

**DRAFT ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN
(ESMP) FOR THE INTERCONNECTED 2.5MW SOLAR-HYBRID
PROJECTS AT THE UNIVERSITY OF ILORIN TEACHING
HOSPITAL, UNDER THE NIGERIA DISTRIBUTED ACCESS
THROUGH RENEWABLE ENERGY SCALE-UP (DARES) - REA-
NEP/DARES/C/CQS/071/2025**

Submitted to



***Federal Ministry of Environment
Mabushi, FCT, Abuja.***

AUGUST 2026

ESMP REPORT

**Of the Proposed Solar Power Plant and Associated Infrastructure at the
University of Ilorin Teaching Hospital, Ilorin, Kwara State**

**Under the Nigeria Distributed Access Through Renewable Energy Scale-up
(DARES)**

**Submitted To
*Federal Ministry of Environment
Mabushi, FCT, Abuja.***

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LIST OF ACRONYMS AND ABBREVIATIONS

APPI	Area of Potential Project Influence
ARAP	Abbreviated Resettlement Action Plan
BESS	Battery Energy Storage System
BMP	Biodiversity Management Plan
BOD	Biochemical Oxygen Demand
COPE	Care of the People
CWD	Coarse woody debris
DRG	Debt Relief Gains
EA	Environmental Assessment
ECN	Energy Commission of Nigeria
EEP	Energizing Education Programme
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EMF	Electromagnetic Field
EMS	Environmental Management Strategy
ERSED	Erosion and sediment control
ESCP	Erosion and Sediment Control Plan
ESMP	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
FEPA	Federal Environmental Protection Agency
FGN	Federal Government of Nigeria
FMEnv	Federal Ministry of Environment
GPS	Global Positioning System
GW	Gigawatt
Ha	Hectares
HSE	Health, Safety, and Environment
HT	High Tension
ICREEE	Inter-ministerial Committee on Renewable Energy and Energy Efficiency
LGA	Local Government Area
LT	Low Tension
NACOP	National Council on Power
MW	Megawatt
MWh	Megawatt hour
MWp	Megawatt peak
NEEAP	National Energy Efficiency Action Plan
NEP	Nigeria Electrification Project
NEPP	National Electric Power Policy
NERC	Nigerian Electricity Regulatory Commission
NESREA	National Environmental Standards and Regulations Enforcement Agency
NIMET	Nigerian Meteorological Agency
NML	Noise Management Level
NOx	Nitrogen oxides
NSITF	National Social Insurance Trust Fund
NUC	National University Commission
O&M	Operations and maintenance

PAPs	Project Affected Persons
PCT	Plant Community Type
PESCP	Progressive Erosion and Sediment Control Plan (aka ESCP)
PMP	Project Management Plan
PV	Photovoltaic
REA	Rural Electrification Agency
SE4All	Sustainable Energy for All
Sp./spp.	Species/species (plural)
SWMP	Soil and Water Use Management Plan
TCN	Transmission Company of Nigeria
TCP	Traffic Control Plans
TMP	Traffic Management Plan
TWA	Time Weighted Average
UITH	University of Ilorin Teaching Hospital
VLMP	Vegetation and Land Management Plan
WMP	Waste Management Plan
WPMP	Weed and Pest Management Plan

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EXECUTIVE SUMMARY

ES01 INTRODUCTION

The Federal Government of Nigeria (FGN) has, over the past decade, prioritized expanding access to electricity as a critical driver of economic growth, social inclusion, and sustainable development. In 2018, this commitment materialized through the Nigeria Electrification Project (NEP), financed by concessional funding from the World Bank and the African Development Bank. The NEP was designed as a flagship off-grid electrification initiative to bridge the energy access gap in rural and underserved communities. Implemented by the Rural Electrification Agency (REA), the project successfully deployed mini-grids and standalone solar systems, delivering clean and reliable electricity to over seven million Nigerians, while stimulating private sector participation through results-based financing mechanisms.

The Rural Electrification Agency (REA) is a Nigerian government agency responsible for ensuring electricity reaches every part of the country. REA focuses on rural electrification projects, providing power solutions for on-grid and off-grid areas with an emphasis on renewable energy. As the Implementing Agency of the Federal Government of Nigeria, the team at REA is tasked with the electrification of rural and unserved communities across Nigeria. **MISSION** To provide access to reliable electric power supply for rural dwellers irrespective of where they live and what they do, in a way that would allow for a reasonable return on investment through an appropriate tariff that is economically responsive and supportive of the average rural customer. **MANDATE** - Promote Rural Electrification in the Country - Co-ordinate Rural Electrification Programs in the country - Administer the Rural Electrification Fund (REF) to promote, support, and provide rural electrification through Public and Private Sector Participation. The Abuja Office is located at No. 15 Constitution Avenue, Central Business District, FCT-Abuja.

Project Specific Activities

This component of the project will involve activities undertaken during the various implementation phases of the project as follows;

- Site clearing
- Civil, mechanical and electrical works
- Installation of PV panels and associated plant facilities
- Construction of training centre
- Installation of streetlights as well as underground armoured cable for power evacuation
- Testing and checking individual equipment /system, as well as the associated infrastructure to ensure they have been installed correctly and can be handed over for use.
- Generation and distribution of electricity to different sections of the Teaching Hospital
- Operation of the renewable energy training centre to support learning and capacity development in clean energy technologies
- Preventive and corrective maintenance aimed at maintaining optimal system performance throughout the plant's lifespan
- Periodic cleaning of photovoltaic (PV) panels to maintain their efficiency
- Regular safety inspections and implement measures aimed at preventing accidents, injuries, and occupational health risks
- Wastes management

Objectives of the ESMP

The purpose of the Environmental and Social Management Plan (ESMP) is to ensure that Environmental and Social impacts identified during the ESMP process are effectively addressed during the construction, operation and closure of the project. The ESMP specifies the mitigation and management measures to which the Proponent is committed and shows how the Project will mobilize organizational capacity and resources to implement these measures. The ESMP will be a living document and will continue to develop during the design and construction phases to enable continuous improvement of the Project's environmental performance.

The specific objectives of the ESMP are to:

- Promote effective environmental and social management and communicate the objectives and requirements of the ESMP.
- Ensure compliance with applicable environmental and social laws, regulations, permit conditions, and Project commitments.
- Define clear roles, responsibilities, and accountability for implementing environmental and social measures.
- Integrate environmental and social considerations into Project planning, design, construction, and operation.
- Apply the mitigation hierarchy by avoiding, minimizing, restoring, and, where necessary, compensating for adverse impacts.
- Enhance positive environmental, social, and economic benefits generated by the Project.
- Serve as an action plan for implementing environmental and social management measures.
- Provide a framework for implementing and monitoring mitigation and enhancement measures identified in the ESMP.
- Support continual improvement through monitoring, reporting, and corrective actions.

Scope of the ESMP

The scope of the ESMP includes;

- Project Lifecycle Integration.
- Institutional and Regulatory Boundaries
- Environmental and Social Receptors
- Mitigation and Monitoring Protocols

Work Execution Plan/Methodology

This ESMP has been prepared in accordance with standard procedures for Environmental Assessment, including other applicable World Bank safeguard policies and Nigerian policy guidelines. The baseline status of the project area was obtained through consultations with the relevant stakeholders, a review of relevant literature as well as field studies. Environmental data acquisition involved a multidisciplinary approach and was conducted in line with regulatory requirements and best international practices. This approach includes literature desktop review, designing, and development of field sampling strategy; confirmation of the sampling design and locations, pre-mobilization activities (job hazard analysis, sampling equipment/materials calibrations and checks and mobilization to the field; community consultations, sample collection, handling, documentation, and storage protocols and, and demobilization from the field, transfer of sample custody to the laboratory for analysis.

ES02 Project Description

Key Components of DARES are:

- Component 1: Solar Hybrid Mini Grids for Rural Economic Development: \$410 million IDA commitment to deploy mini-grids for rural economic growth.
- Component 2: Stand-alone Solar Systems for Homes and MSMEs: \$300 million IDA commitment to provide solar systems for households and micro, small, and medium-sized enterprises
- Component 3: Technical Assistance: \$40 million IDA commitment for technical support and capacity building.

The Rural Electrification Agency (REA) is implementing DARES through its existing Project Management Unit (PMU). The project has already shown significant progress, with over 200 mini grids delivered nationwide. REA has also signed grant agreements with eight renewable energy companies to deploy solar home systems and mini grids, aiming to electrify underserved communities and drive economic growth.

Description of Project Intervention

The project is being implemented under the Distributed Access through Renewable Energy Scaleup (DARES) programme, which serves as a scale-up initiative from the Nigeria Electrification Project (NEP)

Given that this is an Energy-as-a-Service (EaaS) model, the same Energy Service Company (ESCO) responsible for the design and construction of the project will also manage its operations and maintenance (O&M) throughout the service period. This arrangement promotes lifecycle accountability because the ESCO has a direct incentive to ensure that the system is designed for reliability, efficiency, maintainability, and long-term performance. Its O&M responsibilities will typically include routine inspections, preventive and corrective maintenance, fault response, equipment replacement, spare-parts management, performance monitoring, and compliance with agreed service-level requirements and key performance indicators (KPIs).

The ESCO will also be responsible for maintaining appropriate environmental, health and safety (EHS) standards during operations, including electrical safety, emergency response, waste management, battery and e-waste handling, worker protection, and community health and safety. Performance and maintenance records should be regularly documented and reported, while any end-of-service handover should include asset condition assessments, updated maintenance records, operating manuals, outstanding repairs, and training where required. This integrated approach reduces interface risks between construction and operations and supports consistent performance throughout the project lifecycle.

The project intervention for a utility-scale solar photovoltaic (PV) plant involves a multi-phase transformation of land to harness solar irradiance for electrical power generation. The intervention begins with site preparation, which necessitates the clearing of vegetation and the leveling of terrain to accommodate the mounting structures. This phase is critical as it alters the local topography and drainage patterns, requiring careful management to prevent soil erosion and sedimentation.

The core of the intervention involves the installation of PV modules, which are typically arranged in arrays mounted on steel or aluminum racking systems. These systems may be fixed-tilt or utilize single-axis tracking mechanisms to optimize the angle of incidence, thereby maximizing energy yield.

The electrical infrastructure component includes the installation of inverters to convert direct current (DC) to alternating current (AC), transformers to step up the voltage for grid transmission, and a network of underground or overhead cabling. The intervention also requires the construction of access roads, perimeter fencing, and an operations and maintenance (O&M) building. The total land footprint is a function of the power capacity and the technology employed, often requiring significant spatial allocation to minimize inter-row shading. The intervention concludes with the grid interconnection, which links the facility to the regional transmission network, marking the transition from the construction phase to the operational phase.

ES03 Relevant Policies, Legal and Administrative Framework

The project shall ensure compliance with the relevant and applicable local and international regulations, policies, and standards throughout its life cycle.

Policy Framework

- National Environmental Policy/ National Policy on the Environment (Revised 2016)
- Social Protection Policies
- National Policy on Climate Change/ National Climate Change Policy for Nigeria 2021-2030
- The National Electric Power Policy (NEPP), 2001
- The National Energy Policy (NEP) 2013
- The National Energy Efficiency Action Plans of Nigeria

National Legal Framework

The Environmental Impact Assessment Act No. 86, 1992/Environmental Impact

- National Environmental Policy/ National Policy on the Environment (Revised 2016)
- Social Protection Policies
- National Policy on Climate Change/ National Climate Change Policy for Nigeria 2021-2030
- The National Electric Power Policy (NEPP), 2001
- The National Energy Policy (NEP) 2013
- The National Energy Efficiency Action Plans of Nigeria

National Legal Framework

The Environmental Impact Assessment Act No. 86, 1992/Environmental Impact

- Assessment Act Cap E12 LFN 2004
- Electricity Act, 2023
- Energy Commission of Nigeria Act CAP 109 LFN 1990
- Land Use Act, Cap. L5, Laws of the Federation of Nigeria (LFN) 2004
- The Nigerian Urban and Regional Planning Act CAP N138, LFN 2004
- Harmful Waste (Special Criminal Provisions) ACT CAP H1, LFN 2004
- The Endangered Species Act, CAP E9, LFN 2004
- Inland Fisheries Act, Cap I10, LFN 2004
- The Factories Act, 1987 (Factory Act cap 126, LFN, 1990)
- Wages Boards and Industrial Councils Act, Cap W1, LFN 2004
- Employees' Compensation Act, 2010 (ECA 2010)
- National Environmental Standards & Regulations Enforcement Agency (NESREA) Act, 2007
- National Environmental Regulations:
- EIA Procedural Guidelines:

- EIA Sectoral Guidelines (Infrastructures):
- FMEnv ESMP Guidelines for Solar Mini-Grid Projects in Nigeria

International Legislation

The International Conventions, to which Nigeria is a signatory, relevant to this programme are as follows:

- African Convention on the Conservation of Nature and Natural Resources
- Convention on Biological Diversity
- Endangered Species (Control of International Trade and Traffic)
- Conservation of Migratory Species of Wild Animals 1973
- Framework Convention on Climate Change 1992
- Convention to Combat Desertification 1994
- Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW)
- Human and Peoples' Rights on the Rights of Women in Africa 2005
- Civil and Political Rights Covenant
- Economic, Social and Cultural Rights Covenant
- Convention on the Elimination of All Forms of Violence Against Women
- Convention on the Rights of the Child

Institutional Framework

This section highlights the relevant institutions through which the planning and implementation of the program will be affected. Several institutions have been identified and will be involved in the overall implementation of this programme. These include:

- The Federal Government of Nigeria (FGN)
- Federal Ministry of Power
- Transmission Company of Nigeria (TCN)
- Federal Ministry of Environment (FMEnv)
- Nigerian Electricity Regulatory Commission (NERC)
- National Environmental Standards and Regulatory Enforcement Agency (NESREA)
- National University Commission (NUC)
- Relevant State Agencies: State Ministry of Lands, State Ministry of Environment and State Environmental Protection Agencies
- Local Government Authority (LGA)

ES04 Description of Environmental and Social Impacts

The basis for identification of potential environmental and social impacts that may be associated with the proposed Solar Power project was formed during field inspections and observations, issues arising from stakeholder consultations as well as project description and designs.

Highlights of the ESMP as the primary instrument for ensuring that a project's commitment to sustainability is maintained throughout its lifecycle, bridging the gap between theoretical impact prediction and practical field execution is presented here. By establishing a rigorous system of governance, the ESMP ensures that project activities remain in strict alignment with national regulatory requirements, international lending standards, and the fundamental principles of corporate social responsibility. It provides a systematic blueprint for the mitigation of environmental and social risks and as well delineates

the institutional framework, clearly assigning roles and responsibilities to project developers, contractors, and environmental consultants to ensure accountability at every stage of development. It also integrates specific mitigation measures, monitoring protocols, and reporting requirements designed to protect natural ecosystems, minimize pollution, and safeguard the well-being of local communities.

Evaluation of impacts

Positive Impacts: The anticipated positive impacts of the proposed solar power project have been rated as either major or moderate which include;

- Independent and reliable power supply through solar energy source and thus, improve the quality of education and other services within the institution as there will be longer hours available with better illumination for studying. Reduced noise and pollutants from generator sets, and natural habitats and human health will be protected from pollution arising from the use of fossil fuels.
- The installation of streetlights as part of the proposed Project will improve safety by reducing hazards associated with flammable fuels and candles and enhance security within the school.
- Improve social cohesion and community development and generate new income as it would stimulate economic activities and offer new opportunities for small businesses in the Hospital premises.
- The employment opportunities for skilled, semi-skilled, and unskilled labour associated with the project will multiply job creation, especially during construction to facilitate overall socioeconomic development.

Negative Impacts: Anticipated negative impacts of the proposed project have been rated as major, moderate, minor or even negligible and could include the following:

- Loss of terrestrial floral and faunal population during site clearing
- Disturbance of soil formation during excavation
- Particulate matter in form of dust, and NO_x, CO, Total Suspended Particulates (TSP), SO_x from combustion engines of the earth-moving equipment that will be used for clearing will likely impact on air quality.
- Intermittent noise emissions could also occur from the operation of the machinery.
- Injury and accidents may occur especially when those involved are unskilled

ES05 Environmental and Social Mitigation and Management Plan

The ESMP also incorporates the actions needed to implement these measures, including the following features:

- Mitigation measures based on the potential environmental and social impacts describing with technical details each mitigation measure;
- The ESMP also includes monitoring objectives that specifies the type of monitoring activities that will be linked to the mitigation measures. Specifically, the monitoring section of the ESMP provides:
 - A specific description, and technical details, of monitoring measures that includes the parameters to be measured, frequency of measurements and definition of thresholds that will signal the need for corrective actions;

- Monitoring and reporting procedures to ensure early detection of conditions that necessitate particular mitigation measures and to furnish information on the progress and results of mitigation.
- The ESMP provides a description of institutional arrangements i.e. who is responsible for carrying out the mitigating and monitoring measures (for operation, supervision, enforcement, monitoring of implementation, remedial action, financing, reporting, and staff training);
- Additionally, the ESMP includes an estimate of the costs of the measures and activities recommended; and
- The ESMP is required all through the implementation stage of the project or sub-project.

Environmental and Social Monitoring

Environmental and Social monitoring is an important aspect of an ESMP during project implementation. It is a way of systematically monitoring both effects and compliance of the proposed project to existing regulations throughout the entire life cycle and shall oversee the effectiveness of impact mitigation measures, including the extent to which mitigation measures are successfully implemented. This is presented in **Table 5.2** of this report.

Capacity Building for Implementation of ESMP and Permit Conditions

All staff employed will be trained in the following:

- General operation of the plant.
- Environmental management.
- Specific job roles and procedures.
- Occupational health and safety; and
- Contingency plans and emergency procedures. Training will include:
- Induction training on appointments.
- Specialist training (as required for specific job roles); and
- Refresher training as required.

The capacity building plan proposed to achieve this is provided in **Table 5.3** of the report.

Roles, Responsibilities and Accountabilities

The Rural Electrification Agency Project Management Unit (REA-PMU) supervises the implementation of the ESMP throughout the project life span while conformance with the mitigation measures will be ensured by the contractor during the construction phase and as well as during the operations and maintenance (O&M) phase of the project. This is presented in **Table 5.4** of this report.

Estimated Budget for ESMP Implementation

Table 5.5 of this report provides a summary of the cost estimate required to effectively and efficiently implement the recommended mitigation measures and management plans required to address the potential and associated impacts of the proposed project. The total cost of implementing the ESMP is estimated at US\$ **57,300** with the current Naira value of 1,3500 to 1 dollar.

ES06 Conclusion

The Environmental and Social Impact Assessment (ESMP) for the proposed solar power plant at the University Teaching Hospital is still in progress. However, the ESMP is intended to provide comprehensive

information to support informed decision-making and promote environmentally sound and socially sustainable development.

ACKNOWLEDGEMENTS

The Rural Electrification Agency would like to thank the ESMP Consultant – Chalton Consult Limited for their commitment to the success of the ESMP study. We also thank the World Bank, Federal Ministry of Environment, the Kwara State Ministry of Environment, and other stakeholders, including the local communities in the Project area, for their valuable contributions and support.

CHAPTER ONE

INTRODUCTION

1.1 Background

The Federal Government of Nigeria, in partnership with the World Bank, launched the Distributed Access through Renewable Energy Scale-Up (DARES) Project, a US\$750 million initiative aimed at expanding electricity access to approximately 17.5 million Nigerians living in rural and underserved communities. The project builds on the successes recorded under the Nigeria Electrification Project (NEP), which has already delivered clean, reliable, and sustainable electricity to over seven million Nigerians.

The Rural Electrification Agency (REA) is a Nigerian government agency responsible for ensuring electricity reaches every part of the country. REA focuses on rural electrification projects, providing power solutions for on-grid and off-grid areas with an emphasis on renewable energy. As the Implementing Agency of the Federal Government of Nigeria, the team at REA is tasked with the electrification of rural and unserved communities across Nigeria. MISSION To provide access to reliable electric power supply for rural dwellers irrespective of where they live and what they do, in a way that would allow for a reasonable return on investment through an appropriate tariff that is economically responsive and supportive of the average rural customer. MANDATE - Promote Rural Electrification in the Country - Co-ordinate Rural Electrification Programs in the country - Administer the Rural Electrification Fund (REF) to promote, support, and provide rural electrification through Public and Private Sector Participation. The Abuja Office is located at No. 15 Constitution Avenue, Central Business District, FCT-Abuja.

1.2 Project Specific Activities

This component of the project will involve activities undertaken during the various implementation phases of the project as follows;

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- Installation of PV panels and associated plant facilities
- Construction of training centre
- Installation of streetlights as well as underground armoured cable for power evacuation
- Testing and checking individual equipment /system, as well as the associated infrastructure to ensure they have been installed correctly and can be handed over for use.
- Operation of the renewable energy training centre to support learning and capacity development in clean energy technologies
- Preventive and corrective maintenance aimed at maintaining optimal system performance throughout the plant's lifespan
- Periodic cleaning of photovoltaic (PV) panels to maintain their efficiency
- Regular safety inspections and implement measures aimed at preventing accidents, injuries, and occupational health risks
- Wastes management

1.3 Objectives of the ESMP

The purpose of the Environmental and Social Management Plan (ESMP) is to ensure that Environmental and Social impacts identified during the ESMP process are effectively addressed during the construction, operation and closure of the project. The ESMP specifies the mitigation and management measures to which the Proponent is committed and shows how the Project will mobilize organizational capacity and resources to implement these measures. The ESMP will be a living document and will continue to develop during the design and construction phases to enable continuous improvement of the Project's environmental performance.

The specific objectives of the ESMP are to:

- Promote effective environmental and social management and communicate the objectives and requirements of the ESMP.
- Ensure compliance with applicable environmental and social laws, regulations, permit conditions, and Project commitments.
- Define clear roles, responsibilities, and accountability for implementing environmental and social measures.
- Integrate environmental and social considerations into Project planning, design, construction, and operation.
- Apply the mitigation hierarchy by avoiding, minimizing, restoring, and, where necessary, compensating for adverse impacts.
- Enhance positive environmental, social, and economic benefits generated by the Project.
- Serve as an action plan for implementing environmental and social management measures.
- Provide a framework for implementing and monitoring mitigation and enhancement measures identified in the ESMP.
- Support continual improvement through monitoring, reporting, and corrective actions.

1.4 Rationale for ESMP

The rationale for an Environmental and Social Management Plan (ESMP) is rooted in the necessity to bridge the gap between environmental policy and project implementation. In the context of large-scale development, the ESMP acts as the primary mechanism for ensuring that the findings of an Environmental and Social Impact Assessment (ESMP) are not merely academic but are integrated into the daily operational workflow of a project.

The fundamental rationale for the ESMP is the mitigation of uncertainty. During the planning phase, environmental impacts are often predicted through modeling and baseline studies. The ESMP provides a structured, iterative process to verify these predictions and manage unforeseen impacts as they arise during construction and operation. By establishing a formal management system, the ESMP ensures that the project developer fulfills their "duty of care" toward the environment and local communities, thereby reducing the risk of legal liability, project delays, and reputational damage.

Furthermore, the ESMP is a living management tool which defines the institutional framework, assigning specific roles and responsibilities to contractors and environmental managers, which prevents the diffusion of accountability. From a financial perspective, international lending institutions—such as those adhering to the Equator Principles—require an ESMP as a condition for project financing. The rationale here is to

ensure that the project meets international environmental and social performance standards, which serves to protect the lender's investment by minimizing the risk of environmental litigation or social unrest.

1.5 Scope of the ESMP

The scope of the ESMP includes;

1. The ESMP will address the distinct environmental challenges associated with each phase. During construction, the scope focuses on site-specific impacts such as erosion, dust, noise, and waste management. During operation, the scope shifts toward long-term monitoring of emissions, resource consumption, and ongoing community engagement.
2. The scope defines the limits of responsibility for the project developer, contractors, and subcontractors. It establishes the legal and administrative framework within which all project personnel must operate to ensure adherence to environmental permits and licenses.
3. The plan also covers a wide array of receptors, including physical (air, water, soil), biological (flora, fauna, ecosystems), and social (local communities, cultural heritage, public health) elements. The scope is defined by the spatial and temporal boundaries established during the ESMP, ensuring that all areas directly or indirectly affected by the project are managed.
4. The scope includes the development of specific procedures for incident reporting, emergency response, and training. It mandates the use of quantitative benchmarks, where the effectiveness of management is evaluated against established quality standards.

1.6 Work Execution Plan/Methodology

This ESMP has been prepared in accordance with standard procedures for Environmental Assessment, including other applicable World Bank safeguard policies and Nigerian policy guidelines. The baseline status of the project area was obtained through consultations with the relevant stakeholders, a review of relevant literature as well as field studies. Environmental data acquisition involved a multidisciplinary approach and was conducted in line with regulatory requirements and best international practices. This approach includes literature desktop review, designing, and development of field sampling strategy; confirmation of the sampling design and locations, pre-mobilization activities (job hazard analysis, sampling equipment/materials calibrations and checks and mobilization to the field; community consultations, sample collection, handling, documentation, and storage protocols and, and demobilization from the field, transfer of sample custody to the laboratory for analysis. A summary of field sampling methods is discussed in the sub-sections below.

1.7 Stakeholders Consultation

A process of continual consultation and involvement of the public in the project was initiated which involved various discussions with the REA as well as other vital stakeholders such as the Federal Ministry of Environment, Federal Ministry of Women Affairs and Social Development, Federal Ministry of Power, Kwara State Ministry of Environment, Kwara State Ministry of Women Affairs and Social Development, NERC, TCN, NUC and other relevant stakeholders such as the village heads of the various communities in the project area.

CHAPTER TWO

PROJECT DESCRIPTION

2.1 Project Overview

The University of Ilorin Teaching Hospital (UIITH) is situated along Old Jebba Road in the Ilorin East Local Government Area of Kwara State, North Central Nigeria (Latitude 8°36'6.98"N, Longitude 4°48'21.66"E). The surrounding landscape features a mix of urban and peri-urban developments, characterized by relatively flat terrain, scattered vegetation, open spaces, and expanding built-up areas.

Land use in the vicinity is diverse, comprising educational, healthcare, residential, commercial, and small-scale agricultural activities. Due to its proximity to the university and neighboring communities, the area experiences moderate to high human and vehicular traffic. It is well-connected to the broader Ilorin metropolis and adjacent settlements via major access roads and is serviced by basic social infrastructure and utilities, including electricity, water supply, telecommunications, and medical facilities.

The institution acts as a key socioeconomic driver in the region, fostering commercial growth, job creation, educational opportunities, and improved public health services. Given its accessibility, existing infrastructure, and developmental context, the environment is well-suited for institutional and infrastructural projects, provided appropriate environmental and social management protocols are observed.

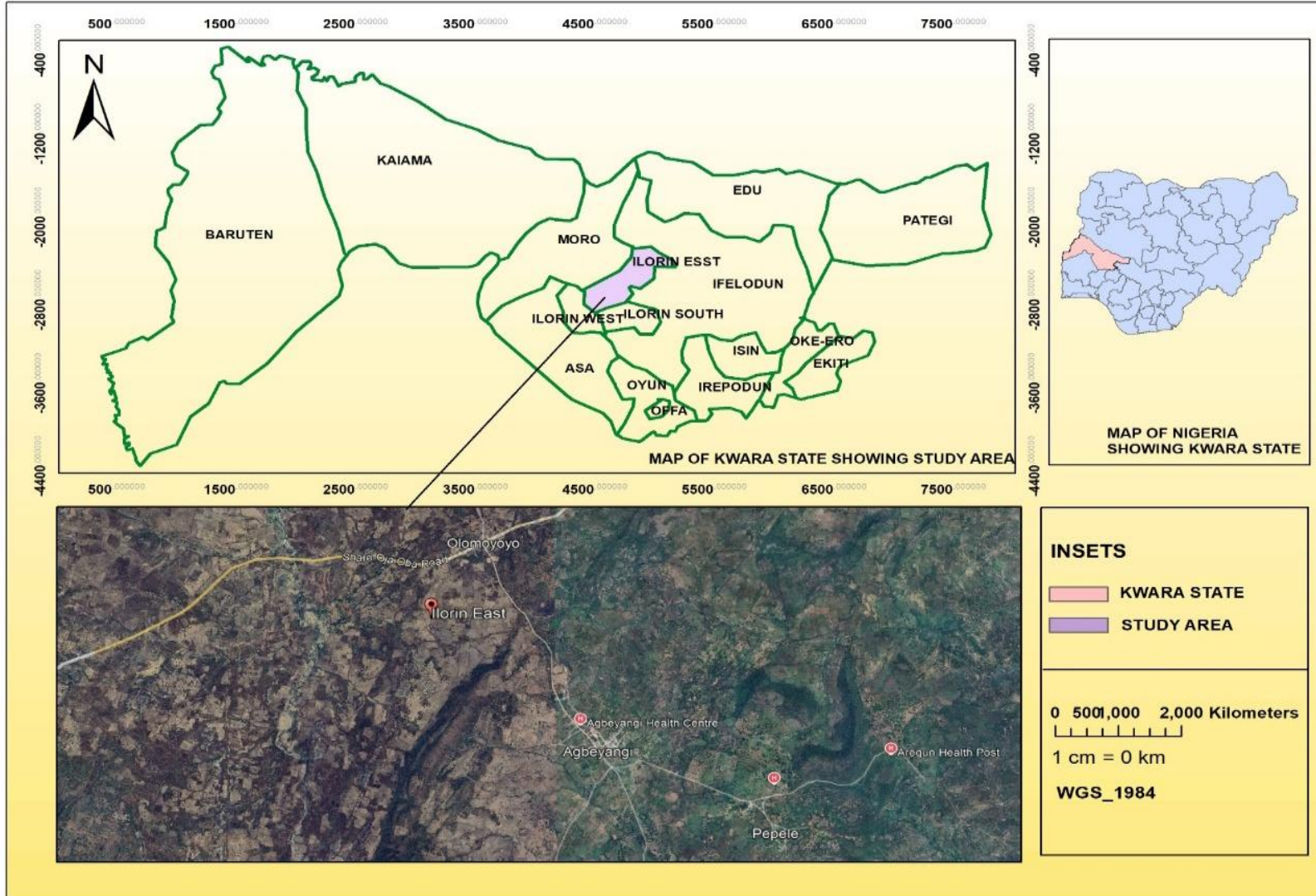


Figure 2.1: Administrative Map of Kwara State Showing the Project Area

2.2 Project Components

There are three key components of the project and the specific activities under these components are discussed below:

Component One Solar Hybrid Mini-Grids

Supported by a \$410 million commitment from the World Bank's International Development Association (IDA), the deployment of solar hybrid mini-grids offers a transformative electrification strategy for rural areas where main-grid extension is economically unfeasible. By integrating solar photovoltaic (PV) arrays, battery energy storage systems (BESS), and secondary power sources (such as diesel generators or wind turbines), these systems deliver reliable, continuous electricity to power local businesses, agricultural processing, and essential public services. Ultimately, mini-grids drive rural economic growth by facilitating the "productive use of energy" (PUE), enabling local enterprises to upgrade from manual labor to mechanized operations.

Component Two: Stand-Alone Solar Systems (Solar Home Systems - SHS)

Backed by \$300 million in IDA funding, stand-alone solar systems serve as decentralized energy solutions to bridge the electricity access gap for off-grid households and Micro, Small, and Medium Enterprises (MSMEs) without requiring costly grid expansions. Comprising individual PV panels, charge controllers, and battery storage, these modular units allow users to power basic lighting, communication equipment, and small-scale business machinery, with options to scale capacity as operational demands increase. System designs incorporate "days of autonomy" to ensure power reliability during low-solar periods. To improve affordability, the funding supports Pay-As-You-Go (PAYG) financing mechanisms, enabling low-income consumers to avoid heavy upfront costs, while integrated maintenance and support services ensure long-term operational sustainability.

Component Three: Technical Assistance (TA) and Capacity Building

The \$40 million IDA commitment for Technical Assistance (TA) provides the regulatory, policy, and human capital foundation necessary for long-term project viability. Designed to align local capabilities with international standards, this funding focuses on training local technicians in operation and maintenance (O&M)—utilizing a "train-the-trainer" model—to reduce Mean Time to Repair (MTTR), improve plant performance diagnostics, and maintain system longevity. Additionally, the TA program establishes standardized procurement guidelines, quality assurance protocols, environmental compliance standards, and project management practices, leaving behind a self-sustaining local ecosystem capable of managing renewable energy assets.

Implementation Progress

The Nigeria Rural Electrification Agency (REA) is implementing the DARES initiative through its Project Management Unit (PMU). The programme has already achieved significant milestones, deploying over 200 mini-grids nationwide and signing grant agreements with eight renewable energy companies to expand solar home systems and mini-grids across underserved communities.

2.3 Description of Project Intervention

The Distributed Access through Renewable Energy Scale-Up (DARES) Programme is supporting the implementation of this project. DARES is an expansion of the Nigeria Electrification Project (NEP).

The project will be delivered through an Energy-as-a-Service (EaaS) arrangement. Under this model, the Energy Service Company (ESCO) that designs and constructs the facility will remain responsible for operating and maintaining it throughout the service period. Combining these responsibilities encourages the ESCO to consider the asset's entire lifecycle during design and construction. The facility must therefore be reliable, efficient, easy to maintain, and capable of delivering sustained performance.

During operations, the ESCO will conduct scheduled inspections and preventive maintenance. It will also repair faults, replace defective equipment, manage spare parts, and respond to operational incidents. System performance will be continuously monitored against the agreed service standards and key performance indicators (KPIs).

Environmental, health, and safety (EHS) management will form another important part of the ESCO's responsibilities. Relevant measures will address electrical hazards, emergency response, occupational safety, community protection, and waste disposal. Particular attention will be given to the safe handling and disposal of batteries and electronic waste.

The ESCO will maintain complete records of system performance, inspections, repairs, and equipment replacement. These records will be submitted through regular reports. When the service period ends, the ESCO will assess the condition of the assets and provide updated operating and maintenance documents. The handover package will also identify unresolved repairs and include training for the new operators where necessary. Assigning construction and operational responsibilities to one entity will reduce coordination risks and promote consistent performance over the project's lifetime.

Developing the utility-scale solar photovoltaic (PV) facility will require several stages. The process will convert the selected land into an electricity-generating site that uses solar energy.

Initial activities will include removing vegetation and preparing the ground for construction. Uneven areas may be graded to provide stable surfaces for the mounting structures and other facilities. These activities could modify the existing landscape and natural drainage routes. Erosion-control and sediment-management measures will therefore be implemented during site preparation.

After the site has been prepared, PV modules will be installed in rows or arrays. Steel or aluminium structures will support the modules. The project may use either fixed-tilt mounting systems or single-axis trackers. Tracking systems follow the sun's movement to improve solar exposure and increase electricity production.

The facility will also require supporting electrical infrastructure. Inverters will change the direct current (DC) produced by the PV modules into alternating current (AC). Transformers will then increase the voltage to the level required for power transmission. Underground or overhead cables will carry electricity between the plant's components and the grid connection point.

Other project facilities will include internal access roads, security fencing, and an operations and maintenance (O&M) building. The amount of land required will depend on the plant's generation capacity, the technology selected, and the spacing between module rows. Adequate spacing will be maintained to reduce shading and optimize energy output.

Grid-interconnection facilities will be installed and tested during the final stage. Once commissioned, these facilities will connect the solar plant to the regional transmission network. Successful grid connection will signal the completion of construction and the beginning of the operational phase.

2.4 Project Schedule

The proposed Project is planned to be operational by the fourth quarter (Q4) of 2028. The tentative Project schedule is provided in **Table 2.1**.

Table 2.1: Tentative Project Schedule

Project Schedule	Timeline											
	2026				2027				2028			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Site allocation												
Energy demand audit												
Front-End Engineering Design												
ESMP study and Approval												
Selection of EPC Contractor and contract signing												
Civil, electrical, and mechanical design												
Procurement (manufacturing and transportation)												
Preconstruction and construction Phase Activities												
Commissioning												
Commencement of operation												

CHAPTER THREE

RELEVANT POLICIES, LEGAL AND ADMINISTRATIVE FRAMEWORK

3.1 Introduction

This section provides an overview of the relevant statutory regulations, legislation, and guidelines for the proposed Project and the ESMP study. The project shall ensure compliance with the relevant and applicable local and international regulations, policies, and standards throughout its life cycle.

3.2 Policy and Legal Framework

3.2.1 FGN Requirements and Relevant Legislation

The Constitution of the Federal Republic of Nigeria (1999), as the national legal order, recognizes the importance of improving and protecting the environment and makes provision for it. The relevant sections are:

- **Section 20** makes it an objective of the Nigerian State to improve and protect the air, land, water, forest, and wildlife of Nigeria.
- **Section 12** establishes, though impliedly, that international treaties (including environmental treaties) ratified by the National Assembly should be implemented as law in Nigeria; and
- **Sections 33 and 34**, which guarantee fundamental human rights to life and human dignity, respectively, have also been argued to be linked to the need for a healthy and safe environment to give these rights effect.

The Policy, Legal, and Institutional Framework guiding the Environmental and Social Impact Assessment (ESMP) for the proposed project is anchored on applicable national policies, laws, and institutional arrangements, as well as relevant international standards. At the national level, the framework is defined by the Federal Ministry of Environment (FMEnv) regulations, including the Environmental Impact Assessment Act Cap E12 LFN 2004, FMEnv Procedural Guidelines (2017), and other sectoral environmental, social, health, and safety regulations. The assessment also aligns with the objectives of the Nigeria Electrification Project and the Rural Electrification Agency's implementation framework. At the international level, the ESMP is guided by the African Development Bank Integrated Safeguards System, alongside international good practice such as the IFC Performance Standards and relevant ISO standards, ensuring that the project complies with both national regulatory requirements and global environmental and social sustainability benchmarks.

3.2.2 Policy Framework

3.2.2.1 National Environmental Policy/ National Policy on the Environment (Revised 2016)

The national environmental policy launched by Government in November 1989 revised in 2016, prescribed guidelines for achieving sustainable development in fourteen vital sectors of the nation's economy, namely: Human Population; Land Use and Soil Conservation; Water Resources Management; Forestry, Wildlife and Protected Natural Areas; Marine and Coastal Area Resources; Sanitation and Waste Management; Toxic and Hazardous Substances; Mining and Mineral Resources; Agricultural Chemicals; Energy Production; Air Pollution; Noise in the Working Environment; Settlements; Recreational Spaces, Green Belts, Monuments, and Cultural Property.

It also contains Nigeria's commitment to ensuring that the country's natural and built environment is safeguarded for the use of present and future generations. This commitment demands that efficient resource management and minimization of environmental impacts be the core requirements of all

development activities. Accordingly, this Policy seeks to promote good environmental practices through environmental awareness and education. The goal of the National Policy on the Environment is to 'ensure environmental protection and the conservation of natural resources for sustainable development'. Its strategic objective is to coordinate environmental protection and natural resources conservation for sustainable development.

3.2.2.2 Social Protection Policies

Social protection policy has been on the agenda since 2004, when the National Planning Commission, supported by the international community, drafted a social protection strategy. More recently, the National Social Insurance Trust Fund (NSITF) drafted a social security strategy. The social protection policy approached social protection using a life cycle and gender lens, recognizing both economic and social risks, including, for example, job discrimination and harmful traditional practices. The policy was organized around four main themes: social assistance, social insurance, child protection and the labour market.

However, only a few of the instruments of this approach were adopted in the national implementation plan, most notably the provision of specific and limited social assistance, social insurance (such as expanding national health insurance to the informal sector) and labour market programmes (such as developing labour-intensive programmes). Moreover, in practice, programmes to date have been focused largely on conditional cash transfers and two health financing mechanisms driven by the federal government with little inter-sectoral or state-federal coordination. A significant number of actors are involved in funding and implementing social protection, including those from government, donors, international non-governmental organisations and civil society. Federal government-led social protection includes three main programmes:

- The conditional cash transfer in Care of the People (COPE) (funded initially through the debt relief gains (DRG fund) targeted at households with specific social categories (those with children of school-going age that are female-headed or contain members who are elderly, physically challenged, or are fistula or HIV/ AIDS patients).
- The health fee waiver for pregnant women and children under five (financed through the debt relief gains (DRG fund); and
- The community-based health insurance scheme, which was redesigned in 2011 because the previous scheme had design challenges.

Other social assistance programmes are implemented in an ad hoc manner by various government ministries, departments and agencies at state level, and some are funded by international donors. These include conditional cash transfer programmes for girls' education (in three states), child savings accounts, disability grants, health waivers, education support (such as free uniforms) and nutrition support. HIV and AIDS programming at state level also include social protection sub-components (although not as the primary objective), including nutrition, health and education support. Labour market programmes include Federal and State level youth skills and employment programmes, and Nigeria also has agricultural subsidies/inputs.

3.2.2.3 National Policy on Climate Change/ National Climate Change Policy for Nigeria 2021-2030

Given Nigeria's status as a fossil-fuel dependent economy with a large climate sensitive agricultural sector, the development of a climate change policy and response strategy is critical, as climate change presents a serious threat to poverty eradication and sustainable development in general. One of the key pillars of Vision 20:2020 is investment in low-carbon fuels and renewable energy. Achieving the goal

of low carbon, high-growth and resilient socio-economic system for equitable and sustainable socio-economic and environmental development faces some challenges which include stability and sustainability of the enabling environment, adequate institutional and human resource capacity and availability of adequate resources to address mitigation and adaptation initiatives to address climate change. Thus, the Government needs to ensure that economic growth, resource management and climate change mitigation and adaptation can all happen simultaneously if this will be done effectively (Department of Climate Change 2017).

The National Climate Change Policy for Nigeria 2021-2030 was established to promote a low-carbon, climate-resilient and gender-responsive sustainable socio-economic development. The revised National Policy on Climate Change was to define a new holistic framework to guide the country's response to the development challenge of climate change.

3.2.2.4 The National Electric Power Policy (NEPP), 2001

In order to ensure a safe, steady, reliable and progressively improved electric power sector in Nigeria, the Electric Power Reform Implementation Committee (EPIC) was inaugurated by the BPE and resulted in Federal Executive Council (FEC) of Nigeria approving the National Electric Power Policy in September 2001, which recommended, amongst others: establishment of the electric power sector regulator and the privatisation of the electric power sector. The National Electric Power Policy (NEPP), 2001 outlines the realization of an adequate and reliable supply of electricity in three phases - the privatization of the state-own utility NEPA and the introduction of the Independent Power Producers (IPPs); increasing the competition between market participants, partial removal of subsidies, and sale of excess power to distribution companies (DISCOs); and the freedom to select suppliers by large consumers and the creation of a fully liberalized and competitive market.

In 2004, the National Integrated Power Project (NIPP) was initiated to boost power supply by the launch of gas-powered stations. The National Electric Power Policy (NEPP) of 2001 resulted in the Electric Power Sector Reform (EPSRA) Act of 2005, establishing the Nigerian Electricity Regulatory Commission (NERC). The EPSRA provided the statutory basis for the privatization of the power sector.

3.2.2.5 The National Energy Policy (NEP) 2013

The National Energy Policy (NEP) 2013 is a revised version of the NEP 2003, emphasizes the effective and efficient use of energy and proposes major areas to be considered for energy efficiency and conservation including amongst others: transportation, services/commercial sector, and energy efficient building designs.

3.2.2.6 The National Energy Efficiency Action Plans of Nigeria

The first version of the National Energy Efficiency Action Plans (NEEAP) for Nigeria (2015-2030) was approved on July 14, 2016, by the National Council on Power (NACOP). It has been formulated within the framework of United Nations' Sustainable Energy for All (SE4All) and adopted by the Inter-Ministerial Committee on Renewable Energy and Energy Efficiency (ICREEE). The NEEAP includes baseline data and information on energy efficiency activities and programmes in Nigeria, barriers to the development and promotion of energy efficiency in the country and suggested achievable energy efficiency targets, including gender disaggregated indicators, based on national potentials and socio-economic assessments. The implementation of the NEEAP is being monitored by the Federal Ministry of Power.

3.3 National Legal Framework

3.3.1 *The Environmental Impact Assessment Act No. 86, 1992/Environmental Impact Assessment Act Cap E12 LFN 2004*

The EIA Act makes it mandatory for any person, authority, corporate body private or public, to conduct EIA before the commencement of any new major development or expansion that may likely have significant effects on the environment. The Act sets out the EIA objectives and the procedures for consideration of EIA of certain public or private projects. The programme is a minor development, which is expected to have minimum impact on the environment. Hence, the programme is categorized as Category II (B) EIA. The EIA guidelines (procedural and sectoral) issued by the FMEnv derive from this Act and the programme proponents shall conduct their activities in conformance with these guidelines.

3.3.2 Electricity Act 2023

It is more accurate to refer to the Electricity Act 2023 as the replacement Act, rather than simply calling it an amendment to the EPSRA. The 2023 Act expressly repealed the EPSRA 2005 and established a more comprehensive framework governing generation, transmission, system operation, distribution, supply and trading of electricity, as well as consumer rights and renewable energy.

One of its most important changes is decentralisation. States can now establish and regulate their own intrastate electricity markets, while NERC continues to regulate matters involving interstate electricity, the national grid, transmission, system operation and other federally regulated activities.

3.3.3 *Energy Commission of Nigeria Act CAP 109 LFN 1990*

The Act was promulgated to create the Energy Commission of Nigeria (ECN) with responsibility for coordinating and general surveillance over the systematic development of the various energy resources of Nigeria. Subject to this Act, the ECN is charged with responsibility for the strategic planning and co-ordination of national policies in the field of energy in all its ramifications. The mandates of ECN include statistical analysis of Electricity Generation, Transmission and Distribution.

3.3.4 *Land Use Act of 1978 and Resettlement Procedures*

The Land Use Act (Cap 202, 1990), now Cap L5 Laws of the Federation of Nigeria 2004, is the key legislation that has direct relevance to this project. Relevant sections of these laws that may relate to this project with respect to land ownership and property rights, resettlement, and compensation are summarized in this section.

The Land Use Act is the applicable law regarding ownership, transfer, acquisition, and all such dealings on Land. The provisions of the Act are vast on every parcel of Land, in every State of the Federation, under the Executive Governor of the State. He holds such parcels of land in trust for the people and government of the State.

The Act categorized the land in a state into urban and non-urban or local areas. The administration of the urban land is vested in the Governor, while the latter is vested in the Local Government Councils. At any rate, all land, irrespective of the category, belongs to the State, while individuals only enjoy a right of occupancy as contained in the Certificate of Occupancy, or where the grants are “deemed”.

The concept of ownership of land as known in the Western context is varied by the Act. The Governor administers the land for the common good and the benefit of all Nigerians. The law makes it lawful for the Governor to grant statutory rights of occupancy for all purposes, grant easements appurtenant to statutory rights of occupancy, and to demand rent. The Statutory Rights of Occupancy are for a definite time (the limit is 99 years) and may be granted subject to the terms of any contract made between the state Governor and the Holder.

The Local Government Councils may grant customary rights of Occupancy for agricultural (including grazing and ancillary activities), residential and other purposes. But the limit of such grants is 500 hectares for agricultural purposes and 5,000 for grazing, except with the consent of the Governor. The local Government, under the Act, is allowed to enter, use, and occupy for public purposes any land within its jurisdiction that does not fall within an area compulsorily acquired by the Government of the Federation or of the relevant State, or subject to any laws relating to minerals or mineral oils.

The State is required to establish an administrative system for the revocation of the rights of occupancy and payment of compensation for the affected parties. So, the Land Use Act provides for the establishment of a Land Use and Allocation Committee in each State that determines disputes as to compensation payable for improvements on the land (Section 2 (2) (c)).

In addition, each Local Government is required to set up a Land Allocation Advisory Committee to advise the Local Government on matters related to the management of land. The holder or occupier of such revoked land is entitled to the value of the unexhausted development as at the date of revocation. (Section 6) (5). Where land subject to customary rights of Occupancy and used for agricultural purposes is revoked under the Land Use Act, the local government can allocate alternative land for the same purposes (section 6) (6).

If Local Government refuses or neglects, within a reasonable time, to pay compensation to a holder or occupier, the Governor may proceed to effect assessment under section 29 and direct the Local Government to pay the amount of compensation to the holder or occupier. (Section 6) (7).

Where a right of occupancy is revoked on the ground that the land is required by the Local, State or Federal Government for public purposes or for the extraction of building materials, the holder and the occupier shall be entitled to compensation for the value at the date of revocation of their unexhausted improvements. Unexhausted improvement has been defined by the Act as:

“anything of any quality permanently attached to the land directly resulting from the expenditure of capital or labour by any occupier or any person acting on his behalf, and increasing the productive capacity the utility or the amenity thereof and includes buildings plantations of long-lived crops or trees, fencing walls, roads and irrigation or reclamation works, but does not include the result of ordinary cultivation other than growing produce.”

Developed Land is also defined in the generous manner under Section 50(1) as follows: land where there exists any physical improvement in road development services, water, electricity, drainage, building, structure or such improvements that may enhance the value of the land for industrial, agricultural or residential purposes.

It follows from the foregoing that compensation is not payable on vacant land on which there exist no physical improvements resulting from the expenditure on capital or labour. The compensation payable is the estimated value of the unexhausted improvements at the date of revocation.

Payment of such compensation to the holder and the occupier as suggested by the Act may appear confusing, as it raises the following question: Does it refer to the holder in physical occupation of the land or two different parties entitled to compensation, perhaps in equal shares?

The correct view appears to follow from the general tenor of the Act.

First, the presumption is more likely to be the owner of such unexhausted improvements. Secondly, the provision of section 6 (5) of the Act, which makes compensation payable to the holder and the occupier according to their respective interests, gives a pre-emptory directive as to who shall be entitled to what.

Again, the Act provides in section 30 that where any dispute arises as to the amount of compensation calculated in accordance with the provisions of section 29, such disputes shall be referred to by the appropriate Land Use and Allocation Committee. It is clear from section 47 (2) of the Act that no further appeal will arise from the decision of such a committee. If this is so, then the provision is not only retrospective but also conflicts with the fundamental principle of natural justice, which requires that a person should not be a judge in his own cause.

The Act must, in making this provision, have proceeded on the basis that the committee is a distinct body quite different from the Governor or the Local Government. It is submitted, however, that it will be difficult to persuade the public that this is so since the members of the committee are all appointees of the Governor. Where a right of occupancy is revoked for public purposes within the state of the Federation, or on the grounds of the land for the extraction of building materials, the quantum of compensation shall be as follows:

- *In respect of the land, an amount equal to the rent, if any, paid by the occupier during the year in which the right of occupancy was revoked.*
- *In respect of the building, installation or improvements therein, for the amount of the replacement cost of the building, installation or improvements to be assessed based on the prescribed method of assessment as determined by the appropriate officer, less any depreciation, together with interest at the bank rate for delayed payment of compensation. With regards to reclamation works, the quantum of compensation is such cost as may be substantiated by documentary evidence and proof to the satisfaction of the appropriate officer.*
- *In respect of crops on land, the quantum of compensation is an amount equal to the value as prescribed and determined by the appropriate officer.*

Where the right of occupancy revoked is in respect of a part of a larger portion of land, compensation shall be computed in respect of the whole land for an amount equal in rent, if any, paid by the occupier during the year in which the right of occupancy was revoked less a proportionate amount calculated in relation to the area not affected by the revocation; and any interest payable shall be assessed and computed in the like manner.

Where there are any building installations or improvements or crops on the portion revoked, the quantum of compensation shall follow that outlined in paragraph (ii) above, and any interest payable shall be computed in like manner.

3.3.5 The Nigerian Urban and Regional Planning Act CAP N138, LFN 2004

The Urban and Regional Planning Act is aimed at overseeing realistic, purposeful planning of the country to avoid overcrowding and poor environmental conditions. In this regard, the following sections are relevant:

- **Section 30 (3)** requires a building plan to be drawn by a registered architect or town planner.
- **Section 39 (7)** establishes that an application for land development would be rejected if such development would harm the environment or constitute a nuisance to the community.
- **Section 59** makes it an offence to disobey a stop-work order. The punishment under this section is a fine not exceeding ₦10,000 (Ten thousand naira) and in the case of a company, a fine not exceeding ₦50,000.
- **Section 72** provides for the preservation and planting of trees for environmental conservation.

3.3.6 Harmful Waste (Special Criminal Provisions) ACT CAP H1, LFN 2004

The Harmful Waste Act prohibits, without lawful authority, the carrying, dumping or depositing of harmful waste in the air, land or waters of Nigeria. The following sections are notable:

- **Section 6** provides for a punishment of life imprisonment for offenders as well as the forfeiture of land or anything used to commit the offence.
- **Section 7** makes provision for the punishment accordingly of any conniving, consenting or negligent officer where the offence is committed by a company.
- **Section 12** defines the civil liability of any offender. He would be liable to people who have suffered injury as a result of his offending act.

3.3.7 The Endangered Species Act, CAP E9, LFN 2004

This Act focuses on the protection and management of Nigeria's wildlife and some of their species in danger of extinction because of overexploitation. These sections are noteworthy:

- **Section 1** prohibits, except under a valid license, hunting, capture or trade in animal species, either presently or likely, in danger of extinction.
- **Section 5** defines the liability of any offender under this Act.
- **Section 7** provides for regulations to be made necessary for environmental prevention and control as regards the purposes of this Act.
-

Most of the proposed program locations are on virgin land that serves as wildlife habitats, which will be impacted by the programme. Hence, the programme activities shall be carried out to comply with the relevant provisions.

3.3.8 Inland Fisheries Act, Cap I10, LFN 2004

The Inland Fisheries focused on the protection of the water habitat and its species. The following section is relevant:

Section 6 prohibits the taking or destruction of fish by harmful means. This offence is punishable with a fine of ₦3,000 or an imprisonment term of 2 years, or both. One of the integral components of solar hybrid systems is battery storage. During the operational phase of the project, there may be the possibility of battery leakages, which may leach into water bodies for project locations with flowing

rivers. The chemical contents of these batteries are toxic to aquatic life (fisheries), which necessitates the relevance of this Act.

3.3.9 National Commission for Museums and Monuments Act, Cap. N19, LFN 2004

The Act provides for the dissolution of both the Antiquities Commission and the Federal Department of Antiquities and to create a National Commission for Museums and Monuments, with the responsibilities to establish and administer national museums, antiquities and monuments, including antiquities, science and technology, warfare, African, Black and other antiquities, arts and crafts, architecture, natural history and educational services among others. Sections 12 to 18 provide the process/steps for the declaration of antiquities as national monuments, while section 19 deals with the restriction of excavations for the purpose of finding antiquities as well as the issuance of permits and section 20 deals with accidental discoveries. In case of any accidental find, the Commission shall be notified within seven (7) days.

3.3.10 The Factories Act, 1987 (Factory Act cap 126, LFN, 1990)

The Factories Act, as contained in the Laws of the Federation of Nigeria 1990, seeks to legislate and regulate the conduct of health and safety in the Nigerian work environment. It was enacted in June 1987 with the objective of protecting the workers and other professionals against exposure to occupational hazards. The Director of Factories at the Federal Ministry of Employment, Labour and Productivity is responsible for the administration of the provisions or requirements of this Act. Section 13 allows an inspector to take emergency measures or request that emergency measures be taken by a person qualified to do so, in cases of pollution or nuisances. This Act deals with working conditions at work sites, including construction sites, such as those to be undertaken under the EEP III. Hence, the occupational requirements applicable to construction sites, as well as other work sites to be used by the program, shall be subject to the provisions of this Act.

3.3.11 Labour Act, Cap. L1, LFN 2004

This Act deals with labour issues, including payment of wages, recruitment, discipline, employee welfare, employment of women and child labour. Sections 54 to 58 which deal with employment of women, prescribed period of absence from work for nursing mothers and allows her half an hour twice a day during her working hours to attend to the baby for a period of up to six months after she resumes work. Section 55 also exempted women from night work, except when they are employed as nurses. Sections 59-64 deal with the employment of young adults.

3.3.12. Wages Boards and Industrial Councils Act, Cap. W1, LFN 2004

The Act provides for the establishment of a National Wages Board and Area Minimum Wages Committee for States and for Joint Industrial Councils for particular industries. It empowers the Minister to order or direct that an industrial wages board be established to perform, in relation to the workers described in the order and their employers, the functions specified in the provisions of this Act, including the minimum wage. The minimum wage is currently ₦30,000.00 per month, and all individuals contracted/employed in relation to this programme shall not earn less than the minimum wage.

3.3.13. Employees' Compensation Act, 2010

The Act makes provisions for the payment of compensation to workmen for injuries suffered in the course of their employment. The compulsory insurance covers employees for injury or death resulting

in the course of work or in workplaces. All types of workers are covered, including those employed under a contract for service or an apprenticeship with an employer, whether by way of manual labour, clerical work or otherwise, and whether the contract is expressed or implied, is oral or in writing. The programme will employ both skilled and non-skilled labour and shall be subject to this law as applicable.

3.3.14 National Environmental Standards & Regulations Enforcement Agency (NESREA) Act, 2007

Administered by the Ministry of Environment, the National Environment Standards and Regulations Enforcement Agency (NESREA) Act of 2007, replaced the Federal Environmental Protection Agency (FEPA) Act. It is the embodiment of laws and regulations focused on the protection and sustainable development of the environment and its natural resources. The following sections are worth noting:

- **Section 7** provides authority to ensure compliance with environmental laws, local and international, on environmental sanitation and pollution prevention and control through monitoring and regulatory measures.
- **Section 8 (1)(K)** empowers the Agency to make and review regulations on air and water quality, effluent limitations, control of harmful substances, and other forms of environmental pollution and sanitation.
- **Section 27** prohibits, without lawful authority, the discharge of hazardous substances into the environment. This offence is punishable under this section, with a fine not exceeding 1,000,000 (One Million Naira) and an imprisonment term of 5 years. In the case of a company, there is an additional fine of ₦50,000 for every day the offence persists.

3.3.15 National Environmental Regulations:

Section 34 of the NESREA Act, 2007, empowers the Minister of Environment to make regulations for a safe and sustainable environment. In exercise of this power, the minister issued the national environmental regulations covering various environmental components and sectors of development. The regulations relevant to the programme are as follows:

- National Environmental (Energy Sector) Regulations, 2014. S.I. 63.
- National Environmental (Electrical/Electronic Sector) Regulations, 2011, S.I. No. 23
- National Environmental (Wetlands, Riverbanks and Lake Shores) Regulations, 2009. S. I. No. 26.
- National Environmental (Sanitation and Wastes Control) Regulations, 2009. S. I. No. 28.
- National Environmental (Watershed, Mountainous, Hilly and Catchment Areas) Regulations, 2009. S. I. No. 27.
- National Environmental (Sanitation and Wastes Control) Regulations, 2009. S. I. No. 28.
- National Environmental (Noise Standards and Control) Regulations, 2009. S. I. No. 35.
- National Environmental (Air Quality Control) Regulations, 2013, S. I. No. 64,
- National Environmental (Soil Erosion and Flood Control) Regulations, 2010. S. I. No. 12.
- National Environmental (Surface and Groundwater Quality Control) Regulations, 2010. S. I. No. 22.
- National Environmental (Control of Vehicular Emissions from Petrol and Diesel Engines) Regulations, 2010. S. I. No. 20.

3.3.16. EIA Procedural Guidelines:

This procedure prescribes the steps to be followed in the EIA process from project conception to commissioning and post-commissioning impact mitigation to ensure that the program is implemented with maximum consideration of environmental factors. This ESMP study will be conducted in compliance with this guideline.

3.3.17 EIA Sectoral Guidelines (Infrastructures):

This provides general guidelines for EIA of projects in the infrastructure sectors of Nigeria, with specific details for sub-sectors.

3.3.18. FMEnv ESMP Guidelines for Solar Mini-Grid Projects in Nigeria

The ESMP Guidelines for Solar Mini-Grid Projects in Nigeria was developed as an abridged form of the EIA Procedures Guidelines with the aim of simplifying the method of preparing ESMPs for proposed solar mini-grid projects. The simplified method is to also optimize the mini-grid projects EIA timeline and the cost of development.

3.4 International Legislation

The International Conventions, to which Nigeria is a signatory, relevant to this programme are as follows:

- African Convention on the Conservation of Nature and Natural Resources
- Convention on Biological Diversity
- Endangered Species (Control of International Trade and Traffic)
- Conservation of Migratory Species of Wild Animals 1973
- Framework Convention on Climate Change 1992
- Convention to Combat Desertification 1994
- Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW)
- Human and Peoples' Rights on the Rights of Women in Africa 2005
- Civil and Political Rights Covenant
- Economic, Social and Cultural Rights Covenant
- Convention on the Elimination of All Forms of Violence Against Women
- Convention on the Rights of the Child
- World Bank Safeguards Policies

3.5 Institutional Framework

This section highlights the relevant institutions through which the planning and implementation of the program will be affected. Several institutions have been identified and will be involved in the overall implementation of this programme. These include:

- The Federal Government of Nigeria (FGN)
- Federal Ministry of Power
- Transmission Company of Nigeria (TCN)
- Federal Ministry of Environment (FMEnv)
- Nigerian Electricity Regulatory Commission (NERC)
- National Environmental Standards and Regulatory Enforcement Agency (NESREA)
- National University Commission (NUC)

- Relevant State Agencies: State Ministry of Lands, State Ministry of Environment and State Environmental Protection Agencies
- Local Government Authority (LGA)

The responsibilities and roles of each of the institutions are discussed below.

3.5.1 The Federal Government of Nigeria

Section 20 of the Constitution of Nigeria makes it an objective of the Nigerian State to improve and protect the air, land, water, forest and wildlife of Nigeria. Sections 33 and 34 which guarantee fundamental human rights to life and human dignity, respectively, can also be linked to the need for a healthy and safe environment to give these rights effect. The Executive Council of the Federation approves all national policies including the National Policy on Environment.

3.5.2 Federal Ministry of Environment

The Federal Ministry of Environment is responsible for the overall environmental policy of the country. It has the responsibility for EIA implementation, approval and issuance of certificates. It has developed certain guidelines and regulations to protect the environment and promote sustainable development. It will monitor the implementation of mitigation measures when the project commences. They can also issue directives to the project on specific actions related to the environment in the project area. The Ministry normally involves the states and sometimes local governments in this responsibility depending on the specific activity.

3.5.3 The National Environment Standards and Regulations Enforcement Agency (NESREA) ensure the embodiment of laws and regulations focused on the protection and sustainable development of the environment and its natural resources are monitored and complied with. NESREA ensures that the operational phase of the solar power system Mini grid project complies with national environmental standards and regulations.

3.5.4 The National Universities Commission

The National Universities Commission (the Commission) was established in 1974 by the National Universities Commission Act CAP N81 to advise the Federal and state governments of all aspects of university education and the general development of universities in Nigeria. It is the dynamic regulatory agency acting as a catalyst for positive change and innovation for the delivery of quality university education in Nigeria. It is also the agency for channeling all external aid to the universities in Nigeria; To receive block grants from the Federal Government and allocate them as appropriate.

3.5.5 The Federal Ministry of Power

The Federal Ministry of Power is the policy-making arm of the Federal Government with the responsibility for the provision of power in the country. The Ministry is guided by the provisions of the Electricity Act No 28 of 1988, the National Electric Power Policy, 2001, the Electric Power Sector Reform Act, 2005, the Roadmap for Power Sector Reform, 2010, and the National Energy Policy, 2013 as described earlier in section 1.6.4. The following parastatals are under the ministry: Energy Commission of Nigeria (ECN) Nigerian Electricity Regulatory Commission (NERC) Power Holding Company of Nigeria (PHCN) Rural Electrification Agency (REA). The responsibilities of the Federal Ministry of Power are as follows:

- Initiating and formulating broad policies and programmes on the development of the power sector Initiating concessions in the power sector Licensing of electrical contractors and electric generating sets of 1MW capacity and below
- Conducting investigation on electrical accidents and to ensure safety in the electricity industry in Nigeria
- Conducting statutory tests and certification of electric poles (concrete, wooden, steel etc.) and other major electrical materials before they are used on the grid and networks in Nigeria
- Implementing renewable energy programmes/ initiatives (solar, wind, biomass, small hydro etc.) Coordinating activities of the power sector
- Handling policy matters relating to research and development in the power sector
- Promoting the development of hydro power plants through public-private partnership (PPP), participating in bilateral and multilateral relations affecting the power sector
- Facilitating the overall coordination of the activities of the parastatals under their supervision

3.5.6 Nigerian Electricity Regulatory Commission (NERC)

The Nigerian Electricity Regulatory Commission (NERC) is an independent regulatory agency. NERC was established in 2005 as part of the economic reform agenda of the Obasanjo administration. The Electric Power Sector Reform Act of 2005 was the legislation that led to the establishment of NERC.

The Commission is required to carry out the following, amongst others:

- i. Monitor and regulate the activities of the electricity industry in Nigeria.
- ii. Issue licenses to market participants; and
- iii. Ensure compliance with market rules and operating guidelines.

In order to create an enabling investment climate for rural electrification projects, NERC established the Mini-Grid Regulation in 2016; regulatory guidelines for mini-grids less than 100 kW and a light-handed regulation for mini-grids between 100 kW and 1 MW.

3.5.7 Transmission Company of Nigeria (TCN)

TCN emerged from the defunct National Electric Power Authority (NEPA) as a product of the merger of the Transmission and Operations sectors on April 1, 2004. TCN was incorporated in November 2005. Being one of the 18 unbundled Business Units under the Power Holding Company of Nigeria (PHCN), TCN was issued a transmission License on 1st July 2006. It was subsequently issued two licenses on June 10, 2013, for electricity transmission and system operations.

3.5.8 Rural Electrification Agency

The Rural Electrification Agency was set up by Section 88 of the Electric Power Sector Reform Act 2005 as the Implementing Agency of the FGN tasked with the electrification of rural and unserved communities. The mission is to provide access to a reliable electric power supply for rural dwellers irrespective of where they live and what they do, in a way that would allow for a reasonable return on investment through an appropriate tariff that is economically responsive and supportive of the average rural customer.

3.5.9 Federal Ministry of Women Affairs and Social Development

Promote actions to achieve the National Gender Policies and a gender budget among policymakers. The goals of the gender policy, among others, include:

- Eliminate cultural/religious gender-based biases and harmful cultural and religious practices which rise to inequalities in gender-role relations in Nigerian society. A culture that is amenable to development must be dynamic.
 - Tap the potential of women for development.
 - Eliminate all forms of gender-based violence.
 - Ensure equal access to women, boys and girls to both formal and informal education.
- Women's education is a priority because it is the key to gender equity, justice, and poverty reduction, improved skills and technological knowledge, as well as the general socioeconomic development of the nation.

3.5.10 State Institutions

Kwara State Ministry of Environment

The Ministry of Environment is currently responsible for environmental service matters and resources in the state. Other objectives include initiating formulation, execution, and monitoring of all issues relating to all environmental matters, solid waste management, and mineral resources. A recent law passed established the Kwara State Environmental Law 2021.

Kwara State Ministry of Women Affairs and Social Development

The ministry seeks to empower women and youth, promote the participation of women in governance, pay attention to women in rural areas, enhance the economic self-reliance of women, create awareness, and campaign against gender-based violence, etc.

Kwara State Lands and Survey

This Ministry was created for the purpose of overseeing the land resources in the state. They are also charged with the responsibility to plan, devise and implement the state policies on land and its resources.

3.6 Funding Agency Requirements

This programme is funded by the World Bank. Therefore, the World Bank Environmental and Social safeguard Standards will be integrated in the project cycle as well as other national and international environmental and social protection requirements, to comply with the best international practices. Both the main environmental and social requirements that the project needs to comply with are described in the following sections.

3.6.1 The World Bank Environmental and Social Safeguard Standards

The World Bank policies on the environmental and social safeguard are the fulcrum of its support towards sustainable poverty reduction, particularly in developing countries. The policies aimed at preventing and mitigating undue harm to the people ESMP of the proposed Solar Hybrid Power Plant and Associated Infrastructure in UNILORIN. As indicated in Table 1.1, the compliance status of the proposed along the various phases are presented below.

The framework was developed in alignment with applicable national environmental regulations and relevant Environmental and Social Framework (ESF) Environmental and Social Standards (ESS), particularly ESS1 (Assessment and Management of Environmental and Social Risks and Impacts),

ESS2 (Labour and Working Conditions), ESS3 (Resource Efficiency and Pollution Prevention and Management), ESS4 (Community Health and Safety), and ESS10 (Stakeholder Engagement and Information Disclosure).

3.7 Institutional Arrangements for Environmental and Social Management

REA will select the Renewable energy service company (RESCO) contractors (through competitive process) to build, operate and maintain the proposed power plant, and also build and equip the associated training center. The selected RESCO will also be considered for a ten-year operation and maintenance (O&M) contract for the power plant. In the long run, UITH will be responsible for operating and maintaining the Project responsible. REA has established a Project Management Unit (PMU) which includes experienced Environmental and Social Safeguard Specialists. The REA-PMU will provide oversight functions for the management of potential environmental and social issues associated with the Project throughout its life cycle. The PMU, in conjunction with UITH's Department of Works and Physical Planning, will monitor the hired contractor's E&S performance. The implementation of mitigation measures for potential environmental and social impacts associated with the Project (at various stages) will also be monitored by FMEnv, NESREA, Kwara State Ministry of Environment and other relevant regulatory agencies, as part of their statutory responsibilities. In addition, the World Bank will provide overall supervision, facilitation and coordination of the Project, and monitor Project performance indicators.

Table 3.1: Safeguards Compliance Matrix for the Solar-Power Project

Pre-construction Phase

Aspect	Nigeria Legal Requirements	World Bank Standards	International Agreements	Key Compliance Actions
Environmental Assessment	EIA Act (Cap E12 LFN 2004)	ESS1: Assessment of Environmental & Social Risks	Paris Agreement	Conduct EIA/ESMP; obtain approval from the Federal Ministry of Environment
Land Acquisition	Land Use Act (1978)	ESS5: Land Acquisition & Resettlement	International Labour Organization (land & livelihood rights)	Secure land titles; compensate affected persons
Stakeholder Engagement	National environmental guidelines	ESS10: Stakeholder Engagement	Aarhus Convention (principles)	Public consultations; disclosure of project info
Biodiversity Screening	NESREA Act	ESS6: Biodiversity Conservation	Convention on Biological Diversity	Identify sensitive habitats; avoid critical areas
Permits & Licensing	NERC mini-grid regulation	ESS1 compliance	NA	Obtain generation/distribution permits

Construction Phase

Aspect	Nigeria Legal Requirements	World Bank Standards	International Agreements	Key Compliance Actions
Occupational Health & Safety	Factories Act; Labour Act	ESS2: Labor & Working Conditions	International Labour Organization conventions	Provide PPE; enforce safety procedures

Waste Management	NESREA Regulations	ESS3: Resource Efficiency & Pollution Prevention	Basel Convention	Proper disposal of hazardous waste (e.g., batteries)
Community Health & Safety	Public Health Act	ESS4: Community Health & Safety	WHO guidelines	Traffic management; site safety measures
Noise & Air Pollution	NESREA Air Quality Regulations	ESS3: Resource Efficiency & Pollution Prevention	Paris Agreement	Control emissions, dust, and noise
Cultural Heritage	National Commission for Museums Act	ESS8: Cultural Heritage	UNESCO conventions	Chance finds procedures in place

Operation and Maintenance Phase

Aspect	Nigeria Legal Requirements	World Bank Standards	International Agreements	Key Compliance Actions
Energy Efficiency	National Energy Policy	ESS3: Resource Efficiency	Paris Agreement	Optimize system performance; reduce losses
Waste (Batteries, Panels)	NESREA e-waste regulations	ESS3: Resource Efficiency	Basel Convention	Safe recycling/disposal systems
Labor Conditions	Labour Act	ESS2: Labor & Working Conditions	International Labour Organization	Fair wages, worker rights compliance
Community Relations	Local governance laws	ESS10: Stakeholder Engagement	NA	Maintain grievance redress mechanism
Safety & Risk Management	Nigerian Electricity Safety Code	ESS4: Community Health & Safety	NA	Routine inspection and maintenance

Decommissioning Phase

Aspect	Nigeria Legal Requirements	World Bank Standards	International Agreements	Key Compliance Actions
Environmental Restoration	EIA Act (closure requirements)	ESS1: Assessment of Environmental & Social Risks	Convention on Biological Diversity	Site rehabilitation and restoration
Waste Disposal	NESREA Regulations	ESS3: Resource Efficiency	Basel Convention	Dispose of solar panels, batteries safely
Worker Safety	Labour Act	ESS2: Labor & Working Conditions	International Labour Organization	Safe dismantling procedures
Community Safety	Public Health Act	ESS4: Community Health & Safety	NA	Secure site; prevent hazards post-closure

Asset Removal & Land Return	Land Use Act	ESS5: Acquisition Resettlement	Land &	NA	Restore land to its original or agreed condition
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CHAPTER FOUR

DESCRIPTION OF ENVIRONMENTAL AND SOCIAL IMPACTS

4.1 Introduction

The basis for identification of potential environmental and social impacts that may be associated with the proposed Solar Power project was formed during field inspections and observations, issues arising from stakeholder consultations as well as project description and designs.

Highlights of the ESMP as the primary instrument for ensuring that a project's commitment to sustainability is maintained throughout its lifecycle, bridging the gap between theoretical impact prediction and practical field execution is presented here. By establishing a rigorous system of governance, the ESMP ensures that project activities remain in strict alignment with national regulatory requirements, international lending standards, and the fundamental principles of corporate social responsibility. It provides a systematic blueprint for the mitigation of environmental and social risks and as well delineates the institutional framework, clearly assigning roles and responsibilities to project developers, contractors, and environmental consultants to ensure accountability at every stage of development. It also integrates specific mitigation measures, monitoring protocols, and reporting requirements designed to protect natural ecosystems, minimize pollution, and safeguard the well-being of local communities.

4.2 Project Area of Influence

The immediate geographical area of influence of work for the proposed project is the land area allocated for the project while the larger geographical area of influence covers the University of Ilorin Teaching Hospital.

4.2.1 Physical Environmental Media Influence

The physical environmental media to be potentially influenced by the activities of the proposed project are land (landscape), air quality, groundwater and any adjacent drain to any of the project sites. The landscape features include soil, flora and fauna at the proposed project site, which will be impacted by the project activities. Any adjacent drain to any of the project sites will be the recipient of runoff water from the project site. Any percolation of fuels through the soil may impact on groundwater resources. The air quality may also be impacted by dust and gaseous emissions from construction activities.

4.3 Impacts of the project activities on the environmental and social components

Activities of potential environmental and social impacts identified with the proposed project are outlined under the four phases of the project activities; namely pre-construction; construction; operations/maintenance and decommissioning phases. The activities are discussed below;

Pre-construction Phase Activities

- Siting of workers camp, where necessary
- Assessment of existing project location, selection of beneficiary institutions, field studies and environmental screening;
- Preparation of environmental and social screening reports;
- Statutory permitting activities from appropriate authorities.

Construction Phase Activities

- Site clearing and excavation works;
- Identification of storage area for construction material;

- Transportation and handling of materials and equipment;
- Civil, mechanical and electrical works
- Construction of waste bin bays (where applicable); and
- Disposal of construction waste/rubble and waste in general.

Decommissioning activities after construction works will involve:

- Removal of construction equipment
- Disposal of construction spoil and waste in general; and

Operations and Maintenance Phase Activities

- Housekeeping;
- Waste management (collection and disposal);
- Maintenance and repair works; and
- Materials management and storage (including personal protective equipment, etc.).

Decommissioning Phase

Decommissioning issues under this project will occur after construction and will cover the following:

- Dismantling of temporary work camp of the contractor;
- Waste management; and
- Restoration of landscape around construction site

4.4 Evaluation of Potential Positive Impacts

Table 4.1: Evaluation of potential positive impacts.

Activity	Receptor	Associated Impact	Significance
Reliable Power supply to UITH through solar energy source	UNILORIN community	Improve the quality of education and other services within the institution as there will be longer hours available with better illumination for studying and will also contribute to the achievement of Nigeria's carbon emission reduction targets (20% reduction by the year 2030) in fulfilment of the nation's Nationally Determined Contributions (NDC) to climate change	Major DESC
Reduced noise and pollutants from generator sets, and natural habitats	UNILORIN community	Human health will be protected from pollution arising from the use of fossil fuels	Moderate
Construction of renewable energy training centre	UNILORIN Community members.	Provide capacity development through learning renewable energy technologies and practices in UITH and consequently, the	Moderate

Activity	Receptor	Associated Impact	Significance
		certification of trained individuals	
The installation of streetlights	UITH Community members	improve safety by reducing hazards associated with flammable fuels and candles and enhance security	Moderate
Stimulate economic activities and offer new opportunities	UITH and nearby Communities	Improve social cohesion and community development and generate new income	Moderate
The employment opportunities for skilled, semi-skilled, and unskilled labour	UITH and nearby communities	Multiply job creation, especially during construction to facilitate overall socioeconomic development	Moderate

4.5 Evaluation of Potential Adverse Impacts Associated with the Proposed Project

The potential adverse impacts from project activities are grouped into the following subjects and discussed further according to the different applicable phases – Preconstruction, Construction, Operation and Decommissioning phase as presented in **Table 4.2**.

Table 4.2: Evaluation of potential adverse impacts

Activity	Receptor	Associated Impact	Significance
Pre-construction Phase			
Site Selection/land	Existing crop farming on site	- Loss of land for farming activities due to land - Take for the Project	Moderate
Site clearing and preparation	Terrestrial flora and fauna	- Vegetation loss - Direct impacts on vegetation and soil-dwelling organisms; indirect impacts on fauna species in the immediate surroundings of the Project site	Minor
	Soil	- Loss of topsoil - Soil compaction and degradation - Increased erosion potential - Reduction in structural stability and percolative ability of soil	Minor
	Air Quality and Noise	- Air quality impacts due to emissions from site clearing equipment - Increase in ambient noise levels	Minor
	Workers Safety	Injuries and accidents to workers during site clearing and preparation.	Minor
Mobilization of construction equipment and materials to site	Air Quality and Noise	- Air quality impacts from vehicular emissions (TSP, NO_x, CO, SO_x) - Increase in noise levels	Minor
	Infrastructure (road)	Increase in vehicular movement and traffic including potential for road accident	Minor
	Workers Safety	Injuries and accidents to workers during loading and offloading of construction materials.	Minor

Activity	Receptor	Associated Impact	Significance
Construction Phase			
Movement of Equipment, Personnel and Plant Materials	Air Quality	- Vehicular emissions (CO, SO₂, NO₂) from exhaust - Contribution to global warming and ozone layer depletion - Dust emissions from construction activities	Minor
	Social System (Road)	Increased traffic from heavy-duty trucks en route to project site	Minor
	Health & Safety	Risk of accidents involving personnel and assets due to vehicle movement	Minor
Civil and Electrical Works / Installation Activities	Air Quality	- Emissions from construction equipment (SPM, NO_x, CO, SO_x) - Dust from land clearing and stockpiles	Minor
	Ambient Noise	Increased noise levels from construction activities	Minor
	Soil	- Increased erosion from excavation - Reduced soil stability and permeability due to compaction	Moderate
	Terrestrial Flora and Fauna	- Loss of plant species due to invasive species - Loss of fauna due to human activity and noise	Minor
	Groundwater	- Depletion of groundwater from abstraction (e.g., concrete mixing, washing) - Increased sediment load from erosion - Increased runoff and drainage formation from hard surfaces	Minor
	Gender	Potential discrimination against women and GBV risks	Moderate
	Socio-economic & Health	Influx of people leading to increased risk of sexually transmitted diseases	Moderate
	Infrastructure (Road)	Road damage, traffic congestion, and safety concerns	Minor
	Construction Workers Safety	Risk of injury during construction activities	Moderate
	Soil	Soil contamination from construction waste (solid and liquid)	Minor
Commissioning Phase			
Waste Generation and Disposal	Groundwater	Contamination from liquid construction waste streams	Minor
	Infrastructure (Waste Management Facility)	Disposal of waste at existing facilities in project area	Negligible
Plant Testing	Ambient Noise	Increase in ambient noise levels during testing activities	Minor
	Workers	Occupational health and safety hazards (e.g., injuries, electrocution) due to incorrect electrical connections	Moderate
	Campus Occupants' Safety	Risk of electrocution from wrong electrical connections	Minor
	Population Influx	Temporary increase in population during commissioning phase	Negligible
	Infrastructure (Road)	Increased traffic and risk of road accidents	Negligible
Operational Phase			
Power Generation and Distribution	Noise	Noise from batteries and inverters during power generation and evacuation	Negligible
	Gender	- Discrimination of women during employment - GBV (sexual harassment, assault, poor working conditions)	Minor
	Socio-economic (Visual)	Landscape alterations causing unpleasant visual changes in the area	Negligible

Activity	Receptor	Associated Impact	Significance
	Socio-economic (Health Issues)	• Community health and safety concerns due to electromagnetic field (EMF) radiation	Negligible
	Health, Safety and Welfare of Staff (Plant Operation)	• Electric shock and injuries during plant operation • Work-related issues (discrimination, denial of rights, unfair treatment, poor working conditions)	Moderate
Routine Maintenance	Soil	• Soil contamination from spent batteries and inverters	Minor
	Groundwater	• Groundwater abstraction from cleaning of PV panels	Minor
Waste Generation and Disposal	Soil & Groundwater	• Soil and groundwater contamination from waste streams	Negligible
	Health, Safety and Welfare of Staff (Maintenance)	• Electric shock and injuries during maintenance activities	Minor

CHAPTER FIVE

ENVIRONMENTAL AND SOCIAL MITIGATION AND MANAGEMENT PLAN

5.1 Introduction

The Environmental and Social Management Plan (ESMP) is a detailed plan and schedule of measures necessary to minimize, mitigate or control any potential negative environmental and social impacts identified under this project.

This ESMP consists of a set of mitigation, monitoring and institutional measures to be taken during the implementation and operation of the proposed project to eliminate negative environmental and social impacts, offset them or reduce them to acceptable levels.

The ESMP also incorporates the actions needed to implement these measures, including the following features:

- Mitigation measures based on the potential environmental and social impacts, describing with technical details each mitigation measure;
- The ESMP also includes monitoring objectives that specify the type of monitoring activities that will be linked to the mitigation measures. Specifically, the monitoring section of the ESMP provides:
 - A specific description and technical details of monitoring measures that include the parameters to be measured, frequency of measurements, and definition of thresholds that will signal the need for corrective actions;
 - Monitoring and reporting procedures to ensure early detection of conditions that necessitate particular mitigation measures and to furnish information on the progress and results of mitigation.
- The ESMP describes institutional arrangements i.e., who is responsible for carrying out the mitigating and monitoring measures (for operation, supervision, enforcement, monitoring of implementation, remedial action, financing, reporting, and staff training);
- Additionally, the ESMP includes an estimate of the costs of the measures and activities recommended; and
- The ESMP is required throughout the implementation stage of the project or sub-project.

5.2 Mitigation/Action Plan

Mitigation and management measures for the significant adverse impacts (rated as moderate or major) identified from the analysis and evaluation of the potential impacts from the proposed project activities are provided in Table 5.1.

Table 5.1: Mitigation Measures/Actions for Potential Significant Adverse Environmental Impacts

No	Project Activities	Potential Environmental and Social Impacts	Proposed Mitigation Measures/Actions	Responsibility	location	Cost
Pre-construction Phase						
1	Site selection/Land	Loss of land for farming activities	REA shall: • Engage affected communities through consultation and participation	Director of Works and Physical Planning/PIU	Project site/affected community	850,000
2	Site clearing and preparation	- Vegetation loss - Direct and indirect impacts on flora and fauna	REA shall: i. Minimize clearing footprint ii. Conduct pre-clearance ecological surveys iii. Avoid clearing during breeding seasons iv. Implement biodiversity management plan	Site Engineer	Project footprint	1,275,000
		- Loss of topsoil - Soil compaction and erosion - Reduced soil stability	REA shall: • Strip and store topsoil • Restrict heavy machinery movement • Implement erosion control (mulching, silt fences) • Progressive restoration	Site Engineer	Site clearing areas	1,020,000
		- Air emissions from equipment - Increased noise levels	REA shall: • Maintain machinery regularly • Apply dust suppression (water spraying) • Limit work to daytime • Provide PPE for noise protection	Site Engineer	Project site	765,000
		Injuries and accidents	REA shall: • Implement OHS procedures (ILO standards) • Provide PPE • Conduct safety training/toolbox talks	HSE	Project site	1,360,000

No	Project Activities	Potential Environmental and Social Impacts	Proposed Mitigation Measures/Actions	Responsibility	location	Cost
			• Enforce supervision			
3	Mobilization of Construction Equipment & Materials	• Vehicular emissions (TSP, NOx, CO, SOx) • Increased noise levels	REA shall: • Maintain vehicles to emission standards • Optimize logistics • Enforce speed limits and reduce idling • Use low-sulfur fuels	Site engineer	Access roads/project site	850,000
Construction Phase						
1	Movement of Equipment, Personnel & Materials	• Vehicular emissions (CO, SO₂, NO₂) • Dust emissions	REA shall: • Maintain vehicles regularly • Use low-sulfur fuels • Apply dust suppression (water spraying, covering trucks) • Limit idling and enforce speed limits	Site Engineer	Access roads/project site	1,020,000
		• Increased traffic and congestion	REA shall: • Implement Traffic Management Plan • Schedule deliveries off-peak • Use designated routes • Community awareness and signage	Site Engineer/Traffic Control Officer	Access roads/nearby communities	1,275,000
		• Risk of accidents	REA shall: • Train drivers • Enforce speed limits • Conduct vehicle inspections • Use traffic marshals and signage	Site Engineer/HSE	Haulage/access routes	850,000

No	Project Activities	Potential Environmental and Social Impacts	Proposed Mitigation Measures/Actions	Responsibility	location	Cost
2	Civil & Electrical Works / Installation	• Air emissions and dust generation • Increased noise levels	REA shall: • Maintain equipment • Apply dust suppression • Limit work during high winds • Provide PPE REA shall: • Restrict work to daytime • Use silencers • Provide hearing protection • Establish buffer zones	Site Engineer	Construction areas	1,275,000
		• Soil erosion and compaction	REA shall: • Install silt fences and drainage • Restrict machinery movement • Rehabilitate progressively • Proper grading	Site Engineer	Civil works/excavation areas	1,275,000
		• Loss of flora and fauna	REA shall: • Minimize clearing • Control invasive species • Restrict worker movement • Implement biodiversity plan	Site Engineer	Project footprint	1,020,000
		• Groundwater depletion and contamination	REA shall: • Use water efficiently • Monitor abstraction • Install sediment traps • Prevent contamination	Site Engineer	Project site/water points	850,000
		• GBV and discrimination risks	REA shall: • Implement Gender & GBV Action Plans • Enforce code of conduct • Awareness training • Grievance mechanism	State Ministry of Women's Affairs & Social Development (GBV/SEA Service Provider)	Site/host community	1,700,000

No	Project Activities	Potential Environmental and Social Impacts	Proposed Mitigation Measures/Actions	Responsibility	location	Cost
		• Spread of STDs	REA shall: • Carry out Health awareness programs • Provide testing access • Enforce worker conduct • Collaborate with health agencies	Director of Physical planning/PIU	Site/host community	1,020,000
		• Road damage and congestion	REA shall: • Traffic management plan • Maintain roads • Control vehicle loads •Coordinate with authorities	Site Engineer	Project access roads	1,700,000
		• Worker injuries and accidents	REA shall: • Implement OHS system (ILO aligned) • Provide PPE • Conduct training •Emergency preparedness	SITE Engineer/HSE	Construction site	2,040,000
Commissioning Phase						
	Plant Testing	• Increase in ambient noise levels during testing activities	REA shall: • Restrict testing to daytime hours • Use well-maintained equipment with noise suppression features • Notify nearby occupants in advance • Provide hearing protection (PPE) to workers	Director of Physical planning/PMU	Testing/plant area	510,000
		• Occupational health and safety hazards (injuries, electrocution due to incorrect connections)	REA shall: • Implement electrical safety procedures (lockout/tagout) • Use certified personnel only • Provide PPE (insulated gloves, boots)	Site Engineer/HSE	Electrical installations	1,020,000

No	Project Activities	Potential Environmental and Social Impacts	Proposed Mitigation Measures/Actions	Responsibility	location	Cost
			• Conduct safety checks and supervision • Ensure emergency response readiness			
		• Risk of electrocution to campus occupants	REA shall: • Restrict access to testing areas • Install warning signage and barriers • Ensure proper grounding and insulation • Supervise all testing activities	Site Engineer	Plant/site boundary	680,000
Operational Phase						
1	Power Generation & Distribution	• Discrimination of women in employment • GBV (sexual harassment, assault, poor working conditions)	REA shall: • Implement Gender Action Plan & GBV prevention (World Bank aligned) • Enforce equal opportunity employment • Worker code of conduct & training • Confidential grievance mechanism	PMU/Site Engineer	Plant/workplace	1,020,000
		• Electric shock and injuries • Workplace discrimination	REA shall: • Implement OHS system (ILO aligned) • Install LOTO systems & signage • Provide PPE (insulated gloves, boots) • Conduct training & audits • Enforce fair labor practices	PMU/Site Engineer/Director of Physical works	Generation/distribution facilities	680,000
2	Routine Maintenance	• Soil contamination from batteries and inverters	REA shall: • Store hazardous materials in sealed/labeled containers • Implement hazardous waste plan • Use certified waste handlers • Install secondary containment & spill response	PMU/Site Engineer	Battery/inverter area	1,700,000

No	Project Activities	Potential Environmental and Social Impacts	Proposed Mitigation Measures/Actions	Responsibility	location	Cost
		Groundwater use for panel cleaning	REA shall: - Use water-efficient/dry-cleaning methods - Harvest/reuse rainwater - Monitor abstraction & comply with permits - Apply water conservation measures	Site Engineer	Solar array/water source	1,020,000
3	Waste Generation & Disposal	Electric shock and injuries during maintenance	REA shall: - Enforce LOTO procedures - Provide PPE & insulated tools - Conduct competency-based training - Routine inspection & supervision	Site Engineer	Operational facilities	680,000
Decommissioning Phase						
1	Dismantling of Plant & Equipment	- Dust emissions - Emissions from machinery and vehicles	REA shall: - Apply dust suppression (water spraying) - Use low-emission equipment - Cover haulage trucks - Limit idling	Director of Public Works/ Site Engineer	Decommissioning site	1,020,000
		Increased noise levels	REA shall: - Restrict daytime hours - Use silencers - Provide hearing PPE - Notify nearby communities	Director of Public Works/ Site Engineer	Plant/nearby receptors	680,000
		Injuries and electrocution risks	REA shall: - Implement OHS procedures (ILO aligned) - Apply LOTO systems - Provide PPE - Use trained personnel - Emergency preparedness	Director of Public Works/ Site Engineer	Plant/electrical areas	1,700,000

No	Project Activities	Potential Environmental and Social Impacts	Proposed Mitigation Measures/Actions	Responsibility	location	Cost
2	Removal of Foundations & Civil Works	• Soil disturbance, erosion, compaction	REA shall: • Minimize excavation footprint • Implement erosion controls • Reinststate topsoil • Progressive rehabilitation	Director of Public Works/ Site Engineer	Former plant footprint	1,020,000
		• Groundwater contamination risks	REA shall: • Proper storage of fuels/chemicals • Spill prevention & response plan • Prevent contaminant discharge • Regular inspections	Director of Public Works/ Site Engineer	Decommissioning area	680,000
3	Waste Generation & Disposal	• Soil & groundwater contamination from waste	REA shall: • Implement waste management plan • Use licensed contractors • Secure hazardous waste storage • Comply with regulations	Director of Public Works/ Site Engineer	Site/approved disposal facilities	1,360,000
		• Pressure on waste infrastructure	REA shall: • Coordinate with approved facilities • Schedule transport efficiently • Promote recycling and recovery	Director of Public Works/ Site Engineer	Approved waste facilities	1,700,000
4	Transportation of Decommissioned Materials	• Emissions and noise from vehicles	REA shall: • Maintain vehicles • Optimize logistics • Enforce speed limits • Use designated routes	Director of Public Works/ Site Engineer	Haulage routes	2,550,000
		• Traffic congestion and road safety risks	REA shall: • Traffic Management Plan • Trained drivers & signage • Off-peak scheduling • Repair road damage	Director of Public Works/ Site Engineer	Access/public roads	1,275,000
		• Community accident risks	REA shall: • Community awareness programs	Director of Public Works/ Site Engineer	Communities along haulage routes	1,020,000

No	Project Activities	Potential Environmental and Social Impacts	Proposed Mitigation Measures/Actions	Responsibility	location	Cost
			• Warning signs and barriers • Escort oversized loads • Enforce safety protocols			
5	Site Restoration & Rehabilitation	• Habitat loss prior to restoration	REA shall: • Re-vegetate with native species • Restore habitat conditions • Monitor ecological recovery • Prevent invasive species	Director of Public Works/ Site Engineer	Entire disturbed project area	2,550,000
		• Loss of employment post-closure	REA shall: • Worker transition programs • Skills training • Job placement support • Stakeholder engagement	Director of Public Works/ Site Engineer	Workforce/host community	1,700,000

5.3 Environmental and Social Monitoring

Environmental and Social monitoring is an important aspect of an ESMP during project implementation. It is a way of systematically monitoring both effects and compliance of the proposed project to existing regulations throughout the entire life cycle and shall oversee the effectiveness of impact mitigation measures, including the extent to which mitigation measures are successfully implemented. Particularly, monitoring shall:

- Improve environmental and social management practices;
- Check the efficiency and quality of the ESMP processes;
- Establish the scientific reliability and credibility of the ESMP for the project (as well as the quality of specialists providing ESMP consultancy services
- Provide the opportunity to report the results on safeguards and impacts and proposed mitigation measures implementation.

Upon commencement of sub-project implementation in the construction works, the environmental and social specialist and the safeguard unit will begin monitoring as an important feedback mechanism. This ensures compliance with the environmental and social measures of the ESMP.

Methods for monitoring the implementation of mitigation measures or environmental impacts should be as simple as possible, consistent with collecting useful information, so that the implementation process can easily be applied.

These indicators could be used to ensure participation process involved in project activities:

- Number and percentage of affected households/individuals/institutions consulted during the planning stage;
- Levels of decision-making of affected people;
- Level of understanding of project impacts and mitigation;
- Effectiveness of local authorities to contributing and making relevant decisions;
- Frequency and quality of public meetings; with community heads and general public;

The environmental and social monitoring plan is shown in **Table 5.2**.

Table 5.2: Environmental and Social Monitoring Plan

No.	Environmental/ Social Component	Monitoring Parameters	Monitoring Site	Frequency	Responsibility (Implementation/ Supervision)	Cost Estimate/ Year (NGN)
1.	Soil impacts	• Presence of habitats or vegetation at the site	Construction site	Daily (throughout the construction period)	PIU Safeguards Specialist, Project Contractor/ Engineering Consultant	
2.	Air quality/ Noise	• Observation of air borne particulates (dust) and exhaust fumes • Records of dust level measurements (dust concentration should be below 150µg/m³) • Records of dampening of construction sites and routes for vehicles/trucks • Daily noise levels.	• Construction site • Immediate environs	Daily During Peak construction period	PIU Safeguards Specialist, Project Contractor/ Engineering Consultant	500,000.00
3.	Vibration and noise nuisance	• Complaints on noise nuisance	• Construction site • Immediate environs	Daily (during construction)	PIU Safeguards Specialist, Project Contractor/ Engineering Consultant	
4.	Visual Intrusion	• Hoarding in place • Condition of areas around construction site	• Construction site • Immediate environs	Daily (during construction)	PIU Safeguards Specialist, Project Contractor /Engineering consultant	No additional costs
5.	Waste Management	• Transportation for monitoring of the provision and use of bins in project area • Records on frequency and location of waste disposal site of domestic and construction waste	Construction site	Monthly (during construction)	PIU Safeguards Specialist, Project Contractor/ Engineering Consultant, FMEnv, KWSMEnv,	500,000.00
6.	Occupational Health and Safety	• Transportation for monitoring workers' awareness of Contractor's health and safety policy • Availability and proper use of PPEs	Construction site	Daily (during construction)	PIU Safeguards Specialist, Project Contractor/ Engineering Consultant	

No.	Environmental/ Social Component	Monitoring Parameters	Monitoring Site	Frequency	Responsibility (Implementation/ Supervision)	Cost Estimate/ Year (NGN)
		• Availability and proper use of warning signs • Availability of first aid kit • Adherence to health and safety procedures • Records on frequency, type and source of illness/accident/injury • Records on non-compliances • Absence of unauthorized persons at active construction sites				
7.	Public safety and traffic issues	• Transportation for monitoring availability and proper use of warning signs • Hoarding of site • Use of caution tape around trenches/ excavations • Records on frequency, type and source of illness/accident/injury • Absence of unauthorized persons at active construction sites	Construction Site	Daily (during construction)	PIU Safeguards Specialist, Project Contractor/Engineering consultant	150,000
8.	Sanitation issues, health and safety impacts	• Availability and use of bins • Records on frequency and location of waste disposal site of domestic and construction waste • Mobile toilet facilities in place • Presence of stagnant water in trenches	Construction site	Daily (during construction)	PIU Safeguards Specialist, Project Contractor/ Engineering Consultant	
9.	Public Complaints/ Grievances Redress	Transportation for monitoring of Grievance Redress issues, which will include such elements as: • Lodging and registration of PAPs grievance by grievance redress committee;	Project host community	Weekly (during construction)	KWMEEnv, PIU Safeguards Specialist, Project Contractor/ Engineering Consultant/school heads/medical director of hospital	

No.	Environmental/ Social Component	Monitoring Parameters	Monitoring Site	Frequency	Responsibility (Implementation/ Supervision)	Cost Estimate/ Year (NGN)
		- Redress decision, feedback and implementation; - Dissatisfaction and alternative action; and - Monitoring and evaluation				150,000.00
10.	Monitoring of Social Impacts	Transportation to monitor impacts such as, labor influx, GBV and SEA, VAC and STDs. Potential temporary physical or economic displacement, if any and provide	Project host Community	Weekly (during construction)	KWMEEnv, PIU Safeguards Specialist, Project Contractor/Engineering Consultant/medical director of hospital, Community Liaison Officer/Health centers	
11	Routine Maintenance	- Implementation of hazardous waste plan - Implementation of Gender Action Plan and GBV prevention - Worker code of conduct and training - Provide PPE (insulated gloves, boots)	Project site and host community	Quarterly (during operation)	PIU and PMU	350,000
TOTAL						1,650,000.00

Table 5.3: Specific Environmental Monitoring Plan

Impact Parameter	Project Phase	Impact Indicator	FMEnv Limits	Sampling Location	Sampling Frequency	Sampling Method	Monitoring Duration	Monitoring Personnel
Ambient Air Quality	Site preparation, Construction and Operation and decommissioning	TSP	600µg/m³	Receiving air - upwind and downwind of site	Daily, during site preparation, construction; Quarterly during operation	Air Sampler	Short-term	PMU-REA Contractor KWMEnv and FMEnv
		NO₂	100 µg/m³				Long-term	
		SO₂	300 µg/m³					
		CO	20 ppm					
Noise	Site Preparation and Construction	Noise Level	80 dBA (8-hr)	Work Site and 200m away	Daily (During site preparation, construction)	Decibel Noise Meter	Short-term	PIU-REA Contractor

Impact Parameter	Project Phase	Impact Indicator	FMEnv Limits	Sampling Location	Sampling Frequency	Sampling Method	Monitoring Duration	Monitoring Personnel
								KWMEEnv and FMEnv
Soil	Site Preparation and construction.	Particle Size, TOC, Oil and Grease Heavy Metals, Nutrients,	As specified in FMEnv Guidelines	Within and around construction area.	Once, before and after construction	Visual Inspection and Soil auger	Short-term	PIU-REA Contractor KWMEEnv & FMEnv
Socio-economics	Construction stage	Absence of Contractor/community conflict, increase/ decrease in economic activities	National/ World Bank guidelines and procedures	Host UNILORIN community	Monthly during construction	Socio-economic survey, observations and interviews	Short term	PIU-NUWSRP3 Contractor KWSMEnv, & FMEnv
Health	Construction and operation	Presence/ absence of alien diseases	National health survey guidelines	Host UNILORIN community	Monthly at construction and bi-annually at operation stages	Interview and medical examinations and records	Long term	PIU-REA KWMEEnv

5.4 Capacity Building for Implementation of ESMP and Permit Conditions

REA shall identify, plan, monitor, and record training needs for personnel whose work may have a significant adverse impact on the environmental or social conditions. Employees at each relevant phase of the project must be aware of the potential environmental impacts of their activities and the occupational hazards associated with the work; as well as their roles and responsibilities in achieving conformance with the management documented in this report. Thus, a formal training process will be organized for employees on environmental management programs, plans and procedures associated with the project.

All staff employed will be trained in the following:

- General operation of the plant.
- Environmental management.
- Specific job roles and procedures.
- Occupational health and safety; and
- Contingency plans and emergency procedures. Training will include:
- Induction training on appointments.
- Specialist training (as required for specific job roles); and
- Refresher training as required.

Training for the local community on general environmental awareness and ESMP mitigation measures on community health, safety, and security shall also be provided.

Objectives of the training

The main objective of the capacity building and training activities is to create, enhance and develop the necessary skills and abilities for successful implementation of the proposed project.

It is recommended that the site meetings to discuss the ESMP issues and any health and safety issues identified in the course of the month. Non-compliances identified during monitoring should reviewed and corrective actions taken. The capacity building plan proposed to achieve this is provided in **Table 5.4**.

Table 5.4: Capacity Building Plan for Implementation of the ESMP.

No.	Activity	Target Group/Participants	Timeline/Durati on	Proposed Facilitator	Cost USD
1.	Specialized Training on Environmental & Social Management (ESM) (ESMP, safeguards, monitoring, reporting)	PMU, Environmental & Social Safeguard Officers	3 days (annually)	Consultant / PMU	4,500
2.	ESMP Implementation Training (mitigation measures, roles & responsibilities, monitoring procedures)	Project Team (PMU, Site Engineer, Supervisors)	3 Days (annually)	Consultant / PMU	1,500

No.	Activity	Target Group/Participants	Timeline/Durati on	Proposed Facilitator	Cost USD
3	Contractor Training on ESMP Compliance (mitigation measures, Code of Conduct, OHS requirements)	Contractor's management, workers, HSE Officers	1 day (annually)	Consultant / PMU	1,500
4	Driver & Traffic Management Training (fleet management, road safety, traffic control within project area)	Drivers, Transport Officers, HSE Officers, Security Personnel	1 day (quarterly)	Transport/Traf fic Specialist / PMU	1,200
5	GBV/SEA/SH Prevention & Response Training (Code of Conduct, reporting channels, survivor-centered approach)	Project Team, Safeguard Officers, Contractors	3Days (biannually)	GBV Specialist / Consultant / PMU	2,500
6	Grievance Redress Mechanism (GRM) Training (complaint handling, documentation, resolution process)	GRC Members (project & management levels), PMU	3days (biannually)	Consultant / PMU	2,000
Total					13,000

Table 5.5: Description of Cost Breakdown

Description	Cost (USD)
Professional fee for 2 Consultants	3,500
Rent/Hiring of venue	4,500
Feeding of participants - tea break	2,000
Feeding of participants (4 days)	3,200
Total	13,200

Output of the Training

An efficient capacity building programme takes into consideration the health, safety, environmental and social management measures as provided in this chapter. The focus is to ensure the effective implementation of the ESMP and the permit conditions. All monthly and progress reports shall capture health, safety and environment capacity building activities carried out.

5.5 Institutional Arrangements

Institutional arrangement for the implementation of the Framework of this ESMP shall comprise:

- REA Project Office
- The Federal Government of Nigeria (FGN)
- Federal Ministry of Power
- Transmission Company of Nigeria (TCN)
- Federal Ministry of Environment (FMEEnv)

- Nigerian Electricity Regulatory Commission (NERC)
- National Environmental Standards and Regulatory Enforcement Agency (NESREA)
- National University Commission (NUC)
- Kwara State Ministry of Lands
- Ilorin East Local Government Area (LGA)

Roles and Responsibilities for the Implementation of the Framework ESMP

The Rural Electrification Agency Project Management Unit (REA-PMU) supervises the implementation of the ESMP throughout the project life span while conformance with the mitigation measures will be ensured by the contractor. **Table 6.4** indicates the roles and Responsibilities of the Stakeholders in the Implementation, Monitoring and Review of the ESMP.

Table 5.6: The Roles and Responsibilities of the Stakeholders in the Implementation, Monitoring and Review of the ESMP					
Stakeholder	Pre-Construction Phase	Construction Phase	Commissioning Phase	Operational Phase	Decommissioning Phase
Director of Works / Physical Planning	• Approve site and land use • Review ESMP and ensure institutional commitment • Appoint & train Site Engineer • Ensure livelihood restoration before mobilization	• Supervise ESMP implementation • Ensure contractor compliance • Address grievances and enforce corrective actions	• Oversee safe plant testing • Ensure stakeholder communication • Confirm readiness for operation	• Review ESMP reports • Recommend improvements to PMU/O&M • Ensure safeguards (OHS, GBV, environment)	• Oversee decommissioning activities • Ensure site restoration • Support livelihood transition
REA – PMU	• Approve ESMP and integrate into contracts • Coordinate stakeholders and regulators • Allocate ESMP budget	• Monitor compliance and conduct audits • Report to regulators • Enforce corrective actions	• Ensure compliance during testing • Approve transition to operation	• Oversee ESMP implementation • Ensure monitoring, audits, reporting • Address non-compliance	• Supervise dismantling compliance • Ensure waste management • Prepare closure reports
Site Engineer	• Support ESMP planning • Participate in training	• Implement ESMP daily on-site • Monitor EHS compliance • Maintain records and reports	• Supervise testing • Ensure safety procedures (LOTO, PPE) • Report incidents	• Monitor operations & maintenance • Ensure ESMP compliance • Report environmental & safety issues	• Supervise dismantling • Monitor waste handling • Support site rehabilitation
NESREA / FMEEnv Representatives	• Review and approve ESMP/ESMP • Issue environmental permits	• Monitor ESMP implementation (environmental compliance) • Conduct inspections and enforce regulations	• Monitor compliance during commissioning • Verify environmental and safety readiness	• Monitor ESMP implementation (environmental compliance) • Conduct periodic audits and inspections	• Monitor decommissioning activities • Verify environmental restoration

		• Engage stakeholders on compliance issues		• Discuss ESMP improvements with PMU, Director, and O&M Contractor to address non-compliance and emerging risks	• Approve closure compliance • Recommend corrective actions where necessary
State Ministry of Women's Affairs & Social Development (GBV/SEA Service Provider)	• Review Gender/GBV Action Plans • Support stakeholder engagement on GBV risks	• Monitor implementation of gender and GBV mitigation measures • Provide GBV/SEA support services • Conduct awareness programs	• Monitor GBV risk during commissioning activities • Ensure reporting and response mechanisms are active	• Monitor Gender Action Plan implementation • Handle GBV/SEA cases confidentially • Provide survivor support services • Engage with PMU, Director, and Gender Officer on improvements	• Monitor GBV risks during workforce demobilization • Support vulnerable groups and affected persons • Ensure proper closure of GBV cases and services

5.6 Estimated Budget for ESMP Implementation

Table 5.7 provides a summary of the cost estimate required to effectively and efficiently implement the recommended mitigation measures and management plans required to address the potential and associated impacts of the proposed project. The total cost of implementing the ESMP is estimated at US\$ **57,300** with the current Naira value of 1,3500 to 1 dollar.

Table 5.7: Cost of ESMP

S/N	ESMP Activity	Cost (USD)	Key Cost Components	Justification
1	Pre-Construction Phase	8,000	Stakeholder engagement, ESMP disclosure, livelihood restoration planning, training of safeguards staff	Required to address social risks early, prevent conflicts, and ensure readiness before project mobilization
2	Construction Phase	13,000	Daily monitoring, mitigation measures (dust, erosion, OHS), PPE, inspections, reporting	Most impact-intensive phase requiring continuous supervision and high resource allocation
3	Commissioning Phase	800	Testing supervision, safety monitoring, stakeholder notification	Short-term phase with limited activities but critical safety requirements
4	Operational Phase	13,500	Routine monitoring, OHS audits, waste management, GBV/SEA implementation, reporting	Long-term phase requiring sustained compliance, monitoring, and system maintenance
5	Decommissioning Phase	4,000	Dismantling supervision, waste disposal, site restoration, livelihood transition	Ensures safe closure, environmental restoration, and social safeguards at project end
6	Mitigation & Monitoring	7,000	Environmental sampling, inspections, compliance audits, documentation	Dedicated funding ensures effective tracking of impacts and regulatory compliance
7	Capacity Building	11,000	ESMP training, OHS training, GBV/SEA awareness, GRM training	Builds stakeholder capacity for effective ESMP implementation and sustainability
	TOTAL	57,300		Cost reflects full lifecycle ESMP implementation aligned with international standards

CHAPTER SIX

INCIDENT REPORTING AND EMERGENCY RESPONSE PLAN

6.1 Introduction

For a project of this nature, Incident Reporting and Emergency Response Plan (ERRP) is a specialized component of the ESMP that addresses the unique risks associated with large-scale photovoltaic (PV) installations, such as electrical hazards, chemical spills from battery energy storage systems (BESS), and fire risks. The primary objective of the ERRP is to establish a clear protocol for the identification, notification, and mitigation of emergencies. The plan must be structured around a tiered response system.

6.2 Key components

The key components of ERRP include:

1. **Emergency Organization and Responsibilities:** The plan must define the "Emergency Coordinator" role, who holds the authority to halt site operations. This individual is responsible for maintaining communication with local emergency services, such as fire departments and medical facilities, which is critical given the remote locations often chosen for solar farms.
2. **Hazard-Specific Procedures:** Solar projects require specific protocols for:
 - **Electrical Hazards:** Procedures for de-energizing arrays during maintenance or fire events to prevent arc flash injuries.
 - **Battery Energy Storage System (BESS) Safety:** If the project includes lithium-ion battery storage, the plan must detail thermal runaway mitigation, including specialized fire suppression techniques and hazardous material containment to prevent toxic gas release.
 - **Natural Disasters:** Protocols for high-wind events (e.g., stowing trackers in a "park" position) and flood mitigation for inverter stations.
3. **Reporting and Investigation:** Every incident, including "near misses," must be documented in an Incident Log. The reporting process follows a strict timeline: initial notification within 2 hours, and a detailed Root Cause Analysis (RCA) report within 48 hours. This data is used to calculate the incident frequency rate, ensuring that the project remains within the safety thresholds defined during the design phase.
4. **Communication and Training:** The ERRP mandates regular emergency drills—such as fire evacuation and spill response—to ensure that all personnel, including subcontractors, are familiar with assembly points and alarm signals.

CHAPTER SEVEN

CONCLUSION

7.1 Conclusion

The Environmental and Social Impact Assessment (ESMP) for the proposed solar power plant at the University Teaching Hospital is still in progress. However, the ESMP is intended to provide comprehensive information to support informed decision-making and promote environmentally sound and socially sustainable development.

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