricity generation, the following table summarises those hindrances identified in the participatory process at project preparation (see GEF ProDoc section A3. pages 7 - 8) and evaluates whether the higher level impacts have helped overcome these barriers.

Table 12 – Evaluation of barriers identified at preparation stage

Barriers	Evaluation
1. Lack of awareness and data	Based on responses from interviewees and reading documents provided, the project has created awareness about the potential for biomass power generation in government, private sector, financiers and civil society through the stakeholders keenly involved over the 10 years period of intervention. What is lacking, but still within reach, is the building of wider technical awareness on the engineering and construction of actual plant, with priority on rice husk and wood waste gasification, but also the waste burning to steam turbine technology that did not reach development in Ondo state.
2. Policy and regulatory barriers such as lack of feed-in-tariff	Because of the long period of implementation there are now a raft of relevant policies that can guide pathways for mini-grid projects based on renewable energy to be developed (see Table 4). Early on in the project cycle a Review of the Feed-in-Tariff for RE electricity showed that the NERC have already issued a Multi-Year Tariff Order which establishes regulated prices for RE generators, with biomass promised a rate of US$ 0.1744/kWh and a wholesale FIT of about US$ 100/MWh (US$ 0.1/kWh), more generous than for wind and small-hydro. The suggestion in the review was that distribution companies should be compelled to purchase a certain amount of renewable energy because these small-scale projects are always more expensive that from the NBET (Nigerian Bulk Electricity Trading plc.).
3. Lack of human and institutional capacity	By having a component devoted to capacity building, the project did benefit dozens of staff from the stakeholders through them attending SC meetings, workshops, formal trainings and technological exposure trips (including overseas). However, this has not been wide enough and should target potential engineering and construction companies, developers, investors, insurers, etc. In addition, the ability to encourage 'doing-by-seeing' has not yet been realised because the full-scale demo. projects have not been completed.
4. Financing/ private sector investments in RE, etc.	By having a component devoted to the financial environment to support RE-based mini-grid systems, the project did create awareness in those circles about what is possible. However, the project did not in the end prove how to raise finance for actual projects and even the Bank of Industry did not come forward to co-finance the two demonstration projects and the GEF grant is instead being used to pay for the 1.5 MW in Phase 1 of APPL's plan. Without the projects operating, the return on investment cannot yet be proven considering all the local inputs (rice husk, O&M staff for plant and lines) and outputs (sale price of electricity, capacity development, scaling-up etc.).

Assessment of the interview responses and scoring the above table indicates that the project impact measured across those perceived barriers at the start of the intervention would achieve a score of 4, which is Moderately Satisfactory.

4.2. Design

The design of the project should formulate a plan for the intervention to achieve the specific purpose as discovered in the preparatory phase and the evaluation looks at overall design and interrogates the Logical Framework (Logframe). Initial assessment echoes the analysis done in the MTR with regards to design with the following key points re-iterated:

- The project continues to accord with the national development needs of more capacity in the power sector especially in agricultural/rural areas by using cleaner fuels.
- The project continues to receive attention by the original stakeholders and new ones such as Manufactures Association of Nigeria (MAN) and the National Sugar Development Council (NSDC) because it was designed after wide consultations with a participatory approach.
- The Logframe has clear and simple objectives with verifiable indictors and has a manageable number of components with outputs that are designed to reach the goal in a logical/natural step-by-step approach.

- Although the approved GEF documentation from 2011 has some variance to the final Logframe and other elements adopted, the latter is more achievable having been simplified and was updated as the project progressed.

Considering that the early investigations, pre-feasibility studies and other activities that lead up to the project commencement started in 2007 with APPL established in 2010, the passage of well over a decade means that, the original design may not have kept pace with developments in the energy sector and wider economy, changes that have been quite significant since 2015. This will provide comment for the lessons learnt section of the evaluation because even for the demonstration of the original target of 5 MW, a whole project life of 14 years is probably twice as long as it should be.

Overall, as a summarised Logframe shows below, the components and their requisite outcomes are clear and not overly ambitious which is also reflected in the outputs (of which there are not too many and do not overlap too much as can often be the case) as shown in full in Annex 1.

Table 13 – Summarised Logframe for use within the evaluation

		TARGET	**VERIFICATION**
GOAL	To reduce and avoid GHG emission from the energy sector of Nigeria.	1. 5 MW of biomass based mini-grid capacity added during the project.	1. Physical verification of plants in operation generating more than 31,000 MWh pa. 2. Incremental CO_2 emission reduction (25,000t annually).
OBJECTIVE	To promote RE (biomass) based mini-grids as an alternative to diesel-based energy generation systems in Nigeria.	1. 5 MW of biomass-based power plant. 2. Policy and regulatory regime established. 3. Replication potential of biomass projects identified.	1. Physical verification of implemented projects. 2. 5 MW of biomass-based power generation installed. 3. Investments by financial institutions to biomass projects in Nigeria.
COMPONENT 1 – Development of techno-economic feasibility studies and business plans for identified potential sites to facilitate replication			
OUTCOME 1	Preparatory works completed for facilitating replication in the identified potential sites.	Techno-economic feasibility studies, business plans and essential reports for three (3) identifies sites.	1. Project reports. 2. Feasibility studies, business plans and other power plants support/ development activates and reports for potential replication sites.
COMPONENT 2 – Demonstration of techno-economic viability of biomass based mini-grid			
OUTCOME 2	Acceptance by state-holders on the technical and financial viability of selected sites for setting up the biomass based mini-grid for rural electrification.	Investors are ready to invest in the biomass based mini-grid project identified for implementation.	1. Shareholder agreement. 2. Investors ready to invest and agreement signed for implementing the biomass based mini-grid project.
COMPONENT 3 – Strengthening of financial and policy environment to support RE based mini-grids			
OUTCOME 3	Conducive financing and policy environment for promoting investments in rural mini-grids in place.	1. Favourable policy and feed-in- tariff schemes are in place. 2. More and more financing institutions and investors ready to finance/ invest. 3. Increased local capacity of finance institutions.	1. End of project survey. 2. Evaluation of polices and FIT schemes in Nigeria. 3. Favourable policy and investment conditions for biomass mini-grid projects.
COMPONENT 4 – Capacity development for replication of RE mini-grid technologies			
OUTCOME 4	Capacity of local planners, institutions and experts	1. More than 100 persons trained.	1. Number of persons trained. 2. Training material available. 3. Training evaluation report.

		TARGET	VERIFICATION
	for RE based mini-grid enhanced.	2. Establishment and operation of the one-stop information centre for biomass / RE. 3. Number of operators identified and trained for the O&M of power plant and management of mini-grid.	4. Verification of O&M personnel in the power plant. 5. Trainings given to the O&M staff. 6. Physical verification of one-stop information centre.

Although the points mentioned in the MTR about mixing outputs with outcomes and not being SMART are still broadly relevant but do not impede the usefulness of the Logframe itself. The Logframe is well laid out by placing the outcomes above each component to fix attention on the longer term effects that the project aims to bring about, although more detail would be better within the sources of verifications and reference to whether the risks are technical, financial, socio-political, institutional/governance or environmental in nature. Also the targets should have more verifiable numbers, especially when it comes to the planned outputs.

Considering all of these assessments and as was concluded in the MTR, the design is regarded as a score of 5, which is Satisfactory.

4.3. Relevance

The relevance of an intervention is the extent to which the activity is suited to the priorities and policies of both the target beneficiaries and the donor(s). In this case it covers customers who would value electrification in rural areas, local government officials that have responsibilities to support various sectors such as agriculture, small businesses and rural industry, Federal Government Ministries that have a mandate to see the development of renewable electrification with the environmental benefits that brings, and the private sector which may find business opportunities in the biomass energy technologies in sub-Saharan Africa's largest economy.

As it has been demonstrated throughout the interviews and data collected, the project is consistent with the priorities of these groups. For example, respondents shared that at Ministerial level, the biomass project aligned with their own Masterplans, be that for infrastructure, reduction of wastes, mitigation of diesel-based emissions, improving energy access or support for economic enterprise zones (ref. ECN, MoBNP, FMEnv, Ogun Ministry of Forestry, Ebonyi State Government), while for civil society (Saw mill and Rice Mill Owners Associations) delivering energy to rural people is also one of their key objectives, as well as ensuring that waste products from agriculture are utilised ("waste to wealth").

For the donors in the project, the GEF's latest strategic positioning (GEF-8) is outlined in its paper GEF/R.8/01 on 2 April 2021 (Strategic Positioning and Programming Directions: Pathways to an Equitable, Nature-Positive and Carbon Neutral World Beyond Covid-19) wherein it is stated in two paragraphs (548. and 558.) that i) effective decarbonization of the energy system (nearly three quarters of the world's GHG emissions) will need to include aggressive efficiency measures, massive expansion of renewable energy, electrification of end-use sectors, the replacement of fossil fuels with zero emission alternatives, and ii) in light of the significant technology cost reduction gains over the last decade, the priority is now increasing the pace of renewable energy growth and its integration to the grid, as well as the electrification of all end uses. The GEF promises support long-term planning and modelling from a systems perspective and investments in smart-grids, demand-side management, energy storage, and grid modernization to enable the scaled-up integration of renewable energy, including flexibility and balancing needs of power systems, to bridge gaps in technical, policy and regulatory capacity.

Although promotion of biomass energy is not specifically mentioned as it was in earlier GEF documents (Focal Area Strategies and Strategic Programming for GEF-4, October 2007 and From Projects to Programs: Clarifying the Programmatic Approach In the GEF Portfolio, GEF/C.33/6, March 2008), there is continued focus on renewables and mini-grids for increased energy access. Meanwhile UNIDO has its "Clean Energy Access for Productive Use" under one of the six main focus area, "Safeguarding the Environment", therefore the project continues to be relevant and consistent to the donors' own priorities.

Finally, as can be seen in Table 4 with the wide range of policies and enablers for development of RE-based mini-grids, the project remains highly relevant to the nation as a whole, with particular accord with what the

REA is doing with the Renewable Energy Fund, the latest NREEEP of 2015 and the movements lately with Feed-in-Tariffs and regulation for mini-grids. As Nigeria continues to face huge shortages in power due to the inadequate distribution system and due to its increased reliance on fossil fuels (particularly gas power plants) and the need to encourage more renewables into the grid at a time when climate change is ramping up the international agenda, the project has never been as relevant to Nigeria as now.

It is therefore clear that the project's relevance attains a score of 6, which is Highly Satisfactory, not least because it has kept the important topic of RE and mini-grids alive, not only through the stakeholders at the Federal level but also to the beneficiaries at the state level.

4.4. Effectiveness

Effectiveness measures the extent to which the intervention's objectives were achieved and is therefore fairly wide-ranging because it also can look at the achievement of outputs and their outcomes in the Logframe. In terms of interviews held, questions were asked about benefits that have arisen as well as how those benefits would continue in the short and medium term. Responses solicited were in the categories listed below and an analysis based on whether these benefits were expected in the Logframe has been done.

1. Awareness generated – nearly all stakeholders interviewed recognised the extent to which the project has created knowledge about how agricultural and forestry wastes can be used for energy generation. This was not a specific output or outcome other than being associated with capacity building plans in Components 2 and 4 (which is also covered under training) but because the overall objective is to 'promote the technology', good awareness about what can be achieved feeds directly into this objective. Those involved in techno-economic studies in Ondo and Ogun also saw Component 1 as a good means to generate awareness about the use of sawdust for electricity generation and saw clear benefits arising for these areas, in spite of no demonstration projects.

2. Promotion of the local economy – those from the private sector as well as government recognised the link that the demo. projects could have in supporting local businesses and enterprises in the area near to the plants, by providing reliable and affordable electricity through the mini-grid. This also was not a discrete output or outcome, it is only linked to Component 2's outcome on stakeholders being 'accepting' of the technical and financial viability of biomass-based energy projects. The crucial thing now is to complete those demonstrations and prove to stakeholders that the local economy can benefit on a range of fronts by then reaching operation.

3. Less residue waste – mentioned a few times in the interviews, people in the three states not only recognised the opportunity of using an abundant (and low cost) feedstock for the plants (rice husk or sawdust) but also the benefit of cleaning up what can be a nuisance in rural areas (piles of waste that are often burnt with bad health impacts). Again this benefit was not mentioned in the Logframe but certainly runs through the background and rationale for the GEF concept, so it would have been good to see a specific target (tonnes per annum) for expected consumption of agricultural wastes into the demo. projects as well as the targeted annual MWh and CO2 emissions reductions.

4. Access to energy – this was seen particularly by the private sector as important but recognised by some government institutions and Associations in the states as a benefit that should accrue from the demonstration plants. It is surprising that the Logframe also did not target a particular number that might access electricity once the plants are established rather than simply stating that "a biomass-based power plant incl. mini-grid is in operation" in Output 2.1. At least by having the indicator "electricity usage by consumers", the access to energy point is catered for but it would have been good to qualify this in the Logframe.

5. Uplift local incomes – this was often referred to in interviews but remains quite a vague statement in line with the thinking that electrification would bring economic opportunities with local employment, as well as better welfare services and general development. But the point was also made that the sale of rice husk to the energy plants would uplift incomes and that women would benefit mostly as they tend to lead in handling harvests and also are in charge of managing wood through sawmills. This again was not a specific output or outcome in the Logframe and it would have been good to make mention of the way that these local power plants, albeit small, could have a positive effect on local incomes through their operation and also the services they provide. The local economy and the need for employment and uplift of incomes does not get

enough mention in the GEF document but Output 2.3 (sustainability indicators) was subsequently removed from the final Logframe, which although simplifies it, does mean that these and other important indicators (such as investment/kWh, GHG/kWh, generating cost/kWh, economic development, employment effects, health impacts, maintenance requirements, supply security, know-how improvement, involvement of women) are not to be formally captured. It is suggested that these are covered in the new Output 2.3 (M&E) and then disseminated through the planned outlets (seminars, website leaflets etc.).

6. Trainings – similar to awareness generated, this was mentioned less by interviewees but recognised as an important benefit from the project activities. Specific numbers were given such as four (4) people from the Rice Millers Assoc. were deeply involved in the feasibility studies in Component 1 and seven (7) people from Ebonyi went on a study tour to Thailand. Ten (10) individuals from the Ogun Assoc. of Sawmillers went to technical workshops while hundreds from Ogun and Ondo were involved in the capacity building activities in Component 4. This is good to see that the trainings were recognised by stakeholders and concurs with the outcome target of more than 100 people trained in the concept of RE mini-grids, although it would be nice to see the actual training reports from UNIDO. The responses from Ebonyi that training was engendered within Component 1 is also good to see because of the output to 'facilitate replication' from studying potential sites.

7. Lower tariffs through RE – mentioned a few times, particularly by those in Ebonyi that will hopefully benefit from the future operation of the power plants but also recognised by members of the Steering Committee that want to see the outputs reached in Component 2. The generation of affordable energy by using a renewable resource is linked to uplifting rural people's welfare but is not reflected in the Logframe where it should be under Component 2 and part of the monitoring in Output 2.3. Instead the spirit of Component 2 is more about encouraging investors forward into the sector but even this target was not achieved because the demo. projects have had to be grant supported through the GEF. However, the tariff issue does appear in Component 3 with policy work that was done around finding favourable FIT for biomass-based energy projects, to allow financing and investment to come in.

8. Environmental and climate change benefits – these aspects ran through many of the interviews as important and it was good to see people make the link between the intervention and positive impacts on the environment. This is reflected well in the Logframe not least in the main goal "to reduce and avoid GHG emissions" by showing how to move away from diesel-based power generation and actual targets (made in Output 2.1) of 25,000 tonnes CO2 abated by generating more than 31,000 MWh annually. It is hoped that the pilot projects will indeed contribute to this target eventually but it has to be concluded that in terms of benefits to the environment and the climate, the project has not yet delivered.

9. Long-term benefits – an issue that was also on stakeholders' minds during the interviews was that once the demos. are operating they can be used as good case studies (and the only of significant scale in Nigeria) for many years to come and it is expected that due to the strong and continued support of the stakeholders, the project has a good chance of continuing its benefits in the medium term. This is reflected in the Logframe's objective which is to target replication of similar biomass projects.

10. Other sentiments – made in the interviews was that generally the project brought benefits by showing what is possible and starting out on an innovative technological journey that has huge potential in Nigeria, and recognising that the SPV set up in Ebonyi has durability and now capacity to continue forward. This will be further enhanced by the finalisation of the two schemes for APPL and all stakeholders look forward to that happening.

So although there are specific outputs not met as per the Logframe, this does not mean the project has not been effective but by looking at how the achievement spans across the objectives, outputs and outcomes, the ***evaluation rates the Effectiveness performance criterion at a score of 3, which is Moderately Unsatisfactory***. This reflects the fact that benefits cannot yet be reported for 6 out of 10 of the following outputs (highlighted), noting that others did perform reasonably:

Output 1.1	More than 3 techno-economic studies and business plans were developed and these were recognised by all 3 States
Output 2.1	No biomass-based power plant with mini-grid is in operation
Output 2.2	O&M training yet to be done but is planned and personnel identified
Output 2.3	M&E of demo. plant should be done across extra indicators
Output 3.1	FIT analysis was done but may need updating (from 2014)
Output 3.2	No evidence of a financing facility, although could still be discussed with BOI
Output 4.1	Unsure if any training on mini-grids took place for local companies
Output 4.2	Trainings have happened incl. overseas exposures to technology but it is not known how many participants
Output 4.3	Unsure if any trainings for 5 financiers and 2 RE institutions have taken place
Output 4.4	Local firms have been involved in the various project plans in all 3 States but the project is not at the stage to require O&M yet

4.5. Efficiency

The efficiency is a measure of how economically the resources and inputs are converted to results and within the expected timeframe. The inputs are usually cash, funding, loans, services given (in-kind), expertise (paid or unpaid) and people's time. Each interviewee was asked what inputs they gave, and all responded that they had given time rather than any cash or funding, and some gave in-kind inputs such as provision of local transport at their cost. For the ESG, they had to cover the initial costs for the two biomass plants bought from China and the costs for labour to assemble the equipment and construct the rice husk warehouses next door, although the bulk of these costs would be reimbursed by UNIDO under the GEF grant.

In order to evaluate efficiency, the results achieved by the project have to be understood which the previous sections have presented, i.e. impacts, outputs, outcomes. The timing of the roll-out of the project also have to be discerned which the table below assists with (taken from the UNIDO files).

Table 14 – Main activities timeline

Component	Activities	Timeline
PFS	Feasibility Study for 5 MW rice husk power plant in Abakaliki	Feb 2008
Preparatory	Establishment of APPL as SPV for proposed 5 MW plant	Nov 2010
GEF	Project GEF CEO endorsement/ approval date	27 Dec 2011
UNIDO	Project implementation start date	7 Aug 2012
Component 1	Feasibility Studies and Business Plans	Sept 2014 – Oct 2017
Component 2	• EPC Contract Agreement between APPL and Isgec Heavy Engineering Ltd. for US$ 9,700,00	Nov 2013
	• GEF grant of US$ 1M issued as incentive to APPL	Oct 2015
	• Under new Governor ESG review price of EPC Contract	May – Aug 2016
	• ESG receive 3 bids and although select Helmbold as preferred, this is later reversed with MoU signed between ESG and Wuxi Tenang	Sept 2016
	• UNIDO inform ESG/APPL that the GEF grant incentive would be terminated if no tangible milestone achieved towards 5 MW	June 2017
	• APPL contract with UNIDO terminated (also GEF grant)	March 2018
	• New EOI issued by UNIDO for development of a range of sites.	April 2018
	• ESG lead on ordering 2 plants from Wuxi and equipment delivered to site and GEF grant requested again by ESG	May 2018
	• Other proponents selected for GEF incentive include Quintas for Ondo (200 kW), Prado Power for Ondo (1000 kW) and Gussing for Ogun (5000 kW).	Dec 2018
	• Installation of 1.5 MW equipment in Ebonyi by Wuxi and local staff (Ikwo 1000 kW and Uburu 500 kW).	July 2019 – Mar 2020
	• Abandoning of development of sites for due to COVID-19.	Mar 2020
	• Inspection and Verification Reports at 2 plants by SGS	May 2021
	• Status report on installation at the 2 sites by APPL	Aug 2021
	• ESG request first payment from UNIDO of US$ 157,500	Sept 2021
Component 3	Analysis, Forums, Workshops	2014 - 2020
Component 4	Meetings, Study Tours, Events, Trainings	April 2014 – June 2015
Evaluation	Mid Term Review TE started and then stopped at Interim Stage due to COVID-19	Sept 2015 April – Aug 2020

	TE re-started and interviews done in-country	Sept – Oct 2021

The flow of GEF money year-on-year has been presented earlier in the Background section and although there may be differences between UNIDO's Grant Development Reports and internally reported figures, the following chart gives the most likely accounting of the GEF funds, not including the credit of almost US$ 500,000 made back to the project in 2021.

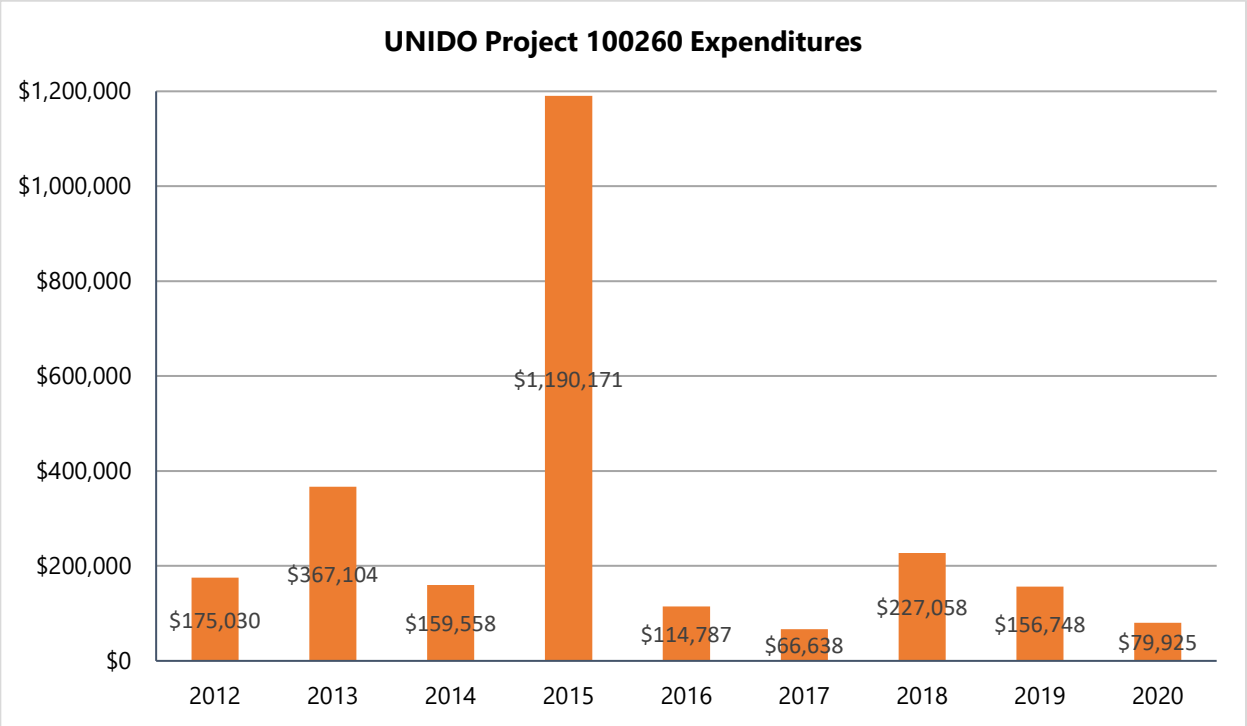


Figure 1 – Flow of funds during project implementation

Most of the year spending is between 6 – 9% (2013 aside which is 14%) except in 2015 when almost half of the budget was accounted for, due to the US$ 1M GEF grant commitment made to APPL at that time. There are smaller expenditures in 2017 and 2020 of 3%, the latter is not surprising given the impact on progress due to the COVID-19 pandemic. Overall, looking at the project history above, this pattern of spending is broadly in keeping with the progress of the project and its milestones.

The major issue for efficiency is that the resources have had to stretch over a timeframe that is double what was originally planned, i.e. a 4 -5 year period, and yet the most crucial milestone has not been completed, that of the demonstration projects, although there is still 22% of the original budget remaining. There is a small concern whether there will there be enough funds as well as time to be further offered by stakeholders to see the objectives and goal fulfilled. ***The implication of this to the evaluation of efficiency is that the score has to be 3, which is Moderately Unsatisfactory***.

4.6. Sustainability

There are two aspects to the sustainability criterion, its environmental credentials (which are clear in this case being the promotion of renewable energy and do not have to be borne out here) and the continuation of the benefits after the assistance with the probability of continued long-term resilience to the rise of benefit flow over time. For the latter, interviewees were asked whether the benefits seen would continue to be ensured in the short, medium or long-term. Most of respondents thought that there was sustainability built into the project due to the establishment of the SPV in Ebonyi and the high degree of stakeholders engagement, the willingness and ability of technical partners that could emerge into the sector (even for wood waste projects) and the knowledge already embedded in staff involved in the project for over a decade, not least the dozens of engineers given technical trainings.

But these comments came with the proviso that the rice husk demo. projects are completed (so they can be used for case studies for replication in the next two to three decades) and that UNIDO continues to be involved in the short-term to drive the project to satisfactory completion. Another important observation was that the sustainability of the project depends on the continued inputs from engineers, of which there are only two in

Ebonyi, with small cash incentives from the State Government for APPL although after being trained by the project, they were separately funded by ESG to design set up a demo mini-grid system at the Ebonyi State University. In addition, several engineers were already given training (in Thailand and Benin Republic) but need to be supported into the medium term so they can train people for the future.

A request was made from both Ondo and Ogun that the project be continued a stage further in their states so that the good work done in Component 1 is capitalised on and realised through project developments. There was also some optimism about the role of renewable energy generally in the country and given the fact that 40 – 50 % of business operating costs can be on power, biomass to energy schemes must have a future and able to compete, particularly for mini-grids based on diesel. With the next COP to be held in Glasgow, UK on the near horizon and the latest moves by the international community to make billions of dollars available for Less Developed Countries to combat climate change, such funds could be channelled into programmes for aggressive renewable energy development in Nigeria. With proper financing support to unblock bottlenecks in the cycle, there is potential for the private sector to play its part, as long as there are good pilot projects to refer to. The requirement for electricity throughout Nigeria, and particularly in rural areas where access is still low, will never diminish and interviewees recognised how such projects could unleash mini-industrial development with huge knock-on benefits for underserved populations.

It is evaluated that there has been a reasonable degree of sustainability built into the intervention, but it does still depend on completion of the demonstrations as case studies, further project management support from UNIDO and a need to fund engineers in Ebonyi on the back of pilot schemes so they can train the next cohort of interested stakeholders. ***Therefore the score for Sustainability would be 5, which is Satisfactory.***

4.7. Coherence

This is a new criterion using suggestions from the OECD/DAC's 'Better Criteria for Better Evaluation' (2019) which measures the compatibility of the intervention with other initiatives in the respective sector/s and tries to capture project linkages, systems thinking, partnership dynamics and complexity. This was assessed through the interviews with two questions, one on whether the project was in line with priorities and policies of the stakeholder's institution and the other on whether there is compatibility with other institutions and to the country as a whole. The following list gives the range of answers:

- 70% of the country uses biomass for primary energy (mainly cooking) so the use of wastes for modern energy supply for greater energy access is in keeping with national policies (e.g. ECN, FMEnv).

- The private sector (such as MAN) see the issue of energy as crucial to its ability to prosper in business so a project that offers an alternative to the national grid is in line with their policies, to encourage SMEs to continue to engage in economic activities.

- In Ogun and Ondo States there are at least 250 and 150 sawmills respectively and with liaison between these two neighbouring states, there is compatibility of the aims of this project (showing how to burn wood waste for gas and electricity) and the regional (and perhaps national) level policies (e.g. at Ministry of Forestry and Ministry of Commerce and Industry).

- The project has a high degree of alignment to most of the stakeholders' policies, not least for promotion of renewable energy. Solar energy is now showing promise as a growth area, but for biomass there needs to be more careful consideration of the actors within projects (farmers, small businesses, industrial off-takers) as well as who should own such projects (local government, private sector, community groups) and making them financially viable. So whilst it is laudable that the intervention is well aimed and generally compatible across the board, there are detailed concerns that still need to be addressed to get successful projects off the ground.

- A new sector has recently been engaged within the project, which is the sugar industry and as such the NSDC are now a stakeholder, so the inclusion of bagasse to energy into the study is compatible because bagasse is also a waste product (some fines are used as a fertilizer) and there are a few existing 3 – 5 MW schemes generating power for the sugar plant consumption. The concern is that it is a very late extra inclusion into the intervention although it fits with the project aims and objectives.

- In Ebonyi, the project aligns well with the emphasis of support to rural people where rice processing is a large industry and the project supports state policy such as 'One Man/One Hectare' and others made at the Ministry of Power and at the Ministry of Women's Affairs.

Having solicited those responses and reviewed many of the project documents with regard to how the project has linked to issues facing many of the stakeholders and to energy challenges faced by the country, it is clear that the intervention has a high degree of compatibility which is demonstrated particularly at the external level and therefore ***the Coherence criterion should score 5, which is Satisfactory.***

4.8. Gender mainstreaming

Although gender aspects were not considered in the design nor were the words gender or women mentioned in the GEF endorsement document, nevertheless it is implicit in the terms of UNIDO evaluations to ensure that the evaluation complies with policies on gender equality, the empowerment of women and gender parity. Gender equality refers to the equal rights, responsibilities and opportunities not only of women but also men, girls and boys, that those aspects do not depend on whether they are born male or female. Empowerment of women signifies women gaining power and control over their own lives through raising awareness, building confidence, expansion of choices, increased access to and control over resources and to transform institution which reinforce gender discrimination. Gender parity seeks to achieve equal numbers of men and women at all levels of an organisation, particularly at decision-making levels.

The evaluation tries to ascertain the extent to which the intervention has contributed to better gender equality and parity and whether it has empowered women. Questions that may be answered are:

- Were gender issues identified in the design stage and were gender dimensions integrated into the project?
- Is the project in line with UNIDO and Nigerian policies on gender?
- If the project has a people-oriented focus, was gender equality reflected in the objective/s and to what extent are the output/outcome indicators gender disaggregated?
- Did project monitoring and assessment collect and analyse gender disaggregated data?
- How gender balanced was the composition of the PMU, the Steering Committee, experts and consultants and beneficiaries?
- Have women and men benefited equally from the project's interventions and do the results affect women and men differently?

In the interviews one question asked how gender issues were integrated into the project (e.g. involvement of women in decision-making) and nearly all responded, explaining that in the rice milling and sawmilling areas, the majority of workers in the factories are women, they are also more likely to be involved in agricultural activities as well as leading on business activity in SMEs. As one woman interviewee (there were 2 out of 13) put it, "females are dominant in the rice husk value chain in Nigeria" and the same could be said about other agricultural and forestry sectors. It has identified that women feel the lack of access to electricity more than men, because of the proactive role they take in running households and they will be the main beneficiaries of electrification.

Nearly all Ministries have women staff, although men were the respondents in most cases and at the PSC and within UNIDO, at least 2 or 3 women were involved closely to the project and contributed equally in meetings. Within Component 1 when the feasibility studies and business plans were done in Ondo State, there was a good representation of women, with 60 men and 25 women involved and a similar 30% of women were reached in the trainings given. When it comes to technical roles within the future of biomass-energy initiatives, women often play key roles as engineers, agronomists, economists and technicians in the field or in laboratories even as operators and maintenance staff or as clerks in the warehouses that monitor the rice husk deliveries (which are usually led by women). In Nigeria, there are no particular hindrances for girls to achieve educational ambitions and be able to join a nascent biomass-energy sector.

While all of these findings were very positive for inclusion of women as beneficiaries as well as participants in the project, there remains the issue that no gender concerns were written into the project's design with no targets for women's inclusion in the Logframe. This is regarded as a big oversight as the results has been quite good for gender equality and, to some degree, empowerment. Of course there is always room for improvement in gender parity to try and achieve 50% composition of women in the key stakeholders (and the PSC) as well as

trainees. Despite the lack of indicators for women's participation, it is suggested that in the future monitoring, any data pertaining to gender is disaggregated analysed to enrich the reporting.

The project did have a clear gender element to it but because it was not integrated into the design and made no targets for women's involvement and because the progress of the project has not particularly contributed to women's equality (although it still has the opportunity to do that) the ***Gender mainstreaming) will score a 4, which is Moderately Satisfactory***.

4.9. Monitoring and evaluation (Design and implementation)

The monitoring and evaluation of the intervention refers to the indicators made in the Logframe and the tools used by the project team (UNIDO and key stakeholders) to measure if the project has been implemented according to the plan (monitoring) and whether it is having the desired results (evaluation). This process should be happening externally to any formal (independent) evaluations such as the MTR or this TE. It includes the Logframe, baseline reports, periodic reports, minutes of meetings and documentation of activities.

The defining document in this respect is of course the Logframe but also in the interviews it was asked whether the institutions monitored the project in any way and the tools used and if there were any formal assessments (or evaluations) done by them.

Firstly, within the Logframe, there are 4 outcomes and 10 outputs with targets that should be monitored by the core project team (UNIDO/PMU, Project Coordinator, PSC and GEF OFP) through the duration of the project. The key document for this purpose is the UNIDO Project Implementation Report (PIR) which is done for the fiscal year (July – June) and from the records the following years have been filed (with their evaluations noted).

	Comp 1	Comp 2	Comp 3	Comp 4	Overall	Budget	Risk
2013	S	HS	MS	S	S	Yes	Substantial
2014	HS	S	S	S	S	Yes	Low
2015	S	MS	S	MS	S	Yes	Low
2016	HS	MS	MS	S	MS	Yes	Not reported
2017	-	-	-	-	MS	No	Low
2018	-	-	-	-	S	No	Low
2019	-	-	-	-	Not reported	Yes	Low/Moderate
2020	-	-	-	-	MS	No	Moderate*
2021	-	-	-	-	MS	No	Moderate*

[HS – Highly Satisfactory, S – Satisfactory, MS – Moderately Satisfactory]
* - mistakenly listed as Low in the PIR risk table

The first comment is that it is somewhat of a surprise for a project that originally was scheduled to complete in 2016 to report Satisfactory in all the first years when in reality the project was having to be extended, firstly to 2017 then again to 2019 and now to 2021.

A review of the detail in the table above shows that the reporting against each component and a budget report was done up to the middle of the project and then the PIR format changed from the useful spreadsheet type to a field-filling exercise in a Word document that is then converted to PDF. This gave a significant decrease in quality of reporting, which is evident from the use of previous years data pulled into the next year's reporting or missing fields. For example, in Risk Management there is in 2020/2021 a non-concurrence between the risk table in Section III. 1 and the global reporting in 1. And in fact, the reporting in the 2 years is copied and pasted. It is suggested that if a previous year's risk rating is substantial or high, then there should have been actions taken to mitigate the relevant risks. There was a substantial risk rating posted in 2013 and it is good to see that a mitigation action was indeed reported in 2014.

However, as the project progressed into subsequent years, the risk of the demo. projects not being developed in time must have become more and more apparent, yet this is not reflected in the risk table (2017 – 2019 are continually perceived as Low risk). This cannot have reflected reality on the ground and has not created focus by the Project Manager where it was needed and hence the project has been seen to slide to the present circumstances where the projects have still not been installed.

What is equally concerning about the PIR is that there is poor reporting against the output indicators made in the Logframe. From 2013 to 2015, the PIR is in the form of a spreadsheet and made quite detailed progress-to-

date reports but these are more 'activities done' and they are against outcomes, not outputs (except in 2016). Outcomes are generally assessed at the end of the project and are qualitative whereas the outputs are more quantitative and enable tracking of the progress of the project against numerical targets (i.e. number of FS done, number of people trained etc.). This lack of detail in early annual reporting has not encouraged the proper scrutiny within the monitoring and has ultimately not kept the project well driven.

From 2017 to 2018 the PIR provided is in the form of a PDF with 28 questions and a field to enter details or append documents and there is no analysis of progress against target, and then for 2019 – 2021 the PIR is in the form of Word document that does capture progress against each output following the Logframe format. There is enough reporting of progress, but it fails to be analytical (seeing if the targets were not met or surpassed and why) and one example in 2019 the target for number of techno-economic studies and business plans (Output 1.1) was changed from the original 3 to 9 and then in 2020 changed back again. Because in the end 8 potential sites in Ondo and Ogun were done, and the target surpassed, it should be noted how that was done, why and whether that success can be capitalised on.

Yet none of that learning is conveyed so the PIRs tend to stop at 'monitoring' and do not attempt to move to 'evaluation'. This is despite Output 2.3 being an "independently monitored, evaluated, lessons learnt, and information widely distributed" for the mini-grid. Unfortunately this output has never been tracked in the PIRs to date but as earlier mentioned it would still be relevant and useful to include extra indicators such as investment/kWh, local economic and employment effects in this Output and report on it.

For the enquiries made with the interviewees, although across the board there was no formal assessment or evaluation reports done by stakeholders, they all had done some form of monitoring which varied from attending the PSC and getting feedback, to going to the various proposed sites to witness developments, liaising with ECN (that has been the most active stakeholder), maintaining dialogue with UNIDO and its consultants, undertaking general internal assessments and ESG/APPL undertaking their own technical assessments using the (only remaining) two engineers assigned.

There was an assumption of course that UNIDO and PMU were undertaking the M&E formally and reporting back through the PSC with ECN approving those reports. There was an understanding from the GEF that as the OFP, they will have to draft an M&E document in due course which accords to the GEF guidance (see page 45 of the ProDoc) and should make reference to the impact and performance indicators and track, report and review the following KPIs:

- Implementation of any biomass mini-grid projects and replication potential of such biomass mini-grid projects elsewhere in Nigeria.
- CO_2 emission reduction resulted from implemented biomass mini-grids and CO_2 emission reduction potential from replication projects in development.
- Capacity building sessions and any trainings conducted and their usefulness and level of awareness and technical capacity within relevant institutions.
- Readiness of financial institutions to fund biomass mini-grid projects.
- Improvement in Government policy measures to support biomass based mini-grids.
- Effectiveness and usefulness of the dissemination activities such as trainings, seminars, site visits, mini-grid performance reports, project website, leaflets, etc.

As has been noted in the MTR, a lot of the performance indicators are not SMART and in some instances the outputs do not reflect the related outcomes which still stand. Taking all of these assessments of the M&E criterion and accepting that the substantive monitoring rests on Component 2, which has yet to deliver the demo. projects and therefore some monitoring are yet to come, the consistency of reporting data against the indicators in the Logframe and quality of the PIRs from UNIDO has not been to a high enough standard.

In terms of evaluation, there has been only a cursory comment made as the cause of the technical and scheduling challenges faced during implementation which should have been picked up if there was more thorough result-based management. Overall, it has taken a lot of effort in this evaluation to piece all of the disparate information together for the duration of this project and it is not believed that the progress against results, or the risk assessments, have been subjected to the proper scrutiny and warning flags that should have been raised early on, particularly about the severe delays to the project, have not been raised. ***Therefore, the score for this criterion (monitoring and evaluation) would therefore be 2, which is Unsatisfactory.***

4.10. Results-Based Management (RBM)

The definition of this evaluation criterion is that an assessment of issues relating to results-based planning of the work, the M&E and reporting back, which would naturally fall into UNIDO's responsibility. Results-based Management (RBM) is sometimes called Management by Objectives (MBO) and the tool used is the Logframe which guides the planning, implementation and evaluation of an intervention, using the principles of objectives, indicators, baselines, targets and sources of verification as well as risks and assumptions.

The Logframe has already been comprehensively assessed in preceding sections, so this evaluation is more on how this tool was managed which was not a specific question in the interviews but was covered by generic answers about how stakeholders found the project being managed. In this respect there was unanimity in satisfaction with UNIDO's RBM reporting. However, comments were made that often there was not a clear enough definition between UNIDO and others in the project team, notably the GEF OFP and often stakeholders would not be aware of exactly who the consultants were and what were their briefs. And of course there was concern about the long time for the period of implementation which has been further exacerbated by COVID-19 in the past 20 months (2019 – 2021).

In order to assess this criterion, the following table has been drawn up which follows the timeline in the project and makes comment against how the works progressed and how they were reported on and checked against results expected.

Table 15 – Results management against timeline

Stage	Management of Results
Preparation (2008 – 2012)	The project conception, pre-feasibility studies and preparation were successful because the stakeholders involved at that time are still engaged and understand the goal and objectives. The project design was good and consistent with national priorities and this continues to be the case due to the severe energy shortages still felt. The counterpart arrangements put in place (e.g. APPL which was established well before project initiation) have stood the test of time and the project management has broadly in line with the expected institutions involved.
Initiation (2013 – 2015)	The GEF approval process was based on a good document but there were slight changes made to the final RBM tool which UNIDO then used from 2012 onwards. Progress was quite good to start with as the project attracted a lot of attention and in Ebonyi various rice mills were relocated into clusters in order to better handle the biomass resource. An EPC Contract was quickly put in place for 5 MW rice husk power plant after checking the best condensing technology to use and local facilities to support the project were constructed. Meanwhile work progressed well in the supporting components on feasibility studies, financing and policy areas and for the capacity building with exposure trips and study tours and trainings made overseas.
Mid-Term (2016 – 2018)	After the MTR in 2015, a new Governor was elected to Ebonyi State which caused a review of the EPC contract and subsequent termination of UNIDO's Contract with APPL, putting the GEF grant incentive on hold. Outside of the project the State Government made a commitment to a new (Chinese) company to supply two (2) plants in Phase 1 to the rice husk clusters (1.5 MW) while UNIDO also initiated calls for other plant (6.2 MW) to be taken forward in Ondo and Ogun States. There were still some activities within Component 1 (business plans for wood waste) and Component 3 but these were just forums and workshops of the progress of the project to date and lessons learnt for the RE sector.
Extensions (2019 – 2021)	A small progress was made on development of the power plants in Ebonyi after delays due to the economic situation in the country, with the arrival then installation of the first two plants, but the other three (3) proposed sites never reached financial closure, so the project that had already been extended to October 2017 in 2015 was again extended twice, firstly by 15 months to December 2018 then to mid-2020 (to enable the terminal evaluation and close the project) and finally due to the challenges under COVID-19, the completion is now targeted to be end of December 2021.

The assessment of RBM monitoring has already been done in the previous section and judged as Unsatisfactory and although Components 1, 3 and to some extent 4, have been carried out reasonably satisfactorily according

to the timeline and as assessed across the usual evaluation criterion above, the reporting of these works against the works originally planned has not been satisfactory. There appears to have been scant attention given and even less concern about the serious delays that built up in the project with permission continually given for extensions (4 times) without asking why or addressing these concerns through the proper reporting and evaluation channels. ***Therefore this assessment point (RBM) would also be evaluated as a 2, which is Unsatisfactory.***

4.11. Partners performance

This section assesses the contribution of partners to the project design, implementation, monitoring, reporting, supervision, backstopping and evaluation and concentrates on UNIDO, the National Counterparts and the Donors.

UNIDO

Because there was a question in the interviews as to the performance of UNIDO (and other donors), the assessment starts with those comments before moving to the consultants' evaluation.

- A lot of international experts were used and they were not always introduced to some stakeholders or their role was not clear. It would have been good to see more national consultants used, to have engendered capacity building. However, especially for the feasibility study work done in Component 1 there was good experience from the various Associations.

- Of course, the project implementation has been recognised as slow but its relevance remains important and UNIDO have done well to keep consensus within the stakeholders.

- The management by UNIDO has not been called into question and positive comments have been made about the communication and the good coordination of capacity building activities and organisation of many study tours overseas.

- Some in the various Ministries have seen that there is still a need for an extension of the project to properly realise the demonstration projects in Ebonyi and maybe even pick up the false starts for wood waste demonstration projects in Ogun and Ondo.

- Project partners in Ebonyi State call for continued support to be given by UNIDO to the engineers in the form of cash incentives to complete the projects, noting that at least four (4) engineers are needed to be maintained to train for the future and help ensure sustainability. Only two engineers are engaged.

- The issue of financial management was raised, as UNIDO have often been late in honouring their own funding commitments to the project especially in the case of the two demonstration projects in Ebonyi.

In addition to these points, the evaluation notes that in the preparatory and early stages UNIDO performed well, the project had a good design based on solid research and a lot was completed by end of 2013 when an EPC Contract had been agreed by APPL. UNIDO delivered on many of its responsibilities and went the extra mile by covering for the National Project Coordinator until ECN took on that role in 2016. However, since the decision to not move ahead with the 5 MW plant and termination of APPL's contract in 2016 – 2018, the project has been allowed to drag and this does not seem to have been flagged for serious attention at the UNIDO Headquarters and the project has little prospect of being properly complete by the close of 2021. ***Therefore UNIDO's performance is rated as 4, Moderately Satisfactory.***

National Counterparts

The official counterparts (in Government) were listed in the GEF document as ECN, FMEnv, ESG and the Federal Ministry of Power (FMP) with others participating in implementation as Ministry of Agriculture and Water Resources, ESG, private sector investors and financing institutions. In the end, those that were active and contributed are listed (Ministry of Agriculture did not play a part):

- ECN – the Director General is the chair of the PSC from the beginning and one ECN staff has been involved since 2012 serving as the National Project Coordinator.

- FMEnv – as the GEF Operational Focal Point this Ministry is responsible for the entire project cycle and is also a key member of the PSC. It is presently headed by Mr. Stanley Jonah, but he has only been in post since October 2020.
- ESG – a lead counterpart and project partner and the main beneficiary, ESG has been responsible for providing land for the pilots, constructing the required infrastructure and as a shareholder in the SPV, is expected to take ownership of the project results.

- FMP - a key member of the PSC and was involved from inception but was not able to be interviewed because the desk officer who acted as focal point had retired and no handover notes had been given.

- Private Sector – did engage with UNIDO's RfP and EoI processes when equipment was called for and several bids were tendered for projects in all 3 states, but in the end only one (Chinese) firm worked together with ESG/APPL. An interviewee from the private sector group, the Manufacturers Association of Nigeria (MAN), has a keen input into the project and is a PSC member.

- Financing Institutions – The Bank of Industry is a shareholder in APPL and has been involved in PSC meetings since 2015 as the banking sector expert and was meant to provide the Federal Government's power fund for the project.

With the exception of FMP, the inputs from these counterpart institutions are considered good and interviews with their representatives showed the enthusiastic work they continue to bring to the project. ***The evaluation therefore rates the counterparts' inputs at 5, which is Satisfactory.***

Donors

Following analysis of the financing of the project in earlier sections the donors to this project are listed:

- GEF - US$ 2,621,00 committed in 2011 (support costs are a further 10%).
- UNIDO - US$ 60,000 in-cash for Evaluations.
- FMEnv – originally targeted US$ 2.5 M in-cash and in-kind but only reported in 2015 to have given US$ 127,388 in-kind.
- ECN – reported to have given US$ 159,236 in-kind (2015).
- ESG – reported to have contributed US$ 1,366,242 for relocation of the rice mill cluster, infrastructure and construction costs for the field, building the EPC Contractor residential HQ and APPL's offices.
- Private sector – originally targeted to give co-financing in-kind of US$ 9.375 M but their costs have been covered by the ESG and GEF.

Therefore the global contributions from donors into the sector add up to more than US$ 4.33 M and it is expected more than this was committed but no counterpart records are available except for 2015. However, it is evaluated that the total amount targeted to be donated falls well short of the original target of US$ 14.56 million and this was down to the inability to bring in the private sector investments. The situation with Nigeria's economy faltering in 2015/2016 is the main contributing factor in the hesitancy of the private sector to financially back the project concept although there are detailed operational reasons also, such as the changes in political emphasis in Ebonyi State and the uncertainty of entering the electrical mini-grids market, despite the groundwork done in Component 3.

So taken altogether, although there were some disappointments in the journey to finance this innovative and first-of-a-kind biomass initiative, there have been notable inputs along the way particularly from the ESG and UNIDO, delivering on their requirements within the GEF commitment. Therefore this assessment is rated at a score of 5, which is Satisfactory.

Overall therefore, the partners performance and their contributions into the project can be rated as a 5, which is Satisfactory.

A summary of the scores evaluated in this assessment is given below and an averaging across the 11 criteria with equal weighting gives an overall rating of 4, which is Moderately Satisfactory.

Criterion	Score
Progress towards Impact	4 – Moderately Satisfactory
Design	5 – Satisfactory
Relevance	6 – Highly Satisfactory
Effectiveness	3 - Moderately Unsatisfactory
Efficiency	3 - Moderately Unsatisfactory
Sustainability	5 – Satisfactory
Coherence	5 – Satisfactory
Gender mainstreaming	4 – Moderately Satisfactory
Monitoring & Evaluation	2 – Unsatisfactory
Results-based Management	2 – Unsatisfactory
Partners performance	5 – Satisfactory
Overall	**4 – Moderately Satisfactory**

4. CONCLUSIONS

4.1. Main conclusions

Taking each Component in turn, the contents of which the stakeholders could generally recall, for Component 1 on the feasibility studies and business plans generated for the three states, it is felt that these were carried out well in participation with interested parties, but also appreciated by the Ministries and achieved the target outcome in terms of laying the preparatory groundworks for facilitating project development. The studies were utilised to make the plans for the 1.5 MW plants in Ebonyi State and the techno-economic studies in Ogun and Ondo States have the potential to enhance future replication, although it would have been much more beneficial to have wood waste to energy generation projects financed and implemented there. There was also a recognition of capacity and awareness building generated with all the technical information compiled by the project's consultants. This Component is regarded as the only one to be Highly Satisfactory, but the study reports may now be becoming outdated as were written between 2014 and 2016.

For Component 2, although there have been plenty of activities completed and the continued participation from the stakeholders in order for the two demo. projects to be realised in Ebonyi State, significant outputs made are overshadowed by the incomplete installation of the equipment. The inspection and verification reports by SGS in May 2021 put both the Ikwo and Uburu projects at 90% mechanically complete but only 10% complete for electrical, instrumentation and process control, with a snagging list of 20 crucial items at each site.

The list of outstanding technical items does not consider the mini-grid infrastructure, so in reality and having visited and studied at the pictures from the sites, it is estimated that outstanding work will last well into 2022. Stakeholders recognise that the implementation cycle has been very slow (many personnel have moved to different posts or retired since APPL was established in 2010) but do want to keep pushing for completion of the two plants. If UNIDO can find a way of facilitating this and put itself in the driving seat, the intervention would have a strengthened case to be referred to as viable and relevant and the awareness already generated about the role of biomass for electrification would be reinforced. Within the outcome for Component 2, the major missing element was the investors not being able to reach financial closure for implementation of three further projects in Ogun and Ondo States and the dependence of the one Chinese firm installing the rice husk gasification plants on the GEF grant, rather than brining counterpart funds as originally envisaged.

It was commented that the work done early on in Component 3, in undertaking the FIT review with participation of NERC and their recent issuing of the Mini-grid Regulations, did not encourage the private sector forward enough into the sector. In fact, despite the FIT analysis work done within Component 3, there were challenges throughout the project in aligning supportive policy (e.g. REFIT is one example of many that Nigeria has for the small-scale RE sector) with getting demonstration projects actually installed. Since the economic difficulties in Nigeria from 2015 the private sector has been hesitant in new areas, particularly in the energy arena where there is such a huge demand for electrification but continued hurdles and bottlenecks that prevent projects going ahead. In terms of meeting the outcome of Component 3, the project has assisted to some degree in forging favourable policy and investment conditions for biomass mini-grid projects, but there is much more to do with encouraging the private sector forward.

Feedback from the interviews on the capacity building within Component 4 was favourable, recognising that there had been many opportunities to learn about biomass in the energy sector and indeed these ran through all Components and affected all participants including at Governor level in the three states. Although much of the capacity building took place over 5 years ago, the numbers benefiting from the various trainings, events, forums and workshops were recalled in the interviews and overall it is thought that at least 100 people have improved their awareness, some in deep technical details, others with more general knowledge through the variety of training sessions and some at the managerial level through the experience of the SPV establishment and meetings of the PSC. What is still missing is the centralised information hub for how biomass projects (as an important form of renewable energy) can be realised widely in Nigeria.

Having looked at stakeholder's feedback on the Components the concluding remarks are that the project is satisfactorily designed with a clear and simple-to-use Logframe with only some mixing between outputs and outcomes, and in some cases targets that are imprecise and not SMART. It is found to be highly relevant at the time of preparation and inception and continues to be as Nigeria still faces power shortages and is actually increasing its reliance on fossil fuels at a time when climate change is of major international concern.

When drilling down into the detailed outputs by Component, it was seen that many of the benefits noted by interviewees were not captured in the Logframe (e.g. promotion of the local economy through access to energy that can lift rural incomes) whereas other indicators have yet to be realised (e.g. the environmental and CO2 abatement benefits) and of the ten (10) outputs only four (4) had any actual benefits accruing, so effectiveness is Moderately Unsatisfactory (below 50%).

A similar assessment is given to the efficiency which is reflective of the lack of clarity around the flow of financial resources (from GEF) across the years and lack of accountability of counterpart funding, except in 2015. Ultimately even with the in-kind funding from ECN and ESG and the considerable time given by stakeholders for activities spanning almost 10 years, the main concern remains that the resources given have had to stretch over double the expected timeframe of 4 -5 years. And yet the most crucial milestone is still not met, the completion of the demonstration projects, although there is some reserve GEF budget for that.

On the other hand the sustainability does not seem to be in doubt particularly for the institutional aspects such as establishment of APPL, the technical trainings of several engineers that are still employed and continued stakeholder engagement. The project is demonstrating clean energy that deals with problematic wastes in rural areas so is naturally environmentally sustainable. Although one Component was on fixing the policy, regulatory and investment climate in favour of such projects, the lack of actual investment in more demonstration projects means that financial sustainability may not be delivered yet. But feedback from the Ministries, private sector players and civil society groups showed that through the awareness built there is good socio-political sustainability, which causes this aspect to be Satisfactory. Similarly the project has aligned itself to many issues faced by stakeholders and to energy challenges faced by the country and has a high degree of compatibility to other interventions in the rural sphere.

Although gender aspects were not considered in the project's design, it was found that there were clear benefits to women's empowerment but because the progress has not particularly contributed to women's equality (although it still has the opportunity to do that) or did not have equal representation of men and women in meetings and Committees, the mainstreaming of gender is Moderately Satisfactory.

When it comes to monitoring and evaluation and reporting of results, the assessment is that the monitoring of whether the implementation is according to plan has been patchy but the evaluation of whether it is having the desired results is missing, although the GEF OFP are aware of their need to evaluate across the key KPIs in due course. The reporting is generally more thorough in the first half of the project, but risks do not seem to have been properly analysed against the main institutional, technical, market, financial, implementation and sustainability risk quantums. There appears to have been little concern about the serious delays that built up in the project with permission given many times for extensions with no evidence of asking why or addressing these concerns through the proper reporting and evaluation channels.

For the partners performance, UNIDO gained respect from the stakeholders in the questionnaires especially in the early stages and the flow of information from the Country Office has been good but, in the end, UNIDO has allowed the delay of the demonstration projects into 2021 (and unlikely to complete by the end of the year) which is cause for concern. The national counterparts, particularly ECN and ESG have been keen, enthusiastic and long-lasting members of the PMU and the PSC meetings are still continuing and ensure good communication to interested parties. Although the GEF target of encouraging over US$ 9 million in investment from the private sector has not been reached, the GEF grant has been utilised to support all of the Components and has assisted ESG to take the technical steps forward to development of 1.5 MW capacity of power plants, and they themselves have contributed considerable infrastructure to realise the projects. The partners contribution to the project is therefore Satisfactory.

In terms of the extent to which conditions have been put in place that will help the key drivers and overcome barriers to biomass-based electricity generation, the project has helped overcome some hindrances, notably in creating awareness and information about what is possible, work on the policy and regulatory barriers, improvement of human and institutional capacity and to some degree engagement of the private sector and investment community. So overall there have been positive and negative findings and the total assessment of the various evaluation criteria has scored the project as Moderately Satisfactory with an achievement rate of between 50% and 69%.

4.2. Recommendations

The recommendations arising from this evaluation are made based on the interviews conducted and therefore drawn from the evidence given by those stakeholders, but also from the documentation provided, although this was not as comprehensive as it should be. The recommendations endeavour to be clearly stated, identifying the target group with priorities for action and follow-up required. The evaluation has assessed the project performance (progress to impact, design, relevance, effectiveness, efficiency, sustainability and coherence as well as cross-cutting issues) and in the main conclusions presented above develops a series of findings which can be drawn from to inform the recommendations and lessons learnt in order to enhance the design of new and implementation of ongoing projects by UNIDO.

Meeting the project Objectives and Goal

The objective and goal of this project is 'to promote renewable energy (biomass) based mini-grid as an alternative to diesel-based energy generation systems in Nigeria' in order 'to reduce and avoid GHG emission from the energy sector'. The evaluation shows that the objective was partially met in that some promotion of biomass energy systems to supply electricity to mini-grids, but this has been limited mainly to the feasibility studies and business plans made for the three States involved and the trainings and capacity building activities done. The goal has not been met because the main activity of establishing pilot projects has not been completed within the period expected (the development of the pilots has been continually delayed). So no GHG emissions have yet been avoided coming from the biomass-fired generators and one of the key objectives of the GEF, that of global benefit of 501,936 tonnes of CO_2 cumulative direct GHG reductions, has not been reached. The recommendation is that the lessons from this experience be brought to bear on the design of any similar projects planned by UNIDO. One of the failings in fully meeting the objective and goal is founded in the lack of monitoring of project progress with weak result-based management within UNIDO.

UNIDO supervision and follow up

It is noted that some of the recommendations from the MTR still stand such as the need for regular supervision and follow up missions for the construction of the power plants then supporting an awareness campaign to give those demo-projects visibilities and to encourage the private sector for replications (Output 2.3). This requires the UNIDO Project Manager to have a good interaction with the activities in the field through continuous liaison with the Country Office.

Capture extra outcomes in the Logical Framework

It is suggested that the Logical Framework is adjusted during the progress of the project to capture the extra benefits as seen by the stakeholders during implementation and to integrate the benefits to gender mainstreaming which were not considered in the original design. This should be the responsibility of the UNIDO Project Manager by having continuous monitoring of the project activities as they unfold in the host country.

Financial reporting and results-based management

UNIDOs' reporting within this project needs to be tighter, accounting more clearly for the financial flow of funds year-by-year and the counterpart funds given, but also to make sure that the principles of results-based management are followed in the internal evaluation reporting, covering for example, why were there delays to the pilot projects, why no investment from the private sector etc. so that lessons can be learnt at UNIDO HQ and the Country Office.

Completion of the Demonstration Biomass Projects

Within the interviews there was most concern on how to resolve the completion of the 500 kW (Uburu) and 1000 kW (Ikwo) plants in Ebonyi State, with many voicing the need for UNIDO to find a way of continuing to give support. The modality for that would perhaps not be within the current GEF project which has to complete at the end of 2021, but through a second phase with the same counterpart institutions. Because the old UNIDO Country Programme is possibly going to be converted to the new Programme Country Partnership (PCP)[5], of

[5] According to UNIDO's website the PCP is an innovative model for accelerating inclusive and sustainable industrial development in high-growth sectors, aligning with national development agendas. Led by the Nigerian Government it would build synergies with government and its partners' interventions relevant to industrial development, leveraging in additional investments in priority sectors to achieve larger development impacts. It is already operating within Africa in Ivory Coast, Ethiopia, Rwanda, Senegal, Tanzania and Zambia.

which energy is one of the 9 components, it is recommended that this could be the vehicle for channelling further support to complete the pilots.

Encouragement of the Private Sector

If the demonstration projects in Ebonyi State can be operated as case studies, it is assessed that the private sector investors and developers could come forward in other areas of the country. But to ensure this continuity, the recommendation is that the two engineers already assigned by ESG need to be properly remunerated and the number of trained engineers needs to be increased to between 4 and 7, so that they impart knowledge onwards to the next project proponents. This requires urgent discussion between UNIDO and ESG.

Justification for late addition of stakeholders

Although the involvement of the National Sugar Development Council (NSDC) at this late stage seems too late and misguided, it is evaluated as a reasonable step because of the amount of knowledge that the private sector (e.g. Dangote, Golden Penny) have built up in the bagasse sector, the existence of a few MW-level biomass-to-electricity power plants (Dangote in Numan, Adamawa State and Golden Penny Sunti, Niger State) and because NSDC will support the principles of the project going forward. However, a Briefing Note should have been prepared by the UNIDO Project Manager to justify and explain the NSDC inclusion in 2020.

4.3. Lessons learnt

The lessons learnt is an important aspect in order to inform UNIDO of the success or failure of the practices in designing, implementing and managing the project and to enhance the planning, design and implementation of on-going and future UNIDO initiatives.

Although the project was well design with a good preparatory phase and some notable results on institutional sustainability, the project's effectiveness, and particularly its efficiency, have been let down by poor monitoring and internal evaluation. The lesson learnt is that the UNIDO reporting needs to be improved particularly for the financial aspects which were hard to deduce from different sources and with financial data and reporting that was contradictory and UNIDO should consider how to report properly within the principle of results-based management on how to overcome barriers and risks.

The main failing in the project was the incompletion of the rice-husk pilot projects in Ebonyi State and halting of the wood waste pilots in Ondo and Ogun States. The lesson learnt is that project should have been done in two phases; one for introduction, mainstreaming and capacity development with inclusions of finance institutions and investors from private sector (2 - 3 years) and the next phase should have been specifically for demonstration projects development (2 - 4 years).

The efficiency was one focal point in that the inputs of stakeholder's time, funds and expertise were not used in a timely manner because the project is over 5 years late in delivery. A lesson learnt and shared from a private sector interviewee is that UNIDO should have carried out more regular checks on project progress and delivery against plan than the annual reporting allows, with quarterly targets that were properly assessed and reported on, noting whether all the resources that could be brought were in place in order to realise a shorter timeframe.

There is no debate that the promotion of renewable energy and clean and sustainable project developments are good and necessary for Nigeria for a whole number of reasons, but the lesson learnt is that the output (electricity) has to be affordable to end-users and reliable to gain the custom of SMEs and household consumers in order to increase the output and productivity of businesses and small industries and the prosperity of the nation as a whole.

ANNEXES

ANNEX 1 – Logical framework

Project Strategy		**Objectively verifiable indicators**				
		Indicator (quantified and time-bound)	**Baseline**	**Target**	**Source of verification**	**Risks and Assumptions**
Goal	To reduce and avoid GHG emission from the energy sector of Nigeria.	Incremental CO2 emission reduction.	CO2 emission due to diesel based power generation.	1. 5 MW of biomass based mini-grid capacity added during the project period.	1. Physical verification of projects in operation. 2. End of project survey.	Continuous support of all participating organizations, State Government and project investors.
Objective of the project	To promote renewable energy (biomass) based mini-grid as an alternative to diesel based energy generation systems in Nigeria	1. 5 MW of biomass based power generation. 2. Investments by financial institutions to biomass projects.	1. No biomass based power plant and mini-grid exists in Nigeria. 2. No practically workable support schemes available in Nigeria for the promotion of biomass projects.	1. 5 MW of biomass power plant capacity established. 2. Policy, regulatory regime established. 3. Replication potential of biomass projects identified.	1. Physical verification of Implemented project. 2. End of project survey.	1. Sustained government / investor support to the agreed project activities. 2. Commitment of Government agencies in building capacity and making policy changes.
Outcome 1	Preparatory works completed for facilitating replication in the identified potential sites.	Feasibility study, business plans and other power plant support/development activities and reports available for the potential replication sites.	No preparatory works for the replication of the biomass power plants have been taken	Techno-economic feasibility studies, business plans and other essential reports for the three identified sites.	Project reports.	Sustained Government support.
Project Component 1- Development of techno-economic feasibility studies and business plans for identified potential sites to facilitate replication.						
Output 1.1	Techno-economic feasibility studies and business plans developed for the 3 identified potential sites to facilitate replication.	1. Techno-economic feasibility studies and business plans for the identified sites 2. Reports on existing tax schemes, BoI privileges, required licenses and permits, environmental regulations, proposed government schemes,	1. Techno-economic feasibility studies and business plans not available for the identified sites. 2. Very little information available on existing set-up and schemes	1. 3 techno-economic feasibility studies and business plans developed for the identified sites. 2. Other compiled reports	Project reports.	Sustained Government support.

Project Strategy		Objectively verifiable indicators				
		Indicator (quantified and time-bound)	**Baseline**	**Target**	**Source of verification**	**Risks and Assumptions**
		meteorological, seismic data and other relevant data for the implementation for the biomass project feasibility study sites				
Outcome 2	Acceptance by stakeholders on the technical and financial viability of selected site for setting up the biomass based mini-grid for rural electrification.	Investors ready to invest and agreement signed for implementing the biomass based mini-grid project.	Investors not ready to invest/develop biomass projects in Nigeria due to risks and lack of knowledge.	Investors are ready to invest in the biomass based mini-grid project identified for implementation.	Shareholder agreement.	Investors' support and Government support.
Project Component 2 - Demonstration of techno-economic viability of biomass based mini-grid.						
Output 2.1	A biomass based power plant of 5 MW installed capacity commissioned in the selected site along with mini-grid.	1. A biomass mini-grid of capacity 5 MW is established. 2. Electricity usage by the consumers. 3. CO2 emission reduction from biomass electricity usage.	1. Biomass based mini-grid not in place. 2. Diesel based power generation in the absence of biomass based electricity. 3. No biomass electricity available.	1. A biomass based power plant including mini-grid is in operation. 2. 25,000 t CO2 emission reduction annually from biomass electricity usage. 3. Above 31,000 MWh of annual electricity supply to various users from biomass mini-grid.	1. Physical verification of biomass power plant project. 2. Records of biomass power plant 3. UNIDO expert report	Sustained Government / investor support to agreed project activities.
Output 2.2	Capacity on biomass power plant operation and maintenance as well as mini-grid management developed	Trained personals in place for operation and maintenance of the biomass power plant including management of mini-grid.	No local capacity to operate, maintain power plant and mini-grid.	Number of operators identified and trained for the operation and maintenance of power plant and management of mini-grid.	1. Physical verification of operation and maintenance personal in the power plant. 2. Trainings given to operation and maintenance staff.	Sustained investor support to agreed project activities.
Output 2.3	The mini-grid independently monitored, evaluated, lessons learnt and information widely distributed	1. Plant performance study reports. 2. Full scale demonstration site visits and seminars.	Biomass based mini-grid projects not in place to study the performance and	1. Performance assessment report 2. Full scale demonstration site visits and seminar 3. Website	Performance monitoring report, site visit/seminar, programme evaluation form, seminar	Sustained investor support to visit the project while in operation and data collection.

Project Strategy		Objectively verifiable indicators				
		Indicator (quantified and time-bound)	**Baseline**	**Target**	**Source of verification**	**Risks and Assumptions**
		3. Dissemination leaflets. 4. Website	to learn the lessons from.	4. Project leaflet	material, leaflet, website.	
Outcome 3	Conducive financing and policy environment for promoting investments in rural mini-grids in place.	Favourable policy and investment conditions for biomass mini-grid projects.	The existing policy, financing, investment facilities are not adequate and institutional capacity for biomass mini-grid projects are limited.	1. Favourable policy and feed-in-tariff schemes are in place. 2. More and more financing institutions and investors ready to finance/invest. 3. Increased local capacity of institutions.	1. End of project survey 2. Final evaluation	Sustained government support to agreed project activities.
Project Component 3 - Strengthening of financial and policy environment to support RE based mini-grid systems						
Output 3.1	FiT for biomass power in place.	FiT for biomass power plant exporting electricity to national grid in place.	There is no FiT specific to the biomass projects in Nigeria.	FiT is in place for the biomass power projects.	1. End of project survey 2. Final evaluation	Sustained government support.
Output 3.2	Appropriate financing facility developed for RE related projects.	More supportive financing facility in place for RE related projects including biomass power projects.	Financing facility not in place to fund biomass mini-grid projects.	Exclusive financing facility available for RE projects including biomass projects.	1. End of project survey. 2. Final evaluation.	Support from commercial and development banks.
Outcome 4	Capacity of local planners, institutions and experts for RE based mini-grid enhanced.	1. Number of local planners, institutions and experts for RE based mini-grids trained. 2. Establishment of one-stop information centre for biomass/renewable energy	1. Number of local planners, institutions and experts do not have capacity to develop and implement biomass power plant mini-grids. 2. No such centralized information centre available	1. More than 100 persons trained. 2. Establishment and operation of the centre	1. No. of persons trained. 2. Training material 3. Training evaluation report	Sustained support from Government, local planners, institutions and experts for RE based mini-grids
Project Component 4 - Capacity development for replication of RE mini-grid technologies.						

Project Strategy		Objectively verifiable indicators				
		Indicator (quantified and time-bound)	**Baseline**	**Target**	**Source of verification**	**Risks and Assumptions**
Output 4.1	Local capacity in designing mini-grid developed	Number of local companies trained on mini-grid design.	Lack of knowledge and experience in mini-grid design for biomass projects.	One training programme for mini-grid design conducted for local companies.	1. No. of persons trained. 2. Training material 3. Training evaluation report	Interest of local electrical companies.
Output 4.2	Experts, planners, and institutions are trained in developing biomass based energy and mini-grid systems	1. Biomass project development and implementation training programme conducted 2. No. of participants benefited from the training 3. Biomass mini-grid project development guide prepared	Lack of knowledge and experience in the development of biomass mini-grid projects in Nigeria.	1. Two biomass project development trainings conducted 2. More than 60 participants trained 3. Biomass mini-grid project development guide prepared.	1. No. of persons trained. 2. Training material 3. Training evaluation report	Sustained support from Government, local planners, institutions and experts for RE based mini-grids.
Output 4.3	Capacity of RE related and financing institutions strengthened.	Number of RE related and financial institutions trained.	Financing institutions lack knowledge on assessment and evaluation of biomass based mini-grid projects. RE institutions lack knowledge and skill in biomass based mini-grids.	Minimum of 5 financing institutions and 2 RE related institutions trained.	1. No. of persons trained. 2. Training material 3. Training evaluation report	Sustained support from Government renewable energy institutions and financial institutions support.
Output 4.4	Capacity of local engineering firms and O&M companies developed in operation and maintenance of biomass power plants and mini-grid systems.	Number of local engineering companies trained in operation and maintenance services.	There is no or very limited local capacity for operation and maintenance of biomass Power plants in Nigeria.	More than 2 local engineering firms ready to provide operation and maintenance service	1. No. of persons trained. 2. Training material 3. Training evaluation report	Support of local engineering companies.

ANNEX 2 – Terms of reference

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

TERMS OF REFERENCE

Independent terminal evaluation of project

[Title]

UNIDO ID: [Status]
GEF Project ID: 3943

November 2019

Contents

I. Project background and context

1. Project factsheet[67]

Project title	[Title]
UNIDO ID	[Status]
GEF Project ID	3943
Region	Africa
Country(ies)	Nigeria
Project donor(s)	GEF
Project implementation start date	07/08/2012
Expected duration	48 months
Expected implementation end date	31 May 2020
GEF Focal Areas and Operational Project	GEF-4: Climate Change; Strategic programme CC-SP3 – promoting markets for renewable energy
Implementing agency(ies)	UNIDO
Government coordinating agency	Energy Commission of Nigeria,
Executing Partners	Federal Ministry of Environment, Ebonyi State Government Federal Ministry of Science and Technology, Federal Ministry of Power, Bank of Industry
UNIDO RBM code	HC32 (Clean energy access)
Donor funding	USD 2,621,800
Project GEF CEO endorsement / approval date	12/27/2011
UNIDO input (in kind, USD)	60,000
Co-financing at CEO Endorsement, as applicable	11,935,000
Total project cost (USD), excluding support costs and PPG	14,556,800
Mid-term review date	May-June /2015
Planned terminal evaluation date	December 2019 – March 2020

(Source: Project document)

2. Project context

UNIDO's project "Mini-grids based on renewable energy (small-hydro and biomass) sources to augment rural electrification" (UNIDO PROJECT ID:100260), funded by GEF aims at promoting Renewable Energy (RE), mainly in the form of biomass based mini-grids as viable options for augmenting the rural electrification programme at Ikwo cluster, Ebonyi State Nigeria. The project is expected to demonstrate biomass gasification technology in Nigeria under four broad thematic components: development of techno-economic feasibility studies and business plans; demonstration of techno-economic viability of biomass-based mini-grid; strengthening of financial and policy environment to support RE based mini grid-systems; capacity development for replication of RE mini-grid technologies. A 5 MW rice husk based power generation plant will be installed within the Ikwo rice mill cluster as a demonstration biomass power plant. The demonstration of technical and financial viability of 5 MW biomass based power plant

[6] Data to be validated by the Consultant

and mini-grid will enable the Government to further establish appropriate policy and regulatory framework, to strengthen institutions and to build capacity leading to the creation of a conducive market environment for increased private sector investment programmes in RE.

The project document was signed in December 2011 and, according to the same, a mid-term evaluation was envisaged to be carried out approximately two years after implementation start date.

3. Project objective and expected outcomes

The project goal is to reduce and avoid the GHG emissions from the energy sector of Nigeria.
The project description is to develop policy and conducive market environment in order to promote renewable based mini-grids for augmenting rural electrification and productive uses in Nigeria.
The project immediate objective is to promote renewable energy (biomass) based mini-grid as an alternative to diesel based energy generation systems in Nigeria.

Output	**Output indicators**
1. Techno-economic feasibility studies and business plans developed for the 3 identified potential sites to facilitate replication	2 (Ebonyi and Ogun state) techno-economic feasibility studies developed
2. A biomass based power plant of 5 MW installed capacity commissioned in the selected site along with mini –grid.	A 5 MW rice husk-based power generation plant has been identified within the Ikwo rice mill cluster in Ebonyi state. A techno-economic feasibility study has been developed, the project is in the final stage of selecting an Owners Engineer to supervise EPC contractor.
3. Capacity on biomass power plant operation and maintenance as well as mini-grid management developed.	
4. The mini-grid independently monitored, evaluated, lessons learnt and information widely distributed.	
5. Feed-In-Tariff (FiT) for biomass power in place.	A FiT of (N/MWh) 32,000 has been proposed for biomass projects in Renewable Energy Master Plan. Provision of low interest rate loans not exceeding 5 percent per annum by Bank of Industries (BOI) is available
6. Appropriate financing facility developed for RE related projects.	

4. Project implementation arrangements

The project management structure as designed is provided in Figure 1, UNIDO as GEF's Executing Agency is responsible for implementing the project, the delivery of the planned outputs and achievement of the expected outcomes. UNIDO is executing the project in collaboration with Federal Ministry of Energy, Energy Commission of Nigeria and Federal Ministry of Environment, Housing and Urban Development.

UNIDO is responsible for:

- The general management and monitoring of the project;
- Reporting on the project performance to the GEF;

- Procuring the international expertise needed for delivering the planned outputs under the four project components; and
- Managing, supervising and monitoring the work of the international teams and ensuring that the deliverables are technically sound and consistent with the project requirements.

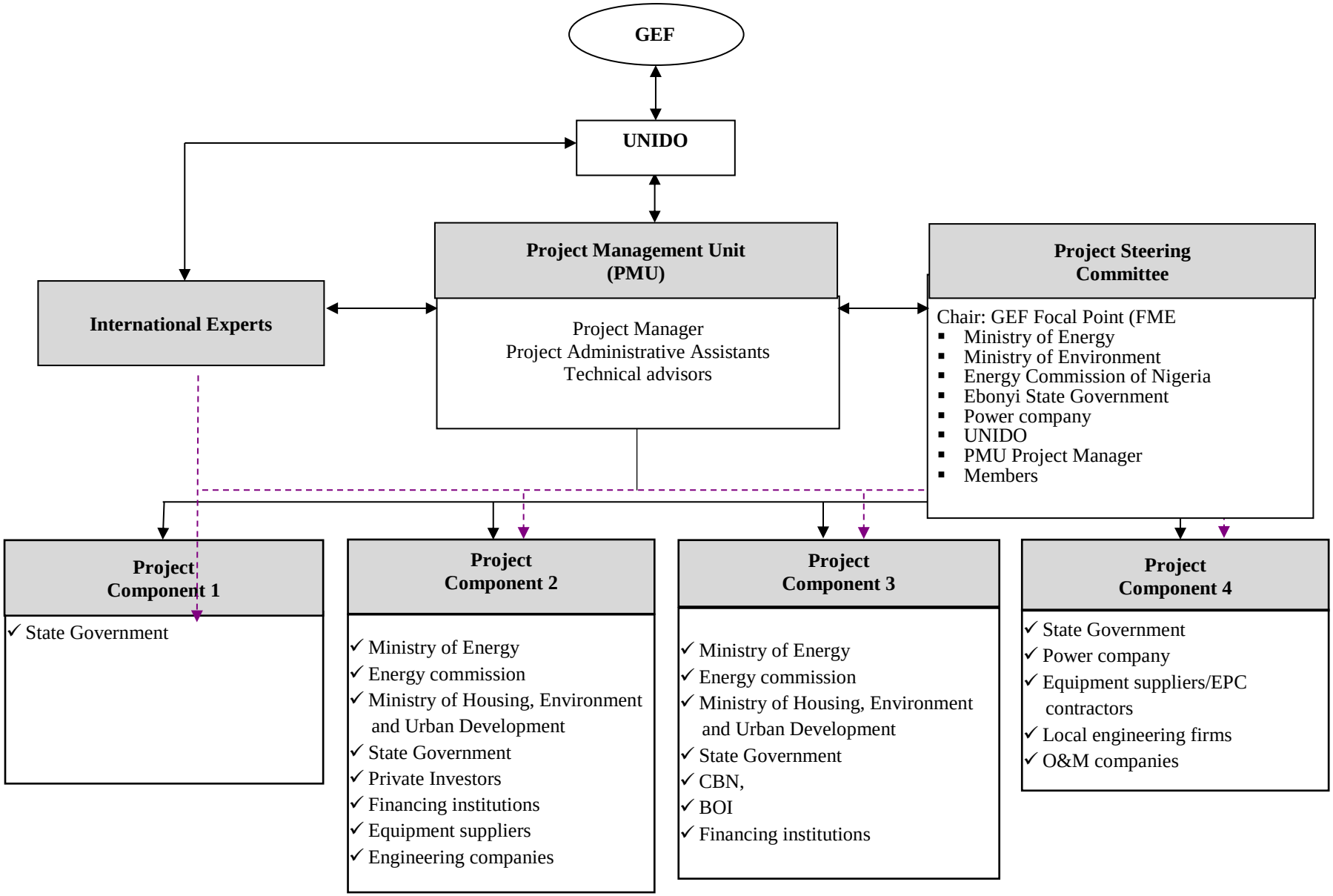
A Project Management Unit (PMU) has been established within the Energy Commission of Nigeria. The PMU consist of a Project Manager (PM) and the Project Administrative Assistant (PAA). The responsibilities of PMU are as follows:

- Coordination of all project activities carried out by the national experts and other partners by having close association with the Ministry of Energy/State Governments;
- Day-to-day management, monitoring and evaluation of project activities as per planned project work; and
- Organization of the various seminars and trainings to be carried out under Project Components 2, 3 and 4.

Since the implementation of the project, the PMU has received the necessary management and monitoring support from UNIDO and the monetary support from GEF and counterparts.

A Project Steering Committee (PSC) has been established. This committee has being reviewing progress of project implementation, to facilitate co-ordination among project shareholders and to maintain transparency in ensuring ownership and to provide support for the sustainability of the project. The PSC has a balanced representation from key stakeholders including counterpart Ministries, public institutions and private sector representatives and UNIDO. The committee is chaired by the GEF Focal point (Operations) and meets twice a year.

A detailed work plan for the entire duration of the project has been developed by UNIDO in collaboration with the PMU, State Governments and international teams of experts. The working plan is used as management and monitoring tool by PMU and UNIDO and it is to be reviewed and updated appropriately on a biannual basis. Figure 1 presents a summary of the project implementation


GEF
UNIDO
Project Management Unit (PMU)
Project Manager
Project Administrative Assistants
Technical advisors
International Experts
Project Steering Committee
Chair: GEF Focal Point (FME
Ministry of Energy
Ministry of Environment
Energy Commission of Nigeria
Ebonyi State Government
Power company
UNIDO
PMU Project Manager
Members
Project Component 1
✓ State Government
Project Component 2
✓ Ministry of Energy
✓ Energy commission
✓ Ministry of Housing, Environment and Urban Development
✓ State Government
✓ Private Investors
✓ Financing institutions
✓ Equipment suppliers
✓ Engineering companies
Project Component 3
✓ Ministry of Energy
✓ Energy commission
✓ Ministry of Housing, Environment and Urban Development
✓ State Government
✓ CBN,
✓ BOI
✓ Financing institutions
Project Component 4
✓ State Government
✓ Power company
✓ Equipment suppliers/EPC contractors
✓ Local engineering firms
✓ O&M companies

5. Main findings of the Mid-term review (MTR)

The findings of the Mid-Term Review (MTR) of the "Mini grid based renewable energy (biomass) sources to augment rural electrification" Project in Nigeria is summarized in the following paragraphs.
The MTR team consisted of an external team of independent evaluators - international expert Mr. Marjan Mihajlov and national expert Mr. Benjamin Aniakor.The MTR was conducted in the period of 01.05.2015 – 30.06.2015. It assesses project performance and progress against the evaluation criteria: relevance, effectiveness, efficiency, sustainability and impact.
The overall objective of the review is to provide information to the key question of the mid-term review - to what extent the project is achieving the expected results at the time of the mid-term review, i.e. to what extent the project has promoted renewable energy (biomass) based mini-grid as an alternative to diesel based energy generation systems in Nigeria.

Findings and recommendations
The key findings of this Mid Term Review are summarized upon evaluation criteria and recommendations and presented accordingly.

Key Findings.
Relevance. The Project is very consistent with the focal areas/operational program strategies of GEF and very relevant to the national development and environmental priorities and strategies of the Government and population of Nigeria, and regional and international agreements.
The Project has been identified as relevant at the time of its conception and preparation, considering the energy situation. Now, the Project is even more relevant having in mind the wide gap between energy supply and demand and the cost of energy in Nigeria.
Design. The Project has a very good design which is in line with the national developmental needs of the country considering the power shortfall and adequate to address the problems at hand. It has been based on the outcome of various studies and verifications conducted by both external and internal consultants. The preparatory process has been based on wide consultations and participatory approach involving relevant national counterparts and beneficiaries participating in the identification of critical problem areas and the development of technical cooperation strategies.
The project has a very clear thematically focused development objective, formulated based on the logical framework approach which was found to be adequate but it may requires to be reviewed considering the delay in implementation over time.
Although the design is simple and fits the needs, it is not completely clear in terms of the outcomes and outputs as they seem to be mixed in some instances, and the targets and indicators do not look sufficiently precise as they are not SMART, again in some instances.
Effectiveness. At the time of the MTR, the Project seems to be partly satisfactory in the light of successful project implementation. All the activities of the first period but the demo project were implemented in a very satisfactory way. However, due to the circumstances explained further in the Report, there is significant delay on the commencement of the construction of the biomass power plant.
In terms of achievement of the outcomes and expected behavioural changes, it must be noticed that although the Project is somewhere in the middle and there is a delay on the demo project implementation, there are noticeable benefits. The awareness about the project and the expected results it seems to be higher, the stakeholders are more confident in the outcomes particularly now when the relevance of the Project is bigger.
Efficiency. All component activities foreseen to be implemented in the first period have been implemented within the expected time frame including all preparatory activities for the demo project, except for the construction activity itself.
Sustainability. There are no issues that may pose significant possible risk affecting the sustainability of the Project. In financial terms, considering the commitments expressed so far and the resources invested

in the Project, it is not much likely that the change of the Government would pose risk on the financial commitments to the Project. However, it is necessary UNIDO to follow up on this issue and to get a reaffirmation on the position from the owner's side.

M&E. The project has a plan for M&E which includes the Project Results Framework, the annual work plans as well as detailed progress and activity reports. The plan also includes and budgets for a mid-term evaluation and a final project evaluation.
The main concern is related with the M&E design and that is some indicators /targets are not reflective of the related outcomes and are not SMART in some instances.

Project management has been successfully carried out by the UNIDO Project Manager. On the side of the PMU, the absence on the position of national Project coordinator seems to affect the coordination and information.

Key Conclusions
UNIDO's Mini grid based renewable energy sources to augment rural electrification Project is an excellent and very important concept with a numerous benefits on different levels. The Project is very in line with country's national strategic plans on energy, environment and socio-economic level. The Project for sure will bring great number of economic, institutional, social and environmental benefits on a local, regional and national level.
At this stage it is essential that all stakeholders give a good push within their roles and responsibilities. It is an opinion of the review team that there is no significant technical barrier that can stand on the way of the implementation once the first milestone payment is done by the owner of the Project.
However, there is room for improvement for each of the parties. UNIDO and the stakeholders need to make one good push on the implementation in order to overcome the most important obstacle – the first payment. Also, there is room for improvement in the management and coordination particularly having in mind that more important part of the project is yet to come in the second period.

6. Budget information

Table 1. Financing plan summary

US$	***Project Preparation***	***Project***	***Total (US$)***
Financing (GEF / others)	60,000	2,621,800	2,681,800
Co-financing (Cash and In-kind)	Click here to enter text.	11,935,000	11,935,000
Total (US$)	60,000	**14,556,800**	**14,616,800**

Source: Project document/Progress report

Table 2. Financing plan summary - Outcome breakdown[8]

Project outcomes	**Donor (GEF/other) (US$)**	**Co-Financing (US$)**	**Total (US$)**
1. Mapping and selection of potential biomass site for development	100,000	200,000	**300,000**

[8] Source: Project document.

Project outcomes	Donor (GEF/other) (US$)	Co-Financing (US$)	Total (US$)
2. Demonstration of techno economic viability of biomass based mini grid	2,000,000	10,575,000	**12,575,000**
3. Strengthening of financial, policy and institutional mechanisms to support RE based mini grid systems	100,000	200,000	**3000,000**
4. Capacity development for replication of RE mini grids technologies developed.	221,800	500,000	**721,800**
5. Project management	200,000	460,000	**660,000**
Total (US$)	**2,621,800**	**11,935,000**	**14,556,800**

Source: Project document/Progress report

Table 3. Co-Financing source breakdown

Name of Co-financier (source)	In-kind	Cash	Total Amount (US$)
UNIDO		60,000	60,0000
Federal Ministry of Environment of Nigeria			2,500,000
Private Sector Investment	9,375,000	-	9,375,000
Total Co-financing (US$)	9,375,000	60,000	11,935,000

Source : Project document

Table4. UNIDO budget execution (Grant

Items of expenditure	2012	2013	2014	2015	2016	2017	2018	Total expend.
Contractual Services	1,727	-	9,600					11,327
International Meetings	-	-	-	-	13,945	2,913	-	16,858
Local travel	18,899	36,751	36,709	16,957	2,886	9,101	-	121,303
Nat. Consult./Staff	14,741	21,411	48,578	41,192	32,844	8,335	-	167,101
Other Direct Costs	22,289	16,462	25,917	18,857	11,081	1,777	-	96,383
Staff & Intern Consultants	101,479	121,380	29,610	68,176	-	32,086	-	352,731
Train/Fellowship/ Study	8,457	-	-	-3	-	9,821	-	18,275
Contractual Services	-	21,473	9,600	1,045,278	47,629	2,088	-	1,126,068
Premises			9,209	648	-	-	-	9,857
Equipment	7,438	149,627	-66	-935	6,402	518	-	162,984
Grand Total	**175,030**	**367,104**	**169,557**	**1,190,170**	**114,787**	**66,639**	**-**	**2,082,887**

Source: UNIDO Project Management database as of 11/8/19

II. Scope and purpose of the evaluation

The purpose of the evaluation is to independently assess the project to help UNIDO improve performance and results of ongoing and future programmes and projects. The terminal evaluation (TE) will cover the whole duration of the project from its starting date in 07 August 2012 to the estimated completion date in 31 May 2020.

The evaluation has two specific objectives:

(i) Assess the project performance in terms of relevance, effectiveness, efficiency, sustainability and progress to impact; and
(ii) Develop a series of findings, lessons and recommendations for enhancing the design of new and implementation of ongoing projects by UNIDO.

III. Evaluation approach and methodology

The TE will be conducted in accordance with the UNIDO Evaluation Policy[9] and the UNIDO Guidelines for the Technical Cooperation Project and Project Cycle[10]. In addition, the GEF Guidelines for GEF Agencies in Conducting Terminal Evaluations, the GEF Monitoring and Evaluation Policy and the GEF Minimum Fiduciary Standards for GEF Implementing and Executing Agencies will be applied.

The evaluation will be carried out as an independent in-depth evaluation using a participatory approach whereby all key parties associated with the project will be informed and consulted throughout the evaluation. The evaluation team leader will liaise with the UNIDO Independent Evaluation Division (ODG/EIO/IED) on the conduct of the evaluation and methodological issues. The evaluation will use a theory of change approach and mixed methods to collect data and information from a range of sources and informants. It will pay attention to triangulating the data and information collected before forming its assessment. This is essential to ensure an evidence-based and credible evaluation, with robust analytical underpinning.

The theory of change will identify causal and transformational pathways from the project outputs to outcomes and longer-term impacts, and drivers as well as barriers to achieve them. The learning from this analysis will be useful to feed into the design of the future projects so that the management team can effectively manage them based on results.

1. Data collection methods

Following are the main instruments for data collection:

(a) **Desk and literature review** of documents related to the project, including but not limited to:
- The original project document, monitoring reports (such as progress and financial reports, mid-term review report, output reports, back-to-office mission report(s), end-of-contract report(s) and relevant correspondence.
- Notes from the meetings of committees involved in the project.

(b) **Stakeholder consultations** will be conducted through structured and semi-structured interviews and focus group discussion. Key stakeholders to be interviewed include:
- UNIDO Management and staff involved in the project; and
- Representatives of donors, counterparts and stakeholders.

(c) **Field visit** to project sites in.

[9] UNIDO. (2015). Director General's Bulletin: Evaluation Policy (UNIDO/DGB/(M).98/Rev.1)

[10] UNIDO. (2006). Director-General's Administrative Instruction No. 17/Rev.1: Guidelines for the Technical Cooperation Programme and Project Cycle (DGAI.17/Rev.1, 24 August 2006)

2. Evaluation key questions and criteria

The key evaluation questions are the following:

(b) What are the key drivers and barriers to achieve the long-term objectives? To what extent has the project helped put in place the conditions likely to address the drivers, overcome barriers and contribute to the long-term objectives?

(c) How well has the project performed? Has the project done the right things? Has the project done things right, with good value for money?

(d) What have been the project's key results (outputs, outcome and impact)? To what extent have the expected results been achieved or are likely to be achieved? To what extent the achieved results will sustain after the completion of the project?

(e) What lessons can be drawn from the successful and unsuccessful practices in designing, implementing and managing the project?

The evaluation will assess the likelihood of sustainability of the project results after the project completion. The assessment will identify key risks (e.g. in terms of financial, socio-political, institutional and environmental risks) and explain how these risks may affect the continuation of results after the project ends. Table 5 below provides the key evaluation criteria to be assessed by the evaluation. The details questions to assess each evaluation criterion are in annex 2.

Table 5. Project evaluation criteria

#	Evaluation criteria	Mandatory rating
A	**Impact**	**Yes**
B	**Project design**	**Yes**
1	• Overall design	Yes
2	• Logframe	Yes
C	**Project performance**	**Yes**
1	• Relevance	Yes
2	• Effectiveness	Yes
3	• Efficiency	Yes
4	• Sustainability of benefits	Yes
D	**Cross-cutting performance criteria**	
1	• Gender mainstreaming	Yes
2	• M&E: ✓ M&E design ✓ M&E implementation	Yes
3	• Results-based Management (RBM)	Yes
E	**Performance of partners**	
1	• UNIDO	Yes
2	• National counterparts	Yes
3	• Donor	Yes
F	**Overall assessment**	Yes

Performance of partners

The assessment of performance of partners will ***include*** the quality of implementation and execution of the GEF Agencies and project executing entities (EAs) in discharging their expected roles and responsibilities. The assessment will take into account the following:

- Quality of Implementation, e.g. the extent to which the agency delivered effectively, with focus on elements that were controllable from the given GEF Agency's perspective and how well risks were identified and managed.
- Quality of Execution, e.g. the appropriate use of funds, procurement and contracting of goods and services.

Other Assessments required by the GEF for GEF-funded projects:

The terminal evaluation will assess the following topics, for which ***ratings are not required***:

a. **Need for follow-up**: e.g. in instances financial mismanagement, unintended negative impacts or risks.
b. **Materialization of co-financing**: e.g. the extent to which the expected co-financing materialized, whether co-financing was administered by the project management or by some other organization; whether and how shortfall or excess in co-financing affected project results.
c. **Environmental and Social Safeguards**[11]: appropriate environmental and social safeguards were addressed in the project's design and implementation, e.g. preventive or mitigation measures for any foreseeable adverse effects and/or harm to environment or to any stakeholder.

3. Rating system

In line with the practice adopted by many development agencies, the UNIDO Independent Evaluation Division uses a six-point rating system, where 6 is the highest score (highly satisfactory) and 1 is the lowest (highly unsatisfactory) as per Table 6.

Table 6. Project rating criteria

Score		Definition	Category
6	Highly satisfactory	Level of achievement presents no shortcomings (90% - 100% achievement rate of planned expectations and targets).	SATISFACTORY
5	Satisfactory	Level of achievement presents minor shortcomings (70% - 89% achievement rate of planned expectations and targets).	
4	Moderately satisfactory	Level of achievement presents moderate shortcomings (50% - 69% achievement rate of planned expectations and targets).	
3	Moderately unsatisfactory	Level of achievement presents some significant shortcomings (30% - 49% achievement rate of planned expectations and targets).	UNSATISFACTORY
2	Unsatisfactory	Level of achievement presents major shortcomings (10% - 29% achievement rate of planned expectations and targets).	
1	Highly unsatisfactory	Level of achievement presents severe shortcomings (0% - 9% achievement rate of planned expectations and targets).	

IV. Evaluation process

The evaluation will be conducted from December 2019 to March 2020. The evaluation will be implemented in five phases which are not strictly sequential, but in many cases iterative, conducted in parallel and partly overlapping:

i. Inception phase: The evaluation team will prepare the inception report providing details on the methodology for the evaluation and include an evaluation matrix with specific issues

[11] Refer to GEF/C.41/10/Rev.1 available at: http://www.thegef.org/sites/default/files/council-meetingdocuments/ C.41.10.Rev_1.Policy_on_Environmental_and_Social_Safeguards.Final%20of%20Nov%2018.pdf

for the evaluation; the specific site visits will be determined during the inception phase, taking into consideration the findings and recommendations of the mid-term review.

ii. Desk review and data analysis;
iii. Interviews, survey and literature review;
iv. Country visits;
v. Data analysis and report writing.

V. Time schedule and deliverables

The evaluation is scheduled to take place from December 2019 to March 2020. The evaluation field mission is tentatively planned for January 2020. At the end of the field mission, there will be a presentation of the preliminary findings for all stakeholders involved in this project in Nigeria. The tentative timelines are provided in Table 7.

After the evaluation field mission, the evaluation team leader will visit UNIDO HQ for debriefing and presentation of the preliminary findings of the terminal evaluation. The draft TE report will be submitted 4 to 6 weeks after the end of the mission. The draft TE report is to be shared with the UNIDO PM, UNIDO Independent Evaluation Division, the UNIDO GEF Coordinator and GEF OFP and other stakeholders for receipt of comments. The ET leader is expected to revise the draft TE report based on the comments received, edit the language and form and submit the final version of the TE report in accordance with UNIDO ODG/EIO/EID standards.

Table 7. Tentative timelines

Timelines	Tasks
December 2019	Desk review and writing of inception report
beginning of January 2020	Briefing with UNIDO project manager and the project team based in Vienna through Skype
Tentatively in January 2020	Field visit to Nigeria (locations to be arranged at Inception phase)
end of January 2020	Debriefing in Vienna Preparation of first draft evaluation report
February 2020	Internal peer review of the report by UNIDO's Independent Evaluation Division and other stakeholder comments to draft evaluation report
end of March 2020	Final evaluation report

VI. Evaluation team composition

The evaluation team will be composed of one international evaluation consultant acting as the team leader and one national evaluation consultant. The evaluation team members will possess relevant strong experience and skills on evaluation management and conduct together with expertise and experience in innovative clean energy technologies. Both consultants will be contracted by UNIDO.

The tasks of each team member are specified in the job descriptions annexed to these terms of reference. The ET is required to provide information relevant for follow-up studies, including terminal evaluation verification on request to the GEF partnership up to three years after completion of the terminal evaluation.

According to UNIDO Evaluation Policy, members of the evaluation team must not have been directly involved in the design and/or implementation of the project under evaluation.

The UNIDO Project Manager and the project team in Nigeria will support the evaluation team. The UNIDO GEF Coordinator and GEF OFP(s) will be briefed on the evaluation and provide support to its conduct. GEF OFP(s) will, where applicable and feasible, also be briefed and debriefed at the start and end of the evaluation mission.

An evaluation manager from UNIDO Independent Evaluation Division will provide technical backstopping to the evaluation team and ensure the quality of the evaluation. The UNIDO Project Manager and national project teams will act as resourced persons and provide support to the evaluation team and the evaluation manager.

VII. Reporting

Inception report

This Terms of Reference (ToR) provides some information on the evaluation methodology, but this should not be regarded as exhaustive. After reviewing the project documentation and initial interviews with the project manager, the Team Leader will prepare, in collaboration with the national consultant, a short inception report that will operationalize the ToR relating to the evaluation questions and provide information on what type of and how the evidence will be collected (methodology). It will be discussed with and approved by the responsible UNIDO Evaluation Manager.
The Inception Report will focus on the following elements: preliminary project theory model(s); elaboration of evaluation methodology including quantitative and qualitative approaches through an evaluation framework ("evaluation matrix"); division of work between the International Evaluation Consultant and national consultant; mission plan, including places to be visited, people to be interviewed and possible surveys to be conducted and a debriefing and reporting timetable[12].

Evaluation report format and review procedures

The draft report will be delivered to UNIDO's Independent Evaluation Division (the suggested report outline is in Annex 4) and circulated to UNIDO staff and national stakeholders associated with the project for factual validation and comments. Any comments or responses, or feedback on any errors of fact to the draft report provided by the stakeholders will be sent to UNIDO's Independent Evaluation Division for collation and onward transmission to the project evaluation team who will be advised of any necessary revisions. On the basis of this feedback, and taking into consideration the comments received, the evaluation team will prepare the final version of the terminal evaluation report.

The ET will present its preliminary findings to the local stakeholders at the end of the field visit and take into account their feed-back in preparing the evaluation report. A presentation of preliminary findings will take place at UNIDO HQ after the field mission.
The TE report should be brief, to the point and easy to understand. It must explain the purpose of the evaluation, exactly what was evaluated, and the methods used. The report must highlight any methodological limitations, identify key concerns and present evidence-based findings, consequent conclusions, recommendations and lessons. The report should provide information on when the evaluation took place, the places visited, who was involved and be presented in a way that makes the information accessible and comprehensible. The report should include an executive summary that encapsulates the essence of the information contained in the report to facilitate dissemination and distillation of lessons.
Findings, conclusions and recommendations should be presented in a complete, logical and balanced manner. The evaluation report shall be written in English and follow the outline given in annex 4.

[12] The evaluator will be provided with a Guide on how to prepare an evaluation inception report prepared by the UNIDO ODG/EVQ/IEV.

VIII. Quality assurance

All UNIDO evaluations are subject to quality assessments by UNIDO Independent Evaluation Division. Quality assurance and control is exercised in different ways throughout the evaluation process (briefing of consultants on methodology and process of UNIDO Independent Evaluation Division, providing inputs regarding findings, lessons learned and recommendations from other UNIDO evaluations, review of inception report and evaluation report by UNIDO's Independent Evaluation Division).

The quality of the evaluation report will be assessed and rated against the criteria set forth in the Checklist on evaluation report quality, attached as Annex 5. The applied evaluation quality assessment criteria are used as a tool to provide structured feedback. UNIDO Independent Evaluation Division should ensure that the evaluation report is useful for UNIDO in terms of organizational learning (recommendations and lessons learned) and is compliant with UNIDO's evaluation policy and these terms of reference. The draft and final evaluation report are reviewed by UNIDO Independent Evaluation Division, which will submit the final report to the GEF Evaluation Office and circulate it within UNIDO together with a management response sheet.

Annex 1: Project Logical Framework

Project Strategy		Objectively verifiable indicators				
		Indicator (quantified and time-bound)	**Baseline**	**Target**	**Source of verification**	**Risks and Assumptions**
Goal	To reduce and avoid GHG emission from the energy sector of Nigeria.	Incremental CO_2 emission reduction.	CO_2 emission due to diesel based power generation.	1. 5 MW of biomass based mini-grid capacity added during the project period.	1. Physical verification of projects in operation. 2. End of project survey.	Continuous support of all participating organizations, State Government and project investors.
Objective of the project	To promote renewable energy (biomass) based mini-grid as an alternative to diesel based energy generation systems in Nigeria	1. 5 MW of biomass based power generation. 2. Investments by financial institutions to biomass projects.	1. No biomass based power plant and mini-grid exists in Nigeria. 2. No practically workable support schemes available in Nigeria for the promotion of biomass projects.	1. 5 MW of biomass power plant capacity established. 2. Policy, regulatory regime established. 3. Replication potential of biomass projects identified.	1. Physical verification of Implemented project. 2. End of project survey.	1. Sustained government / investor support to the agreed project activities. 2. Commitment of Government agencies in building capacity and making policy changes.
Outcome 1	Preparatory works completed for facilitating replication in the identified potential sites.	Feasibility study, business plans and other power plant support/development activities and reports available for the potential replication sites.	No preparatory works for the replication of the biomass power plants have been taken	Techno-economic feasibility studies, business plans and other essential reports for the three identified sites.	Project reports.	Sustained Government support.
Project Component 1- Development of techno-economic feasibility studies and business plans for identified potential sites to facilitate replication.						

Project Strategy		Objectively verifiable indicators				
		Indicator (quantified and time-bound)	**Baseline**	**Target**	**Source of verification**	**Risks and Assumptions**
Output 1.1	Techno-economic feasibility studies and business plans developed for the 3 identified potential sites to facilitate replication.	1. Techno-economic feasibility studies and business plans for the identified sites 2. Reports on existing tax schemes, BoI privileges, required licenses and permits, environmental regulations, proposed government schemes, meteorological, seismic data and other relevant data for the implementation for the biomass project feasibility study sites	1. Techno-economic feasibility studies and business plans not available for the identified sites. 2. Very little information available on existing set-up and schemes	1. 3 techno-economic feasibility studies and business plans developed for the identified sites. 2. Other compiled reports	Project reports.	Sustained Government support.
Outcome 2	Acceptance by stakeholders on the technical and financial viability of selected site for setting up the biomass based mini-grid for rural electrification.	Investors ready to invest and agreement signed for implementing the biomass based mini-grid project.	Investors not ready to invest/develop biomass projects in Nigeria due to risks and lack of knowledge.	Investors are ready to invest in the biomass based mini-grid project identified for implementation.	Shareholder agreement.	Investors' support and Government support.
Project Component 2 - Demonstration of techno-economic viability of biomass based mini-grid.						

Project Strategy		Objectively verifiable indicators				
		Indicator (quantified and time-bound)	**Baseline**	**Target**	**Source of verification**	**Risks and Assumptions**
Output 2.1	A biomass based power plant of 5 MW installed capacity commissioned in the selected site along with mini-grid.	1. A biomass mini-grid of capacity 5 MW is established. 2. Electricity usage by the consumers. 3. CO_2 emission reduction from biomass electricity usage.	1. Biomass based mini-grid not in place. 2. Diesel based power generation in the absence of biomass based electricity. 3. No biomass electricity available.	1. A biomass based power plant including mini-grid is in operation. 2. 25,000 t CO_2 emission reduction annually from biomass electricity usage. 3. Above 31,000 MWh of annual electricity supply to various users from biomass mini-grid.	1. Physical verification of biomass power plant project. 2. Records of biomass power plant 3. UNIDO expert report	Sustained Government / investor support to agreed project activities.
Output 2.2	Capacity on biomass power plant operation and maintenance as well as mini-grid management developed	Trained personals in place for operation and maintenance of the biomass power plant including management of mini-grid.	No local capacity to operate, maintain power plant and mini-grid.	Number of operators identified and trained for the operation and maintenance of power plant and management of mini-grid.	1. Physical verification of operation and maintenance personal in the power plant. 2. Trainings given to operation and maintenance staff.	Sustained investor support to agreed project activities.
Output 2.3	The mini-grid independently monitored,	1. Plant performance study reports.	Biomass based mini-grid projects not in place to	1. Performance assessment report	Performance monitoring report, site visit/seminar,	Sustained investor support to visit the project while in

Project Strategy		Objectively verifiable indicators				
		Indicator (quantified and time-bound)	**Baseline**	**Target**	**Source of verification**	**Risks and Assumptions**
	evaluated, lessons learnt and information widely distributed	2. Full scale demonstration site visits and seminars. 3. Dissemination leaflets. 4. Website.	study the performance and to learn the lessons from.	2. Full scale demonstration site visits and seminar 3. Website 4. Project leaflet	programme evaluation form, seminar material, leaflet, website.	operation and data collection.
Outcome 3	Conducive financing and policy environment for promoting investments in rural mini-grids in place.	Favourable policy and investment conditions for biomass mini-grid projects.	The existing policy, financing, investment facilities are not adequate and institutional capacity for biomass mini-grid projects are limited.	1. Favourable policy and feed-in-tariff schemes are in place. 2. More and more financing institutions and investors ready to finance/invest. 3. Increased local capacity of institutions.	1. End of project survey 2. Final evaluation	Sustained government support to agreed project activities.
Project Component 3 - Strengthening of financial and policy environment to support RE based mini-grid systems						
Output 3.1	FiT for biomass power in place.	FiT for biomass power plant exporting electricity to national grid in place.	There is no FiT specific to the biomass projects in Nigeria.	FiT is in place for the biomass power projects.	1. End of project survey 2. Final evaluation	Sustained government support.
Output 3.2	Appropriate financing facility developed for RE related projects.	More supportive financing facility in place for RE related projects including biomass power projects.	Financing facility not in place to fund biomass mini-grid projects.	Exclusive financing facility available for RE projects including biomass projects.	1. End of project survey. 2. Final evaluation.	Support from commercial and development banks.

Project Strategy		Objectively verifiable indicators				
		Indicator (quantified and time-bound)	**Baseline**	**Target**	**Source of verification**	**Risks and Assumptions**
Outcome 4	Capacity of local planners, institutions and experts for RE based mini-grid enhanced.	1. Number of local planners, institutions and experts for RE based mini-grids trained. 2. Establishment of one-stop information centre for biomass/renewable energy	1. Number of local planners, institutions and experts do not have capacity to develop and implement biomass power plant mini-grids. 2. No such centralized information centre available	1. More than 100 persons trained. 2. Establishment and operation of the centre	1. No. of persons trained. 2. Training material 3. Training evaluation report	Sustained support from Government, local planners, institutions and experts for RE based mini-grids.
Project Component 4 - Capacity development for replication of RE mini-grid technologies.						
Output 4.1	Local capacity in designing mini-grid developed	Number of local companies trained on mini-grid design.	Lack of knowledge and experience in mini-grid design for biomass projects.	One training programme for mini-grid design conducted for local companies.	1. No. of persons trained. 2. Training material 3. Training evaluation report	Interest of local electrical companies.
Output 4.2	Experts, planners, and institutions are trained in developing biomass based energy and	1. Biomass project development and implementation training programme conducted 2. No. of participants benefited from the training	Lack of knowledge and experience in the development of biomass mini-grid projects in Nigeria.	1. Two biomass project development trainings conducted 2. More than 60 participants trained	1. No. of persons trained. 2. Training material 3. Training evaluation report	Sustained support from Government, local planners, institutions and experts for RE based mini-grids.

Project Strategy		Objectively verifiable indicators				
		Indicator (quantified and time-bound)	**Baseline**	**Target**	**Source of verification**	**Risks and Assumptions**
	mini-grid systems	3. Biomass mini-grid project development guide prepared		3. Biomass mini-grid project development guide prepared. 4.		
Output 4.3	Capacity of RE related and financing institutions strengthened.	Number of RE related and financial institutions trained.	Financing institutions lack knowledge on assessment and evaluation of biomass based mini-grid projects. RE institutions lack knowledge and skill in biomass based mini-grids.	Minimum of 5 financing institutions and 2 RE related institutions trained.	1. No. of persons trained. 2. Training material 3. Training evaluation report	Sustained support from Government renewable energy institutions and financial institutions support..
Output 4.4	Capacity of local engineering firms and O&M companies developed in operation and maintenance of biomass power plants and mini-grid systems.	Number of local engineering companies trained in operation and maintenance services.	There is no or very limited local capacity for operation and maintenance of biomass Power plants in Nigeria.	More than 2 local engineering firms ready to provide operation and maintenance service	1. No. of persons trained. 2. Training material 3. Training evaluation report	Support of local engineering companies.

Annex 2: Detailed questions to assess evaluation criteria: See Annex 2 of the UNIDO Evaluation Manual

Annex 3: Job descriptions

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

TERMS OF REFERENCE FOR PERSONNEL UNDER INDIVIDUAL SERVICE AGREEMENT (ISA)

Title:	International evaluation consultant, team leader
Main Duty Station and Location:	Home-based
Missions:	Missions to Vienna, Austria and Nigeria
Start of Contract (EOD):	1 December 2019
End of Contract (COB):	31 March 2020
Number of Working Days:	42 working days spread over the above mentioned period

1. ORGANIZATIONAL CONTEXT

The UNIDO Independent Evaluation Division (ODG/EIO/IED) is responsible for the independent evaluation function of UNIDO. It supports learning, continuous improvement and accountability, and provides factual information about result and practices that feed into the programmatic and strategic decision-making processes. Independent evaluations provide evidence-based information that is credible, reliable and useful, enabling the timely incorporation of findings, recommendations and lessons learned into the decision-making processes at organization-wide, programme and project level. ODG/EIO/IED is guided by the UNIDO Evaluation Policy, which is aligned to the norms and standards for evaluation in the UN system.

2. PROJECT CONTEXT

Detailed background information of the project can be found the terms of reference (TOR) for the terminal evaluation.

MAIN DUTIES	Concrete/ Measurable Outputs to be achieved	Working Days	Location
1. Review project documentation and relevant country background information (national policies and strategies, UN strategies and general economic data). Define technical issues and questions to be addressed by the national technical evaluator prior to the field visit. Determine key data to collect in the field and adjust the key data collection instrument if needed. In coordination with the project manager, the project management team and the national technical evaluator, determine the suitable sites to be visited and stakeholders to be interviewed.	• Adjusted table of evaluation questions, depending on country specific context; • Draft list of stakeholders to interview during the field missions. • Identify issues and questions to be addressed by the local technical expert	6 days	Home-based

MAIN DUTIES	Concrete/ Measurable Outputs to be achieved	Working Days	Location
2. Prepare an inception report which streamlines the specific questions to address the key issues in the TOR, specific methods that will be used and data to collect in the field visits, confirm the evaluation methodology, draft theory of change, and tentative agenda for field work. Provide guidance to the national evaluator to prepare initial draft of output analysis and review technical inputs prepared by national evaluator, prior to field mission.	• Draft theory of change and Evaluation framework to submit to the Evaluation Manager for clearance. • Guidance to the national evaluator to prepare output analysis and technical reports	5 days	Home based
3. Briefing with the UNIDO Independent Evaluation Division, project managers and other key stakeholders at UNIDO HQ (included is preparation of presentation).	• Detailed evaluation schedule with tentative mission agenda (incl. list of stakeholders to interview and site visits); mission planning; • Division of evaluation tasks with the National Consultant.	2 day	Through skype
4. Conduct field mission to in 2019[13].	• Conduct meetings with relevant project stakeholders, beneficiaries, the GEF Operational Focal Point (OFP), etc. for the collection of data and clarifications; • Agreement with the National Consultant on the structure and content of the evaluation report and the distribution of writing tasks; • Evaluation presentation of the evaluation's preliminary findings, conclusions and recommendations to stakeholders in the country, including the GEF OFP, at the end of the mission.	14 days	(specific project site to be identified at inception phase)

[13] The exact mission dates will be decided in agreement with the Consultant, UNIDO HQ, and the country counterparts.

MAIN DUTIES	Concrete/ Measurable Outputs to be achieved	Working Days	Location
5. Present overall findings and recommendations to the stakeholders at UNIDO HQ	• After field mission(s): Presentation slides, feedback from stakeholders obtained and discussed.	2 day	Vienna, Austria
6. Prepare the evaluation report, with inputs from the National Consultant, according to the TOR; Coordinate the inputs from the National Consultant and combine with her/his own inputs into the draft evaluation report. Share the evaluation report with UNIDO HQ and national stakeholders for feedback and comments.	• Draft evaluation report.	10 day	Home-based
7. Revise the draft project evaluation report based on comments from UNIDO Independent Evaluation Division and stakeholders and edit the language and form of the final version according to UNIDO standards.	• Final evaluation report.	3 day	Home-based
	TOTAL	42 days	

REQUIRED COMPETENCIES

Core values:

1. Integrity
2. Professionalism
3. Respect for diversity

Managerial competencies (as applicable):

1. Strategy and direction
2. Managing people and performance
3. Judgement and decision making
4. Conflict resolution

Core competencies:

1. Results orientation and accountability
2. Planning and organizing
3. Communication and trust
4. Team orientation
5. Client orientation
6. Organizational development and innovation

MINIMUM ORGANIZATIONAL REQUIREMENTS

Education:

Advanced degree in environment, energy, engineering, development studies or related areas.

Technical and functional experience:

- Minimum of 15 years' experience in evaluation of development projects and programmes
- Good working knowledge in environmental management
- Knowledge about GEF operational programs and strategies and about relevant GEF policies such as those on project life cycle, M&E, incremental costs, and fiduciary standards
- Experience in the evaluation of GEF projects and knowledge of UNIDO activities an asset
- Knowledge about multilateral technical cooperation and the UN, international development priorities

and frameworks
- Working experience in developing countries

Languages:
Fluency in written and spoken English is required.
All reports and related documents must be in English and presented in electronic format.

Absence of conflict of interest:
According to UNIDO rules, the consultant must not have been involved in the design and/or implementation, supervision and coordination of and/or have benefited from the programme/project (or theme) under evaluation. The consultant will be requested to sign a declaration that none of the above situations exists and that the consultants will not seek assignments with the manager/s in charge of the project before the completion of her/his contract with the UNIDO Independent Evaluation Division.

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

TERMS OF REFERENCE FOR PERSONNEL UNDER INDIVIDUAL SERVICE AGREEMENT (ISA)

Title:	National evaluation consultant
Main Duty Station and Location:	Home-based
Mission/s to:	Travel to potential sites within Nigeria
Start of Contract:	1 December 2019
End of Contract:	31 March 2020
Number of Working Days:	32 days spread over the above-mentioned period

ORGANIZATIONAL CONTEXT

The UNIDO Independent Evaluation Division (ODG/EIO/IED) is responsible for the independent evaluation function of UNIDO. It supports learning, continuous improvement and accountability, and provides factual information about result and practices that feed into the programmatic and strategic decision-making processes. Independent evaluations provide evidence-based information that is credible, reliable and useful, enabling the timely incorporation of findings, recommendations and lessons learned into the decision-making processes at organization-wide, programme and project level. ODG/EIO/IED is guided by the UNIDO Evaluation Policy, which is aligned to the norms and standards for evaluation in the UN system.

PROJECT CONTEXT

The national evaluation consultant will evaluate the projects according to the terms of reference (TOR) under the leadership of the team leader (international evaluation consultant). S/he will perform the following tasks:

MAIN DUTIES	**Concrete/measurable outputs to be achieved**	**Expected duration**	**Location**
Desk review Review and analyze project documentation and relevant country background information; in cooperation with the team leader, determine key data to collect in the field and prepare key instruments in English (questionnaires, logic models); If need be, recommend adjustments to the evaluation framework and Theory of Change in order to ensure their understanding in the local context.	Evaluation questions, questionnaires/interview guide, logic models adjusted to ensure understanding in the national context; A stakeholder mapping, in coordination with the project team.	4 days	Home-based
Carry out preliminary analysis of pertaining technical issues determined with the Team Leader. In close coordination with the project staff team verify the extent of achievement of project outputs prior to field visits.	• Report addressing technical issues and question previously identified with the Team leader • Tables that present extent of achievement of project outputs	6 days	Home-based

MAIN DUTIES	**Concrete/measurable outputs to be achieved**	**Expected duration**	**Location**
Develop a brief analysis of key contextual conditions relevant to the project	• Brief analysis of conditions relevant to the project		
Coordinate the evaluation mission agenda, ensuring and setting up the required meetings with project partners and government counterparts, and organize and lead site visits, in close cooperation with project staff in the field.	• Detailed evaluation schedule. • List of stakeholders to interview during the field missions.	2 days	Home-based
Coordinate and conduct the field mission with the team leader in cooperation with the Project Management Unit, where required; Consult with the Team Leader on the structure and content of the evaluation report and the distribution of writing tasks. Conduct the translation for the Team Leader, when needed.	• Presentations of the evaluation's initial findings, draft conclusions and recommendations to stakeholders in the country at the end of the mission. • Agreement with the Team Leader on the structure and content of the evaluation report and the distribution of writing tasks.	12 days (including travel days)	In
Follow up with stakeholders regarding additional information promised during interviews Prepare inputs to help fill in information and analysis gaps (mostly related to technical issues) and to prepare of tables to be included in the evaluation report as agreed with the Team Leader. Revise the draft project evaluation report based on comments from UNIDO Independent Evaluation Division and stakeholders and proof read the final version.	• Part of draft evaluation report prepared.	8 days	Home-based
TOTAL		**32 days**	

REQUIRED COMPETENCIES

Core values:

1. Integrity
2. Professionalism
3. Respect for diversity

Core competencies:

1. Results orientation and accountability
2. Planning and organizing
3. Communication and trust
4. Team orientation
5. Client orientation

Managerial competencies (as applicable):

1. Strategy and direction
2. Managing people and performance
3. Judgement and decision making
4. Conflict resolution

6. Organizational development and innovation

MINIMUM ORGANIZATIONAL REQUIREMENTS

Education: Advanced university degree in environmental science, engineering or other relevant discipline like developmental studies with a specialization in industrial energy efficiency and/or climate change.

Technical and functional experience:

- Excellent knowledge and competency in the field of environmental management and renewable energies
- Evaluation experience, including evaluation of development cooperation in developing countries is an asset
- Exposure to the needs, conditions and problems in developing countries.
- Familiarity with the institutional context of the project is desirable.

Languages: Fluency in written and spoken English and is required.

Absence of conflict of interest:

According to UNIDO rules, the consultant must not have been involved in the design and/or implementation, supervision and coordination of and/or have benefited from the programme/project (or theme) under evaluation. The consultant will be requested to sign a declaration that none of the above situations exists and that the consultants will not seek assignments with the manager/s in charge of the project before the completion of her/his contract with the UNIDO Independent Evaluation Division.

Annex 4- Outline of an in-depth project evaluation report

Executive summary (maximum 5 pages)

Evaluation purpose and methodology
Key findings
Conclusions and recommendations
Project ratings
Tabular overview of key findings – conclusions – recommendations

1. Introduction

1.1. Evaluation objectives and scope
1.2. Overview of the Project Context
1.3. Overview of the Project
1.4. Theory of Change
1.5. Evaluation Methodology
1.6. Limitations of the Evaluation

2. Project's contribution to Development Results - Effectiveness and Impact

2.1. Project's achieved results and overall effectiveness
2.2. Progress towards impact
2.2.1. Behavioural change
2.2.1.1. Economically competitive - Advancing economic competitiveness
2.2.1.2. Environmentally sound – Safeguarding environment
2.2.1.3. Socially inclusive – Creating shared prosperity
2.2.2. Broader adoption
2.2.2.1. Mainstreaming
2.2.2.2. Replication
2.2.2.3. Scaling-up

3. Project's quality and performance

3.1. Design
3.2. Relevance
3.3. Efficiency
3.4. Sustainability
3.5. Gender mainstreaming

4. Performance of Partners

4.1. UNIDO
4.2. National counterparts
4.3. Donor

5. Factors facilitating or limiting the achievement of results

5.1. Monitoring & evaluation
5.2. Results-Based Management
5.3. Other factors
5.4. Overarching assessment and rating table

6. **Conclusions, recommendations and lessons learned**

6.1. Conclusions
6.2. Recommendations
6.3. Lessons learned
6.4. Good practices

Annexes (to be put online separately later)

- Evaluation Terms of Reference
- Evaluation framework
- List of documentation reviewed
- List of stakeholders consulted
- Project logframe/Theory of Change
- Primary data collection instruments: evaluation survey/questionnaire
- Statistical data from evaluation survey/questionnaire analysis

Annex 5: Checklist on evaluation report quality

Project Title:
UNIDO ID:
Evaluation team:
Quality review done by: Date:

Report quality criteria	UNIDO IEV assessment notes	Rating
a. Was the report well-structured and properly written? (Clear language, correct grammar, clear and logical structure)		
b. Was the evaluation objective clearly stated and the methodology appropriately defined?		
c. Did the report present an assessment of relevant outcomes and achievement of project objectives?		
d. Was the report consistent with the ToR and was the evidence complete and convincing?		
e. Did the report present a sound assessment of sustainability of outcomes or did it explain why this is not (yet) possible? (Including assessment of assumptions, risks and impact drivers)		
f. Did the evidence presented support the lessons and recommendations? Are these directly based on findings?		
g. Did the report include the actual project costs (total, per activity, per source)?		
h. Did the report include an assessment of the quality of both the M&E plan at entry and the system used during the implementation? Was the M&E sufficiently budgeted for during preparation and properly funded during implementation?		
i. Quality of the lessons: were lessons readily applicable in other contexts? Did they suggest prescriptive action?		
j. Quality of the recommendations: did recommendations specify the actions necessary to correct existing conditions or improve operations ('who?' 'what?' 'where?' 'when?'). Can these be immediately implemented with current resources?		
k. Are the main cross-cutting issues, such as gender, human rights and environment, appropriately covered?		
l. Was the report delivered in a timely manner? (Observance of deadlines)		

Rating system for quality of evaluation reports
A rating scale of 1-6 is used for each criterion: Highly satisfactory = 6, Satisfactory = 5, Moderately satisfactory = 4, Moderately unsatisfactory = 3, Unsatisfactory = 2, Highly unsatisfactory = 1, and unable to assess = 0.

Annex 6: Guidance on integrating gender in evaluations of UNIDO projects and Projects

A. Introduction

Gender equality is internationally recognized as a goal of development and is fundamental to sustainable growth and poverty reduction. The UNIDO Policy on gender equality and the empowerment of women and its addendum, issued respectively in April 2009 and May 2010 (UNIDO/DGB(M).110 and UNIDO/DGB(M).110/Add.1), provides the overall guidelines for establishing a gender mainstreaming strategy and action plans to guide the process of addressing gender issues in the Organization's industrial development interventions.
According to the UNIDO Policy on gender equality and the empowerment of women:
Gender equality refers to the equal rights, responsibilities and opportunities of women and men and girls and boys. Equality does not suggest that women and men become 'the same' but that women's and men's rights, responsibilities and opportunities do not depend on whether they are born male or female. Gender equality implies that the interests, needs and priorities of both women and men are taken into consideration, recognizing the diversity of different groups of women and men. It is therefore not a 'women's issues'. On the contrary, it concerns and should fully engage both men and women and is a precondition for, and an indicator of sustainable people-centered development.
Empowerment of women signifies women gaining power and control over their own lives. It involves awareness-raising, building of self-confidence, expansion of choices, increased access to and control over resources and actions to transform the structures and institutions which reinforce and perpetuate gender discriminations and inequality.
Gender parity signifies equal numbers of men and women at all levels of an institution or organization, particularly at senior and decision-making levels.
The UNIDO projects/projects can be divided into two categories: 1) those where promotion of gender equality is one of the key aspects of the project/project; and 2) those where there is limited or no attempted integration of gender. Evaluation managers/evaluators should select relevant questions depending on the type of interventions.

B. Gender responsive evaluation questions

The questions below will help evaluation managers/evaluators to mainstream gender issues in their evaluations.

B.1. Design

- Is the project/project in line with the UNIDO and national policies on gender equality and the empowerment of women?
- Were gender issues identified at the design stage?
- Did the project/project design adequately consider the gender dimensions in its interventions? If so, how?
- Were adequate resources (e.g., funds, staff time, methodology, experts) allocated to address gender concerns?
- To what extent were the needs and priorities of women, girls, boys and men reflected in the design?
- Was a gender analysis included in a baseline study or needs assessment (if any)?
- If the project/project is people-centered, were target beneficiaries clearly identified and disaggregated by sex, age, race, ethnicity and socio-economic group?
- If the project/project promotes gender equality and/or women's empowerment, was gender equality reflected in its objective/s? To what extent are output/outcome indicators gender disaggregated?

B.2. Implementation management

- Did project monitoring and self-evaluation collect and analyse gender disaggregated data?
- Were decisions and recommendations based on the analyses? If so, how?

- Were gender concerns reflected in the criteria to select beneficiaries? If so, how?
- How gender-balanced was the composition of the project management team, the Steering Committee, experts and consultants and the beneficiaries?
- If the project/project promotes gender equality and/or women's empowerment, did the project/project monitor, assess and report on its gender related objective/s?

B.3. Results

- Have women and men benefited equally from the project's interventions? Do the results affect women and men differently? If so, why and how? How are the results likely to affect gender relations (e.g., division of labour, decision making authority)?
- In the case of a project/project with gender related objective/s, to what extent has the project/project achieved the objective/s? To what extent has the project/project reduced gender disparities and enhanced women's empowerment?

ANNEX 3 – In-country schedule (National Evaluation Consultant)

Day	Proposed date	Activity	Location	Stakeholder	Focal point	Knowledge of Project	Assumptions/Remarks
Day 1	Tues 14 Sept 2021	Air travel to Abuja, Nigeria.	Home - Abuja				
Day 2	Weds 15 Sept 2021	Introductions and planning at UNIDO Regional Office and confirm meetings already set up. Conduct meetings, 1.GEF Operational Focal Point (OFP), 2. Federal Ministry of Power, 3. Energy Commission of Nigeria (ECN), 4. Ministry of Environment, 5. Ministry of Budget and National Planning, 6. Nig. Electricity Regulatory Commission (NERC) 7. Nat. Sugar Devt Council. (NSDC)	Abuja	NERC ***(9:00 a.m.)***	Mr. Chinedu Ukabiala	Full	- UNIDO Nig. Office would have sent pre-intro mails to all stakeholders. - Interview date, time and location(s) confirmed according to their availability.
				ECN ***(11:00 a.m.)***	Prof. Eli Jidere Bala	Full	
				FM-Budget ***(2:00 p.m.)***	Mrs. Elizabeth Egharevba	Limited	
				NSDC	Mr. Hezekiah Kolawole	Limited	
				FMEnv	Dr. (Mrs) Bolatito Obisesan	Scanty	
Day 3	Thurs 16 Sept 2021	Conduct remaining meetings with relevant project stakeholders as they are available.	Abuja	GEF OFP ***(11:00 a.m.)***	Mr. Stanley Jonah	Limited	
				FM-Power	Engr. Faruk Yusuf Yabo	Scanty	
Day 4	Fri 17 Sept 2021	Travel to Lagos (by air). Conduct meetings and interviews in Lagos e.g. Ministry of Energy, private sector, financiers, Bank of Industry, biomass technology providers, etc. ABJ – LAG (***first flight)***	Lagos	Bank of Industry	Mr. Austin Egwuche	Full Took part in PSC meetings	- Contact details of (Lagos) private sector stakeholders, biomass tech. providers provided by UNIDO HQ and Nig. Office. - Interview date, time and location(s) confirmed according to their availability.
Day 5	Sat 18 Sept 2021	Conduct further meetings in Lagos if possible, then compilation of data and make any clarifications.	Lagos	MAN	Dr. Osidipe	Fair Part of PSC in Ogun State	Physical meeting might not possible due to weekend, except follow-ups by telephone calls/emails.
Day 6	Sun 19 Sept 2021	**Lagos**	**Lagos**				
Day 7	Mon 20 Sept 2021	Leave to Akure, Ondo State (by flight) to Conduct meetings/interviews assess pre-feasibility and development work done on biomass electricity plants. Flight: ***Overland Airways***	Akure; Ondo State	Ondo State Government	Mr. Olusegun Awodogan	Fair Project Anchor and liason person with Sawmill Owners	
				Assoc. of Sawmillers	Elder Ogumade Ayodele Benson	Good. Rep. of the Sawmill Association in	

Day	Proposed date	Activity	Location	Stakeholder	Focal point	Knowledge of Project	Assumptions/Remarks
						Ondo State and helped to coordinate his members.	
Day 8	Tues 21 Sept 2021	Travel to Lagos ***(by air)*** and **proceed** to Abeokuta Ogun State ***by road (car rental)*** to assess wood waste projects pre-feasibility and development work done on biomass electricity plants. ***Travel back to Lagos.***	Lagos – Abeokuta - Lagos	Assoc. of Sawmillers	Mr. Ope Banjo	Good In areas of techno-economic feasibility studies.	
				Ogun State Govt.	Mr. Kayode Onanuga	Good. Project Anchor Member of PSC in Ogun State.	
Day 9	Weds 22 Sept 2021	**Update:** **Stay in Lagos:**	**Lagos**				**The Hon. Commissioner/Stakeholders in Ebonyi State advised the TE-Team to arrive in Ebonyi on the 23rd Sept.**
Day 10	Thurs 23 Sept 2021	- Air travel from Lagos to Ebonyi (Enugu Airport) and drive to sites near Abakaliki (Ikwo and Uburu). - Visit to biomass project sites at Ikwo and Uburu and interviews with stakeholders.	Abakaliki Ebonyi State				
Day 11	Fri 24 Sept 2021	Further interviews with State Government and local stakeholders as relevant.	Abakaliki Ebonyi State	Ebonyi State Government	Hon. Mrs. Ann Aligwe	Good Served as Ebonyi State Focal Point to UNIDO. She is now a State Commissioner and serves as State Focal Point for the 1.5MW biomass power plant	
				Rice Mill Owners Association	Hon. Chief Vincent Nwibo	Full Part of Project since inception	
Day 12	Sat 25 Sept 2021	Return (air travel) from Ebonyi (Enugu Airport) to Abuja.	Ebonyi State - Abuja				
Day 13	Sun 26 Sept 2021	Further meetings as required with UNIDO and initial presentation of evaluation preliminary findings to	Abuja – Home base				

Day	Proposed date	Activity	Location	Stakeholder	Focal point	Knowledge of Project	Assumptions/Remarks
		UNIDO with conclusions and recommendations made available to stakeholders in the country. Wrap up of National Consultant work and departure from Abuja.					

ANNEX 4 - Interview Questionnaire

Mini-Grid Based Renewable Energy (Biomass) Sources to Augment Rural Electrification

UNIDO ID: 100260

Interviewee details:

Name_____

Institution / Employer_____

Place of work address_____

Length of employment_____

Questions:

1. Please describe how have you been involved in the project and for how long?

   _____

   _____

   _____

   _____

   _____

   _____

2. Are their specific components in the project you have been involved with? Please elaborate….

   [NB. Component 1 - Development of techno-economic feasibility studies and business plans
   Component 2 - Demonstration of a biomass based mini-grid projects
   Component 3 - Strengthening of financial and policy environment to support biomass mini-grid projects
   Component 4 - Capacity development (training) for replication of biomass mini-grid technologies]

   _____

   _____

   _____

   _____

   _____

3. What are the OBJECTIVES of the project as understood by you/your institution?

   _____

   _____

   _____

   _____

   _____

4. How would you describe the IMPACT of the project particularly any long-term effects produced?

   _____

   _____

   _____

   _____

   _____

   _____

   _____

5. Would you say that the project is in line with the priorities and policies of your institution? Please elaborate….

_____

_____

_____

_____

_____

6. Did the project have COMPATIBILITY with policies of other institutions involved and to the country as a whole?

_____

_____

_____

_____

_____

7. What INPUTS did your institution commit to in the project (i.e. funding, time, services etc.)?

_____

_____

_____

_____

_____

8. What BENEFITS have you seen arise from the project (i.e. electrification services, uplift of incomes, training, environmental improvement etc.)?

_____

_____

_____

_____

_____

9. Would you say that these benefits will CONTINUE to be ensured in the short, medium or long-term?

_____

_____

_____

_____

_____

10. How were GENDER issues integrated into the project (i.e. involvement of women in decision making etc.)?

_____

_____

_____

_____

_____

11. Did you/your institution MONITOR the project in any way? Please describe the tools used…..

_____

_____

_____

_____

_____

12. Have you/your institution formally ASSESSED or EVALUATED whether the project is having the desired results? How was this done?

_____

_____

_____

_____

_____

13. Do you have any comments about how UNIDO and other donors to the project managed the design, implementation, monitoring, reporting, supervision, backstopping and evaluation of the project?

_____

_____

_____

_____

_____

14. Overall, how would you assess this project intervention?

_____

_____

_____

_____

_____

Date of interview:

Name and signature of interviewer:

ANNEX 5 – People Met in the Evaluation

Name	Institution	Position	Phone	E-mail
Mr. Chinedu Ukabiala	Nigeria Electricity Regulatory Commission (NERC)	Deputy General Manager of Generation, Engineering, Performance, Monitoring	+234 805 516 0180	chinedum.ukabiala@nerc.gov.ng; ukabialachinedum@yahoo.com
Prof. Eli Jidere Bala	Energy Commission of Nigeria (ECN)	Director Genera	+234 803 334 3977	dg@energy.gov.ng; elijidere@gmail.com
Engr. Okon Ekpenyong	ECN	Deputy Director		ekpenyongokon@yahoo.com
Mrs. Elizabeth Egharevba	Ministry of Budget and National Planning	Director, International Cooperation (IC) Department.	+234 803 426 4007	begharevba@gmail.com
Mr. Hezekiah Kolawole	National Sugar Development Council (NSDC)	Director (Policy, Planning, Research & Statistics)	+234 803 5986234 +234 815 5611653	hkolawole@nsdc.gov.ng; kolawolehezekiah@yahoo.co.uk
Dr. (Mrs) Bolatito Obisesan	Federal Ministry of Environment (FMEnv)	Retired	+234 805 547 8494	drbolatitoo@gmail.com
Mr. Stanley Jonah	GEF -Operational Focal Point (OFP)	Director of Planning, Research & Statistics	+234 803 450 0728	husseini.ambo@gmail.com
Engr. Faruk Yusuf Yabo	Federal Ministry of Power (FMP)		+234 803 852 1476	fyyabo@yahoo.com
Mr. Austin Egwuche	Bank of Industry (BOI)	Head of Renewable Energy (Investment) Department	+234 802 306 3137	aegwuche@boi.ng
Dr. Israel Olusegun Osidipe (joined by Mr. Oweh Mba-Sam)	Manufacturers Association of Nigeria (MAN)	Assistant Director	+234 909 810 8177 +234 803 373 7635	israel_osidipe@yahoo.com
Mr. Olusegun Awodogan	Ondo State Government	Director of Planning, Research & Statistics, Ministry of Commerce and Industry	+234 806 516 9433	olusegunawodogan@yahoo.com

Name	Institution	Position	Phone	E-mail
Elder Ogumade Ayodele Benson	Ondo Assoc. of Sawmillers	Treasurer and Public Relations Officer	+234 803 420 1383	victoriaogunmade2020@gmail.com
Mr. Ope Banjo	Ogun Assoc. of Sawmillers	Liaison Officer	+234 803 551 9810	opsydodomayana@gmail.com
Mr. Kayode Onanuga	Ogun State Govt.	Director of Planning, Research & Statistics, Ministry of Forestry,	+234 803 474 5446	Kaycrown2002@yahoo.com
Hon. Mrs. Ann Aligwe	Ebonyi State Government	Hon. Commissioner, Ministry of Human Capital Development and Monitoring	+234 803 332 4661	anekaligwe@gmail.com
Hon. Chief Vincent Nwibo	Rice Mill Owners Association	President, Abakaliki Rice Mill Owners Association	+234 806 693 1719 +234 809 493 0807	vincentnwibo03@gmail.com
Mr. Reuben Bamidele	UNIDO	Project Officer	+234 9 2205009 +234 803 321 6539	r.bamidele@unido.org

ANNEX 6 – Pictures from the field mission

Ikwo 1 MW Site – 23 September 2021

National Evaluation Consultant inspecting the plant

Overview of Ikwo site alongside rice husk storage and energy plant building

Condition of storage of 1 MW engine

Condition of storage of 1 MW generator

Corroded condition of vessel and pipework and missing flange bolts on Buffer Tank

The main components on site are missing a protective rooftop

Uburu 0.5 MW Site – 23 September 2021

National Evaluation Consultant inspecting the site with two ESG engineers

Overview of Uburu site alongside rice husk storage and energy plant building

Condition of storage of 0.5 WM engine and generator

The main components on site are missing a protective rooftop

Extent of corrosion and poor welding on some of the pipework

ANNEX 7 – Bibliography

1. UNIDO Evaluation Policy (2015)
2. UNIDO Guidelines for Technological Co-operation and Project Cycle (2006)
3. UNIDO Evaluation Manual (2018)
4. OECD/DAC Glossary of Key Terms in Evaluation and Results Based Management
5. OECD/DAC Network on Development Evaluation 'Better Criteria for Better Evaluation' (2019)
6. GEF's Monitoring & Evaluation Policy (2010)
7. Guidelines for GEF Agencies in Conducting Terminal Evaluations for Full-sized Projects (2017)