

Terminal Evaluation Report

UNDP-GEF Project: De-risking renewable energy NAMA for the Nigerian power sector

GEF Project ID: 5345		UNDP Project ID: 5243
Country:	Nigeria	
Region:	Africa	
Focal Area:	Climate Change (GEF-5)	
GEF Agency:	United Nations Development Programme	
Executing Agencies:	Energy Commission of Nigeria	



Final Report Submitted on 28th November 2021

Opening Page

PROJECT DETAILS:

Project Name:	De-risking renewable energy NAMA for the Nigerian power sector	
Project ID:	UNDP PIMS ID: 5243	GEF Project ID: 5345
Country:	Nigeria	
Region:	Africa	
Focal Area:	Climate change (GEF-5)	
Focal Area Objective/Outcome:	Objective 3 (CCM-3): Promote investment in renewable energy technologies Expected Outcome: Favorable policy and regulatory environment created for renewable energy investments Expected Outcome: Investment in renewable energy technologies increased	
Funding Source:	GEF Trust Fund	
Implementing Agency:	United Nations Development Programme	
Implementation Modality:	National Implementation Modality (NIM)	
Executing Partner(s):	Federal Ministry of Environment, Federal Ministry of Power, Energy Commission of Nigeria, Nigerian Electricity Regulatory Commission	

FINANCIALS:

Project Preparation Grant:	USD 130,000
GEF Project Grant:	USD 4,400,000
Cofinancing Total:	USD 213,550,000
GEF Agency Fees:	USD 418,000
Total Cost:	USD 218,080,000

PROJECT TIMELINE:

Received by GEF:	21 March 2013
Preparation Grant Approved:	12 September 2013
Concept Approved:	01 November 2013
Project Approved for Implementation:	04 April 2016
State Date:	28 June 2016
Closing Date (Planned):	28 June 2021

TE DETAILS:

TE Timeframe:	Aug-Sep. 2021
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TE Reporting Language:	English

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Executive Summary

1. This Terminal Evaluation is undertaken on completion of the “De-risking renewable energy NAMA for the Nigerian power sector” project. The evaluation set out to assess the project performance (in terms of relevance, effectiveness and efficiency), and determine outcomes and impacts (actual and potential) stemming from the project, including their sustainability. The evaluation has two primary purposes: (i) to provide evidence of results to meet accountability requirements, and (ii) to promote operational improvement, learning and knowledge- sharing through results and lessons learned among UNDP programmes and in the Government of Nigeria. The evaluation further aims to identify lessons of operational relevance for future project formulation and implementation.
2. This project, implemented from 2016 to 2021, intended to Promote investment in renewable energy technologies in Nigeria. The stated objective of the project was to support the Government of Nigeria to develop a Nationally Appropriate Mitigation Action (NAMA) for the Nigerian power sector. The NAMA was targeting solar photovoltaic (PV) technology, primarily to achieve a transformation in the electricity mix such that at least 20 GW of Nigeria’s electricity is generated from solar PV by 2030.
3. The project was implemented under a national implementation modality. According to the project document, the Federal Ministry of Environment (FME) was the lead implementing partner executing agency through the Energy Commission of Nigeria (ECN). FME appointed a senior officer as a Project Director to: i) coordinate the project activities with the activities of other Government entities; and ii) certify that the expenditures are in line with the approved budgets and work-plans. A project steering committee (PSC) was also created.
4. The project was supported through a grant of USD 4,400,000 made available by the Global Environmental Facility. This funding was to be paired with USD 213,550,000 in-kind co-financing commitments from project partners, for a total project budget of USD 218,080,000.
5. The project sought to offer comprehensive technical assistance across three project components towards achieving the targeted objective of designing and implementing a Renewable Energy NAMA in the Nigerian Power Sector, applying relevant NAMA methodologies and guidance for identifying and designing technology-specific (in this case solar PV) NAMA components, and piloting the implementation of the NAMA by means of grid-connected solar PV plant with quantified GHG emission reductions. These components provided a comprehensive approach for creating an environment conducive to coherent de-risking for catalyzing private sector investment to implement renewable energy power sector NAMA.
6. GEF funding was allocated under Components 1 and 2 to strengthen the enabling environment, i.e., de-risking investments into utility-scale renewable energy (RE). Component 3 sought to establish the first commercial on-grid RE project to demonstrate a proof of concept grid-connected solar PV plant with quantified GHG emission reductions.

Evaluation Findings and Conclusions

7. **Strategic relevance:** The project was aligned to Objective 3 of the GEF-5 climate change focal area strategy, aimed at promoting investment in renewable energy technologies. The project

was informed by the DREI analysis carried out during the PPG phase in broad stakeholder consultation. The project and programme of work was aligned to important national development plans, strategies and policies. The project was aligned to the NV20:2020, the National Energy Policy, the National Energy Master Plan and the Economic Recovery and Growth Plan (ERGP) among others. The promotion of renewable energy in Nigeria remains consistent with the strategic priorities of Global Environmental Facility, UNDP Country Programme (CPD 2018-2022), United Nations Sustainable Development Partnership Framework (UNSDPF) for Nigeria and the 2030 Agenda for Sustainable Development (SDGs). Relevance was reinforced by the significant response to the emerging expanding energy needs of Nigeria.

8. **Quality of project design:** The project was found to be well designed and well-timed to coincide with an anticipated expanded demand for energy in the country. The broad combination of interventions was well chosen to create a comprehensive enabling framework for promoting private sector investment in renewable energy technologies in Nigeria. Weaknesses in the design were related to (i) lack of clarity for advancing the policy and financial de-risking instruments into governmental or financial sector reforms, i.e., de-risking investments into utility-scale RE; and (ii) heavy reliance on Government partners and slow bureaucratic processes to progress key delivery milestones.
9. **Effectiveness** (attainment of project objectives and results): As a result of the actions carried out by the project, the outcomes were rated as moderately unsatisfactory. This is because the primary project objective to develop and operationalize the 100-MW solar PV plant in Bauchi State (later re-oriented towards development and operationalization of the 15 interconnected mini-grids) could not be achieved within the scope of the project. These proposed investments could not reach financial close largely due to the changes introduced by the Government in the terms of signed Power Purchase Agreements (“PPA”) that replaced originally agreed tariff from USD 11.5 cents/kWh to USD 7.5 cents/kWh and which subsequently made the investment less attractive to the lenders. Additionally, due to the lack of solvency in the power sector, largely because of shortcomings in the privatization of the power generation and distribution services, the Federal Government of Nigeria was reluctant to enter into put-call option agreements (PCOAs) or offer a take-or-pay contract, which act as sovereign guarantees for the private sector investments.
10. The project successfully implemented components 1 and 2 of the project. It managed to establish a highly credible knowledge base that will continue to inform policy, planning and development decisions in Nigeria and potentially also other countries around the continent. The portfolio of resources developed for training, communication and awareness building is extensive, creating a comprehensive platform for learning and informing future direction by all role players. These include:
 - a) a Web GIS based tool for identifying potential renewable energy sites in Nigeria
 - b) a report on “De-risking Interconnected Solar Mini-Grid Investment in Nigeria”
 - c) a Training Manual/Curriculum on Interconnected Mini-Grids: Business Plan Development and Loan Application Procedures in Nigeria
 - d) Guidelines for Environmental and Social Safeguard for interconnected mini-grids in Nigeria
 - e) Environmental and Social Impact Assessment (ESIA) Framework for Interconnected

Mini-Grid Development in Nigeria

- f) A Set of Social and Environmental Safeguards for all Utility Scale Renewable Energy for Interconnected Mini-Grids based on International Standards.
- g) a report on “Lessons Learned from the Development of DREI Project: Development of 1st – Ever Utility Scale Solar in Nigeria/Mini-Grids”
- h) Three comprehensive sectoral NAMA renewable energy (RE) technology action plans (TAPs) for Solar, Wind and Biomass
- i) An MRV Mechanism including Grid Emission Factor for the Nigerian Power Sector.
- j) Nigerian Domestic Financial Sector Reform to Unlock Low-Cost Local Capital for Green Investment.
- k) A Compendium of Renewable Energy Investment Incentives in Nigeria

11. Awareness regarding these resources was enhanced by the many awareness and communication events carried by the project; though there still exists an opportunity for increased awareness and utilization. To maximize the impact and contribution of these resources, material should preferably be made available online for download and wider dissemination.
12. The project had limited success with Component 3, the investment part of the project due to the inability in reaching financial close for either the planned solar PV plant in Bauchi State or the 15 interconnected mini-grids that were identified in the later parts of the project; none of these investments managed to get off the ground due to their inability to unlock financing opportunities. The failure of the Federal Government of Nigeria to provide sovereign guarantees for the private sector investments severely impacted implementation. Consequently, there was no achievement on this component and therefore also the overall objective of the project.
13. Despite not all outcomes being met in full, a robust platform has been established consisting of a sound knowledge base of de-risking instruments, and definite growth in capacity and awareness among stakeholders.
14. **Efficiency:** The project execution was slow in the beginning, with an 11-month delay from the official start date. The reasons for the delay included the prolonged time required to recruit the PMU team, difficulties faced in recruitment of international consultants and transitions within government administration, particularly the GEF operational focal point office. The delay in commencing project implementation adversely affected project efficiency, but the lack of progress towards achieving the project objective is largely due to the external factor of the IPPs not reaching financial close.

Due to the inability of the baseline project of 100 MW plant in Bauchi State by the Nigerian Solar Capital Partner (one of the 14 Independent Power Producers (IPPs) to reach financial close), the project reoriented its focus to inter-connected mini-grids in the second half of project implementation.

15. The project further did a good job in facilitating stakeholder engagement by convening several workshops and meetings. Procurement of technical consultancies was successful in recruiting qualified consultants and service providers.

16. The assessment of project implementation and execution were generally satisfactory for the components that were achieved but overall efficiency was diminished by the various delays experienced at the beginning and during project implementation.
17. **Sustainability:** Evaluation did not find adequate evidence that socio-political commitment, financial resources and institutional capacity had been created to ensure sustainability without further support. The financial risks identified at project development are still in place and leveraging investments for the renewable energy investments still require governmental commitment as a requisite for reaching financial close.

Conclusions and recommendations:

18. The project contributed significantly to production of extensive training, communication and awareness building on de-risking RE investments. There is need to expand the reach of communication and information sharing efforts and to ensuring continuation of the dissemination efforts after project conclusion. Any initiative promoting renewable energy stands to benefit greatly from these. It is critical that a repository of the project resources including publications, guidelines, technical notes, video clips and training material, among others, be made available online through a website with parallel efforts in Nigeria linking to the site. The project should set out to influence behavior more broadly by effectively leveraging these resources to benefit existing and or parallel initiatives by other institutions such as the GIZ project on Interconnected Mini-grid Acceleration Scheme (IMAS) launched in 2019 by the Rural Electrification Agency (REA).
19. There is need for concerted effort to address the far-reaching consequences of political and financial risks for RE projects in Nigerian to come up with workable solutions. As has been demonstrated by the unsatisfactory objective outcome of this programme, there is significant risk present in Nigeria that put particular strain on the costs of capital for RE projects. It is imperative that the national government and institutions to take the initiative to eliminate obstacles that investors are facing.
20. There is need to put in place mechanisms for incentivizing private investment on decentralized RE solutions. These decentralized RE solutions such as mini-grids, powered by solar, wind or hydro, are critical for improving energy access, particularly in rural areas. Using the latest technologies, mini-grid development may contribute to increasing the number of households with electricity access and improving the reliability of electricity supply in rural areas where utility scale investments may be still unviable.
21. Overall, the project receives a **Moderately Unsatisfactory** rating in the terminal evaluation. The respective project ratings are summarized below:

Criteria	Rating HU - HS
Strategic Relevance	Relevant
Quality of Project Design	Moderately Satisfactory
Effectiveness	Moderately Unsatisfactory
1. Achievement of Outputs	Moderately Unsatisfactory

2. Achievement of Outcomes	Unsatisfactory
3. Likelihood of impact	Moderately Unlikely
Efficiency	Moderately Satisfactory
Sustainability	Moderately Unlikely
Monitoring and Reporting	Satisfactory

Abbreviations and Acronyms

BOI	Bank of Industry
CPD	Country Programme Document
CTF	Clean Technology Fund
DMB	Deposit Money Bank
DREI	De-Risking Renewable Energy Investment
ECN	Energy Commission of Nigeria
EEI	Energizing Economies Initiative
EIA	Environmental Impact Assessment
ERGP	Economic Recovery and Growth Plan
ESIA	Environmental and Social Impact Assessment
FME	Federal Ministry of Environment
FMPW	Federal Ministry of Power, Works & Housing
GIS	Geographic Information System
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
IMAS	Interconnected Mini-grid Acceleration Scheme
IMGs	Interconnected Mini-Grids
IPP	Independent Power Producer
LEA	Lagos Energy Academy
NAMA	Nationally Appropriate Mitigation Action
NAPTIN	National Power Training Institute
NDC	Nationally Determined Contributions
NERC	Nigerian Electricity Regulatory Commission
NEWMAP	Nigeria Erosion and Watershed Management Project
NPS	Nigerian Power Sector
NSCP	Nigeria Solar Capital Partners
PCOAs	Put Call Option Agreements
PIF	Project Identification Form
PMU	Project Management Unit
PPAs	Power Purchase Agreements
PRG	Partial Risk Guarantee
PSC	Project Steering Committee
PSR	Project Strategy Review
RE	Rural Electrification Agency
REA	Rural Electrification Agency
REMP	Renewable Energy
RENAC	Renewables Academy AG
RES	Renewable Energy Sources
SDG	Sustainable Development Goals
SESP	Social and Environmental Screening Process
TAP	Technology Action Plans
TE	Terminal Evaluation
TEM	Transitional Electricity Market
UNSDPF	United Nations Sustainable Development Partnership Framework
WB	World Bank

1. Introduction

1. The findings and conclusions of the Terminal Evaluation (TE) of the UNDP-GEF Project: De-risking renewable energy NAMA for the Nigerian power sector are presented in this report: GEF ID: 5345.
2. The project identification form (PIF) was approved on 12 September 2013, and following the project preparation phase, the project obtained approval for implementation by the GEF CEO on 04 April 2016. The official start date of the project was 28 June 2016. The date of TE is August-September 2021.
3. The project duration was 5 years, starting from 28 June 2016 and ending 28 June 2021. Implementation was funded with a USD 4,400,000 GEF project grant and USD 213,550,000 of co-financing, contributed from ECN, the Federal Ministry of Environment (FME) the Lagos Energy Academy (LEA), UNDP and Nigeria Solar Capital Partners (private sector).
4. The project was designed to support the Government of Nigeria to develop a Nationally Appropriate Mitigation Action (NAMA) for the Nigerian power sector. The NAMA was targeting solar photovoltaic (PV) technology, primarily to achieve a transformation in the electricity mix such that at least 20 GW of Nigeria's electricity is generated from solar PV by 2030. The NAMA design aims to use a rigorous quantitative methodology based on UNDP's De-risking Renewable Energy Investment (DREI) framework
5. The project was building upon existing national development policies and initiatives that seek to put in place public de-risking instruments to support the more efficient and effective participation of the private sector in the power sector. The project envisaged developing the NAMA architecture and enabling conditions through a combination of complementary policy and financial de-risking instruments.
6. The project was supposed to contribute to the country's attainment of its voluntary mitigation targets in the energy sector, with expected direct emission reductions of 452,000 tons of carbon dioxide equivalents (tCO₂e) during the project's lifetime and additional indirect emission reductions of between 6.61 and 6.79 million tCO₂e. Being the first of its kind, the baseline project was designed to pave the way for catalyzing more private investments so that the NAMA could generate national benefits related to green growth, energy security and job creation at scale.
7. The project was designed to support both the design and implementation of a RE NAMA in the NPS, applying relevant NAMA methodologies and guidance for identifying and designing technology-specific (in this case solar PV) NAMA components, and piloting the implementation of the NAMA activities around a 100 MW private sector solar PV plant in Bauchi State.
8. To achieve this, the project was divided into three main components:

Component 1: Design and development of a power sector renewable energy NAMA supported by DREI analysis

Expected outcome (Outcome 1): A coherent de-risking approach is established for catalyzing private sector investment to implement renewable energy power sector NAMA.

Component 2: Policy and institutional framework for private investment in on-grid renewable power generation

Expected outcome (Outcome 2): Public instruments are developed and implemented for de-risking the national policy environment

Component 3: First commercial on-grid RE project

Expected outcome (Outcome 3): The Nigeria Power Sector RE NAMA is operationalized by demonstrating a proof-of-concept grid-connected solar PV plant with quantified GHG emission reductions

9. The de-risking instruments designed and implemented under Components 1 and 2 were envisaged to serve to reduce the financing costs of renewable energy in Nigeria, thereby reducing the unit cost (cost per ton of CO₂) of GHG abatement. This would provide more incentive for bilateral donors to support the RE NAMA (designed with robust MRV systems and a sound de-risking framework for designing incentives).
10. Between March and April 2019, a mid-term review (MTR) of the project was conducted. One of the key recommendations of the MTR was that the project strategy be reassessed to determine if it should remain focused on utility-scale solar PV or rather reoriented towards, a) rooftop PV b) embedded generation or c) interconnected mini grid.
11. Following stakeholders' consultations and the conduction of a Strategic Project Revision in November 2019, the project strategy was revised to interconnected mini grid. The redesigned components were:
 - 1) **Component 1: Design and Develop an Interconnected mini grid NAMA for supported by DREI analysis.**
Expected Outcome: A coherent de-risking approach established for catalyzing private sector investment to implement interconnected mini grids.
 - 2) **Component 2: Policy and Institutional Framework for Private Investment in On-Grid renewable Power Generation.**
Expected Outcome: Public Instruments developed and Implemented for de-risking the National Policy Environment for Mini Grids Developers.
 - 3) **Component 3: 15 Interconnected Mini Grids Implemented.**
Expected Outcome: The Nigerian Power Sector Renewable Energy (RE) NAMA is operationalized demonstrating a proof-of-concept 15 grid-connected interconnected solar PV mini grids.
12. The project was implemented under a national implementation modality. According to the project document, the Federal Ministry of Environment (FME) was the lead implementing partner executing agency the Energy Commission of Nigeria (ECN). FME appointed a senior officer as a Project Director to: i) coordinate the project activities with the activities of other Government entities; and ii) certify that the expenditures are in line with the approved budgets and work-plans. A project steering committee (PSC) was also created.
13. The role of project steering committee (PSC) was to guide project implementation and to support the project in achieving its listed outputs and outcomes. The PSC chaired by the Federal Ministry

of Environment and comprised of the Federal Ministry of Power, Works and Housing (later changed to Federal Ministry of Power), the Federal Ministry of Finance, Budget and National Planning, the Nigerian Electricity Regulatory Commission, the Energy Commission of Nigeria, the Presidential Task Force on Power (which has since been disbanded), the Lagos Energy Academy, Nigeria Bulk Electricity Trading, National Orientation Agency, Transmission Company of Nigeria, Ministry of Women and Social Development, Federal Consumer, Competition and Protection Commission, Standards Organization of Nigeria, and a representative of the private sector (Nigeria Solar Capital Partners involved in the development of the 100 MW solar PV project in Bauchi State), representative of CSO/NGO, as well as the Project Manager. The Project Manager was a non-voting member in the PSC meetings and was responsible for compiling a summary report of the discussions and conclusions of each meeting.

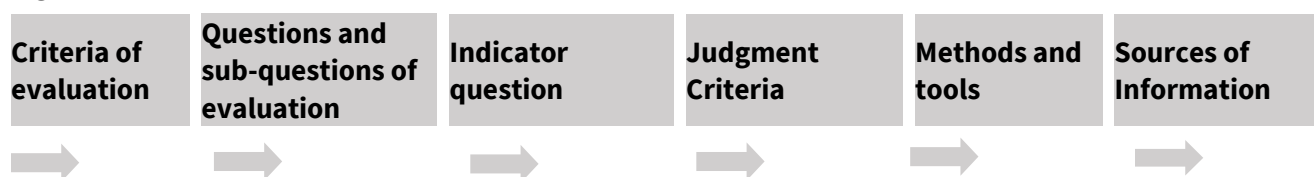
1.1 Purpose, objectives, and users of the Terminal Evaluation

14. The purpose of the TE report was to assess the achievement of project results against what was expected to be achieved and draw lessons that can both improve the sustainability of benefits from this project, and aid in the overall enhancement of UNDP programming. The TE report promotes accountability and transparency and assesses the extent of project accomplishments.
15. The TE also aims to learn from the project's experiences in developing policies and regulations conducive to private sector investment, to explore the benefits of on-grid renewable energy and interconnected mini-grids for improving energy access in the country and to aid the overall enhancement of the UNDP programming.
16. The Terminal Evaluation enhances transparency and dialogue between project stakeholders to promote learning for future similar projects, as well as for its replicability and scaling-up of results; to gain insights on how the project structures and processes functioned; to check to what extent project milestones were achieved, and if targets were met and results achieved as planned. This was based on an assessment of the project's relevance, acceptance, project effectiveness, efficiency, as well as potential impact and sustainability. The Terminal Evaluation report also assesses whether the design of the monitoring and evaluation framework ensured efficient monitoring during project implementation and evaluability.
17. The external Terminal Evaluation provides evidence-based information that is credible, reliable and useful for the stated purpose. In addition, lessons learnt will be shared within UNDP to further develop project approaches and to feed into project design and formulation of similar programmes and projects, to enhance learning within the organization. It will also feed into the UNDP Independent Evaluation Division's report of the programmatic approach to project intervention in Nigeria.
18. The Terminal Evaluation concerns the 60 months of the project. The external Terminal Evaluation reports on criteria of relevance, effectiveness, efficiency, management and gender engagements, while assessing achievements and potential impact and sustainability of the project.

1.2 Methodology

19. The overall approach and methodology of the evaluation follows the guidelines outlined in the Guidance for conducting Terminal Evaluations of UNDP-supported projects.¹
20. To respond to the informational needs contained in the evaluation questions, a participatory and collaborative methodological approach was used, oriented towards learning, based on the theory of change and using mixed methods. In this way, quantitative and qualitative collection techniques and instruments were combined. Once the instruments had been applied and the different techniques implemented, each of the resultant findings were analyzed, then triangulated to obtain a reliable explanatory basis for the assessment of the different aspects of the project.
21. The background information collection techniques (remote interviews due to COVID-19 pandemic and bibliographic review) were applied differentially, depending on the key agent and the information required. The instruments were built and designed based on the evaluation questions and the evaluation objectives.
22. Interviews with key stakeholders took place in September 2021. The key project stakeholders interviewed for their feedback by the national and international consultants are presented in Annex 3.
23. The TE Consultants completed a desk review of relevant sources of information, such as the project document, project progress reports, financial reports, and key project deliverables. A complete list of information reviewed is compiled in Annex 4.
24. As a data collection and analysis tool, an evaluation matrix (see Annex 1) was also developed to guide the review process. For its elaboration, the questions and sub-questions associated with the evaluation criteria established in the terms of reference were considered. Evidence gathered during was cross-checked between as many sources as practicable, to validate the findings. The project results framework was used as an evaluation tool, in assessing attainment of project objectives and outcomes.

Figure 1: Structure of the evaluation matrix



¹ Guidance for Conducting Terminal Evaluations Of UNDP-Supported, GEF-Financed Projects, 2020. Accessed at http://web.undp.org/evaluation/guideline/documents/GEF/TE_GuidanceforUNDP-supportedGEF-financedProjects.pdf

1.2.1 Evaluation issues and questions

25. The Terminal Evaluation sought to address the following questions:

Table 1: Evaluation questions.

• Relevance: How does the project relate to the main objectives of the GEF Focal area, and to the environment and development priorities at the local, regional and national level?
• Effectiveness: To what extent have the expected outcomes and objectives of the project been achieved?
• Efficiency: Was the project implemented efficiently, in line with international and national norms and standards
• Sustainability: To what extent are there financial, institutional, socio-political, and/or environmental risks to sustaining long-term project results?
• Gender equality and women's empowerment: How did the project contribute to gender equality and women's empowerment?
• Impact: Are there indications that the project has contributed to, or enabled progress toward energy self-sufficiency and reduced GHG emissions

26. The TE seeks to accomplish the following:

- i. Review the performance of the Project in achieving the outputs as per the Project Document and the contributions to the UNDP's Country program outcomes.
- ii. Evaluate the results achieved and the impact made by the Project since inception
- iii. Identify factors, which facilitated or hindered the achievement of results, both in terms of the external environment and those internal to UNDP and document lessons learned in the implementation stages. This will include but not be limited to assessing the strengths and weaknesses in Project design, management, coordination, human resource, and financial resources among others.
- iv. Assess how appropriate the programme strategy was during including the programme institutional/management arrangements and the funding modality to reach the intended outputs and outcomes.
- v. Establish the extent to which the approach and implementation of the Project contributed to sustainable development in Nigeria, specifically with regard to energy self-sufficiency and climate change mitigation/adaptation.
- vi. Determine the extent to which the Project addressed crosscutting issues including gender and human rights.
- vii. Make clear and focused recommendations required for enhancing effectiveness of future similar programmes to UNDP and its implementation partners and provide suggestions for sustainability and a transition framework.

1.2.2 Key agents of the evaluation

The main stakeholders for the project and their expected roles and responsibilities, as outlined in the stakeholder analysis in the project document, are listed below in **Table 2**.

Table2: Project stakeholders

Stakeholder	Roles and responsibilities (project preparation & implementation)
Energy Commission of Nigeria (ECN)	The ECN has the statutory mandate for strategic planning and coordination of national policies in the field of energy. ECN coordinated stakeholder consultations during preparation of the project. During the implementation phase, ECN co-chaired the Technical Working Group (TWG) for Component 1 of the project. The ECN housed the Project Management Unit (PMU).
Federal Ministry of Power (FMP)	The key function of the Ministry is to develop and facilitate the implementation of policies for the provision of adequate and reliable power supply in the country. In this capacity, the FMP was consulted during the formulation of the project. The FMP chaired the TWG for Component 2 of the project. The FMP was also be a direct beneficiary of the project through the development of geospatially referenced practicable locations for siting various types of on-grid renewable energy projects.
Nigerian Electricity Regulatory Commission (NERC)	NERC is an independent regulatory agency mandated to regulate and monitor the Nigerian power sector. Of direct relevance to NERC is the DREI analysis that can be used to guide the revision of MYTO II (equivalent of feed-in-tariffs in Nigeria) using a risk-adjusted approach. The DREI analyses complemented the technical assistance that the NERC was getting from GIZ under the NESP and provided an opportunity for the UNDP-GEF project to collaborate with the GIZ and NERC. NERC was invited to join the TWG for Component 2 and the Steering committee.
Federal Ministry of Environment (FME)	The GEF Operational Focal Point and the DNA are hosted within the Ministry of Environment. As the coordinator for developing the Nigeria NAMA strategy and action plan, the FME was closely involved in the formulation of the UNDP-GEF project. The FME had a central role as chair of the Project Steering Committee and hence had the responsibility to seek high level political support for the project during implementation. The FME was also a beneficiary of the project through the output related to the development of guidelines for social and environmental screening of RE projects in such a manner that the national EIA is aligned with international benchmarks.
Private sector – Nigeria Solar Capital Partners (NSCP)	Because of the prevailing barriers and risks, there is currently limited private sector investment in renewable energies in Nigeria. The most prominent solar PV private developer to date – i.e. NSCP – and has been heavily involved in preparation of the UNDP-GEF project. Since NSCP is also the project owner of the 100 MW baselinesolar PV project in Bauchi State, it was proposed to be a key stakeholder throughout project implementation. Further, NSCP was a member of the Project Steering Committee. The DREI methodology, which was used in the preparation of the project and was also used in Component 1 to assist the NAMA preparation, involving active outreach to the private sector to solicit quantitative feedback on the barriers and investment risks to renewable energy in Nigeria.
Federal Ministry of Finance, Budget and National Planning (FMFB & NP)	The FMFB&NP was consulted during project formulation. It chaired the TWG for Component 1 and was a member of the Steering Committee. The FMF was direct beneficiary of the project under Component 1 that sought to identify and propose financial de-risking instruments to attract private sector investments in renewable energies, and in particular solar energy. The FMF was closely consulted during the project implementation to identify the appropriate financial sector reforms that were required in Nigeria in order to unlock low-cost public finance.
<i>Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)</i>	GIZ was consulted throughout all the stages of project design and conceptualization. Since GIZ is working in close collaboration with several national partners, including FMP, NERC and local training institutions, seamless coordination with projects implemented by GIZ was sought. Further, lessons-learned from the GIZ projects were drawn upon when implementing the UNDP-GEF project. GIZ was invited to be a member of the Steering Committee.

Lagos Energy Academy (LEA)	The LEA was consulted during the project formulation, and it was identified as a reliable partner for providing applied trainings for technicians from the private sector across the entire solar PV value chain. Through seed funding from the Lagos State Government and DFID, the LEA has put in place state-of-the-art training facilities, including testing laboratories and field operation of a solar PV array. The UNDP-GEF project capitalized on these initial investments to develop new training courses and to complement existing equipment. The LEA was invited to form part of the Steering Committee and as a member of the WG for Component 2.
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1.2.3 Information gathering techniques and instruments

27. The data instruments were designed based on the evaluation questions and the study objectives (see Annex 2).

1.3 Limitations of the evaluation

28. Because of the prevailing COVID-19 pandemic situation, in-person consultations with project implementers, counterparts and beneficiaries were limited and only very few could be undertaken. For the same reason, it was also not possible to visit the locations where the plants promoted during project execution were meant to be.

29. These conditions were however specific and did not compromise the quality of the evaluation. They were mitigated by including key actors with direct knowledge and information about the project implementation and by conducting remote interviews.

2. Context and framework of the project

2.1 Project context

30. The energy sector is by far the largest source of GHG emissions in Nigeria, accounting for over 70% of the country's total GHG emissions (155.34 MtCO₂e in 2000)². Over 85% of energy sector emissions emanated from fuel combustion activities, and the remaining from fugitive fuel emissions. Power supply comes primarily (70%) from inefficient thermal power stations; the rest is generated by three large hydro power plants, which is the only renewable source of electricity currently in use. In 1994, GHG emissions from the energy sector were 119.83 MtCO₂e, implying an increase of ~30% (or ~2.6% compound annual growth rate, CAGR) between 1994 and 2000.
31. For example, as pointed out in the situational analysis of the project document, in 2013, total on-grid generation was 29,629 GWh, of which thermal generation from gas was 79.4% and the remaining 20.6% from hydro. In 2013, only 46% of the total installed on-grid generation capacity of 10,915 MW was available. Nigeria's electricity grid faces many challenges, including insufficient grid-connected capacity to meet demand, inadequate infrastructure to make the country's abundant gas available for power generation, and an inefficient transmission and distribution system with limited coverage. In part for these reasons, an estimated 50% of the electrical energy consumed in the country is currently produced off-grid by diesel and gasoline generators of all shapes and sizes.
32. The country seeks to create favorable environment for private sector and reach the national Vision 20:20:20 target, which envisages expansion of power generation capacity from current 6,000 MW to 40,000 MW. Consequently, the power sector's annual emissions are projected to increase by up to 200 Mt CO₂ by 2020
33. Large-deployment of renewable energy (RE)-based power generation, in particular solar and wind, can help mitigate the negative impact of Nigeria's power sector on the global climate, while at the same time help achieve the national vision 20:20:20 target. Under the baseline scenario this is unlikely to happen. Renewable energy power projects have a different financing profile with typical much higher upfront capital costs. This makes them more sensitive to cost of capital, which in a country like Nigeria, is high due to additional information, technical, regulatory, financial and administrative risks, which such projects entail.
34. Nigeria is one of the 141 countries to either agree to the Copenhagen Accord (Decision 2/CP.15) or to be associated with it. The Federal Government of Nigeria (FGN) communicated its intention to be associated with the Accord on 21 May 2010 (see Annex 7.1) without submitting a list of Nationally Appropriate Mitigation Actions (NAMAs) to the UNFCCC Secretariat. NAMAs are typically implemented to incentivize mitigation on a long-term basis at a sector-policy level to reduce emissions permanently. Nigeria has not yet submitted any NAMAs to the NAMA Registry for

² Federal Republic of Nigeria (2014) Nigeria's Second National Communication under the United Nations Framework Convention on Climate Change, Federal Ministry of Environment: Abuja (<http://unfccc.int/resource/docs/natc/nganc2.pdf> - accessed 12 January 2015).

financial support. Based on these considerations, the UNDP-GEF project was designed to support the Federal Government of Nigeria (FGN) to develop and implement the first NAMA in the country.

35. In order to achieve economic development goals, the country needs to be expanded installed power generation capacity. The vision relies heavily on the private sector to take an important role in the power market (generation, transmission, and distribution).
36. In view of the foregoing, the project being reviewed was designed to support the Federal Government of Nigeria (FGN) to develop and implement the first NAMA in the country. The project ensures that all barriers for private sector investment in RE generation are addressed through a complementary of policy and financial de-risking instrument and targeted technical assistance to key market players, the Government agencies, and grid operators and RE project developers. In doing so, it is believed that the overall risk profile of such projects could be lowered, resulting in a low-cost of capital and therefore a greater chance to achieve financial closure and actual investment
37. While power sector reforms are being implemented to favor private sector participation in the power market, significant risks (and underlying barriers) are hindering private investments in the Nigerian power sector, especially concerning renewable energy sources. Some of these barriers are described in Table 3.
38. As part of the project development process, the UNDP De-risking Renewable Energy Investment (DREI) methodology was used to assess the potential benefits of investing in de-risking measures in removing the barriers that are constraining uptake of utility-scale, on-grid RE development. In comparing the business-as-usual and post-de-risking scenarios, the results clearly demonstrate how investing in public de-risking measures creates significant direct economic savings in achieving Nigeria's utility-scale solar PV investment targets.
39. This UNDP-GEF project being evaluated was an initiative put in place support the Federal Government of Nigeria (FGN) in the development and implementation of a Nationally Appropriate Mitigation Action (NAMA) in the energy sector, namely a RE NAMA for the Nigerian Power Sector (NPS).
40. The project was expected to contribute towards the reduction of greenhouse gas (GHGs) emissions related to the renewable electricity targets established voluntarily by the Government of Nigeria. Solar PV was the chosen technology for demonstrating the development of the NAMA. This approach was intended to serve to market the NAMA as an integrated package to attract financial (international, bilateral, public and private sector) support.
41. The rationale for selecting the power sector as the focus of the project was twofold. Firstly, the energy sector is the largest emitter of GHGs in Nigeria, and secondly, the deficient state of the power sector has been identified as a primary constraint for achieving the main objectives of the government's energy policy. Renewable energy development in the power sector is seen as a means for energy mix diversification and increasing energy security, improving the reliability of grid power, and delivering job creation and global environmental benefits simultaneously.

42. The project was initially designed to support both the design and implementation of a RE NAMA in the NPS, applying relevant NAMA methodologies and guidance for identifying and designing technology-specific (in this case solar PV) NAMA components, and piloting the implementation of the NAMA activities around a 100 MW private sector solar PV plant in Bauchi State.

Table 3: Risk Categories and Underlying Barriers Considered for DREI Analysis

Risk Category	Generic Description	Underlying Barriers
Power Market Risk	Risk arising from limitations and uncertainties in the power market, and/or sub-optimal regulations to address these limitations and promote renewable energy markets	• <i>Market outlook:</i> Lack of or uncertainties regarding Government renewable energy strategy and targets • <i>Market access/price:</i> Sub-optimal energy market liberalisation; uncertainties regarding competitive and price outlook; limitations in PPA and/or PPA process • <i>Market distortions:</i> high fossil fuel subsidies
Permits Risk	Risk arising from the public sector's inability to efficiently and transparently administer renewable energy-related licensing and permits	• Labour-intensive, complex processes and long time-frames for obtaining licences and permits (generation, EIAs, land title) for renewable energy projects • High levels of corruption. No clear recourse mechanisms
Social Acceptance Risk	Risks arising from lack of awareness and resistance to wind energy in communities, end-users, and other stakeholders such as unions	• Lack of awareness of renewable energy amongst consumers, end-users, and local residents
Resource & Technology Risk	Risks arising from use of the renewable energy resource and technology (resource assessment; construction and operational use; hardware purchase and manufacturing)	• <i>For resource assessment and supply:</i> inaccuracies in early-stage assessment of renewable energy resource • <i>For planning, construction, operations and maintenance:</i> uncertainties related to securing land; sub-optimal plant design; lack of local firms and skills. limitations in civil infrastructure (roads etc.) • <i>For the purchase and, if applicable, local manufacture of hardware:</i> purchasers' lack of information on quality, reliability and cost of hardware; lack of local industrial presence and experience with hardware
Grid/Transmission Risk	Risks arising from limitations in grid management and transmission infrastructure in Nigeria	• <i>Grid code and management:</i> limited experience or sub-optimal operational track-record of grid operator with variable sources (e.g. grid management and stability). Lack of standards for the integration of variable renewable energy sources into the grid • <i>Transmission infrastructure:</i> inadequate or antiquated grid infrastructure, including lack of transmission lines from the renewable energy source to load centres; uncertainties for construction of new transmission infrastructure
Counterparty Risk	Risks arising from the utility's poor credit quality and an IPP's reliance on payments	• Limitations in the utility's (electricity purchaser) credit quality, corporate governance, management and operational track-record or outlook; unfavourable policies regarding utility's cost-recovery arrangements
Financial Sector Risk	Risks arising from the lack of information and track record on financial aspects of solar PV, and general scarcity of investor capital (debt and equity), in Nigeria	• <i>Capital scarcity:</i> Limited availability of local or international capital (equity/and or debt) for green infrastructure due to, for example: under-developed local financial sector; policy bias against investors in green energy • <i>Limited experience with renewable energy:</i> Lack of information, assessment skills and track-record for renewable energy projects amongst investor community; lack of network effects (investors, investment opportunities) found in established markets; lack of familiarity with project finance structures
Political Risk	Risks arising from country-specific governance, social and legal characteristics	• Uncertainty or impediments due to war, terrorism, and/or civil disturbance • Uncertainty due to high political instability; poor governance; poor rule of law and institutions • Uncertainty or impediments due to government policy (currency restrictions, corporate taxes)
Currency/Macro-economic Risk	Risks arising from the broader macroeconomic environment and market dynamics	• Uncertainty due to volatile local currency; unfavourable currency exchange rate movements • Uncertainty around inflation, interest rate outlook due to an unstable macroeconomic environment

Source: Project document

2.2 Project framework

43. The project was designed to support the Government of Nigeria to develop a Nationally Appropriate Mitigation Action (NAMA) for the Nigerian power sector primarily to achieve a transformation in the electricity mix such that at least 20 GW of the Country's electricity is generated from solar PV by 2030
44. The NAMA architecture and enabling conditions were envisaged to be developed through a combination of complementary policy and financial de-risking instruments, which were to be validated through the implementation of interconnected solar PV mini-grids. The project is the first of its kind apply the UNDP de-risking methodology in Nigeria and was expected to contribute to the country's attainment of its voluntary mitigation targets in the energy sector, with expected direct emission reductions of 452,000 tons of carbon dioxide equivalents (tCO₂e) during the project's lifetime and additional indirect emission reductions of between 6.61 and 6.79 million tCO₂e.
45. The baseline project was initially a planned 100 MW on-grid solar PV plant to be developed by Nigeria Solar Capital Partners (NSCP) in Bauchi State, located in the northeast part of the country. At the time of project development, the NSCP project was considered the most advanced on-grid solar PV project being developed in Nigeria, and it had reached the stage of power purchase agreement (PPA) negotiations.
46. After a mid-term review (MTR) of the project conducted in 2019, the project strategy was reassessed to determine if it should remain focused on utility-scale solar PV or rather reoriented towards, a) rooftop PV b) embedded generation or c) interconnected mini grid. This was necessitated by the fact that as of July 2019, the 100 MW solar PV plant in Bauchi State had shown no indication that it was capable of reaching financial close by the end of project (2021) and neither had any construction work commenced. Following stakeholders' consultations and the conduction of a Strategic Project Revision in November 2019, the project strategy was revised to interconnected mini grid. The redesigned components are:
 - 4) **Component 1: Design and Develop an Interconnected mini grid NAMA for supported by DREI analysis.**
Expected Outcome: A coherent de-risking approach established for catalyzing private sector investment to implement interconnected mini grids.
 - 5) **Component 2: Policy and Institutional Framework for Private Investment in On-Grid renewable Power Generation.**
Expected Outcome: Public Instruments developed and Implemented for de-risking the National Policy Environment for Mini Grids Developers.
 - 6) **Component 3: 15 Interconnected Mini Grids Implemented.**
Expected Outcome: The Nigerian Power Sector Renewable Energy (RE) NAMA is operationalized demonstrating a proof-of-concept 15 grid-connected interconnected solar PV mini grids.
47. This TE concerns the redesigned components of the project.

48. The baseline project that was to be developed by Nigeria Solar Capital Partners (NSCP) in Bauchi State to generate 100 MW on-grid solar PV plant carried out social and environmental impact assessments using the due diligence processes of multilateral institutions. The project benefitted from the technical and financial assistance of the World Bank (WB) and the African Development Bank (AfDB) under the Clean Technology Fund (CTF). . At the time of project development, the NSCP project was considered the most advanced on-grid solar PV project being developed in Nigeria, and it had reached the stage of power purchase agreement (PPA) negotiations.

3. Findings

The presentation of findings responds to the informational needs summarized in the questions and sub-questions of the evaluation matrix.

3.1 Relevance

Alignment to relevant policies and strategies

The project was aligned to important national development plans, strategies and policies. The degree of alignment is one of the elements that permitted the project to be strategically positioned as an important initiative for the country and key national stakeholders.

49. The project was prepared in a consultative manner with the Government of Nigeria and development partners through a series of workshops and bilateral discussions. The process sought to ensure that the project contained national energy priorities and objectives as defined by government policies and leveraged UNDP's comparative advantage. The process resulted in the project being aligned with key development plans, strategies and policies, providing the basis on which the project built its programme of work.
50. The major lesson from the development of the project is that participatory processes are slow and difficult especially when dealing with such a diversity of actors as UNDP works with. However, such participatory processes are important for ensuring ownership of the final product by partners. Such ownership was critical for implementation of the programme. To ensure participation of stakeholders and partners in the development of similar projects project, sufficient time and resources should be provided for the process, especially since states and communities have to be engaged.
51. The findings presented in this section demonstrate the high degree to which the project was aligned to key national policies and strategies, therefore being an important contributor to achieving nationally determined goals. The project's objective "to support the FGN in the development and implementation of a NAMA in the energy sector in order to contribute to the reduction of GHGs" correspond to Nigeria's aspirations in the NV20:2020. By taking a strategic approach, through the project, the interventions were meant to contribute towards the respective government priorities.
52. The project was aligned to the **NV20:2020** strategic objective to ensure that the power sector is able to efficiently deliver sustainable, adequate, qualitative, reliable and affordable power in a deregulated market. The Vision estimates that Nigeria will need to generate electricity in the range of about 35,000MW by 2020³. The target is to grow installed power generation capacity to 20,000MW by 2015 and 35,000MW by 2020. NV20:2020 further states that incentives will also be granted to new entrants, especially for renewable power generation, in order to achieve additional generation capacity.
53. **Low carbon strategy to achieve NV20:2020:** The World Bank carried out a study to assess the costs and benefits of different avenues to pursue green growth in Nigeria. The main insight of the

³ FGN (2010) Nigeria Vision 20:2020 – Abridged version, pp. 19-20.

study was that Nigeria can stabilize carbon emissions while at the same time moving it closer to the objectives of NV20:20204. Based on its low carbon development results in four sectors (power, agriculture, transport, and oil & gas), the study recommended that the Federal Ministry of Environment (FME) should expeditiously finalize Nigeria's NAMAs. Several observations have been made concerning the power sector, including:

- a. one recommendation is for up to 20% of grid-based power to be generated by renewable energy sources (including hydropower) between 2020 and 2022,
- b. 80 % of total carbon emission reductions have a negative marginal abatement cost, negative cost (that is, a benefit);
- c. Nigeria should develop large scale grid-connected demonstration projects totaling about 100 MW each for PV, CSP, and wind before 2020, and
- d. Feasibility studies for large-scale renewable energy projects could be supported by seed resources already earmarked for this purpose under the World Bank NEWMAP project (Nigeria Erosion and Watershed Management Project) as well as through mobilization of additional resources

The introduction of low emission technologies in the Nigerian power sector is supported by several policies, strategies, and action plans.

54. **National Energy Policy:** The Renewable Electricity Policy Guidelines 2006 set the FGN's vision of renewable energy in the power sector for the achievement of accelerated sustainable development through increased share of renewable electric power to the national electricity supply⁵. It built on the National Energy Policy 2003 that promoted the "optimal utilization of the nation's energy resources for sustainable development"⁶. The Policy Guidelines identified specific policy, regulatory, financing and investment, technological, public awareness, quality and standards, poor resource assessment database and intermittency of resource availability as barriers to the market development of renewable electricity. The project sought to address several of these bottlenecks during its formulation.

55. **The updated National Energy Policy 2013** reaffirmed the policies and strategies for promoting renewable energy. It proposed policies, objectives and strategies for various renewable energy sources, electricity generation and financing, among others. It stated that the nation shall aggressively pursue the integration of solar energy into the nation's energy mix.

- To develop the nation's capacity and capability in the utilization of solar energy
- To develop the market for solar energy technologies and services
- To intensify human and institutional capacity building in solar energy technologies and applications
- To develop and enforce standards for solar energy technologies, products, services, and processes
- Setting up and maintaining a comprehensive information system on available solar energy resources and technologies

⁴ Cervigni et al. (2013), pg.xi.

⁵ Federal Ministry of Power and Steel (2006) Renewable Electricity Policy Guidelines.

⁶ Energy Commission of Nigeria (2003) National Energy Policy.

- Putting in place measures to leverage funding from international agencies and countries that promote the use of solar energy

The project sought to address all the above objectives.

56. **National Energy Master Plan (NEMP):** The ECN, with the support of the UNDP, produced the first Renewable Energy Master Plan (REMP) in 2005. Supported by the UNDP, the REMP was revised in 2012. Based on REMP 2012, the NEP 2013 and Draft NREEEP 2014, the 2007 draft National Energy Master Plan (NEMP) was updated in 2014 to produce the NEMP 2014⁷. The backdrop of the NEMP 2014 was the need for energy demand forecasting and energy supply diversification in order to meet the goals and objectives of NV20:2020, and the SE4ALL targets.

57. **ERGP 2017-2020:** The project was also aligned to the Economic Recovery and Growth Plan (ERGP) Medium Term Plan for 2017 – 2020 that aimed to optimize the delivery of at least 10 GW of operational capacity by 2020 and to improve the energy mix including through greater use of renewable energy. The Plan also aimed at increasing power generation by optimizing operational capacity, encouraging small-scale projects, and building more capacity over the long term.

58. The **UNDP Country Programme Document (CPD 2018-2022)**⁸: Pillar III on Environmental sustainability and resilience of the UNDP Country Programme Document asserts that will work with partners on six strategic interventions that are aligned to the project viz (i) supporting the implementation of *Nationally Determined Contributions (NDCs)* in five sectors of the economy, National Policy on Environment, and the Sendai Framework and other multilateral and international related commitments (especially those focusing on biodiversity, desertification, chemicals and the Montreal Protocol); (ii) strengthening national and sub-national capacities for participatory planning, policy formulation, national disaster management legislation, sound environment management, including land degradation, resilience to climate change, sustainable natural resources management, conservation of biodiversity and disaster management; (iii) strengthening national preparedness capacities to access the Green Climate Fund (GCF) and GEF, using UNDP global and regional expertise to augment national budgetary allocations, which will contribute to *increased access to clean and renewable energy, reduce emissions from deforestation and forest degradation*; (iv) raising awareness, empowering local communities, *facilitating access to clean energy, and promoting environment related livelihoods opportunities* downstream with a focus on South-South cooperation and the Middle Belt; (v) scaling up partnerships with the Bank of Industry (BOI), and *forging new partnerships for increased investment in clean energy* for community development and to stimulate local economies, and (vi) nurturing South-South cooperation between Nigeria and South Korea on new approaches to natural resource and forest conservation, and knowledge transfer.

Renewable energy was not however prominently included in the 2018-2022 United Nations Sustainable Development Partnership Framework (UNSDPF) for Nigeria. There is one reference to renewable energy development under Outcome 7 of the UNSDPF, but no specific targets were identified.

⁷ ECN (2014) National Energy Master Plan – draft revised edition.

⁸ UNDP Country programme document for Nigeria (2018-2022)

59. Additionally, it was identified that the promotion of Solar PV as a source of energy has a broad potential to contribute to at least 7 of the 17 objectives and goals established in the **2030 Agenda for Sustainable Development (SDGs)**. These include:

- i. Goal 7 Guarantee access to affordable, safe, sustainable, and modern energy for all.
- ii. Goal 8 Promote sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all.
- iii. Goal 9 Build resilient infrastructure promote inclusive and sustainable industrialization, and foster innovation.
- iv. Goal 11 Make cities and human settlements inclusive, safe, resilient, and sustainable.
- v. Goal 12 Guarantee sustainable consumption and production patterns.
- vi. Goal 13 Adopt urgent measures to combat climate change and its effects (taking note of the agreements adopted in the forum of the United Nations Framework Convention on Climate Change).
- vii. Goal 15 Sustainably manage forests, combat desertification, halt and reverse land degradation and halt the loss of biodiversity.

Response to emerging issues

The project's response to emerging needs was appropriate, although at times there were delays occasioned by lengthy procedures by the implementation partner. The responses also lacked a comprehensive strategy to ensure targeted outputs were institutionalized.

60. Even though more could be done, the design and execution of the project strategy has satisfactorily responded to the capacity development requirements of the country in investments in Solar RE technologies, and the need for awareness and inclusion of RE in the public agenda. Due to a number of factors, the project could not fully achieve its objective of enabling the private sector actors to overcome administrative, regulatory and financial barriers in promoting the generation and strengthening of Solar PV RE initiatives in Nigeria.

61. The project responded to the needs perceived by the different groups of beneficiaries. The demands identified and covered by the design and implementation of the project were as follows:

- i. **Capacity development:** The training spaces offered by the initiative have covered an unsatisfied demand for training in Solar PV RE technologies. The trainings have been valued as relevant by the key stakeholders consulted, something which was further reflected in the high levels of participation in the different trainings offered.
- ii. **Sensitization:** The awareness of stakeholders and the incorporation of Solar PV RE technologies as an energy resource in the discussions with government officials responds to a demand from the target group and other key actors (Government, private sector) and is considered a necessary precondition for investments in Solar PV RE technologies in the country.
- iii. **Institutional strengthening:** The ECN has had limited tools to promote the development of Solar PV RE technologies in country. The project, in addition to developing the capacities of public officials, supported the development of new training courses at the Lagos Energy Academy.

In summary, the project design was pertinent and relevant for the advancement of national policies and strategies for the generation of renewable energy. The regulatory framework in which the project

was inserted at the beginning corresponded to the one established by National Energy Policy 2013. The policy aimed at the promotion of renewable energy in the power sector for the achievement of accelerated sustainable development through increased share of renewable energy to the national electricity supply. **Through this policy, the project has presented a high level of alignment at the national level.**

Strategic relevance is rated as:	Relevant
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3.2. Effectiveness

62. As a result of the actions carried out by the project, the outcomes were overall rated as moderately unsatisfactory. With the purpose of promoting investments in renewable technologies to increase electrification rate as well as to reduce greenhouse gases (GHG) emissions in the country, the project proposed a strategy whose purpose was to influence and or improve the landscape in favor of renewal energy, obtaining relevant results, overcoming entry barriers and increasing the presence of solar PV in the renewable energy mix in Nigeria.

Progress towards Outcomes Analysis

Objective: to support the Federal Government of Nigeria (FGN) in the development and implementation of a NAMA in the energy sector, namely a renewable energy NAMA for the Nigerian Power Sector.)	
Progress towards achieving the project objective is rated as:	Moderately Unsatisfactory

Progress towards achievement of the project objective is rated as **moderately unsatisfactory**, as summarized below in **Table 4**.

Table 4: Progress towards results, project objective

Indicator	Baseline	End-of-Project target	TE Assessment
Date:	2015	June 2021	
i). A NAMA developed for the Nigerian power sector (NPS) focus on interconnected mini-grids	No NAMA for the energy sector	A NAMA developed for the NPS focused on interconnected mini-grids and submitted for registration with the UNFCCC NAMA Registry	<i>Not achieved</i>
ii). Quantity of interconnected mini-grids operational	No MRV system for monitoring GHG emission reductions in the energy sector	15 mini-grids operational with an average installed generation capacity of 100 - 1000 kW in Nigeria	<i>Not achieved</i>
iii). Quantity of direct GHG emissions resulting from the baseline projects and power sector NAMA (tCO ₂ /year)	No interconnected mini-grid operational (first expected to become operation in December 2019).)	Emissions reductions: A total of 420,000 tCO ₂ e, between 2020 and 2040 (20 years)	<i>Not achieved</i>

63. The delay in starting the implementation of the project has had an adverse effect on project efficiency, but the underlying constraint is associated with the blockage in the RE sector. The IPP for the Bauchi State solar PV plant and other IPPs that signed PPAs in 2016 was not able to reach financial close as of March 2019 whilst the timeline outlined in the project document envisaged the investment in Bauchi State would occur in Years 1 and 2.
64. The Nigerian Solar Capital Partners' proposed project is the baseline project in Bauchi state was unable to financial close largely due to the changes introduced by Government in the terms of signed Power Purchase Agreements ("PPA") that replaced originally agreed tariff from USD 11.5

cents/kWh to USD 7.5 cents/kWh. The government insisted that the average cost of procuring solar power globally had continued to decline, adding that Nigeria was at the risk of an unhealthy sovereign risk exposure if it went ahead to approve PCOAs on 11.5 cent per kWh citing similar competitive procurements in South Africa, Zambia, Egypt and Ethiopia where prices were between five and seven cents per kWh. This made the investment less attractive to the lenders. Furthermore there were no guarantees or securities provided that this tariff would remain the same in the coming years and neither was the government in a position to provide guarantees needed to cover major risks that can lead to lenders not being able to get their money back.

65. A mid-term review (MTR) of the project recommended a re-assessment of the project strategy to determine whether it should remain focused on utility-scale solar PV or rather reoriented towards, a) rooftop PV b) embedded generation and c) interconnected mini grid. Following stakeholders' consultations and the conduction of a Strategic Project Revision in November 2019, the project strategy was revised to interconnected mini grid. This attempt to reposition itself in accordance with MTR recommendation of reorientation towards interconnected mini grids also experienced challenges, and the objectives could not be achieved within the scope of the project. A tender process for the construction of eight interconnected mini-grids launched in May 2020 did not reach a conclusion as the procurement process was inconclusive. The interconnected mini-grid developers could also not reach financial close within the project's life-span, therefore component 3 that is related to "Demonstration of 1st Commercial on-grid/interconnected mini-grid renewable energy project" stalled.

66. Significant achievements were however made under components 1 and 2 of the programme and include:

- (i) Development of Web GIS based tool for identifying potential renewable energy sites in Nigeria
- (ii) De-risking Interconnected Solar Mini-Grid Investment in Nigeria: A Framework to support policy makers in selecting public instruments for the promotion of private financing
- (iii) Development and Validation of Training Manual/Curriculum on Interconnected Mini-Grids: Business Plan Development and Loan Application Procedures in Nigeria
- (iv) Development of Guidelines for Environmental and Social Safeguard for interconnected mini-grids in Nigeria
- (v) Development of Environmental and Social Impact Assessment (ESIA) Framework for Interconnected Mini-Grid Development in Nigeria
- (vi) Lessons Learned Documentation from the Development of DREI Project: Development of 1st – Ever Utility Scale Solar in Nigeria/Mini-Grids
- (vii) Development and dissemination of renewable energy (RE) technology action plans (TAPs); an MRV mechanism and grid emission factor for the power sector; Nigerian domestic financial sector reform to unlock low-cost capital for green investment to Stakeholders; and Compendium of renewable energy investment in Nigeria
- (viii) An MRV mechanism and grid emission factor for the power sector
- (ix) Nigerian domestic financial sector reform to unlock low-cost capital for green investment to Stakeholders and;
- (x) Compendium of renewable energy investment in Nigeria

67. Because of non-delivery on component 3, the overall rating towards achievement of the project objective is rated as moderately unsatisfactory as the objective level performance metrics were predicated on the development and operation of the 15 interconnected mini-grids.

Component 1: Design and development of a power sector renewable energy NAMA supported by DREI analysis

Outcome 1: A coherent de-risking approach is established for catalyzing private sector investment to implement renewable energy power sector NAMA	
Progress towards achieving Outcome 1 is rated as:	Moderately Satisfactory

68. Significant achievements were realized under Component 1 aimed at establishing a coherent de-risking approach for catalyzing private sector investment in renewable energy. The project completed a DREI analysis on interconnected mini-grids, which identified key barriers to renewable energy investments and appropriate policy and financial de-risking measures to address them. The project also delivered on the preparation of a framework for an MRV mechanism for the power sector, a preliminary calculation of a grid emission factor, and draft technology action plans for solar, wind and Solar PV RE.

Progress towards achievement of the Outcome 1 is rated as **moderately satisfactory**, as outlined below in **Table 5**.

Table 5: Progress towards results, Outcome 1

Indicator	Baseline	End-of-Project target	TE Assessment
Date:	2015	Jun 2021	
1.1. Number of policy and financial de-risking instruments designed using DREI analysis and implemented	No methodology is used to quantify risks that hinder investments in RE, and to develop policy and financial de-risking instruments to promote large-scale private investments.	At least 3 policy and financial de-risking instruments have been assessed using DREI analysis based on work initiated in the development of the project document	<i>Achieved</i>
1.2. Number of national guidelines	No technology action plans for promoting RE projects. Social and environmental safeguards for RE projects do not meet international standards.	3 TAPs developed by the end of Year 3	<i>Achieved</i>

1.3. Standardized baseline for calculating GHG emission reduction for on-grid RE	No baseline exists to calculate emission reductions for grid connected RE.	An MRV mechanism is developed for the power sector, including a standardized baseline for national grid developed in Year 1 and updated on a yearly basis	<i>Achieved</i>
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Output 1.1: At least 3 policy and financial de-risking instruments have been assessed using DREI analysis based on work initiated for solar PV in the development of the project document and implemented. The DREI analyses will be replicated for on-grid wind energy and renewable biomass power generation.

69. The Output 1.1, involving assessing 3 policy and financial de-risking instruments using the UNDP DREI methodology was achieved. The DREI analysis was completed, and three (3) policy and financial de-risking also assessed.
70. Following the re-designed project strategy, the DREI Analysis was completed on solar PV interconnected mini grids. The report identified and analyzed key risks and barriers to private-sector investment in interconnected mini-grids (IMGs) in Nigeria – and evaluated policy and financial instruments designed to address them. Ten risk categories including social acceptance, hardware, digital, labour, energy market, developer, end-user credit, financing, currency, and sovereign risk were assessed. Each risk category consists of one or more underlying barriers, adding up to a total of 23 barriers. The final report of the DREI Analysis on Interconnected Solar Mini-Grid investments in Nigeria: A Framework to Support Policymakers in Selecting Public Instruments for the Promotion of Private Financing was published on UNDP public website⁹ on 3rd May, 2021.
71. The ultimate objective of the studies was to contribute to accelerating private sector-led deployment of IMGs at scale

Output 1.2: Development of a set of guidelines to establish national NAMA eligibility and design criteria

72. Three Technology Action Plans (TAPs) for Nigeria were developed. The TAPs provide background information on the power sector in Nigeria, and includes technology action plans for solar, biomass and wind, and the required financial and non-financial interventions. An awareness creation and national buy-in among key stakeholder event was undertaken through a subsequent Stakeholder's workshop. Challenges remain however because there is still no clear roadmap on how these Technology Action Plans (TAPs) for Solar, Biomass and Wind plans will be mainstreamed.

Output 1.3: An MRV mechanism is developed for the power sector, including a standardized baseline for national grid is developed and updated on a yearly basis

⁹ <https://www.africa.undp.org/content/rba/en/home/library/reports/de-risking-interconnected-solar-mini-grid-investments-in-nigeria.html>

73. The scope of Output 1.3 was focused on the development of a measurement, verification and reporting (MRV) mechanism and GHG emission reduction estimation methodologies as part of the requisite minimum standards for NAMA design.
74. A technical assistance consultancy was undertaken by Deloitte Tohmatsu Financial Advisory LLC for development of an MRV mechanism for the Nigerian power sector and for calculation of the grid emission factor (GEF) for the Nigerian power system. The report on Development of an MRV Mechanism for the Nigerian Power Sector was issued on 01 December 2018 and an awareness creation workshop with over 40 participants held on 18th – 20th May 2021 in Port Harcourt. The report provides an overview of a design for a national MRV system for the power sector, outlines an MRV implementation plan and includes a gap analysis and required support.
75. The report identifies the next steps, which include validation of the calculations and transfer of the ownership of the emission factor to the Clean Development Mechanism designated national authority (DNA) of Nigeria, and the DNA would then need to start data collection and update the grid emission factor. The report also outlines the training needs for data collection and calculation of GHG emissions and emission reductions.

Component 2: Policy and institutional framework for private investment in on-grid renewable power generation

Outcome 2: Public instruments are developed and implemented for de-risking the national policy environment	
Progress towards achieving Outcome 2 is rated as:	Moderately satisfactory

76. Under Outcome 2 on the development and implementation of public instruments for de-risking the national policy environment, satisfactory outputs were achieved towards the EOP targets. The study on domestic financial sector reform to unlock low-cost local capital for green investment was completed and widely disseminated. The GIS based tool to identify practicable RE (PV, wind and biomass) sites in Nigeria was also completed in (despite delays related to challenges in data collection in the COVID-19 context), and is available online on the ECN website.¹⁰ The tool was presented to relevant stakeholders during a workshop organized early 2021. Finally, the initial objective to develop a set of social and environmental safeguard guidelines for all utility-scale renewable energy projects was redirected to interconnected mini-grids following the project reorientation, and the report was completed and disseminated.

Progress towards achievement of the Outcome 2 is rated as **moderately satisfactory**, as outlined below in **Table 6**.

Table 6: Progress towards results, Outcome 2

Indicator	Baseline	End-of-Project target	TE Assessment
Date:	2015	Jun 2021	
2.1. Number of public instruments	Limited availability of local capital because of the risk perception of the financial	A study on domestic financial sector reform to unlock low-cost local capital for green	Achieved

¹⁰ www.nigeria.gestoenergy.com

developed and implemented (e.g. trainings delivered to IPPs, RE resources assessments, environmental and social safeguards, RE IPPs benefiting from trainings)	sector	investment is carried out	
	No GIS-based tool to provide the practicable RE potential is available	A GIS based tool is developed to identify practicable RE (PV, wind and biomass) sites in Nigeria	<i>Achieved</i>
	Lack of internationally-benchmarked social and environmental safeguards	A set of social and environmental safeguard guidelines is developed for all utility-scale RE for interconnected mini-grids based on international standards	<i>Achieved</i>
	Limited capacity in public and private institutions to plan, implement, monitor and evaluate RE projects	The Lagos Energy Academy are capacitated to deliver RE trainings to IPPs, undergraduate students, and public institutions on a cost-recovery basis	<i>Achieved</i>
	Not indicated	A lessons learned report is developed to capture best practices for dissemination	<i>Achieved</i>

77. The project also built capacity of the Lagos Energy Academy to deliver renewable energy trainings to IPPs, undergraduate students, and public institutions on a cost-recovery basis. A training manual/curriculum on the business plan development and loan application procedures for interconnected mini-grids was also completed and validated by relevant stakeholders.

With the completion of a lessons learnt report on investments in on-grid utility scale/interconnected mini-grids renewable energy projects, this outcome is considered as achieved.

Output 2.1: A study on domestic financial sector reform to unlock low-cost local capital for green investment is carried out

78. A study on Nigerian domestic financial sector reform to unlock low-cost local capital for green investment was undertaken through a technical assistance consultancy with the UK-based firm Climate Mundial Limited, with support from the Nigerian firm Clean Energy Consult. The final version of the report was issued on 23 November 2018. The eight recommendations included in the report are as follows.

- Provide capacity building to deposit money banks (DMBs) and national development financial institutions (DFIs) in solar PV project risk
- Provide access to longer-term credit lines to DMBs for green investment
- Prepare securitization vehicle to help DMBs refinance initial project loans
- Work with the Nigerian Electricity Regulatory Commission (NERC) to address solvency challenges in the transitional electricity market (TEM)
- Consider the role of the eligible customer regulation
- Develop a roadmap to listing of a solar independent power producer on equity capital

- markets
 - Take advantage of Article 6 of the Paris Agreement
 - Carry out continuous stakeholder engagement
79. The recommendations provide strategic guidance for achieving financial sector reform. It is advisable to follow up on these recommendations post project, e.g., identifying responsible entities for each of the recommendations and requesting progress feedback reports at each of the project steering committee meetings. The report was published with 500 copies printed and distributed as hard copies to policy and decision makers in government's Miniseries, Departments and Agencies.

Output 2.2: A GIS based tool is developed to identify practicable RE (PV, wind and biomass) sites in Nigeria

80. Activities under Output 2.2, regarding development of a GIS based tool to identify practicable RE sites in Nigeria have been achieved. A Web-GIS based RE tool that identified potential sites for a total of 21 wind farms evaluated in 12 of the 36 States in Nigeria comprising a total installed capacity of 2.5 GW and annual estimated energy production of 10.6 GWh/year was developed. Also, the potential sites for 213 solar PV plants dispersed all over Nigeria was identified with an installed capacity of 330 GW and estimated annual production of 546 TWh/year. The link to the web-GIS can be found at: <http://www.nigeria.gestoenergy.com>.
The ECN has agreed to host the Tool on its domain for sustainability of the project. Budget proposal for hosting the Web GIS RE tool on ECN's Domain has already been captured in the 2021 ECN's annual budget.
81. A workshop to share information on the presence and benefits of the "Nigeria Renewable Energy web GIS tool" among key stakeholders (especially potential investors/developers of large-scale solar-PV and wind projects in Nigeria) was also held in 2021.

Output 2.3: A set of social and environmental safeguard guidelines is developed for all utility-scale RE based on international standards

82. Activities under Output 2.3, regarding development of social and environmental safeguard guidelines is developed for all utility-scale RE based on international standards in Nigeria were achieved. In 2020, Social and Environmental Safeguard guidelines on interconnected mini-grids as well as an Environmental and Social Impact Assessment (ESIA) framework for interconnected mini-grid were developed, and their final version issued in December 2020. The report was published with 500 copies printed and distributed as hard copies to policy and decision makers in government's Ministries, Departments and Agencies
The activity was however largely delayed due to the redesign of the project strategy in 2019.

Output 2.4: The Lagos Energy Academy is capacitated to deliver RE trainings to IPPs, undergraduate students, and public institutions on a cost-recovery basis

83. Activities under this output have also been completed. An international consulting firm Germany based Renewables Academy AG (RENAC) of Germany was engaged to offer technical assistance on "Train-of-Trainer" programme on large-scale grid-connected PV projects in Nigeria" at Lagos Energy Academy. This involved capacitating the Lagos Energy Academy (LEA) to deliver RE trainings to IPPs, undergraduate students and public institutions on a cost-recovery basis. The 12-day training/capacity building programme held in March to April, 2019 was administered on 16 participants from Lagos Energy Academy, National Power Training Institute (NAPTIN), Energy

Commission of Nigeria (ECN) and Private Power Producers and was certified by RENAC. The training provided an end-to-end overview of the process of developing, financing, administering, installing, operating and decommissioning utility-scale solar PV plants.

84. In 2019, the project strategy re-design recommended the development of a Training Manual/ Curriculum on Interconnected Mini-Grids: Business Plan Development and Loan Application Procedures in Nigeria. In May 2020, the project commissioned a contracting firm to develop the Training Manual/ curriculum on interconnected mini-grids. The final version of the Training Manual was issued in November 2020. The report was published with 500 copies printed and distributed as hard copies to policy and decision makers in government's Miniseries, Departments and Agencies. Additionally, in 2021, the draft training manual was subjected to experts peer review, while creating opportunity for stakeholders to scrutinize the manual, thereby enhancing buy-in and ownership by all mini-grid developers. A validation workshop was held in June, 2021. The project further supported the sizing, selection and acquisition of two sets of solar PV components/ Balance of System (BoS) for the hands-on training at Lagos Energy Academy (LEA).

Output 2.5: A lessons learned report is developed to capture best practices for dissemination (and to demonstrate an architecture for leveraging private investments and climate finance using a risk-adjusted approach)

85. Activities under this output which aims to have a lessons learned report developed have also been achieved. A Lessons Learned Report from investments in on-grid utility scale/interconnected mini-grids RE projects was produced towards the end of 2020. A "Compendium of Renewable Energy Incentives in Nigeria" was also developed. The report serves as a one-stop shop of information on policies, incentives, institutions, and risks as it relates to investment in the renewable energy sector.

Component 3: First commercial on-grid RE project

Outcome 3: The NAMA for interconnected mini-grids is operational by demonstrating 15 solar PV interconnected mini-grids	
Progress towards achieving Outcome 3 is rated as:	Unsatisfactory

Progress towards achievement of the Outcome 3 is rated as **unsatisfactory**, as outlined below in **Table 7**.

Table 7: Progress towards results, Outcome 3

Indicator	Baseline	End-of-Project target	TE Assessment
Date:	2015	Jun 2021	
3.1. Emission reductions from solar PV interconnected mini-grids	No interconnected mini-grid established	15 mini-grids established with equity support and debt finance provided by international or domestic lenders;	<i>Not Achieved</i>

3.2. Number of households and industry benefitting from electricity generated by PV plants (clients serviced)	No MRV system for interconnected mini-grids NAMA	Not specified	<i>Not Achieved</i>
3.3 Number of domestic banks trained in appraisal and selection process of interconnected mini-grid investments	Limited knowledge with domestic banks to appraise and select debt finance of interconnected mini-grids.	1 or more domestic banks experienced with appraising and selection of debt finance of interconnected mini-grid projects.	<i>Not Achieved</i>

86. Component 3 was the investment part of the project which was aimed at operationalizing a renewable energy NAMA by initially demonstrating a proof-of-concept grid connected solar PV plant and then construction of 15 interconnected mini-grids. This outcome could not be achieved in the scope of the project.
87. The planned pilot solar PV plant in Bauchi State could not reach financial close. It was also reported that the subsequently proposed 15 interconnected minigrids (IMGs) after project re-orientation could also not get off the ground for similar reasons. However, this assertion seems uncertain because several other parallel efforts in establishment of interconnected minigrids by Rural Electrification Agency (REA) successfully managed to be established during the same period as the project under evaluation. The Interconnected Mini-grid Acceleration Scheme (IMAS) launched in 2019 by the REA with support of the EU and the GIZ which aims at accelerating the deployment of IMGs by offering non-cash grants and technical assistance had managed to award tenders to seven Nigerian companies as of April 2020 and a first IMG had been installed at Makoloki Community in Ogun State. Perhaps therefore, it would seem that ECN was not very well placed to undertake activities associated with project re-orientation to IMGs and probably the Rural Electrification Agency (REA) could have performed better in this aspect given their past experience.
88. The barriers hindering private investment in the utility-scale RE sector in Nigeria that were present at project entry are still in place at end of the project, and, in fact, the financial risks might have increased. Due primarily to the lack of solvency in the power sector, largely as a result of shortcomings in the privatization of the power generation and distribution services, the Federal Government of Nigeria is reluctant to provide a Partial Risk Guarantee (PRG) to DFIs/World Bank to enable them to loan money to IPPs.
89. A tender process for the construction of eight interconnected mini-grids launched in May 2020 resulted in an inconclusive procurement process. The re-orientation to IMGs could have benefitted from the experiences of Rural Electrification Agency (REA) in implementing similar initiatives across the country.
90. Further delays were incurred due mostly to COVID-19 and it was decided early 2021 to wind down the project until its planned closure in June 2021, due to the lack of successful implementation of the investment component of this project. As a result, this project did not generate any renewable energy nor CO₂ emissions reduction. This situation also means that the rest of the proposed

outputs under this component have also not been achieved because they required the project to reach financial close and be implemented.

Capacity building

91. The project contributed to the development of technical capacities and the acquisition of knowledge of beneficiaries from the public and private sectors. The enhanced capacity at the Lagos Energy Academy (LEA) to deliver renewable energy trainings to IPPs, undergraduate students, and public institutions were especially key to the institutional strengthening and sustainability. This is a good model for entrenching relevant capacity within institutions and ascertaining that they have a lasting impact; it is however unclear if these courses have (and will) continued to be provided on a regular basis beyond the initial set of trainings. Sustainability is expected to be enhanced through constituent application of the developed training manual/curriculum on business plan development and loan application procedures for interconnected mini-grids and regular provision of associated capacity building to stakeholders.
92. The evaluation assesses the capacity development processes promoted by the project as satisfactory. This is explained by the following aspects: i) they covered an unmet demand for the acquisition of knowledge on renewable energy solutions; ii) they were carried out with materials and methodologies aimed at facilitating learning e.g. through experiential learning at LEA and use of manuals e.g. the training manual/curriculum on the business plan development and loan application procedures for interconnected mini-grids; iii) they were designed and delivered in conjunction with LEA with recognized experience in the field; and iv) they managed to arouse interest and requests for further training as reported by participants. It should also be noted that courses offered during the project received good evaluation by the participants.

Communication, awareness creation and dissemination

93. The execution of project enabled the dissemination and positioning in the public arena the importance and benefits of the use of RE technologies and in the agenda of both the government and the private sector in general, as well as raising awareness about the same.
94. Communication was essential to disseminate the progress of the project and the knowledge generated, raise awareness about it, position on the agenda of the government the importance and advantages of the use of renewable energy, disseminate the operation of this technology to diverse audiences and bring the topic of renewable energy to the general public. The mechanisms and / or materials designed for these purposes were as follows:

i. Stakeholder Engagement and Partnerships

95. Stakeholder engagement was enhanced through the number of workshops and meetings. The primary approach taken in communicating with stakeholders was through workshops and meetings. The project did a good job in organizing frequent workshops, sharing draft outputs and documenting stakeholder feedback. Among the events that the project organized include:
- 31 May 2017, Calabar, Cross River State. Project inception workshop. 76 participants attended the workshop.
 - 02 June 2017, Calabar, Cross River State. 1st project steering committee meeting. 12 participants attended the meeting.

- 2 June 2017, Calabar. 1st Project Steering Committee meeting held. 12 participants attended the meeting.
- 25 January 2018, Abuja. 2nd project steering committee meeting. 25 participants attended the meeting. 18 participants attended the meeting.
- 15 March 2018, Abuja. 2nd Strategic planning meeting with on-grid solar IPPs and stakeholders on the proposed national stakeholders' forum on grid-connected solar PV in Nigeria. 15 participants attended the meeting.
- 18 May 2018, Abuja. Technical working group meeting on the UNDP-GEF project on de-risking renewable energy NAMA for the Nigeria energy sector. 16 participants attended the meeting.
- 18 July 2018, Abuja. Technical working group meeting on the UNDP-GEF project on de-risking renewable energy NAMA for the Nigeria energy sector. 10 participants attended the meeting.
- 24-25 July 2018, Ikeja, Lagos State. 2-day grid-connected renewable energy investors' forum. 46 participants attended the forum.
- 25-27 September 2018, Port Harcourt. Stakeholders' interactive forum on environmental and social impact assessment (ESIA) for renewable energy (RE) development Nigeria. 70 participants attended the workshop.
- 28 August 2018, Abuja. Meeting between Nigeria UNDP Regional, UNDP Nigeria, De-risking Project Team and Nigeria Solar Capital Partners (NSCP) on seeking solutions for NSCP to implement 100MW RE De-risking project. 5 participants attended.
- 10 October 2018, Abuja. 1st Mission Stakeholders Wrap-up Meeting on development of Nigeria Domestic financial sector reform to unlock local capital for green investment. 14 participants attended.
- 9 -12 October 2018, Abuja. Consultative meetings with stakeholders and working group for the development of TAPs. 14 participants attended.
 - 15-16 November 2018, Port Harcourt. Validation workshop on Nigerian domestic financial sector reform for on-grid renewable energy investment and for the development of a measurement, reporting and verification (MRV) framework for the Nigerian power sector. 48 participants attended the workshop.
- 6 December 2018, Lagos. 3rd project steering committee meeting. 18 participants attended the meeting.
- 5-7 December 2018, Lagos. Fact-finding mission for train-the-trainer program on large-scale grid-connected PV projects in Nigeria. Several stakeholder meetings held during these 3 days.
- 25 March – 6 April 2019, Lagos. 12 days Train-the-Trainer's programme on Large-Scale Grid Connected Solar PV in Nigeria. 33 participants attended.
- 01 February 2019, Abuja. Wrap-up meeting of the inception mission on development of a GIS mechanism for identifying practicable renewable energy (RE) sites in Nigeria. 30 participants attended the meeting. 30 participants attended the meeting.
- 18 March 2019, Abuja. Mid-Term Review (MTR) de-briefing presentation of initial findings.
- 24 – 25 April, 2019, Lagos. 2-Day Workshop for the Validation of Draft Report on: "Development of 3 Comprehensive NAMA Sectoral Technology Action Plans (TAPS) for Solar PV, Wind, Biomass" and "Monitoring Reporting and Verification (MRV) Mechanism for the Nigerian Power Sector". 35 participants attended the meeting.
- 16 May, 2019, Abuja. 2nd stakeholder's meeting on Development of GIS based tool for identifying the practicable sites for various renewable energy resources. 20 participants attended the meeting.

- 27 June, 2019, Lagos. Extra-Ordinary Emergency Steering Committee Meeting of GEF-UNDP De-Risking Renewable Energy NAMA for the Nigerian Power Sector. 25 participants attended the meeting.
- 24 September 2019, Abuja. 3rd stakeholder's meeting on Development of GIS based tool for identifying the practicable sites for various renewable energy resources. 16 participants attended the meeting.
- 13 December, 2019, Delta. 4th Project Steering Committee (PSC) meeting on GEF-UNDP De-Risking Renewable Energy NAMA for the Nigerian Power Sector. 15 participants attended the meeting.
- 29 – 30th September, 2020, Abuja. Stakeholders Meeting on the National Stakeholders Consultative Forum on Scaling-up Interconnected Mini Grids Development in Nigeria: Current Status, Challenges and Prospects. 92 participants attended the meeting.
- 11 November, 2020, Lagos. 5th Project Steering Committee (PSC) meeting on GEF-UNDP De-Risking Renewable Energy NAMA for the Nigerian Power Sector. 23 participants attended the meeting.
- 30 -31 March, 2021, Nasarawa. 6th Project Steering Committee (PSC) meeting on GEF-UNDP De-Risking Renewable Energy NAMA for the Nigerian Power Sector. 24 participants attended the meeting.
- 18 – 20, May, 2021, Port-Harcourt, Stakeholders at the 3-day Workshop on Public Presentation of the Key Achievements and Knowledge Sharing of “De-risking Renewable Energy NAMA Project for the Power Sector in Nigeria”. 40 participants attended the workshop.
- 18 – 20 May 2021, Port Harcourt. Stakeholders at the 3-day Workshop on Adoption, Public Presentation and Mainstreaming of GIS-Based Tool for Identifying the Practicable Sites for Various Renewable Energy Resources in Nigeria".
- 8 - 9 June, 2021, Lagos. 2 Day Stakeholders Consultative Forum on Unlocking Low-Cost Capital for Grid-Connected Renewable Energy Investment in Nigeria. 26 participants attended the workshop.
- 10 - 11 June, 2021, Lagos. 2 Days Stakeholders Validation Workshop on “Training Manual / Curriculum for Developers of Interconnected Mini-Grids (ICM): Business Plan Development and Loan Application Procedure”. 39 participants attended the workshop.

ii. **Publications:**

96. various publications have been produced. These include:

- “Development of an MRV Mechanism for the Nigerian Power Sector” Version 2.0, Nov 2018
- “Calculation of Grid Emission Factor (GEF) for the Nigerian Power System” Version 1.1, Dec 2018
- “Development of Comprehensive Sectoral NAMA Technology Action Plans for Solar, Wind and Biomass”, May 2019
- “Identify Financial De-Risking Instruments and Propose and Implement means of Capitalization”, 2019
- “Compendium of Renewable Energy Investment Incentives in Nigeria”, 2019
- Lessons Learned Report from Investment in On-Grid Utility Scale/Interconnected Mini-Grids Renewable Energy Projects.

- De-risking Interconnected Mini-grids Investment in Nigeria. Online (<https://www.africa.undp.org/content/rba/en/home/library/reports/de-risking-interconnected-solar-mini-grid-investments-in-nigeria.html>).
- WebGIS Tool for Renewable Energy Resources Potential in Nigeria. Online (www.nigeria.gestoenergy.com).

97. It is the opinion of this evaluation however that not enough (and of a wide variety) communication and awareness creation material was developed to disseminate knowledge and raise awareness about renewable energy and position the importance and advantages of the use of solar PV systems for energy purposes to diverse audiences and bring the topic of RE to the general public, including children and primary school teachers. The mechanisms and or materials that could have been designed for these purposes include didactic material for children and teachers, infographics, audiovisual materials etc.

98. The evaluation concludes that the quality of the materials produced and the different communication strategies implemented are satisfactory, since they have constituted an essential success factor for the achievement of the project objectives, in addition to having a high multiplier potential. They are a resource that could potentially be put into use multiple times over in the future by many different types of stakeholders.

99. The main weakness and challenge identified, given the growing interest generated, has to do with the accessibility and management of the information produced. It will be key to expand and improve access to information produced, through a digital repository and websites or other dissemination tools that facilitate the search for documents, most of which are currently in printed form. The GIS based tool to identify practicable RE (PV, wind and biomass) sites in Nigeria is an example of such an online platform that will ascertain that the knowledge already generated is utilized.

iii. Institutionalization of the project

100. Regarding institutional development, the results are favorable, since the execution of the project contributed to the creation and strengthening of the national capacity for RE development within ECN, expressed in the anchoring of the projects in the ECN, the design and preparation of energy plans, and the enhancement of the facilities and curriculum at LEA.

Normative values

101. Despite potential contributions of solar PV renewable energy to most of gender focus areas, the project did not articulate them in a meaningful manner. An opportunity for incorporating them using a systematic approach to mainstreaming gender in the programme work was missed. As a result, there was a lack of clarity on how any gains could be made in relation to key programme activity areas.

102. A social and environmental screening process (SESP) was carried out as part of the project preparation phase (PPG). The SESP concluded that the project is rated as HIGH risk, based on two aspects: (1) security, regarding with the political instability in the north of Nigeria; and (2) resettlement of project affected persons. Four risks, each associated with the construction phase

of the solar PV plant, were characterized as MODERATE: risks to habitats; risks to community health & safety; risks to cultural heritage; and risks of pollution.

103. A gender analysis and action plan were not outlined during the PPG phase, and the project results framework is not gender-specific. During the GEF-5 replenishment cycle, UNDP policy required gender analyses and action plans for projects having identified gender risks. There were no gender-related risks identified in the SESP; however, it was noted that the resettlement would focus on women, even though the communities in Bauchi State tend to be patriarchal. Furthermore, the lack of electricity in rural areas affects women disproportionately, e.g., time required for gathering fuelwood, health impacts of wood-fired cookers etc.
104. While the intervention was categorized as having “limited gender dimensions” according to the UNDP Gender Categorization, meaning that the project has limited direct influence over gender equality and/or women’s empowerment in the country, some notable achievements in this area were made. During project, the participation of women in training and stakeholder engagement activities (as participants) was deliberately emphasized through mechanisms such as the nomination of women by participating institutions when sending out invitation letters. For the institutions who were part of capacity building efforts of the project, gender was a significant consideration during training provided and women were deliberately selected and were represented in all the training activities.
105. Regarding the work with indigenous/vulnerable communities, the project had few beneficiaries belonging to this target group as this was not a strategy that was factored in the project design
106. There were no planning undertaken to target local communities though opportunities existed for expanding the scope for this in areas such as installation of multifunction solar PV powered kitchens in schools and hospitals, supporting subsidized solar PV energy among communities etc. The lack of strategy for inclusion and scope of activities that could directly benefit local and other vulnerable communities’ beneficiaries makes it clear that the action was fundamentally focused onto the policy and industry actors. Of course, it can be argued that the local communities could have benefited indirectly due to improved provision of employment opportunities brought about establishment of enterprises around Solar PV RE but it was unclear how the potential successes of the project could have been replicated to local communities. From this point of view, the analysis carried out shows that the potential offered by this action to support local communities was not clearly articulated from the outset and which was therefore a weakness during the project design.

3.3 Efficiency

Project Efficiency is rated at: Moderately Satisfactory

107. The project was implemented NIM (National Implementation Modality) modality. According to the project document, the Federal Ministry of Environment (FME) was the executing agency. The project appointed a Project Director to: i) coordinate the project activities with the activities of other Government entities; and ii) certify that the expenditures are in line with the approved budgets and work-plans. The project steering committee was chaired by the FME and comprised of 10 members. The approved CEO Endorsement Request lists the following four institutions as executing partners.

- Federal Ministry of Environment (FME)
- Federal Ministry of Power (FMP)
- Energy Commission of Nigeria (ECN)
- Nigerian Electricity Regulatory Commission (NERC)

108. The lead implementing agency for the project was the Energy Commission of Nigeria (ECN). The Deputy Director of ECN was appointed as project director, and a full-time project manager and project assistant, both financed through the GEF funds, made up the project management unit (PMU), with a dedicated office in the ECN headquarters in Abuja.

109. The UNDP Country office in Abuja provided support to the project, including on strategic guidance, administrative issues, and financial reporting. The UNDP Country Office also provided procurement support, e.g., for recruitment of international consultants. UNDP CO staff participated in the PSC meetings and in the stakeholder workshops held by the project.

110. The project's execution modality (Energy Commission of Nigeria being Agency working in conjunction with execution partners and UNDP) established an alliance that generated opportunities for inter-institutional synergies aimed at developing and strengthening knowledge and increasing the quality and impact of the intervention. Key informants expressed confidence in the competence and knowledge of ECN on the subject matter addressed by the initiative. While synergies occurred, this was diminished by the low motivation on the part of some of the execution partners, some of whom did not regularly attend the steering committee meetings.

111. The human and financial resources, as well as the organizational structure, were well adjusted to the necessary requirements of and to achieve the expected results of the project. Greater articulation and communication between the actors would have strengthened and improved the quality and impact of the initiative.

112. Taking into consideration the design of the project, the changes promoted, the results achieved, the products generated, and the activities carried out, it can be stated that the project had an organizational structure and financial resources that are well attuned to match the project requirements and to promote the different strategies aimed at achieving the programmatic outcomes.

113. The available budget allowed the establishment of a qualified team of staff, experts and consultants, to hire external services of proven quality, and to make the appropriate equipment and infrastructure available to the project and to provide resources that allowed to address the operational expenses necessary to implement the different activities.

114. Although the resources invested made it possible to develop the planned activities, the technical-financial execution experienced delays during the implementation of the project. There was a significant delay (11-month) from the official start date, 28 June 2016 to the date when the inception workshop was held, on 31 May 2017. The reasons for the delay, as described in the 2018 PIR report and described in TE interviews were the prolonged time required to recruit the PMU team (the project manager was recruited in January 2018), difficulties faced in recruitment of international consultants and transitions within government administration, particularly the GEF

operational focal point office. The delay in commencing project implementation has adversely affected project efficiency, but the lack of progress towards achieving the project objective is largely due to the external factor of the IPPs not reaching financial close.

115. During the technical formulation and budget design, the establishment of a monitoring system was incorporated as a component of the project. This enhanced the execution of the project since the initiative incorporated an architecture and structure for a systematic technical and financial follow-up, which allowed the generation of relevant and quality information for decision-making by the different actors involved in the management and implementation of the project. The project further produced annual project implementation review (PIR) reports. The PIR reports addressed challenges the project faced, including on issues associated with the IPPs reaching financial close etc.

116. *The COVID-19 pandemic:* The pandemic slowed down implementation of project activities and several activities that require in-person meetings e.g. planned popularization of reports in 2020 through National Sensitization workshops were re-scheduled multiple times due to the COVID-19 times. COVID-19 further delayed the process of gathering needed data during the development of Geographic Information System (GIS) based tool to identify practicable renewable energy (PV, wind and biomass) sites in Nigeria. The high levels of uncertainty required flexibility and review of plans and development of contingencies arising from the new unexpected realities.

Financial Expenditures

117. According to available expenditure reports provided by the UNDP CO, a total of USD 2,765,398 of the GEF implementation grant of USD 4,400,000 have been incurred through project lifetime, or roughly 63%, as shown below in Table 8.

Table 8: Project expenditures through end of project (USD)

Component	Actual Expenditures (USD)							GEF Grant
	2016	2017	2018	2019	2020	2021	Total	Prodoc Budget
Component 1	0	40,272	258,803	122,756	-	13,322	435,153	1,108,200
Component 2	0	319,396	323,557	408,447	449,663	97,076	1,598,138	852,300
Component 3	0	-	40,391	149,398	-	1,019	190,808	2,230,000
Project Management	0	35,426	178,752	173,175	68,239	85,707	541,299	209,500
Total	0	395,094	801,503	853,776	517,902	197,124	2,765,398	4,400,000
							Balance:	1,634,602

118. The USD 435,153 incurred under Component 1 represents 39% of the indicative budget for this component. For Component 2, 1,598,138 (187%) of the indicative USD 852,300 budget was spent through the course of the programme implementation indicating a rather high overspend of 87%. It seems that some of the costs allocated for Component 2 might be Component 3 costs.

119. Project management costs through the project duration were USD 541,299 against a budgeted value of USD 209,500, which represents 258% spend and thus an overspend by 158%. Furthermore, this value represents 24% of costs incurred for Components 1 through to 3. This rate of project management costs is higher than the 5% GEF policy threshold.

Cofinancing

120. It was difficult to obtain the complete picture of the cofinancing contributions during the project. Based on inquiries made during the TE mission, the UNDP CO provided some information regarding the landscape of cofinancing as presented in Table 9. Of the USD 1,500,000 of UNDP grant cofinancing (TRAC funds) confirmed at project endorsement, USD 420,000 representing 28% was incurred by end of the project. The full confirmed USD 1,500,000 (100%) in-kind cofinancing from ECN was incurred during the project, according to the PMU. These contributions are represented by staff time, office space, vehicle use, etc. Similar full 100% cofinancing were incurred by Federal Ministry of Environment (USD 200,000 largely on staff time) and Federal Ministry of Power (USD 350,000 support to LEA for installation of solar lab among other costs).
121. The largest amount of confirmed cofinancing when the project was endorsed was a USD 210 million grant contribution from Nigeria Solar Capital Partners; this sum represents the estimated investment for the solar PV plant in Bauchi State (which was unable to reach financial close). No information was provided by the UNDP CO on how much of this cofinancing the IPP had incurred during the project. A midterm review report however indicated that their interviews with Nigeria Solar Capital Partners indicated that they had spent USD 5 million on activities such as the ESIA, resettlement action plan and others by project mid-term (2019) since 2013. The TE could not however verify these figures.

Table 9: Project cofinancing through end of project (USD)

Note	Sources of Cofinancing	Name of Cofinancer	Type of Cofinancing	Amount Confirmed at CEO Endorsement USD	Actual Amount Contributed at Terminal Evaluation (USD)	Expected Amount by Project Closure (USD)	Actual % of Expected Amount (USD)
1	GEF Agency	UNDP	Grant	\$1,500,000	\$420,000	\$1,500,000	28%
2	National Government	Energy Commission of Nigeria	In-kind	\$1,500,000	\$1,500,000	\$1,500,000	100%
3	National Government	Federal Ministry of Environment	In-kind	\$200,000	\$200,000	\$200,000	100%
4	National Government	Federal Ministry of Power	In-kind	\$350,000	\$350,000	\$350,000	100%
5	Private Sector	Nigeria Solar Capital Partners	Grant	\$210,000,000	Not information	\$147,000,000	
Total				\$213,550,000	\$10,715,000	\$150,550,000	

Adaptive Management:

122. Due to the inability of the baseline project of 100 MW plant in Bauchi State by the Nigerian Solar Capital Partner (being one of the 14 Independent Power Producers (IPPs)) to reach financial close, an adaptive management exercise to re-design and re-orient the project was approved by

an extra-ordinary emergency session of the steering committee in 2019. The project engaged an International consulting Firm Walburg and Partners B.V to carry out the project strategy review (PSR). The final version of the report was issued on 30 November 2019. The report recommended that the project focus on inter-connected mini-grids. The recommendation was approved by the PSC in December 2019. Implementation of the new project strategy commenced in 2020.

123. In summary, the assessment of project implementation and execution were generally satisfactory for the components that were achieved but overall efficiency was diminished by the various delays experienced at the beginning of and during project implementation.

3.5. Sustainability

Overall sustainability rating:

Likelihood that benefits will continue to be delivered after project closure: Moderately unlikely

124. The financial risks identified at project development are still in place due to the liquidity problems in the power sector. Due primarily to the lack of solvency in the power sector, because of shortcomings in the privatization of the power generation and distribution services, the Federal Government of Nigeria has been reluctant to enter into put-call option agreements (PCOAs), the sovereign guarantees for private sector investments. Given that the program was predicated on removing the financial risks to IPPs through concessional loans and a debt replacement facility and given that these were not removed, the risks associated with increasing private sector investment into the Nigerian power sector still remain high and the overall objective outcome of the project that would allow for the evaluation of sustainability was not achieved.
125. On a positive note, the project managed to anchor itself in the institutional framework of Federal Ministry of Environment (FME). This institutional anchoring can stimulate institutional, financial, and programmatic sustainability on the components of the programme that were achieved. The anchoring of the project in the state organization is valued as a substantive contribution to the sustainability of the processes promoted by the initiative. This institutional ownership of project outputs enhances the prospects of the results to be sustained after GEF funding ceases. No sustainability is however expected for on component 3 of the programme which was aimed at operationalizing a renewable energy NAMA because this outcome was not achieved.
126. The sustainability of the results and the capacities developed are however not assured in the medium and long term. It will be contingent upon the commitment of FME to support the implementation of de-risking approaches for catalyzing private sector investments and continuity in consistency in dissemination and integration into programming of the public instruments for de-risking that were developed within the framework of this project. National institutions led by FME will need operationalize the technology action plans; advance the recommendations for developing an MRV mechanism; institutionalize the GIS mapping tool after project closure; and follow up on the recommended financial sector reforms including the social and environmental safeguard guidelines.

127. The "Training of Trainers" activity undertaken at the Lagos Energy Academy (LEA) on Design, Installation, Operations and Maintenance of Grid connected Solar PV constitutes a substantive contribution to the institutional sustainability of the project and ensures continuity in provision of capacity on RE to private and public institutions in the country. LEA has put in place state-of-the-art training facilities, including testing laboratories and field operation of a solar PV array through seed funding from the Lagos State Government and DFID. The project capitalized on these initial investments to develop new training courses and to complement existing equipment. The LEA was further part of the steering committee and as a member of the Working Group for Component 2. In addition, a Training Manual/curriculum on interconnected mini-grids was developed to complement the aforementioned capacity building efforts at LEA.

4. Conclusions and recommendations

Considering the main findings of the Terminal Evaluation, the following conclusions and recommendations are presented:

4.1 Conclusions

128. The underlying objective of the project continues to be relevant, as the Federal Government of Nigeria (FGN) remains committed to diversifying the power sector with increased RE inputs. Due to the current lack of liquidity in the power sector, stemming from some unfavorable outcomes of the 2013 privatization of electricity generation and distribution services, the government is significantly constrained in issuing guarantees for further private sector investment, and the IPPs that signed PPAs in 2016 did not reach financial close.

There is still need for concerted effort to address the far-reaching consequences of political and financial risks for RE projects in Nigerian to come up with workable solutions. As has been demonstrated by the unsatisfactory objective outcome of this programme, there is significant risk present in Nigeria that put a particular strain on the costs of capital for RE projects. It is imperative that the national government and institutions take the initiative to eliminate obstacles that investors are facing.

4.2. Recommendations

Strengthen measures and instruments to address risks to renewable energy projects

129. As has been demonstrated by the outcome of this programme, there is significant risk present in Nigeria that place particular strain on the costs of capital for RE projects. Due to the usually high initial investment costs, competitiveness of renewable energy sources (RES) is impaired by the costs of capital; which are significantly higher, and which reduces the level of acceptance of RES among investors. Thus, the bankability or financing of RE projects is one of the main obstacles to the success of RES and requires strengthened risk management. Due to the relatively far-reaching consequences of political and financial risk, there is need to find practical workable solutions that address these risks.

It is imperative that the national government takes the initiative to eliminate obstacles that investors are facing. In this process, IFIs (International Financial Institutions, e.g. the World Bank) can be engaged to play an advisory role. Main policy measures include clear and long-term oriented regulation of the energy and electricity market; distinct allocation of competencies to institutions regarding RES issues; and provision of guidelines and sharing of good practices on all public authority levels. From the experience of the programme being evaluated, this implies that a lot of preparatory and “pre-project” negotiations and activities need to take place in order to create a conducive environment for investment by IPPs.

Invest in evidence building on the benefits of RE to support its adoption and institutionalization.

130. There is need to engage in building broader evidence (ex-ante and ex-post) of benefits of RE projects within the Nigerian context. There is need to analyze the socio-economic benefits of renewable energy with focus on such areas such as employment creation and skills, gross domestic product (GDP), broader measures of welfare, local economic value creation, improved livelihoods, gender and other benefits. The assessments should include present-day global, regional and national impacts, as well as projections to 2030 and 2050. A monitoring system to measure RE adoption and outcomes needs to be operationalized to generate robust data.

Put in place mechanisms for incentivizing private investment on decentralized RE solutions

131. Decentralized RE solutions such as mini-grids, powered by solar, wind or hydro, are emerging as the superstars of energy access, particularly in rural areas, where they have become a viable option for providing reliable and high-quality electricity to rural populations and businesses.

132. Using the latest technologies, mini-grid development may contribute to increasing the number of households with electricity access and improving the reliability of electricity supply in rural areas, when utility-scale RE plants are still unviable. Solar mini-grids for example contribute to enhanced water security in many rural areas of Africa when used for water pumping and where the solar canopy can also be utilized for rainwater capture and storage. Increased deployment of solar photovoltaic (PV), in the form of mini-grids or standalone solar home systems also reduces the need for large thermal plants, which require substantial amounts of initial investments.

Encouraging examples of Interconnected Mini-Grids (IMGs) already exist in Nigeria. Launched in 2017, the Energizing economies initiative (EEI) increases power supply to economic clusters. One case is the Wuse market in Abuja. Currently in its pilot phase, an IMG is providing 30 shops of the Wuse market with electricity. A second example is the Interconnected Mini-grid Acceleration Scheme (IMAS). IMAS was launched in 2019 by the Rural Electrification Agency (REA) with support of the EU and the GIZ. It aims at accelerating the deployment of IMGs by offering non-cash grants and technical assistance. As of April 2020, seven Nigerian companies have won the IMAS tender. At Mokoloki Community in Ogun State, a first IMG has been installed in the framework of the IMAS¹¹.

Given the significant financial risks that hampered the successful implementation of the utility scale RE in the current programme, interconnected mini-grids offer an opportunity to address this obstacle and can help to smooth the way for greater uptake. Furthermore, there is already significant proof of successful implementation of IMGs by Rural Electrification Agency (REA) in the country.

133. The potential for upscaling these decentralized RE solutions in Nigeria can be realized through the formulation of a clear policy and corresponding strategy promoting decentralized solutions, including mini-grids, and the integration of this strategy into future updates of the Nigeria Renewable Energy Master Plan (REMP). In addition, targeted public interventions could encourage increased private investment in mini-grids; basic policy interventions, including modest subsidies considerably lower than the current grid connection subsidies in grid extension programmes could reduce mini-grid project payback periods

Institutionalize knowledge management practices to facilitate sharing of knowledge

134. The project made significant achievements in completing the outputs under Components 1 and 2; and these now need to be institutionalized and mainstreamed into government processes. The project generated high-quality knowledge, developed methodologies, prepared materials, and created training spaces with a high potential for replicability both in Nigeria and outside the country. In order to multiply the effects of the project and scale its communication and awareness scope, it is recommended that the government creates more communication and awareness materials e.g. infographics, audiovisual material, didactic material for children and teachers and

¹¹ <https://ledsgp.org/2021/05/achieving-sdg7-in-africa-through-interconnected-mini-grids/>

disseminate them in different regions in order to raise awareness and bring knowledge about RE technologies. Application of the generated knowledge products will sustain continuous improvement of RE products and processes for future investments in RE.

It will further be important to institutionalize the project outputs and facilitate ownership of project results. These outputs include technology action plans, MRV mechanism, GIS tool, environmental and social safeguard guidelines and financial sector reforms.

Annex 1: Evaluation Matrix

CRITERION: RELEVANCE			
Question 1. To what extent has the project adapted to commitments in the international development agenda (SDGs), aligned with UNDP's strategic objectives, with national policies (e.g. Vision 2030) and strategies, and responds to the needs and priorities of communities, including the vulnerable groups?			
Evaluation sub-questions	Indicators / judgment criteria	Methods and Tools	Sources
Sub-question 1.1. To what extent are the project objectives and the expected results consistent and contribute to the strategic priorities and policies for promoting RE energy production and use in Nigeria?	Indicators I1.1.1 Degree of alignment, adaptation, adequacy and contribution of the design, implementation and results of the project to the strategic priorities and policies to promote the use of RE. Judgment criteria: • Presence of a justification in the design of the project that refers to the priorities of the Nigerian government. • Incorporation in the PRODOC and a description of the mechanisms to contribute to the development priorities of the Nigerian Government around energy production and GHG emissions reduction. • Assessment of the actions and results of the project based on their contribution to the achievement of development priorities of the Nigerian Government. • Assessment by project staff and stakeholders regarding project in addressing key priorities in promoting RE production and use.	Review of documentation Interviews	Secondary sources: • PRODOC • Semi-annual reports • Technical documents • Institutional and legal framework of the Nigerian Government Primary sources: • Project team • UNDP team • Govt. Officials
Sub-question 1.2. Does the project design consider, is aligned with and contribute to fulfilling the mandate and policy of UNDP, the National Framework for Priorities for UNDP Technical Assistance and the UNDAF in Nigeria in relation to promoting the	Indicators: I1.1.2 Degree of alignment, adaptation and contribution of the project design and implementation documentation to the programming framework, policy and mandate of UNDP and the United Nations in Nigeria. Judgment criteria: • Presence of a justification in the project design that refers to UNDP. • Incorporation into the PRODOC of results and a description of the mechanisms to contribute to the priorities of UNDP and the United Nations system. • Assessment of the actions and results of the project based on their contribution to the achievement of the priorities of UNDP and the United Nations system.	Review of documentation Interviews	Secondary sources: • PRODOC • Semi-annual reports • Technical documents • UNDAF 2018-2022 • UNDP Nigeria Country Strategy Primary sources: • Project team • UNDP team

energy production/use of Solar PV?	- The project has been able to adapt to the modifications of the United Nations assistance framework in Nigeria. - Assessment by project staff and stakeholders regarding project in addressing key priorities of UNDP and the United Nations system in promoting RE production and use.		
Sub-question 1.3. Are the design and results of the project relevant to meeting the goals included in the Millennium Development Goals and the 2030 Agenda of the United Nations system?	Indicators: I1.1.3 Degree of alignment, relevance and adaptability of the project with the Sustainable Development Goals and the Millennium Development Goals. Judgment criteria: - Presence of a justification in the project design that refers to SDGs. - Incorporation into the PRODOC of results and a description of the mechanisms to contribute to the priorities of SDGs and other United Nations agenda. - Assessment of the actions and results of the project based on their contribution to the achievement of the priorities of SDGs. - Assessment by project staff and stakeholders regarding addressing the key priorities of SDGs, Paris Agreement etc. - The project has managed to adapt its execution to the changes in the UN system agenda.	Review of documentation Interviews	Secondary sources: - PRODOC - Semi-annual reports - Technical documents - Agenda 2030 - MDGs - African agenda 2063 Primary sources: - Project team - UNDP team
Sub-question 1.4. Does the project respond to the needs of local communities or other beneficiaries?	Indicators: I1.1.4 Degree of harmony of the project with the needs of the beneficiaries and communities. Judgment criteria: - Assessment (positive or negative) by the project staff and beneficiaries regarding the correspondence of the project activities with the needs of the communities - Existence of a diagnosis that accounts for the priorities of the beneficiary communities. - The project has managed to adapt the execution to eventual changes in context and / or the needs of the target group.	Review of documentation Interviews	Secondary sources: - PRODOC - Semi-annual reports - Financial reports - Technical documents Primary sources: - Project team - UNDP team - Beneficiaries
Sub-question 1.5. To what extent has the project responded to capacity development needs identified and how	Indicators: I1.1.5 Degree of harmony of the project with the needs in terms of capacity development of the beneficiaries. Judgment criteria:		

have it capitalized on existing capabilities?	• A participatory needs assessment for training or similar exercise was performed before / during the design of the intervention. • Another preliminary evaluation process was carried out, taking into account existing capacities (institutional, organizational and individual). • Assessment (positive or negative) of the project staff and beneficiaries regarding the correspondence of the training activities with the needs of the participants
CRITERION: EFFECTIVENESS	
Question 2. How effective has the project been in achieving the objectives and expected results in its three components? What were the observed changes (tangible and intangible)? What did the project contribute to, including unintended results?	
Evaluation sub-questions	Indicators / judgment criteria
	Methods and Sources Tools
Sub question 2.1. Goals and Project Objectives. To what extent did the project contribute to the goal of increasing the utilization of Solar PV plants for satisfying energy needs at the local and national levels? What are the social, economic and environmental impacts?	Indicators: I1.2.1 Level of attainment (quantitative and qualitative) and quality obtained in the products, results and objectives. I2.2.1 Level of attainment of the formulated indicators. Judgment criteria: • Vertical and horizontal coherence of the intervention logic of the project. • Factors (positive and negative) that influenced the attainment (or not) of the results and objectives. • Attainment of the objectives between 2015 and 2020. • Level of replacement of fossil fuels. • Generation of new jobs. • Percentage of reduction of CO2 emissions. • Difficulties in achieving the goals.
Sub-question 2.2. Outcome 1.1. What results have been achieved as a result of capacity building on Solar PV in the Country by the project?	Indicators: I1.2.2 Effects of the project (qualitative/quantitative) in the national/local levels and/or other institutions, as a result of the development of capacities and knowledge generated by the project. Judgment criteria: • Level of appropriation of developed capacities. • Institutional capacity to integrate the knowledge provided/developed into its work.

	Assessment (positive or negative) of the key actors of the project regarding the effects generated as a result of their capacity development.
Sub-question 2.3. Outcome 1.1. What results have been obtained as a result of improved awareness, knowledge sharing on best practices on Solar PV in the Country by the project?	Indicators: I1.2.3 Level of implementation of communication / awareness campaigns. I2.2.3 Appropriation and understanding by the target audience to the scope, advantages and disadvantages arising from the use of RE. Judgment criteria: - Effects generated in the environment and communities as a result of the installation of Solar PV plants and other RE solutions. - Capacity and scope in communicating the achievements of the project. - Replication capacity of Solar PV plants and RE solutions within communities.
Sub-question 2.4. Outcome 2.1. What results have been obtained regarding the increased use of RE?	Indicators: I1.2.4 Level of planning, instrumentation and execution of the Solar PV plants. I2.2.4 Contribution of the Solar PV RE investments towards generation of energy. I3.2.4 Percentage of Solar PV plants that improved their access to financing Judgment criteria: - State of progress in the development, quality of planning, instrumentation and public policy of incentives for the generation and use of Solar PV for energy generation at all levels - Number of projects identified and monitored. - National and county distribution of Solar PV projects. - Impact of projects on the energy matrix at the national and county levels. - Facilitation and improvement in access to instruments of promotion, financing or investment, for the use of Solar PV energy sources.
Sub-question 2.5. Component 3.1. What results have been obtained as a result of establishment and implementation of incentive systems for	Indicators: I1.2.5 Level of financing (USD) leveraged for the Solar PV projects. I2.2.5 improvement in access to instruments of promotion, financing or investment in Solar PV projects Judgment criteria: USD generated due to incentives based on incremental cost principle to Solar PV

Solar PV technologies	projects • Number of project developers benefitted through the incentive facility • Capacity to of Solar PV projects to access the incentives • Replication/enlargement of capacity of Solar PV plants attributed to incentive financing		
CRITERION: EFFICIENCY			
Question 3. Were the financial, technical and operational resources and procedures available adjusted to the project implementation requirements? Have they contributed to or hindered the achievement of the project's results and objectives?			
Evaluation sub-questions	Indicators / judgment criteria	Methods and Tools	Sources
Sub-question 3.1. Have the procedures and human, financial and operational resources been available and have they been sufficient and appropriate for implementation of the project in a timely fashion and with appropriate quality?	Indicators: I1.3.1 Description and assessment of factors (positive and negative) that influenced the performance and budgetary and technical execution of the project. I2.3.1 Assessment and level of ownership of the project by staff of the implemented activities. Judgment criteria: • Perception of project managers regarding the operation and usefulness of supervision and technical support. • Agreement between planned and executed financing. • Causes and consequences of eventual delays in implementation. • Concordance between planning and execution.		
Sub-question 3.2. The institutional /organizational structure of the project. Has the project contributed to achieving efficient and results-based management	Indicators: I1.3.2 evaluation of favorable and unfavorable conditions of the institutional/organizational structure of the project that have impacted the achievement of results. I2.3.2 Existence and usefulness of articulation/communication protocols between the actors. I3.3.2 Quality, timeliness of the technical and operational support of the UNDP office. Judgment criteria: • Perception of the project managers/actors regarding the operation of the designed structure. • Suitability of the institutional / organizational architecture implemented. • Existence, usefulness and monitoring of the project organizational chart.		

	• Functionality, adequacy and efficiency of the coordination mechanisms of UNDP and the project actors and other stakeholders.		
Sub-question 3.3. The supervision and technical/operational support to the project have been adequate to achieve an efficient implementation	Indicators: I1.3.3 Difficulties and successes in technical and operational support mechanisms. I2.3.3 Quality, timeliness of the technical and operational support by the UNDP office. I3.3.3 Existence, usefulness and monitoring of a project organizational chart. Judgment criteria: • Perception of project managers regarding the operation and usefulness of supervision and technical support. • Clarity of the definition of roles and functions. • Perception of managers and public officials regarding the timeliness and quality of technical and operational support from the UNDP office.		
Sub-question 3.4. Is there a monitoring, evaluation and knowledge management system? Does it serve as support to manage the project?	Indicators: I1.3.4 Existence and quality of a monitoring, follow-up and follow-up management system for the project. Judgment criteria • Quality and functionality of the monitoring system implemented. • The monitoring and evaluation system allows the dissemination of lessons and access to timely and quality information. • Assessment of the monitoring mechanisms and tools generated and implemented during the project.		
CRITERION: NORMATIVE VALUES			
Question 4. To what extent was the project designed and implemented considering the aspects of social equity, gender equality and human rights, in particular in relation to vulnerable groups (women, youth and indigenous peoples)?			
Evaluation sub-questions	Indicators / judgment criteria	Methods and Tools	Sources
Sub-question 4.1. Gender: To what extent does the project contribute to meeting UNDP's gender equality	Indicators: I1.4.1 Assessment of the inclusion of the gender perspective in the design and execution of the project based on UNDP standards. I2.4.1 Number and percentage of women who participated in the training and extension spaces of the project.	Review of documents Interviews	Secondary sources: • PRODOC • Semi-annual reports • Financial reports • Technical documents

goals?	I3.4.1 Contribution of the project to the fulfillment of the objectives of the UNDP Gender Equality Policy. Judgment criteria • Perception of beneficiary women regarding their participation and changes generated by the project. • Extent to which women participated in decision-making during project formulation and execution • Volume and quality of women's participation in the project's training activities. • Assessment of methodologies for ensuring women's access to project benefits • Contribution of the project to improving access to technologies by women • Harmony of the project strategy with the UNDP Gender Equality Policy and its standards. • Stakeholders' opinion regarding the inclusion of the gender approach in the formulation and execution of the project	• UNDP Gender Equality Policy • Monitoring system and evaluation Primary sources: • Project team • UNDP team • Beneficiaries • Officials of the • State
Sub-question 4.2. Inclusion: Did the project consider territorial, social and cultural differences of the beneficiary groups in activities such as training etc?	Indicators: I1.4.2 Level of adaptation to social and cultural uniqueness of the beneficiary population. I2.4.2 Degree of inclusion of territorial, social and cultural specificities in the RE solutions promoted by w the project. Judgment criteria • Existence of initial diagnosis and approach strategies. • Perception of beneficiary groups regarding the quality and relevance of the methodologies and solutions	Review of documents Interviews Secondary sources: • PRODOC • Semi-annual reports • Training materials and guides Primary sources: • Project team • UNDP team • Beneficiaries of project
Sub-question 4.3. Participation: To what extent were stakeholders, especially vulnerable groups, involved in the diagnostic processes, project planning and implementation?	Indicators: I1.4.3 Level of stakeholder participation and empowerment during the project cycle. Judgment criteria • Number and diversity of participants consulted in the identification and formulation of the project. • Existence of strategies and / or methodologies to enhance participation of local communities during the project cycle • Equitable incorporation of the different points of view gathered in the affected	Review of documents Interviews Secondary sources: • PRODOC • Semi-annual reports • Financial reports • Technical documents • Monitoring system and evaluation Primary sources: • Project team

	communities, through inclusive decision-making processes.			• UNDP team • Beneficiaries • Government Officials
	• Perception of project managers, partners and beneficiaries regarding their involvement in the project cycle.			
CRITERION: SUSTAINABILITY				
Question 5. How sustainable are the results achieved by the project from an environmental, social, institutional and financial perspective? Were exit strategies designed?				
Evaluation sub-questions	Indicators / judgment criteria	Methods and Tools	and	Sources
Sub-question 5.1. What are the actions implemented to strengthen the sustainability of the project?	Indicators: I1.5.1 Existence and degree of implementation of actions and / or a sustainability strategy. Judgment criteria: • Assessment by key agents of the project on activities aimed at ensuring sustainability. • Relevance and effectiveness of the implemented sustainability actions	Review of documents Interviews		Secondary sources: • PRODOC • Semi-annual reports • Financial reports • Technical documents • Strategies designed Primary sources: • Project team • UNDP team • Project beneficiaries • Government officials
Sub-question 5.2. How sustainable are the results achieved so far in capacity development?	Indicators: I1.5.2 Level of appropriation of beneficiary officials, county and national governments and / or other institutions of the methodologies, knowledge and practices developed within the framework of the project. Judgment criteria: • Signs of transformational changes with potential for durability. • The authorities and state officials have increased and replicated the capacities developed with their peers. • Assessment of technicians and government authorities (KIRDI) capacities. • Increased and/or replication with peers and / or related actors of the capacities developed.	Review of documents Interviews		Secondary sources: • PRODOC • Semi-annual reports • Financial reports • Technical documents • Strategies designed Primary sources: • Project team • UNDP team • Project beneficiaries • Government officials
Sub-question 5.3. What is the probability	Indicators: I1.5.3 Level of ownership of private sector actors/county and national governments and	Review of documents		Secondary sources: • PRODOC

that the spin-offs from the project interventions will endure once funding ceases?	beneficiaries of the methodologies, knowledge and practices developed within the framework of the project. I2.5.3 Institutional capacity (technical and financial) installed, level of awareness and its translation into current and future laws, regulations, plans and / or financial and / or political commitments. I3.5.3 Level of ownership and commitment of government agencies to institutionalize the project and the designed strategies. Judgment criteria: • The private sector actors, authorities and government officials have increased and replicated the capacities developed. • Signature of commitments and / or protocols of agreement on the part of private sector partners and government officials. • The beneficiaries incorporate skills autonomously and apply the skills generated during the project.	Interviews	• Semi-annual reports • Financial reports • Agreement protocols Primary sources: • Project team • UNDP team • Project beneficiaries • Government officials
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Annex 2: Evaluation Interview Questions and Guides

TECHNICAL SHEET 1: IN-DEPTH INTERVIEWS - PROJECT TEAM

Group Target: Project/UNDP team

Objective of the interview: Assess and contrast qualitative information related to the project's evaluation criteria and questions.

Profile of the interviewees: Management, technical and administrative teams of the project

Duration time: 45 - 60 minutes

NB: Not all questions will apply to all interviewees. Only some will be administered, depending on the responsibilities and subject areas of the interviewee.

Introductory questions

- What is his/her name?
- What is their position and responsibilities in the project?

Criterion: Relevance

1. Has the project and its activities responded to the needs of the country (Nigeria) and targeted implementers? During the course of the project, were any new needs identified that needed to be addressed?
2. Taking into account the Nigerian RE reality and its regulatory framework, do you think the project strategies were relevant? Are they still valid?
3. Has the design of the project and its execution made it possible to advance the objectives of the 2030 Agenda and / or the MDGs? Which ones would you specifically highlight?
4. Is the project design consistent with the strategic framework of UNDP and the United Nations priorities in Nigeria?
5. Was a diagnostic or other process carried out to identify the capacities that needed to be addressed within the project?

Criterion: Effectiveness

6. What have been for you the main results derived from the execution of the project?
7. In your opinion, what is the project's contribution to capacity building for government officials and beneficiaries? What elements would it have reinforced?
8. Do you think that public opinion, decision-makers and other actors have been sensitized about the strategic importance of Solar PV for energy generation in Nigeria? How?
9. What effects has the project had on the vulnerable or other communities?
10. In your opinion, what have been the main contributions of the project in the area of organizational strengthening?
11. What results would you highlight so far that have come about due to the activities on use of Solar PV for energy generation?
12. Has it been possible to design strategies, standards and public policies aimed at promoting RE during the project? How was that process (difficulties / enablers)?
13. What are the potential impacts of the installation of Solar PV plants?
14. Do the interventions carried out so far constitute a contribution to the organizational strengthening and / or the design of public policies?

15. In your opinion and taking into account your experience in the execution of the project, what were the strengths and weaknesses that allowed (or not) the achievement of the indicators and outcome achieved so far?
16. Have unplanned results occurred? Could you describe and rate them?

Criterion: Efficiency

17. How would you assess the time-cost-results obtained so far?
18. Have the resources available for the project been sufficient to achieve the planned results with good quality?
19. Has the institutional / organizational structure of the project contributed to achieving efficient and results-based management? Is there clarity in the functions and roles that each member fulfills?
20. Were measures taken to optimize the use of resources to achieve the results expected by the program? Which?
21. Does the work team have the necessary technical and financial assistance to comply with what was planned?
22. Do you foresee a request for extension for the project to complete its activities? If so, what could be the reasons?
23. What factors can you identify that have influenced the implementation costs?
24. Has the project developed a monitoring and evaluation system? What are your strengths and weaknesses? Did this system contribute to better project management?

Criterion: Normative values

25. How has the participation and representation of women been in the planning, training, and implementation of the project activities?
26. Have there been specific actions to include the gender perspective?
27. To what extent has the project contributed to UNDP's gender objectives? (state the objectives)
28. To what extent have the beneficiaries been duly informed, consulted and involved in the decision-making process before and during the implementation of the project? (indicate specific actions)
29. Have adequate mechanisms and procedures been established for the effective participation of the beneficiary local communities?
30. Have the training materials and methodologies been understandable to all beneficiaries? Have they been adapted to the social and cultural situations of the local conditions?

Criterion: Sustainability

32. Have any actions been taken so far to ensure the sustainability of the initiative after end of project? Which?
33. What actions and effects generated do you think will continue once the GEF support stops?
34. Can you identify any risks that could jeopardize the sustainability of the initiative?
35. Have you identified other financing possibilities to give continuity to the project?
36. Do you consider that there are institutional conditions in the government (Ministry) and KIRDI to continue with the processes promoted by the project?
37. Does the government and its agencies (e.g. KIRDI) have the necessary institutional capacity to sustain the commitments made?

TECHNICAL SHEET 2: IN-DEPTH INTERVIEWS – PUBLIC OFFICIALS BENEFICIARIES

Group Target: Public officials and private sector actors who have received training

Objective of the interview: Assess and contrast qualitative information related to the project's evaluation criteria and questions.

Profile of the interviewees: Government officials and other actors

Duration time: 45 - 60 minutes

NB: *Not all questions will apply to all interviewees. Only some are, depending on the responsibilities and subject areas of the interviewee.*

Introductory questions

- What is his/her name?
- What institution do you belong to?
- What is your position and responsibilities in relation to the project?

Criterion: Relevance

1. Was a diagnostic or other process carried out to identify the capacities that needed to be addressed within the project? Did you participate in any of these preliminary activities?
2. Do you think that the training/capacity agenda was aligned with the training needs of the identified sectors?

Criterion: Effectiveness

3. In your opinion, what is the contribution of the program to the development of capacities of Government officials and private sector actors? What elements would it have reinforced?
4. Did the training received allow you to expand your knowledge about RE?
5. Has what you learned in the trainings allowed you to improve your institutional/company work? How?
6. In your opinion, what have been the main contributions of the project in the area of organizational strengthening?
7. Did you participate in research and / or design of public policies? How? What were the main results of your participation?

Criterion: Efficiency

8. Were the resources provided by the project for the training sufficient for the objectives of the training?

Criterion: Normative values

9. How was the participation and representation of women in the training processes?
10. Were there specific actions to include the gender perspective? Which?
11. Have the training materials and methodologies been understandable to everyone?

Criterion: Sustainability

12. Do you think that the results generated from the capacities developed will be maintained over time?
13. What actions and effects do you think will be maintained once the accompaniment ceases?
14. Do you identify risks that could jeopardize the sustainability of the initiative?
15. Does the government/company have the necessary institutional capacity to sustain the commitments made?

TECHNICAL SHEET: IN-DEPTH INTERVIEWS - BENEFICIARIES FROM COMMUNITIES

Group Target Members of the beneficiary communities

Objective of the interview: Assess and contrast qualitative information related to the project's evaluation criteria and questions.

Profile of the interviewees People who have received technical assistance and RE solutions

Duration time: 30 - 45 minutes

NB: *Not all questions will apply to all interviewees. Only some are, depending on the responsibilities and subject areas of the interviewee.*

Introductory questions

- What is his/her name?
- What community do you belong to?

Criterion: Relevance

1. Was a participatory assessment carried out to identify the needs of your community? Did you participate in any of these preliminary activities?
2. Do you think that the solutions provided by the project are in line with your needs and those of your community?
- 3.

Criterion: Effectiveness

4. In your opinion, what was the main contribution of the project to your community? What elements would it have reinforced?
5. What changes do you see in your home and community after participating in the project?

Criterion: Efficiency

6. Are the contributions received by the project sufficient to solve your energy problems?

Criterion: Normative values

7. How was the participation of the community and women in the project activities?
8. Were there specific actions to include the gender perspective? Which?
9. Have the materials, methodologies and technical assistance received been understandable to you and your community?

Criterion: Sustainability

10. Do you think that the results generated in you and your community will be sustained over time?
11. In addition to the project team, have there been contacts with other government agencies?

TECHNICAL SHEET: IN-DEPTH INTERVIEWS - GOVERNMENT AUTHORITIES

Group Target: County and national authorities

Objective of the interview: Assess and contrast qualitative information related to the project's evaluation criteria and questions.

Profile of the interviewees Decision makers

Duration time: 30 - 45 minutes

NB: *Not all questions will apply to all interviewees. Only some are, depending on the responsibilities and subject areas of the interviewee.*

Introductory questions

- What is his/her name?
- What institution do you belong to?

Criterion: Relevance

1. Have the project and its activities responded to the needs of the target group? During the course of the project, were new needs identified that needed to be addressed?
2. Taking into account the Nigerian RE reality and its regulatory framework, do you think the project strategies were relevant? Are they still valid?

Criterion: Effectiveness

3. In your opinion, what have been the main contributions of the project in the area of organizational strengthening?
4. Did you and / or your institution participate in research and / or design of RE policies? How? What were the main results of your participation?
5. Has the training received allowed you to improve the institutional work? How?

Criterion: Efficiency

6. Were the resources available for the project sufficient to achieve the planned results with good quality?

Criterion: Normative values

7. How was the participation and representation of women in the training processes?
8. Were there specific actions to include the gender perspective? Which?
9. Have the training materials and methodologies been understandable to everyone?

Criterion: Sustainability

10. Have actions been taken to ensure the sustainability of the project? Which?
11. What actions and effects generated do you think will continue once the GEF/UNDP support ends?
12. Do you foresee any risks that could jeopardize the sustainability of the initiative?
13. Have you identified other financing possibilities to give continuity to the project?
14. Do you believe that there are institutional conditions in the government/KIRDI to continue with the processes promoted by the project?
15. Does the government have the necessary institutional capacity to sustain the commitments made?

TECHNICAL SHEET: IN-DEPTH INTERVIEWS - PROJECT MANAGERS WHO RECEIVED INTERVENTION

Group Target: Heads, managers and persons in charge of RE projects/plants that received support

Objective of the interview: Assess and contrast qualitative information related to the project's evaluation criteria and questions.

Profile of the interviewees People who have received technical assistance and Solar PV solutions.

Duration time: 30 - 45 minutes

NB: *Not all questions will apply to all interviewees. Only some are, depending on the responsibilities and subject areas of the interviewee.*

Introductory questions

- What is his/her name?
- What is your project and what activities are being undertaken?
- What is your position and responsibilities in the project?

Criterion: Relevance

1. Was a participatory diagnosis carried out to identify the needs of your productive unit? Did you participate in any of these preliminary activities?
2. Do you think that the solutions provided by the project are in line with your needs?

Criterion: Effectiveness

3. What have been for you the main results derived from the execution of the project?
4. In your opinion, what was the main contribution of the project to the community where the project is located? What elements would it have reinforced?
5. What changes do you observe in your environment (environmental, social, economic and political) after participating in the project?
6. Did the training received allow you to expand your knowledge about RE?
7. What quantity of final product is obtained and of what type?
8. What technology do you use in your process? Have you made any technological changes since your participation in the project?
9. What additional market did your product acquire as a result of the project?
10. How many people are employed in your project, directly and indirectly?

Criterion: Efficiency

11. Were the contributions received sufficient to execute your project?
12. How would you assess the time-cost-results obtained?
13. What is the amount of raw material used in your process and what type?

Criterion: Normative values

14. How was the participation of the community and women in the project activities?
15. Were there specific actions to include the gender perspective? Which?
16. Have the materials, methodologies and technical assistance received been understandable to you? Have they adapted to the social and cultural characteristics of your plant/company?

Criterion: Sustainability

17. Have actions been taken to ensure the sustainability of the initiative? Which?
18. What actions and effects generated do you think will be maintained once the intervention ceases?
19. Do you think your business unit is viable over time? With or without the collaboration of third parties?
20. Could you identify risks that could jeopardize the sustainability of the initiative?

Annex 3: List of Persons Interviewed

Name	Organization	Position	Male/ Female
Engr. Ekpenyong Okon N.	UNDP/ECN PMU Office	Director Linkages and Consultancy (Project Team Leader)	M
Engr. Isaac Ierve	UNDP/GEF DREI Project, PMU, ECN	Project Manager	M
Mr. Bestman Uwadia	Afrinergia Energy and CT Cosmos	MD/CEO	M
Engr. Iyoha Anthony	NAPTIN	Instructor	M
Engr. Mudashir Dauda	Lagos Energy Academy (LEA)	Lead Instructor	M
Engr. Temitope Dina	Federal Ministry of Power (FMP)	Renewable and Rural Power Access Department (Chief Electrical Engineer)	M
Aleriwon Daniel O.	GEF Focal Point- Federal Ministry of Environment (FMEEnv.)	PSC Member	M
Engr. Chinedum Ukabiala	Nigerian Electricity Regulatory Commission (NERC)	Deputy General Manager (Generations)	M
Engr. Ismaila Inuwa Dalhatu	Transmission Company of Nigeria (TCN)	Asst General Manager (Business Development)	M
Mr. Obikaonu Udochi Louis	Ministry of Budget & National Planning	Chief Planning Officer	M
Mr. Nicholas Ehizenagah	Nigerian Bulk Electricity Trading Limited (NBET)	Policy Planning Research and Statistics (PPRS)	M
Ms. Mariam Lawal	Federal Ministry of Finance (FMF)	Asst Chief Admin Officer	F
Ms. Ejura J. Obaje	Ministry of Women Affairs and Social Development (FMWASD)	Asst Chief Social Welfare Officer	F
Dr. Christelle Odongo	UNDP Sub-Regional Hub for West and Central Africa	Regional Technical Advisor	F

Annex 4: References

1. Project Identification Form (PIF)
2. UNDP Project Document
3. GEF CEO Endorsement Request
4. GEF Review Sheet
5. STAP Review Sheet
6. UNDP Environmental and Social Screening results
7. Project inception report
8. Annual work plans for each year of implementation (2017, 2018, 2019, 2020, 2021)
9. Annual financial project reports (combined delivery reports - CDR), broken down by components and project management (2017, 2018, 2019, 2020, 2021)
10. Expenditure ledger (from ECN)
11. Co-financing records
12. Project Implementation Review (PIR) reports (2016-2021)
13. Quarterly Progress Reports (QPRs)
14. Finalized GEF focal area Tracking Tools at CEO endorsement and midterm
15. Terms of reference for technical assistance consultancies (development of GIS tool; establish MRV mechanism; financial sector reform study; train-the-trainers; technology action plans; gender analysis; DREI analysis)
16. Consultancy products ((development of GIS tool inception mission report; establish MRV mechanism; financial sector reform study; train-the-trainers inception mission report; technology action plans)
17. Environmental and Social Impact Assessment report of Bauchi State project, June 2017
18. Resettlement Action Plan for the Bauchi State project, June 2017
19. Cumulative Impact Assessment report of the Bauchi State project, May 2017
20. Project Steering Committee meeting minutes
21. Meeting memorandum, 15 March 2018, Abuja. 2nd Strategic planning meeting with on-grid solar IPPs and stakeholders on the proposed national stakeholders' forum on grid-connected solar PV in Nigeria.
22. Meeting memoranda
23. UNDP Country Programme Document (CPD) 2014-2017/2018-2022
24. United Nations Sustainable Development Partnership Framework (UNSDPF) 2018-2022
25. Economic Recovery & Growth Plan 2017-2020, Federal Republic of Nigeria, Ministry of Budget and National Planning
26. Nigeria's Second National Communication, under the United Nations Framework Convention on Climate Change, February 2014
27. Nigeria's Intended Nationally Determined Contribution, 271115 (UNFCCC)
28. Nigeria: Human Development Indices and Indicators: 2018 Statistical Update
29. Green Climate Fund (GCF) funding proposal for FP104 (Nigeria Solar IPP Support Program), 1 February 2019