



THE REPUBLIC OF SOUTH SUDAN
MINISTRY OF ENERGY AND DAMS

THE SOUTH SUDAN ENERGY ACCESS PROJECT (P178891)
ENVIRONMENTAL AND SOCIAL MANAGEMENT FRAMEWORK
(DRAFT)

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LIST OF ACRONYMS

AfDB	African Development Bank
C-ESMPs	Contractor Environmental and Social Management Plans
CPA	Comprehensive Peace Agreement
DPs	Development Partners
DRC	Democratic Republic of the Congo
E&S	Environment and Social
EAPP	East Africa Power Pool
EHS	Environment Health and Safety
ESCP	Environmental and Social Commitment Plan
ESMAP	Energy Sector Management Assistance Programme
ESMF	Environmental and Social Management Framework
ESMS	Environmental and Social Management System
ESS	Environmental and Social Standards
GBV	Gender Based Violence
GHG	Green House Gases
GOSS	Government of South Sudan
IDP	Internally Displaced Persons
IFC	International Finance Corporation
JEDCO	Juba Electricity Distribution Company
LMP	Labour Management Procedure
MoED	Ministry of Energy and Dams
MoFP	Ministry of Finance and Planning
NGO	Non-Government Organisation
NDS	National Development Strategy
PHCCs	Payam-level Health Care Centers
PIU	Project Implementation Unit
SSEC	South Sudan Electricity Corporation
SEP	Stakeholder Engagement Plan
SPLM/A	Sudan People's Liberation Movement/Army
ToR	Terms of Reference
UN	United Nations
UNDP	United Nations Development Program
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Fund
WB	World Bank

EXECUTIVE SUMMARY

The World Bank (WB) is providing financing to the Government of South Sudan (GoSS)¹ in form of a US \$40 million grant to implement the South Sudan Energy Access Project hereinafter referred to as “the project”. The project aims to increase access to electricity services and strengthen the institutional capacity of the energy sector in South Sudan. The project will be structured around four components namely; Juba isolated grid extension/densification, Construction of mini grid pilots in Jam Jang or Maban, Off-grid electrification through standalone solar systems, and Technical Assistance and capacity building in support of the aforementioned components among other aspects.

The development and implementation of the project and its related activities may be associated with environmental and social impacts that must be managed/mitigated so as to ensure that the positive impacts of the project are enhanced while the negative impacts are prevented or reduced to as Low as Reasonably Practicable. As a result, this Environmental and Social Management Framework (ESMF) has been prepared under the coordination of South Sudan’s Ministry of Energy and Dams, to provide guidance regarding the management/mitigation of the impacts.

The preparation of the ESMF entailed undertaking a review of related documents to ascertain specific details of the project at hand and the associated South Sudan policy, legal, regulatory and institutional framework that was relevant to the project. Consultations with identified stakeholders in various government and private sector entities that are pertinent to the implementation of the project, and field visits that were undertaken to potential project host sites that included areas through which the Juba electricity grid is to be extended. Field visits to, and within Juba were undertaken although these were restricted to Juba at the time. It is hoped that visits to areas outside Juba may be undertaken at a later date depending on the prevailing security situation within the country and the specific project areas.

When implemented, the project components will benefit small holder farmers, small businesses, refugee host communities and adjacent refugee camps especially in Maban and/or Jamjang; public institutions such as health care centers, secondary schools, government administration buildings and publicly shared water supply facilities; personnel within the Ministry of Energy and Dams, South Sudan Electricity Corporation, Juba Electricity Distribution Company (JEDCO) and other institutions/agencies that will be part of the Project Implementation Unit (PIU), and private energy entrepreneurs. It should be noted that private sector players and international Non-Governmental Organizations such as the United Nations High Commission for Refugees, United Nations Children’s Fund and the World Bank, will play key roles in the implementation of the project.

The ESMF highlights South Sudan’s policy, legal, regulatory and institutional framework governing environmental and social aspects of the proposed project. Also highlighted are international conventions and legal agreements that have been ratified by South Sudan and are relevant to the project. The World Bank’s Environmental and Social Standards (ESS) and their relevance to the project, is also discussed. It should be noted that only ESS9 (Financial Intermediaries) is not applicable to the project. A gap analysis between South Sudan’s laws and the World Bank ESS has been provided in the ESMF.

South Sudan’s environmental and social baseline is discussed and described in the ESMF. The baseline highlights the physical, biological and socioeconomic aspects that will have to be taken into consideration during the implementation of the project. Environmental and social screening will be undertaken following the steps highlighted in this ESMF, to determine the environmental and social aspects of subprojects on this project. In doing this, the environmental and social aspects of the subprojects will be ascertained as well as the type of environmental and social assessment that will be required in accordance with the ESS requirements. According to the current screening, the project falls under the **High-risk** category since it will entail various potential environment, health and safety risks that can result from the construction and operation of the off-grid and mini-grid products and materials as well as associated civil works. Moreover, the High-risk rating of the project is further considered due to institutional capacity constraints and contextual risks. However, the screening process of individual proposed subprojects will inform decision

¹ Through the Ministry of Energy and Dams.

makers and the project management of the real nature and extent of potential E&S risks and impacts that will arise because of subproject activities at the specific site location as well as biophysical & social setting. The procedure of ESMF encompasses seven processes, such as scoping/screening; assigning of environmental and social risk classification; environmental and social assessment; review and approval; public consultation and disclosure; monitoring, supervision and reporting; and annual reviews.

ESMF establishes exclusion criteria for high-risk activities, which are not eligible for the project financing. High-risk activities are activities that may cause damage to cultural heritage; removal or conversion of forests and other natural resources create encroachment and/or cause significant adverse impacts to critical natural habitats (e.g., wildlife reserves; parks or sanctuaries; protected areas; forests and forest reserves, wetlands, national parks or game reserve; any other ecologically/environmentally sensitive areas); serious adverse effects to human health and/or the environment; significant adverse social impacts and/ or may give rise to significant social conflict; drainage of wetlands and cultivation; significant land acquisition, forced eviction and involuntary physical displacement. It is also excluding activities that may potentially affect the quality or quantity of water or a waterway shared with other nations and affect the historically underserved and vulnerable groups.

The project is expected to have positive impacts such as; improvement of electricity access to project beneficiaries, improvements of the economic status of households and businesses through enhancement of small and medium enterprises, employment opportunities for local community members that will be engaged on project activities, reduced pressure on natural resources by communities who mostly utilise biomass to meet their energy needs that also include lighting, reversing the negative effects of climate change and environmental degradation through promotion of renewable energy, among others. Similarly, the implementation of the project will result in a number of adverse environmental and social impacts that will include; increase in-migration into Juba from other parts of the country, pressure on existing social services and also result in poor sanitation due to poor waste disposal, spikes in crime rates etc, a potential rise in prostitution that could lead to increased spread of sexually transmitted diseases and other communicable diseases, generation of hazardous and non-hazardous wastes, destruction of habitats during construction of access routes, excavation of pits where poles are to be erected and clearing the right of way for power transmission lines, among others. However, in keeping with the impact mitigation hierarchy, measures will be implemented to avoid, minimise or manage the adverse impacts that could be associated with the project and its attendant components to ensure compliance with South Sudan's legal requirements and the World Bank ESF and well as enhance the benefits of the project.

It should be noted that stakeholder consultation and grievance redress/management will be ongoing activities on the project and will be undertaken in all phases of the project.

Environmental and Social Monitoring of aspects on the project will be undertaken to provide for continuous assessment of compliance with the World Bank's ESF and the national requirements of South Sudan. This is in line with propagating continuous improvement on the project.

Regarding arrangements for implementation of the project, responsibilities and capacity building, human resources, logistical facilitation and linkages between government agencies will be required. The government will establish a Project Implementation Unit (PIU) that will assume the overall responsibility of implementing the project. Within the PIU, the MoED and SSEC will have responsibilities for steering the project and its implementation. Capacity building activities and programs will have to be undertaken to ensure that an excellent understanding of the inherent Environment and Social issues on the project is attained by all parties on the project and that these are well equipped to undertake their roles.

1 INTRODUCTION

1.1 Background

South Sudan has one of the lowest energy access rates in Sub-Saharan Africa. It is estimated that only 7% of the population has access to electricity, most of which is concentrated in Juba, which has the country's only large-scale functional distribution network. While some cities used to be partially served by isolated grids, most of this was destroyed during the civil conflict and subsequent conflict and is largely non-operational. Many households and commercial and public institutions rely on diesel-powered generators, which are expensive to operate and require imported fuel and spare parts. Hence, South Sudan is unlikely to achieve universal access to affordable, reliable, sustainable, and modern energy under the Sustainable Development Goals 7 (SDG7) by 2030 in the absence of significant investment and scale-up of electrification activities.

In light of this state of affairs regarding energy access, the World Bank (WB) is providing financing to the Government of South Sudan (GoSS) in form of a US \$40 million grant to implement (*through the Ministry of Energy and Dams*), the South Sudan Energy Access Project hereinafter referred to as "the project". The project aims to increase access to electricity services and strengthen the institutional capacity of the energy sector in South Sudan.

1.2 Scope and objectives of the ESMF

This Environmental and Social Management Framework (ESMF) aims to provide guidance regarding the management/mitigation of environmental and social impacts that may be associated with the development and implementation of the project.

The broad objectives of the ESMF are to ensure that activities under the project:

1. Enhance positive Environmental and Social outcomes; and
2. Prevent or mitigate negative Environmental and Social impacts.

The specific objectives of the ESMF include:

- To establish clear procedures and methodologies for Environmental and Social planning, review, approval and implementation of the project;
- To provide guidance for the development of site-specific ESIA's / ESMPS's;
- To prescribe project implementation arrangements, responsibilities and the required capacity building for the preparation and implementation of the project;
- To assess the potential Environmental and Social impacts of the project;
- To propose mitigation measures which will effectively address identified negative impacts;
- To specify appropriate roles and responsibilities, and outline the necessary reporting procedures for managing and monitoring Environmental and Social concerns related to the project; and
- To determine the training, capacity building and technical assistance needed to successfully implement the provisions of the ESMF.

1.3 Purpose of the ESMF

The main purpose of this ESMF is to set out the modalities for the environmental and social assessment of the project as well as the post assessment situation, as the specific aspects (*such as sites and the necessary subprojects regarding the implementation of components 1 - 4*) of the project become known during its implementation.

1.4 Approach and Methodology

This ESMF was prepared under the coordination of the Ministry of Energy and Dams, and involved documentation reviews; stakeholder consultations; field visits to potential project host sites that included areas through which the Juba electricity grid is to be extended to; ESMF preparation meeting and a workshop; and lessons learned from projects financed by the World Bank in South Sudan as well as those of other Development partners such as the African Development Bank Group (AfDB). The various aspects of the approach and methodology are discussed further in Sections 2.2.1 and 2.2.2 below.

1.4.1 Documentation review

As part of the process of preparing the ESMF, a number of key documents were reviewed in order to ascertain the environmental and social baseline situation in South Sudan as pertains to the project coupled with the associated policy, legal, regulatory and institutional framework. Some of the key documents reviewed included;

- South Sudan's first state of environment and outlook report, 2018; and
- United Nations Development Programme (UNDP) Annual Report 2021: Towards the South Sudan We want.
- Relevant national regulatory framework for the Government of Republic of South Sudan such as the Transitional Constitution of the Republic of South Sudan, 2011 and the Draft Environment Protection Bill, 2015;
- The World Bank Environmental and Social Framework (ESF);
- The International Finance Corporation (IFC) Performance Standards on Environment and Social Sustainability, 2012;
- The World Bank Group General Environmental, Health and Safety (EHS) Guidelines, April 2007;
- The World Bank Group Environmental, Health, and Safety Guidelines for Electric Power Transmission and Distribution, April 2007;
- Core ILO Labor Standards and ILO Basic Terms and Conditions of Employment; and
- Project Information Documents including the project concept note and the concept environmental and social review summary.

1.4.2 Stakeholder consultations

A number of key stakeholders were consulted in South Sudan, mainly in Juba, between 17th – 25th October 2022. The consultations were guided by the stakeholder engagement plan that had been developed and which took into account the degree of influence/level in interest of the stakeholders as pertains to the project. Key among the stakeholders consulted included the following:

- Ministry of Public Service and Human Resource Development, represented by Under the Secretary;
- Ministry of Higher Education, Science and Technology, represented by the Director General in charge of World Bank funded projects;
- Donors in South Sudan whose interests are aligned with those of the Energy Access project;
- Ministry of Energy and Dams, represented the Under Secretary;
- South Sudan Electricity Corporation, represented by the Chairman;
- Ministry of Gender, Social Welfare and Religious Affairs, represented by the Under Secretary;
- Ministry of Labor, represented by the Under Secretary;
- Ministry of Environment and Forestry, represented by the Under Secretary; and

- Representatives of Media and Civil Society, among others.

1.4.3 Field visits

Due to the prevailing security situation and safety/security advisories, field visits were only restricted to Juba although it's hoped that visits to areas outside Juba may be undertaken at a later date depending on the prevailing security situation. Visits were undertaken to: the existing Juba electricity grid and those areas to which it might potentially be extended; an Internally Displaced Peoples (IDP) camp in Juba; an existing thermal power plant and a 20MW solar power plant. Information regarding the potential project host areas outside Juba was obtained from the various stakeholders that were consulted.

1.4.4 Lessons learned from other World Bank/Development Partner projects in South Sudan

Lessons learned from the World Bank's previous interventions in the energy sector in Juba were used to inform the proposed environmental and social interventions of this ESMF. Of particular importance was the Electricity Sector Technical Assistance Project (ESTAP). Equally of importance is AfDB financed Juba Power Distribution System Rehabilitation and Expansion Project² on whose interventions the proposed project is building upon. Equally of importance is the solarisation of Health facilities that has been undertaken by UNICEF in three (3) States of South Sudan.

It was noted in the AfDB financed Juba Power Distribution System Rehabilitation and expansion project that the South Sudan Electricity Corporation (SSEC) is a newly established entity and therefore lacks institutional capacity to implement, operate and maintain the distribution systems. As a result, the following would be key in implementation of any energy related projects in South Sudan, if success is to be attained and project implementation delays avoided. There is a need to ensure knowledge building of SSEC and Ministry of Electricity and Dams (MoED) personnel by including specific provisions to ensure training of the personnel. The aspects of training of personnel, knowledge and technology transfer should be highlighted in the ESMF for the South Sudan Energy Access Project so as to address the issue of capacity short comings in the entities.

² The Project was the first power project undertaken by the Bank in South Sudan.

2 PROJECT DESCRIPTION

2.1 Project Components

The project will be structured around four components as discussed below. The specific project works and locations will be ascertained at a later date. Whereas the detailed descriptions of the project's subprojects were yet to be ascertained at the time of preparation of this ESMF, it can be mentioned at this stage that some of the facilities which are expected to be associated with this project will include; the existing thermal power plant, the grid network that was established by the AfDB within Juba and the solar plant whose power is to be connected to the existing grid network.

2.1.1 Component 1: Juba isolated grid extension/densification

The Juba power distribution system has more than 30,000 customers of which 70% of these are households. The system faces a number of challenges that include financial constraints by the government and JEDCO to expand the network and provide more access to an additional 100,000 households; power theft, arrears by institutions; and a lack of an independent regulator with strong measures. Therefore, this component of the project will entail partial implementation of the so-called second phase of the African Development Bank Group (AfDB) Juba distribution project. It will involve performing additional 16,000 connections (for densification of the existing grid, out of which 10,000 will be connected from 24 existing idle transformers). Additionally, network strengthening (intensification) will be undertaken for an additional 15,000 connections that will be extended to major IDP camps in Juba. Other items under this component include:

- Developing masterplans to benefit South Sudan's energy sector (*such as the Juba Distribution Masterplan*);
- Supporting additional studies for evacuation of power from intermittent sources;
- Supporting the establishment of an energy sector regulator and tariff setting mechanism; and
- Capacity building for the South Sudan Electricity Corporation (SSEC) and Ministry of Energy and Dams (MoED).

2.1.2 Component 2: Construction of mini grid pilots in Jam Jang or Maban

The objective of this component is to electrify South Sudanese communities and adjacent refugee camps with a solar hybrid system that has battery storage or a diesel backup. This component supports energy access in refugee host communities such as Pariang in Ruweng administrative area and the refugee camps, particularly, in Maban and/or Jamjang. These will benefit from affordable and reliable electricity service. It should be noted that each refugee camp has an estimated population of 100,000 – 150,000 people (*approximately 60,000 households and 80% of the refugee population being concentrated in Maban and Jamjang areas*) and 20 – 30 public facilities/markets that are similar to secondary cities in South Sudan.

The component will be financed through the World Bank Window for Host Communities and Refugees (WHR), with additional potential financing expected from the private sector.

The United Nations High Commissioner for Refugees (UNHCR) and public facilities are anchor customers and implementation partners on this component. The new mini grids would displace expensive diesel shipments.

2.1.3 Component 3: Off-grid electrification through standalone solar systems

This component will entail electrification of public institution facilities that include; health and educational facilities. A total of 1,654 health facilities and 5,580 educational facilities have been identified to benefit from this component. Most of these are located outside major cities that have no grid access. The component will finance the delivery of solar and battery-based off-grid solutions for

selected social institutions, with priority on Payam-level Health Care Centres (PHCCs) and secondary schools. Other public facilities such as government administration buildings and publicly shared water supply facilities will also be supported.

The component will be implemented through a combination of public and private sector led approaches with a focus on efficient delivery channels to ensure long-term sustainability of installed systems. The standard anticipated primary components of a standalone Photo Voltaic (SPV) power plant are as indicated below:

- Solar PV panels (also known as solar PV modules or SPV array) use semiconductor material to convert solar energy directly into electrical energy.
- Inverter: The electricity generated by the PV panels is Direct Current (DC). This needs to be converted into Alternating Current (AC) using an Inverter which determines the quality of AC power fed into the system, and also the kind of loads that can be powered with solar energy – different inverters support different levels of starting current requirements which affects the kind of machinery that can run on solar power. An inverter has a typical life of 5-10 years and has to be replaced during the lifetime of the plant.
- Module Mounting Structures: The solar PV panels are mounted on the stands or rooftops using special Module Mounting Structures that are iron fixtures which can withstand wind and the weight of the panels. The proper design of mounting structures is important for the solar power plants performance as the power output from the PV plant will not be maximised if the mountings buckle and the panels are not optimally oriented towards the sun.
- Battery: If solar power is required when there is not enough sunlight for the panels to generate electricity (such as at night), a battery backup is required.
- A charge controller is required to regulate the charging of batteries and provides optimum charging current, and protects the batteries from overcharging. There are two kinds of charge controllers: i) Pulse Width Modulated (PWM); and ii) Maximum Power Point Tracking (MPPT).

Other components include the interconnect cables, junction box, switches, fuses, etc.

2.1.4 Component 4: Technical Assistance and capacity building

This component involves a broad range of analytical work/technical assistance and capacity building to support implementation of the three components highlighted above. The aim of this component will be to prepare the MoED for sustainable long-term development of South Sudan's power sector. This will entail:

Technical assistance aspects

- Development of sector Master plans that focus on electricity generation, transmission, distribution, and electrification;
- Undertaking feasibility studies for new construction/rehabilitation of isolated grids in regional capitals, including Malakal;
- Review and Strengthening of the regulatory framework;
- Development of the Public-Private Partnership (PPP) framework;
- Juba cost of service / tariff setting study, supplementing component 1 intervention; and
- Development of business plans/Human Resource plans for key sector entities.

Capacity building

- Trainings for MoED/SSEC/ Project Implementation Unit (PIU);

- Study tours and knowledge exchange; and
- Incentives and resources for sector agency staff (non-monetary employment benefits, equipment, IT systems, etc.).

NB: *The MoED and the World Bank (WB) are to identify priority activities under this component since it is unlikely that all the activities above will be financed under this project.*

2.2 Project Implementation Arrangements

2.2.1 Project Beneficiaries

These will include:

- Domestic households, small holder farmers, small businesses that will benefit from the standalone solar systems;
- Refugee host communities and adjacent refugee camps especially in Maban and/or Jamjang that will benefit from the development of mini grids;
- Public institutions such as health care centres, secondary schools, government administration buildings and publicly shared water supply facilities;
- Personnel within the MoED, SSEC, JEDCO and other institutions/agencies that will be part of the PIU; and
- Private energy entrepreneurs.

2.2.2 Project Management Structure

The tentative structure of the PIU is summarised in figure 2.1 below. The PIU will have a steering committee that will include the MoED, SSEC and the Ministry of Financing and Planning (MoFP). The project will have one environment and one social risk management specialists, who will be based in the project implementation unit. E&S focal persons shall also be assigned at the major towns which are beneficiaries of the project. The project will also have a procurement officer. Components 1-4 of the project will have various personnel overseeing their implementation. Other partners in the delivery of the project will include; UNHCR, UNICEF, Ministry of Health, and the World Bank.

The fine details on the reporting arrangements will be included in the final version of the ESMF. These will be designed to ensure adequate field supervision and monitoring of subprojects. Additionally, for further oversight on the project, there is need to include Environment and Social focal points at the local level, within the PIU structure.

2.3 Implementing partners and Project Contractors

Various implementing partners shall be involved in the implementation of this project. The Ministry of Finance and Planning, Ministry of Energy and Dams, South Sudan, South Sudan Electricity Corporation, Juba Electricity Distribution Company, Ministry of Health, Ministry of Ministry of General Education and Instruction. The roles of these agencies and their relevance to the project is discussed under section 4.2. Private sector players will be engaged in the rehabilitation and construction of the isolated mini-grids as well as the stand-alone off-grids besides providing services during the implementation of the project. It should be noted that the private sector entities will be required to develop Environment and Social Management Systems (ESMS) that address the nature and scale of Environment and Social risks and impacts for the project components that they will be implementing (*See Annexure I – Guidance on development of an Environmental and Social Management System (ESMS)*). This will entail private sector entities being trained in how to develop an ESMS coupled with providing them with support in its implementation during the project.

The UNHCR, UNICEF, and the World Bank will also play key roles in the implementation of the project. Detailed roles that will be executed by the different partners/contractors and their responsibilities will be included in the ESMF when the PIU structure is finalised.

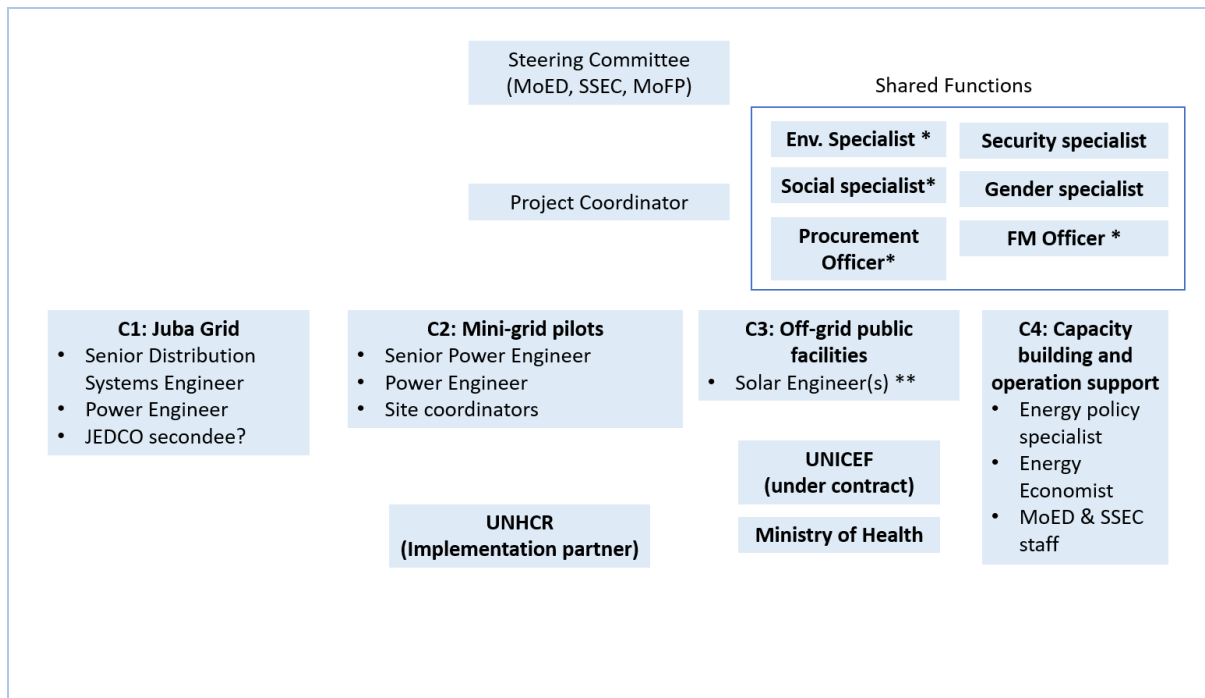


Figure 1.1: Tentative conceptual design of the PIU

3 POLICY, LEGAL AND REGULATORY FRAMEWORK OF SOUTH SUDAN

The policy, legal and regulatory framework governing environmental and social aspects of the proposed energy access project for South Sudan by and large dated, and with most of being revised to ensure that it is in tandem with similar frameworks in the East African Region and for which South Sudan is a member of the East African Community region. For example, as part of the consultations held with the Ministry of Environment and Forestry pertaining to the afore-mentioned issue, the Undersecretary mentioned that a number of Act/Regulations pertaining to environmental matters had been drafted and sent to the Ministry of Justice for review and it is hope that these would be tabled before the council of ministers and hopefully the Environment Act can be passed within 6 months. It is worth noting that a committee for Environment and Forestry does exist at parliamentary level.

It should be noted that prevailing policy, legal and regulatory framework in South Sudan categorised as follows:

- a) Post 2011 (post-independence) policies, laws and associated institutions established by the Government of the Republic of South Sudan; and
- b) 2000-2011 (New Sudan) policies, laws associated institutions established by the Government of South Sudan (GOSS)³ and the Sudan People's Liberation Movement/Army (SPLM/A) administration.

Pre-2011 (pre-independence) policies, laws and associated institutions established while South Sudan was still part of Sudan, provided that they are not based on the Sharia law.

3.1 Policy Framework

Tables 3.1 below; outlines the respective Environment and Social legislation applicable to the Project.

³ The GOSS was formed in 2005 with the signing of the Comprehensive Peace Agreement (CPA) that granted regional autonomy to Southern Sudan. Thus, before the enactment of the 2011 Constitution, the GOSS under the Interim Constitution of Southern Sudan 2005, governed Southern Sudan.

Table 3.1: National Policies and Guidelines applicable to the Project

National Policy/Guideline(s)	Description	Relevance to the Project
Environment Policy of South Sudan (2015 – 2025)	The Policy was passed in 2015 and its strategic goal is to ensure the protection, conservation and sustainable use of the natural resources of South Sudan without compromising the tenets of inter-generational equity. The policy will pursue and archive to develop laws, regulations and guidelines to ensure sustainable management of the environment as well as the prudent utilisation of natural resources. The policy addresses a number of aspect that that include; climate change, management of resources, corporate social and environmental responsibilities and environmental planning, among others.	<p>The project will entail activities such as civil works as part of construction of electricity infrastructure and creation of rights of way for electricity transmission infrastructure. Execution of these activities may involve vegetation clearance which should be undertaken in a sustainable manner.</p> <p>Additionally, the project will generate hazardous and non-hazardous waste during its respective phases that should be responsibly managed to avoid pollution of environmental media.</p> <p>The project will involve provision of support and capacity building to the Project Implementation Unit that will include strengthening the environmental and social safeguard implementation capacity at the Ministry of Energy and Dams as well as other project implementation entities/partners.</p>
Forest Policy, 2019	The Forest Policy of South Sudan was launched in 2019. The Policy is broadly intended to protect the roles forests play in stabilising natural global systems including the hydrological balance, the carbon balance, atmospheric systems/cycles, etc. The policy broadly aims to achieve ecological stability of river systems, the lakes, swamps, agricultural production and other natural ecological systems. It is also meant to ensure that there are optimal benefits from forestry and agro-forestry activities for food security and	<p>Development of mini-grids outside Juba, especially greenfield sites, could affect sensitive ecosystems such as forests and swamps.</p> <p>-Activities that involve removal or conversion of forests and other natural resources, that may cause long term,</p>

	<p>poverty alleviation among rural communities through provision of woody and non-wood forest products. The policy integrates forest sector actions with rural development efforts to ensure that the rural population of South Sudan has access to basic needs which include; household food security, shelter, wood fuel, safe clean water, as well as sanitation and health facilities.</p>	<p>permanent and/or irreversible loss of major forest habitats including habitats of wildlife and significant loss of biodiversity are not eligible for financing.</p>
<p>The South Sudan National Gender Policy, 2012</p>	<p>The goal of achieving gender equality in South Sudan is anchored in the country’s Transitional Constitution and guided by a vision of equality as an inalienable right for all women, men and children, and gender equality as a human right. The ultimate goal of this policy is to ensure that gender equality is an integral part of all laws, policies, programs and activities of all South Sudan’s public institutions, the private sector and civil society so as to achieve equality in the cultural, social, political and economic spheres in South Sudan.</p>	<p>Gender related concerns such as Gender Based Violence, sexual harassment, gender discrimination among others that may be associated with the development of the project should be addressed in line with the policy to ensure that the project objectives/desired benefits are attained.</p>
<p>South Sudan’s Vision 2040</p>	<p>The vision is aimed at ensuring equality, freedom, justice, peace and prosperity for all. The Revised National Development Strategy (R-NDS) for South Sudan, 2021 – 2024, is the main vehicle being used to pursue realise aspects of the vision.</p>	<p>The building of critical infrastructure for sustainable development, that includes energy, is cited among the key objectives that the R-NDS has to deliver as part of South Sudan’s vision 2040 aspirations. The proposed Energy Access Project and its socio-economic transformation aspects ties in with this aspiration.</p>

3.2 Institutional Framework

The development of the proposed Project will require the coordination of national agencies assisted by lower-level sectoral departments. Non-Governmental Organisations will also contribute to the success of this project. Some of the relevant institutions will be key in the implementation of the proposed Project are as presented below.

3.2.1 National Level

Table 3.2 below, presents key national level agencies that are deemed to be of relevance to the implementation of the project.

Table 3.2: National institutions in South Sudan and their relevance to the Project

Institution/Agency	Mandate and relevance to the proposed Project
Ministry of Energy and Dams (MoED)	The Ministry plans and provides power generation, transmission and distribution facilities to industrial and domestic consumers through the South Sudan Electricity Corporation (SSEC). The MoED will be the main implementing agency of the project.
Ministry of Environment and Forestry	The Ministry is mandated with the Protection and conservation of the environment as well as ensuring sustainable utilisation of the environmental resource base to meet the needs of both the present and future generations. The ministry will be essential in providing oversight in implementation of environmental and social safeguards pertaining to the project.
Directorate of Climate Change and Meteorology	The Directorate develops and implements programmes to address climate change issues and coordinates the implementation of South Sudan's obligations under the UN Framework Convention on Climate Change (UNFCCC) and the Convention on Biodiversity (CBD). The project will entail the development of renewable energy assets such as stand-alone solar systems that will mitigate the effects of climate change through the decarbonization of country's energy generation mix. The project should, therefore, remain cognisant of relevant Climate Change Action Plans to ensure that its activities are undertaken in tandem with the plans.
Ministry of Finance and Planning	The ministry allocates financial resources to government ministries and agencies, thus enabling them to implement government plans, policies, and programmes. The ministry will be essential in negotiating and administering/monitoring the grant funds earmarked for the project by the Work Bank.
Ministry of Health	The ministry is responsible for planning, delivering, and maintaining an efficient healthcare system. Since the project will entail providing health units with power, the Ministry is a key stakeholder in the project since the health facilities that will benefit from solarisation are under its jurisdiction.
Ministry of General Education and Instruction	The Ministry is responsible for primary and secondary education, as well as the training of educators in South Sudan. Education institutions have been earmarked as potential beneficiaries of solarisation by the project. Therefore, the ministry will be key in the

	monitoring the implementation of this aspect of the project within these institutions.
Ministry of Internal Affairs	The Ministry is responsible for ensuring and maintaining security and stability. It oversees agencies such as the police that will be key in the provision of security to the project personnel and assets.
Ministry of Humanitarian Affairs and Disaster Management	Its mandate is to oversee all humanitarian work in South Sudan. Therefore, the ministry will be key in decision-making on humanitarian related interventions that will be addressed by the project related interventions.
Ministry of Labour, Public Service and Human Resource Development	The mandate of the ministry includes regulation of the Private Sector labour market in a manner that is consistent with national priorities, values, and cost-effective service delivery. The ministry will ensure that the project's labour policies and guidelines are in line with its requirements and labour standards.
Ministry of Gender, Social Welfare and Religious Affairs	It is responsible for formulation and implementation of policies and legislations for promotion of gender equality, women's empowerment, child protection, social Protection and Social Welfare of the vulnerable groups in general welfare. As such, the ministry will ensure that gender equality and social justice are considered during the development of the project.
South Sudan Electricity Corporation (SSEC)	The SSEC is a government parastatal whose primary purpose is to generate electricity for use in South Sudan and for sale to neighboring countries. SSEC will be among the implementing bodies of the project.

3.3 National Legal Framework

Table 3.3: National legal framework applicable to the Project

Legislation	Description	Relevance to the Project
<p>The Transitional Constitution of the Republic of South Sudan, 2011</p>	<p>The Transitional Constitution of the Republic of South Sudan came into force in 2011. It commits all levels of government in the Republic of South Sudan to sustainable development so as to ensure that the environment is protected for the benefit of both present and future generations, through reasonable legislative action and other measures.</p> <p>Article 41 (1) provides that the people of South Sudan shall have a right to a clean and healthy environment; (2) every person shall have the obligation to protect the environment for the benefit of present and future generations</p> <p>Article 166 (6) mandates local governments to involve communities in decision making regarding the promotion of a safe and healthy environment.</p>	<p>The project’s construction, operation and decommissioning activities are associated with both positive and negative environmental and social impacts and will therefore need to be undertaken in a manner that:</p> <ul style="list-style-type: none"> • Promotes sustainable development; and • Protects the right to a clean and healthy environment for communities and persons in the project host area(s).
<p>The Draft Environment Protection Bill, 2015</p>	<p>This legislation aims to protect the Environment in South Sudan and to promote ecologically sustainable development that improves the quality of life. It grants the right to a decent environment to every person and the attendant right to bring an action to enforce that right if it is threatened as a result of an activity or an omission.</p> <p>It empowers the Ministry of Environment and Forestry to supervise and co-ordinate all matters relating to the environment and to be the principal instrument of government in the implementation of all policies relating to the environment.</p>	<p>The Bill is key to addressing pollution prevention, control and waste management since activities associated with the implementation of the project will generate waste.</p> <p>It is the duty of the Ministry of Environment and Forestry to oversee aspects related to protection of the environment in which the project is being undertaken.</p>
<p>National Electricity Bill, 2015</p>	<p>The Bill provides for the regulation of generation, transmission, distribution, export, and import of electricity in South Sudan. The Bill provides for the power of a licensee (or a project developer) and transmissions (Section 33).</p>	<p>The project will be implemented in accordance with this bill since it will involve the generation, transmission and distribution of electricity.</p>

	The Bill also provides for the establishment of the Electricity Regulatory Authority which as part of its core responsibilities, is supposed to monitor the performance and compliance with the law and licence conditions, and the functioning of regulated entities of the electricity supply industry.	
The Land Act, 2009	<p>One of the key objectives of the Land Act is to promote a land management system that protects and preserves the environment and ecology for the sustainable development of South Sudan. It also provides for fair and prompt compensation to any person whose right of occupancy, ownership or recognised long standing occupancy of customary use of land is revoked or otherwise interfered with by the Government.</p> <p>The Act requires that state authorities approve land acquisitions above 250 feddans (105 hectares) and create a regulated ceiling on land allocations. The Land Act requires that the government consults local communities and consider their views in decisions about community land.</p>	<p>Whereas the project is not expected to require significant land acquisition and resettlement, some activities under component 1 such as isolated grids development and densification along with their low-voltage distribution networks may require some private.</p> <p>The project should seek to fairly and promptly compensate persons/communities whose land will be earmarked to host project components/activities. Additionally, during the implementation of the project, local communities (affected communities) must be adequately consulted.</p>
The Labour Act, 2017	The purpose of this Act is to establish a legal framework for the minimum conditions of employment, labour relations, labour institutions, dispute resolution and provision for health and safety at the workplace; in accordance with the Constitution of the Republic of South Sudan, 2011, and in conformity with international and regional obligations of South Sudan.	A number of people will be employed as a result of the implementation of the project; therefore health, safety, welfare, age of employment and appropriate training of persons employed in workplaces should be considered.
Local Government Act, 2009	The Act provides for establishment of powers, structure and functions of local governments. It defines the decentralised structure of the government administration. It also contains provisions for land administration and management in accordance with the Land Act and defines roles and responsibilities of traditional authority councils in the dispute resolution process. It also gives wide-ranging powers to Local	Implementation of the project must conform with the respective ordinances and by-laws of the local governments within projects area of influence.

	Government councils to perform functions aimed at improving community livelihoods.	
The Environmental Protection Act, 2001	<p>This legislation was in force before South Sudan gained her independence. The Act is not legally binding in South Sudan although it remains an important piece of legislation that is used to give guidance in ensuring environmental conservation in the country.</p> <p>Its principal objectives are: (i) To protect the environment in its holistic definition for the realisation of sustainable development; (ii) To improve the environment while ensuring sustainable exploitation of natural resources; (iii) To create a link between environmental and developmental issues, and to empower concerned national authorities and organs to assume an effective role in environmental protection. Section III of the Act outlines general policies and principles regarding the protection of the environment.</p> <p>Article 17 of the Act required that any individual who intends to implement any project that was likely to have a negative impact on the environment, should present an Environmental Impact Assessment (EIA) for approval by the Monitoring and Evaluation Committee of the Higher Commission for Environment and Natural Resources (HCENR) of the then Federal Government of Sudan.</p>	Environmental and Social impacts of the respective sub-projects of the Energy Access Project should be addressed in a proactive manner by subjecting the respective projects to environmental and assessments prior to their commencement.
Forests and Renewable Natural Resources Act, 2002	<p>This is another Act that is no longer legally binding but whose principles remain useful in guiding the management of forest resources in South Sudan. The 2002 Act attempts to follow a more holistic approach by providing a framework for the management and protection of forests and renewable natural resources, including pastures, rangelands and certain aspects of agricultural land use.</p> <p>The Act imposes a deterrent penalty, namely the confiscation of any property, including the means of transport used in the commission of a forestry offence.</p>	There is need to safeguard natural resources such as trees during project implementation especially as they are likely to be cleared due to their potential shading effect on solarisation projects.

<p>South Sudan Access to Information Act No. 65 of 2013</p>	<p>The South Sudan Access to Information Act No. 65 of 2013 spells out that every citizen shall have the right of access to information. It focuses on the right to access information held by public bodies in South Sudan. The purpose of the Act is to give effect to the constitutional right of access to information, promote maximum disclosure of information in the public interest and establish effective mechanisms to secure that right.</p>	<p>This emphasises the need to disseminate project information to all the respective stakeholders and which go a long way in ensuring transparency on various aspect of the project.</p>
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3.4 International Conventions and Legal Agreements

In addition to compliance with regulatory requirements, the Project will also adhere to the international conventions ratified by South Sudan. Key conventions and treaties potentially relevant to the Project are outlined in Table 3.4. Other important international instruments relevant to the Project are also outlined in Table 3.5.

Table 3.4: International Treaties, Conventions or Agreements relevant to the Project

Treaty, Convention, Agreement	Requirement of the Treaty, Convention, and Agreement	Ratification	Relevance to the Project
United Nations Framework Convention on Climate Change 1992	Under Article 3 (3) parties are required to take precautionary measures to anticipate, prevent or minimise the causes of climate change and mitigate its adverse effects.	17 th February 2014	Given the fossil fuel heavy nature of South Sudan's energy mix, the solarisation aspect of the project will help to reduce the energy generation related emissions and thus contributing to the country's Greenhouse Gas reduction ambitions as set out in the country's second Nationally Determined Contributions (NDC) report. In the second NDC, South Sudan has significantly increased its climate ambition of reducing emissions across its sectors by 109.87 million tonnes of carbon dioxide equivalent while sequestering an additional 45.06 million tonnes by 2030. This among other things is designed to ensure that South Sudan adopts a sustainable and low-carbon growth pathway while also supporting the country's vision to 'transition from a least developed country to a middle-income country by 2030.
Paris Agreement	Its goal is to limit global warming to well below 2 degrees Celsius, preferably to 1.5 degrees Celsius, compared to pre-industrial levels. To achieve this long-term temperature goal, countries aim to reach global peaking of greenhouse gas emissions as soon as possible to achieve a climate neutral world by mid-century.	23 th February 2021	
Bamako Convention, 1991	Requires party states to use legal, administrative and other measures to prevent the import of hazardous waste into Africa from non-contracting parties. All signatories to the Convention are required to impose strict, unlimited liability as well as joint and several liabilities on hazardous waste generators; ensure that environmentally sound treatment and disposal facilities for hazardous wastes are located, to the extent possible, within its jurisdiction; and ensure that persons managing hazardous wastes take all actions necessary to prevent pollution arising from the management of such wastes.	24 th January 2013	Hazardous waste generated during the implementation of the proposed Project and therefore there is need for compliance with the requirements of this Convention.

Conservation of Nature and Natural Resources, 2003	The convention aims at enhancing environmental protection, conservation and sustainable use of natural resources. The convention further identifies water as a critical resource which needs to be maintained at quantitative and qualitative levels.	24th January 2013	Project planning should ensure that the project takes appropriate measures to minimise potential impacts on biodiversity by putting in place measures to control siltation of water bodies and wetlands, disorientation of migrating birds and hunting/illegal exploitation of wildlife resources by contracted teams.
Convention for the Safeguarding of the Intangible Cultural Heritage, 2003	The objectives include to: safeguard the intangible cultural heritage, ensure respect for the intangible cultural heritage of the communities, groups and individuals concerned and raise awareness at the local, national and international levels regarding the importance of the intangible cultural heritage, and of ensuring mutual appreciation thereof.	23rd October 2017	The people of South Sudan have a number of customs and beliefs that may entail tangible and intangible cultural heritage. Additionally, there could be graves/burial areas in sites that are earmarked to host project components. The implementation of the project should consider the potential impact on cultural heritage in the project area and implement measures to safeguard them where they exist.
Convention on Biological Diversity, (1992)	Its objectives are to conserve biological diversity, promote the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilisation of genetic resources, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over those resources and technologies, and by appropriate funding (Article 1).	17 th February 2014	South Sudan has a lot of biodiversity and Wildlife outside protected areas. Project planning should ensure that the project takes appropriate measures to minimise potential impacts on biodiversity and key habitats that may occur in areas earmarked to host project components.
International Labour Organisation's Fundamental Conventions	Labour, working conditions, health and safety are the subject of numerous international agreements, conventions, policies and standards. Fundamental labour standards formulated by the International Labour Organisation (ILO) include forced labour, child labour and workmen's compensation among others.	2012	Labour policies for the Project and impact mitigation measures for employment should be in accordance with the requirements of these Conventions.
Ramsar Convention, 1971	The Convention is an international treaty for the conservation and sustainable utilisation of wetlands, recognizing the fundamental ecological functions of	10 th October 2013	South Sudan currently has one (Sudd wetlands) site designated as a Wetland of International Importance.

	wetlands and their economic, cultural, scientific and recreational value.		This wetland should be conserved during the development of the project.
Vienna Convention on the Protection of the Ozone Layer, 1985	Parties should take appropriate measures to protect human health and the environment against adverse effects resulting or likely to result from destruction of the Ozone layer.	12 th January 2012	The Proposed Project should undertake measures to minimise emissions that deplete the Ozone layer by locally sourcing for materials that are required for the project to avoid long overland transportation of imported materials.
Convention on the Rights of the Child (1989)	The Convention is the most comprehensive compilation of international legal standards for the protection of the human rights of children. It acknowledges children as individuals with rights and responsibilities according to their age and development, as well as members of a family or community.	23rd January 2015	Activities associated with the development of project such as construction activities will require semi-skilled and unskilled labour that pose a potential risk of engaging child labour.
The Treaty of the East African Community, (1999)	Articles 111 and 112 of the EAC Treaty provide for conservation and management of environmental and natural resources. They require member states to take measures to control trans-boundary air, land and water pollution arising from development activities and take necessary disaster preparedness, management, protection and mitigation measures especially for the control of natural and man-made disasters.	15 th April 2016	River Nile is a transboundary water resource shared between Uganda and South Sudan; therefore, measures should be undertaken to minimise/prevent pollution of surface water resources within the Nile Basin during the development of the project.

Table 3.5: Other important international instruments relevant to the Project

Title	Description	Relevance to the Project
Africa Agenda 2063	This is Africa’s transformation plan over the next 50 years and sets out a number of aspirations that are to be realised during that period. The agenda has since been adopted by the African Union (AU).	The agenda promotes the development of infrastructure which is in tandem with proposed Project. The project will lead to the development of electricity infrastructure in South Sudan.
The 2030 Sustainable Development Goals (SDGs)	The SDGs were formally adopted by South Sudan and other member states in September 2015 as an integral part of the 2030 Agenda on Sustainable Development. SDG indicators and targets are to be integrated in the appropriate Sector and Local Government Plans and budgets coupled with implementation, monitoring and evaluation frameworks.	Development of the proposed project should comply with SDG 9 (Resilient infrastructure, sustainable industrialisation and innovation). Additionally, this project will lead to economic growth of South Sudan and contribute to reduction of poverty levels; SDG 1 (No poverty), improve health centres which benefits the realisation of SDG 3 (Good health and wellbeing), contribute to powering educational facilities which benefits SDG 4 (Quality Education), and provide renewable energy to remote areas – this contributes to achievement of SDG 7 (affordable and clean energy)

3.5 World Bank ESS and Relevant Guidelines and Good Practices Notes

The World Bank's Environmental and Social Standards (ESS) are designed to help ensure that programs proposed for Bank financing are environmentally and socially sustainable, and thus facilitate informed decision-making. Their relevance to the proposed Project is outlined in Table 3.6 below and further discussed in section 3.5.1.

Table 3.6: World Bank ESSs and their relevance to the Project

World Bank ESSs	Relevance to the Project		Applicability to the Project
	Yes	No	
ESS1: Assessment and Management of Environmental and Social Risks and Impacts	✓		<p>Whereas the activities to be financed by the project will have a range of environmental and social benefits, the activities could also be a source of adverse environmental and social impacts as highlighted below:</p> <ul style="list-style-type: none"> - Generation of hazardous and non-hazardous waste including e-waste from mainly end-of-life backup solar power batteries and poor; - Small scale soil erosion, sedimentation and landscape disturbance; - Potential risks to flora and fauna; - Introduction of occupational and community health risks; - Localised dust emissions from trenching and installation of equipment, emissions to air from vehicle fleets (exhaust emissions); and - Noise pollution from installation of equipment and generator sets, among others. <p><i>This standard aims at identifying all the probable E&S risks on the project and defining appropriate mitigation measures in order to minimise such risks.</i></p>
ESS2: Labour and Working Conditions	✓		<p>The project will have direct and contracted workers that will be engaged by project implementing entities as well as primary supply workers. The workers will be exposed to occupational health risks when undertaking construction, operation and maintenance activities.</p> <p>Additionally, other risks such as exploitation and unfair wages, electrocution, discrimination at work and exposure to Gender Based Violence (GBV), Sexual Harassment (SH), spread of HIV/AIDS and poor working conditions could impact</p>

			<p>on timely project delivery, lead to injury and even fatalities.</p> <p>Road accidents could also easily occur during project implementation.</p> <p><i>The project should ensure proper labour and working conditions during the construction, operation and decommissioning phases.</i></p>
ESS3: Resource Efficiency and Pollution Prevention and Management	✓		<p>Improper disposal of batteries at the end of their useful life and leachate that is generated in landfills when PV Solar panels are discarded, could cause pollution.</p> <p>The use of generator sets can also contribute to air pollution during operation.</p> <p>Erosion and sedimentation as well as pollution, can result from civil works on mini-grids, construction of powerhouses for storage of components, as well as erection of distribution network poles.</p> <p><i>The assessment of E&S risks related to the project should identify the potential of pollution of environmental media (air, water, soil) as a result of implementing project activities during the construction, operation and decommissioning phases.</i></p> <p><i>Additionally, the potential for project activities to over use natural resources such as water and energy should be considered.</i></p>
ESS4: Community Health and Safety	✓		<p>The project may introduce several health and safety risks to the community. These could be related to an increase in crime, prostitution, GBV, and sexual exploitation. Additionally, the project could contribute to other risks such as; electric shocks during installation and connections, noise, traffic related risks during transportation of personnel and items, etc.</p> <p><i>E&S risk assessment for all the project components should consider community health, safety and security aspects.</i></p>
ESS5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	✓		<p>Whereas the project is not expected to require significant land acquisition and resettlement, some activities under component 1 such as isolated grids development and densification along with their low-voltage distribution networks may require some private land.</p> <p><i>The project should aim at avoiding displacement of people. Where land take and displacement are</i></p>

			<i>inevitable for some project components as highlighted above, compliance with this standard must be sought to ensure compensation of affected individuals/communities. Additionally, impacts on assets and livelihoods must be considered.</i>
ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	✓		<p>Activities involving creation of a right of way and construction of mini-grids, will entail clearance of vegetation to set up project components. It is worth noting that the project will only use concrete distribution poles as opposed to treated wooden poles which would require cutting down a considerable number of trees.</p> <p>Distribution poles and electricity transmission lines, and reflection effect from solar panels, pose fatal risks to birds through collision and electrocution.</p> <p><i>Actions to enhance biodiversity conservation and protection of living natural resources should be considered by the project.</i></p>
ESS7: Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities	✓		<p>The majority of the people/ethnic groups in South Sudan meet the requirements of this standard.</p> <p><i>The needs and priorities of project host communities will be identified in the Stakeholder Engagement Plan. Additionally, the E&S risk assessment will identify impacts of the project on indigenous people.</i></p>
ESS8: Cultural Heritage	✓		<p>Excavation works could unearth materials of cultural importance. These could easily be destroyed if not appropriately managed</p> <p><i>The E&S risk assessment will identify if cultural heritage (tangible and intangible forms of culture) will be affected by the project.</i></p>
ESS9: Financial Intermediaries		✘	Financial Intermediaries will not be engaged on this Project.
ESS10: Stakeholder Engagement and Information Disclosure	✓		<p>Limited/ inadequate stakeholder engagements could lead to public opposition and hostility to the project</p> <p><i>A Stakeholder Engagement Framework (SEF) for informing the associated Stakeholder Engagement Plans (SEPs) for the respective sub-projects will be developed for the project. Stakeholder consultation will be undertaken throughout the project's lifespan.</i></p>

3.6 Detailed assessment of the World Bank ESSs that are applicable to the Project

ESS1: Assessment and Management of Environmental and Social Risks and Impacts

This standard sets out the client's responsibilities for assessing, managing and monitoring environmental and social risks and impacts associated with each stage of a project supported by the Bank through Investment Project Financing, in order to achieve environmental and social outcomes consistent with the Environmental and Social Standards. The environmental and social assessment will be based on literature review, field site visits and stakeholder consultations and any associated aspects at an appropriate level of detail sufficient to inform characterisation and identification of risks and impacts and mitigation measures. The assessment will evaluate the project's potential environmental and social risks and impacts including stakeholder engagement as an integral part of the assessment.

An assessment of the Environmental and social risks and impacts of the project throughout the project life cycle will be conducted in a systematic manner, proportionate to the nature and scale of the project and the potential risks and impacts.

ESS2: Labour and Working Conditions

This standard provides specific requirements on occupation health and safety, expanding upon the World Bank Group's Environmental, Health and Safety Guidelines. It introduces labour management procedures, emphasises non-discrimination and equal opportunity, provides for non-discrimination of workers. ESS2 recognises workers' organisations and requires a grievance mechanism for all project workers.

The project will develop a labour management plan and implement labour management procedures applicable to the project setting and ways in which project workers will be managed, in accordance with the requirements of national law and this ESS.

ESS3: Resource Efficiency and Pollution Prevention and Management

This standard recognises that economic activity and urbanisation often generate pollution to air, water and land, and consume finite resources that may threaten people and ecosystem services at the local, regional and global levels. The current and projected atmospheric concentration of greenhouse gases (GHG) threatens the welfare of current and future generations. This ESS sets out the requirements to address resource efficiency and pollution prevention and management throughout the project life cycle consistent with Good International Industry Practises.

The ESMF should include sections on resource efficiency and pollution prevention and management.

It is worth noting that the proposed project aims to comply with national environmental laws related to pollution, wastes, hazardous materials, resource use and greenhouse gas (GHG) emissions since its geared towards renewable energy.

ESS4: Community Health and Safety

This standard recognises that project activities, equipment and infrastructure can increase community exposure to risks and impacts. In addition, communities that are already subjected to impacts from climate change may also experience an acceleration or intensification of impacts due to project activities.

The project should address the health, safety, and security risks and impacts on project-affected communities with particular attention to people who, because of their particular circumstances, may be vulnerable like women and children.

ESS5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement

This standard recognises that project-related land acquisition and restrictions on land use can have adverse impacts on communities and persons. Project-related land acquisition or restrictions on land

use may cause physical displacement (relocation, loss of residential land) and/or economic displacement (loss of income/sources of livelihoods). Resettlement is considered involuntary when affected persons or communities do not have the right to refuse land acquisition or restrictions on land use that result in displacement. Physical and economic displacement, if unmitigated, may give rise to severe economic, social and environmental risks.

Involuntary resettlement should be avoided; however, where involuntary resettlement is unavoidable, appropriate measures to mitigate adverse impacts on displaced persons should be carefully planned and implemented (adequately compensated).

ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources

Protecting and conserving biodiversity and sustainably managing living natural resources are fundamental to sustainable development. Biodiversity often underpins ecosystem services valued by humans. This standard recognises the importance of maintaining core ecological functions of habitats, including forests, and the biodiversity they support. It also recognises the need to consider the livelihood of project-affected parties, including Indigenous Peoples, whose access to, or use of, biodiversity or living natural resources may be affected by a project. It includes requirements for legally protected, designated or regionally/internationally recognised areas of high biodiversity value. It includes also provisions on invasive alien species and requirements on animal husbandry and large-scale commercial farming.

Project planning should ensure that the project takes appropriate measures to minimise potential impacts on biodiversity since activities associated with the establishment of power grids and solar systems require site clearing that could impact negatively on the biodiversity. Additionally, all areas of conservation concerns such as forests and wetlands (Sudd wetlands) should be conserved during the development of the project.

ESS7: Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities

This standard recognises that Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities have identities and aspirations that are distinct from mainstream groups in national societies and often are disadvantaged by traditional models of development. In many instances, they are among the most economically marginalized and vulnerable segments of the population. Their economic, social, and legal status frequently limits their capacity to defend their rights to, and interests in, land, territories, and natural and cultural resources, and may restrict their ability to participate in and benefit from development projects. In many cases, they do not receive equitable access to project benefits, or benefits are not devised or delivered in a form that is culturally appropriate, and they may not always be adequately consulted about the design or implementation of projects that would profoundly affect their lives or communities. This ESS recognises that the roles of men and women in indigenous cultures are often different from those in the mainstream groups, and that women and children have frequently been marginalised both within their own communities and as a result of external developments, and may have specific needs.

The indigenous people of South Sudan should have equal access to project benefits.

ESS8: Cultural Heritage

This standard recognises that cultural heritage provides continuity in tangible and intangible forms between the past, present and future and tries to integrate this into project design, implementation and operation. People identify with cultural heritage as a reflection and expression of their constantly evolving values, beliefs, knowledge and traditions. Cultural heritage, in its many manifestations, is important as a source of valuable scientific and historical information, as an economic and social asset

for development, and as an integral part of people's cultural identity and practice. ESS8 thus sets out measures designed to protect cultural heritage throughout the project life cycle.

The implementation of the project should consider the potential impact on intangible cultural heritage and implement measures to safeguard them where they exist. Additionally, a project-specific cultural management plan and chance finds procedure⁴ should be developed.

ESS9: Financial Intermediaries

This standard recognises that strong domestic capital and financial markets and access to finance are important for economic development, growth and poverty reduction. The Bank is committed to supporting sustainable financial sector development and enhancing the role of domestic capital and financial markets.

This standard is not applicable to this project.

ESS10: Stakeholder Engagement and Information Disclosure

Open and transparent engagement between the Borrower and project stakeholders is an essential element of good international practice. Effective stakeholder engagement can improve the environmental and social sustainability of projects, enhance project acceptance, and make a significant contribution to successful project design and implementation. Stakeholder engagement is an inclusive process conducted throughout the project life cycle. Where properly designed and implemented, it supports the development of strong, constructive and responsive relationships that are important for successful management of a project's environmental and social risks.

Engage with stakeholders throughout the project life cycle and that appropriate project information is disclosed to stakeholders in a timely, understandable, accessible and appropriate manner. Additionally, develop and implement a Stakeholder Engagement Plan (SEP) proportionate to the nature and scale of the project and its potential risks and impacts.

⁴ See generic template of the CFP in Annexure IX

3.7 Gap Analysis between the National Regulations and ESSs

Table 3.7: An analysis between South Sudan Laws and the World Bank ESS

ESF Objectives	South Sudan Law Requirements	Gaps	Recommended Action
ESS 1: Assessment and Management of Environmental and Social Risks and Impacts			
<ul style="list-style-type: none"> Identify, assess, evaluate, and manage environment and social risks and impacts. Adopt a mitigation hierarchy. Adopt differentiated measures so that adverse impacts do not fall disproportionately on the disadvantaged or vulnerable. Utilise national environmental and social institutions, systems, laws, regulations and procedures where appropriate. Promote improved environmental and social performance, in ways which recognise and enhance Borrower capacity. 	<p>The South Sudan Draft Environmental and Protection Bill (2015) introduces the requirements for Environmental Impact Assessments, Environmental Audits, and Environmental Monitoring. Whereas the above requirements are in line with the requirements of ESS1,</p>	<p>The ESS1 has requirements for projects to undertake Cumulative impacts Assessment, Social and Conflict analysis and Strategic Environmental and Social Assessment (SESA) and associated facilities, that that are missing in the South Sudan Draft Environmental Protection Bill (2015)</p>	<p>The ESMF should outline the screening process of all projects and activities in order to assess the levels of assessments that are required on the project i.e. Strategic Environmental and Social Assessment (SESA). Environmental and Social Impact Assessments (ESIAs) or a less detailed form of environmental and social assessment such as Environmental and Social Management Plans (ESMPs).</p>
ESS 2: Labour and Working Conditions			
<ul style="list-style-type: none"> Promote safety and health at work. Promote the fair treatment, non-discrimination, and equal opportunity of project workers. Protect project workers, with emphasis on vulnerable workers. 	<p>The Labour Act, 2017: The purpose of this Act is to establish a legal framework for the minimum conditions of employment, labour relations, labour institutions, dispute resolution and provision for</p>	<p>South Sudan has no statutory minimum wage. The age of employment is 14 years. Enforcement of labour laws is minimal.</p>	<p>The project will implement all reasonable precautions to protect the health and safety of workers as outlined in the World Bank EHS guidelines. Preventive and protective measures should be introduced according to the hazard mitigation hierarchy.</p>

ESF Objectives	South Sudan Law Requirements	Gaps	Recommended Action
<ul style="list-style-type: none"> • Prevent the use of all forms of forced labour and child labour. • Support the principles of freedom of association and collective bargaining of project workers in a manner consistent with national law. • Provide project workers with accessible means to raise workplace concerns 	<p>health and safety at the workplace, in accordance with the Constitution of the Republic of South Sudan, 2011, and in conformity with international and regional obligations of South Sudan.</p>	<p>Significant amounts of unskilled jobs are filled by immigrant workers.</p> <p>Forced labour takes place, for example in recruitment into the national army.</p>	<p>EHS measures on the project should at a minimum include; aspects of the general facility design and operations, Communication and training, Physical hazards, Chemical hazards, Radiological Hazards, Personal Protective Equipment (PPE) and Monitoring.</p> <p>The project will comply with the Labour Act, but it will monitor wages paid.</p> <p>The minimum age of employment should be defined in the Labour Management Plan (LMP) as 18 years.</p> <p>The LMP should define a minimum wage based on a comprehensive benchmarking exercise that takes the prevailing local conditions into account.</p> <p>The Draft Decent work country programme that South Sudan has developed with the assistance of the International Labour Organisation (ILO) can be used to inform decent work procedures of the project.</p> <p>The project should not deploy project workers from outside the project host community at the expense of local, especially as pertains to semi-skilled and unskilled jobs.</p>

ESF Objectives	South Sudan Law Requirements	Gaps	Recommended Action
			The project should not allow any forced labour.
ESS 3: Resource Efficiency and Pollution Prevention and Management			
<ul style="list-style-type: none"> • Promote the sustainable use of resources including energy, water, and raw materials. • Avoid or minimize adverse impacts on human health and the environment caused by pollution from project activities. • Avoid or minimize project-related emissions of short and long-lived climate pollutants. • Avoid or minimize generation of hazardous and non-hazardous waste. • Minimise and manage the risks and impacts associated with pesticide use. 	<p>The Constitution of South Sudan provides that the people of South Sudan shall have a right to a clean and healthy environment, that every person shall have the obligation to protect the environment, and that future generations shall have the right to inherit an environment protected for the benefit of present and future generations. Specific measures to ensure the objectives above include: Prevention of pollution and ecological degradation; promotion of conservation; and securing of ecologically sustainable development and use of natural resources while promoting rational economic and social development so as to protect the bio-diversity of South Sudan.</p>	<p>There is need for an operational environment Act and associated resource efficiency and pollution preventions regulations that are currently missing. It is worth noting the government is in the process of fast tracking the Act so that it's passed into law.</p>	<p>The project should promote sustainable use of resources and avoid or minimise environmental pollution through the use of the World Bank ESF, as advised by the Undersecretary of the Ministry of Environment and Forestry.</p>
ESS 4: Community Health and Safety			
<ul style="list-style-type: none"> • Anticipate or avoid adverse impacts on the health and safety of project-affected communities during project 	<p>The Public Health Act (2008) for South Sudan emphasises the prevention of pollution of air and water and also encourages</p>	<p>ESS4 unlike the Public Health Act (2008), provides for the need to mitigate hazards related to the Structural Safety</p>	<p>Although the project aims to improve the lives of previously affected communities, it needs to ensure that project activities do not pose any</p>

ESF Objectives	South Sudan Law Requirements	Gaps	Recommended Action
<p>life-cycle from routine and non-routine circumstances.</p> <ul style="list-style-type: none"> Promote quality, safety, and climate change considerations in infrastructure design and construction, including dams. Avoid or minimize community exposure to project-related traffic and road safety risks, diseases and hazardous materials, and have in place effective measures to address emergency events. Ensure that safeguarding of personnel and property is carried out in a manner that avoids or minimizes risks to the project-affected communities. 	<p>improvement in sanitation. Key provisions include the protection of the sanitation of the environment and encompasses the measures to address the pollution of water and air.</p>	<p>of Project Infrastructure at the design stage among other measures, and thereafter, the need to include Road safety initiatives proportional to the scope and nature of project activities.</p>	<p>unintended negative consequences on communities.</p> <p>The project should develop road safety management plan and a Health and Safety Plan, and assess and manage specific risks and impacts outlined in the ESMF.</p> <p>The project should ensure that workers and the general public are not exposed to vector borne diseases, STDs and construction and operation related safety hazards.</p>
<p>ESS 5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement</p>			
<ul style="list-style-type: none"> Avoid or minimise involuntary resettlement by exploring project design alternatives. Avoid forced eviction. Mitigate unavoidable adverse impacts from land acquisition or restrictions on land use through timely compensation for loss of assets at replacement cost and assisting displaced persons in their 	<p>The Land Act of 2009 provides for fair and prompt compensation to any person whose right of occupancy, ownership or recognised long standing occupancy of customary use of land is revoked or otherwise interfered with by the Government.</p>	<p>There is no operational Land Policy to inform the existing law and as a result, the capacity of land management institutions has remained weak.</p>	<p>Involuntary resettlement should be avoided; however, where involuntary resettlement is unavoidable, appropriate measures to mitigate adverse impacts on displaced persons should be carefully planned and implemented (adequately compensated). It is important that the South Sudan Land Commission is engaged both and National and State</p>

ESF Objectives	South Sudan Law Requirements	Gaps	Recommended Action
<p>efforts to improve, or at least restore, livelihoods and living standards, in real terms, to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher.</p> <ul style="list-style-type: none"> • Improve living conditions of poor or vulnerable persons who are physically displaced, through provision of adequate housing, access to services and facilities, and security of tenure. • Ensure that resettlement activities are planned and implemented with appropriate disclosure of information, meaningful consultation, and informed participation. 			<p>level to resolve any project land related disputes that may arise.</p>
ESS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources			
<ul style="list-style-type: none"> • Protect and conserve biodiversity and habitats. • Apply the mitigation hierarchy and the precautionary approach in the design and implementation of projects that could have an impact on biodiversity. • Support livelihoods of local communities, including Indigenous 	<p>Forests and Renewable Natural Resources Act, 2002. This is another Act that is no longer legally binding but whose principles remain useful in guiding the management of forest resources in South Sudan. The 2002 Act attempts to follow a more holistic approach by providing a framework for the</p>	<p>No particular law for South Sudan</p>	<p>Development of isolated grid and densification and off-grid electrification through stand-alone solar systems may traverse sensitive ecosystems such as forests and swamps</p> <p>Activities that may cause any significant loss of biodiversity (critical habitat) will be excluded for financing.</p>

ESF Objectives	South Sudan Law Requirements	Gaps	Recommended Action
<p>Peoples, and inclusive economic development, through the adoption of practices that integrate conservation needs and development priorities</p>	<p>management and protection of forests and renewable natural resources, including pastures, rangelands and certain aspects of agricultural land use. The Act imposes a deterrent penalty, namely the confiscation of any property, including the means of transport used in the commission of the forest offence.</p>		<p>. An exclusion criterion will be developed at the design stage to ensure that project facilities are not sited in critical ecosystems/habitats.</p> <p>Additionally, Biodiversity Management Plans (BMPs) will be developed to aid the management and monitoring of biodiversity in the project areas.</p>
<p>ESS 7: Indigenous People/Sub-Saharan African Historically Underserved Traditional Local Communities</p>			
<ul style="list-style-type: none"> • Ensure that the development process fosters full respect for affected parties’ human rights, dignity, aspirations, identity, culture, and natural resource-based livelihoods. • Promote sustainable development benefits and opportunities in a manner that is accessible, culturally appropriate and inclusive. • Establish and maintain an ongoing relationship based on meaningful consultation with project-affected parties. • Obtain the Free, Prior, and Informed Consent (FPIC) of affected parties. 	<p>No particular law for South Sudan</p>	<p>No particular law for South Sudan</p>	<p>Despite the absence of a law, it’s important that the project interventions take into account historically marginalised groups such as the Toboza, Turkana and Buya, from Equatoria region; and the Murle, Anywaka, from Pibor area, in the Upper Nile region of South Sudan.</p>

ESF Objectives	South Sudan Law Requirements	Gaps	Recommended Action
<ul style="list-style-type: none"> Recognize, respect and preserve the culture, knowledge, and practices of Indigenous Peoples, and to provide them with an opportunity to adapt to changing conditions in a manner and in a timeframe acceptable to them. 			
ESS 8: Cultural Heritage			
<ul style="list-style-type: none"> Protect cultural heritage from the adverse impacts of project activities and support its preservation. Address cultural heritage as an integral aspect of sustainable development. Promote meaningful consultation with stakeholders regarding cultural heritage. Promote the equitable sharing of benefits from the use of cultural heritage. 	<p>The Constitution of South Sudan, Article 38 (1e) spells out to protect cultural heritage, monuments, and places of national historic or religious importance from destruction, desecration, unlawful removal or illegal export.</p>	<p>No gap</p>	<p>The specific requirements below should be considered by the project:</p> <p>The project should avoid impacts on cultural heritage. When avoidance of impacts is not possible, the measures to address impacts on cultural heritage should be identified and implemented in accordance with the mitigation hierarchy.</p> <p>A Cultural Heritage Management Plan should be developed.</p> <p>The project should implement globally recognised practices for field-based study, documentation and protection of cultural heritage in connection with the project, including by contractors and other third parties.</p> <p>The projects Chance Finds Procedure should be followed.</p>

ESF Objectives	South Sudan Law Requirements	Gaps	Recommended Action
			<p>Where necessary due to the potential risks and impacts of a project, the environmental and social assessment will involve the participation of cultural heritage experts.</p> <p>-Activities that may impact on known cultural heritage sites including sites that have significant important to local communities are not eligible for financing.</p>
ESS 9 – Financial Intermediaries			
<ul style="list-style-type: none"> • Promote good environmental and social management practices in the subprojects the FI finances. • Promote good environmental and sound human resources management within the FI. 	Not applicable	Not applicable	Not applicable
ESS 10: Stakeholder Engagement and Information Disclosure			
<ul style="list-style-type: none"> • Establish a systematic approach to stakeholder engagement that helps Borrowers identify stakeholders and maintain a constructive relationship with them. • Assess stakeholder interest and support for the project and enable 	The Constitution of South Sudan, Article 166 (6) expects local governments to involve communities in decision-making in the promotion of a safe and healthy environment.	No gap	The Project will implement stakeholder consultations throughout the lifetime of the project, as per the specific sub-project Stakeholder Engagement Plans.

ESF Objectives	South Sudan Law Requirements	Gaps	Recommended Action
<p>stakeholders' views to be taken into account in project design.</p> <ul style="list-style-type: none"> • Promote and provide means for effective and inclusive engagement with project-affected parties throughout the project life-cycle. • Ensure that appropriate project information is disclosed to stakeholders in a timely, understandable, accessible and appropriate manner. 			

4 REQUIRED ENVIRONMENTAL AND SOCIAL BASELINE OF PROJECT SITES

4.1 Physical Environment

This section provides a brief description of the project area focusing on the relevant physical environment features within South Sudan. The data presented here is primary data (i.e., from field observations and interviews) and secondary information, which has been sourced from available published and unpublished documents. It should be noted that detailed baseline information will be collected in the subsequent site specific ESIA/ESMP studies.

4.1.1 Geographical location of South Sudan

South Sudan, officially called the Republic of South Sudan (RoSS) is a landlocked country located in the tropical zone of Eastern Africa between 3N-13N and 24E-36E (Figure 5.1). It is bordered by Ethiopia to the east, Kenya to the southeast, Uganda to the south, the Democratic Republic of Congo (DRC) to the southwest, the Central African Republic (CAR) to the West, and Sudan to the North. The country is approximately 650,000 km² in size and is situated almost entirely in the Nile River Basin, receiving water from the highlands of CAR, DRC, Ethiopia, and Uganda. The country is comprised of ten (10) states; Northern Bahr el Ghazal, Western Bahr el Ghazal, Lakes, Warrap, Western Equatoria, Central Equatoria, Eastern Equatoria, Jonglei, Unity; and Upper Nile.

South Sudan is divided into three regions, which correspond to historical provinces dating back to when South Sudan was still part of Sudan. These regions are Bhar el Ghazal in the northwest, Equatoria in the south, and the Greater Upper Nile in the northeast. These regions have no formal administrative significance but still serve as an important spatial reference point for data and information that predates the founding of the country (South Sudan Ministry of Environment and Forestry, 2021).

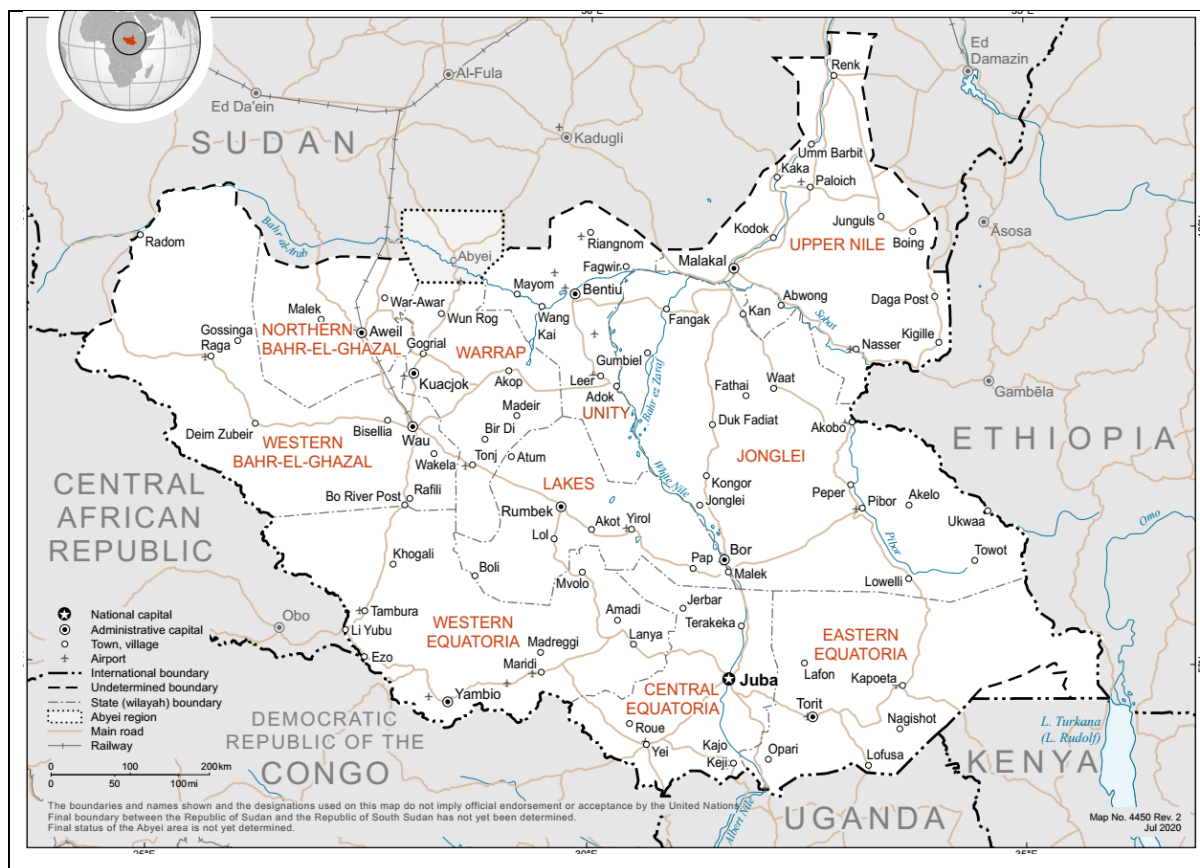


Figure 4.1: Location of South Sudan

4.1.2 Climate

Although South Sudan lies within the tropics, the climate ranges from arid in the north to tropical wet-and-dry in the far southwest. Temperatures do not vary greatly with the season at any location; the most significant climatic variables are rainfall and the length of the dry season. Variations in the length of the dry season depend on the two air flows (from the Arabian Peninsula and moist south-westerly winds from the Congo River Basin).

The climate of South Sudan is characteristically hot and dry with seasonal rains that are significantly influenced by the migration of the Inter-Tropical Convergence Zone (ITCZ). South Sudan has two distinct rainy seasons and high humidity (AfDB 2018). Annual rainfall ranges from 200 mm in the southeast (Eastern Equatoria) to 1,200–2,200 mm in the forest area of Western Equatoria and the highland areas (MoFA, 2018). The north-eastern part of the country is drier and in general, precipitation increases towards the southwest.

There lies a wetter/green belt zone in the southernmost part of the country near the border with the Democratic Republic of Congo (DRC) that includes Western, Central and Eastern Equatoria, which has bimodal rainfall regimes from April to June and from August to October, enabling two or three harvests a year. Annual rainfall in the green belt ranges from 800 mm to 2,500 mm. Rain in the rest of the country occurs between April and October. The heavy rains that fall in August and September cause the Nile River and its tributaries to flood, though many parts of the country are prone to flooding during the wet season, including the states of Jonglei, Unity, Upper Nile, Warrap and Northern Bahr el Ghazal, as well as parts of Western and Eastern Equatoria (MoFA, 2018).

Distinct differences in seasonal rainfall are apparent in a comparison between Malakal in the northern part of the country and Juba in the South. Overall, Juba receives more rainfall annually (953 mm) as opposed to Malakal (770 mm), which begins in March and ends in November. The dry season is particularly harsh in Malakal where on average, only one day with rainfall occurs each month. Approximately 99% of the rainfall in Malakal occurs during the 7-month wet season in comparison to 89 percent over this same period in Juba.

Temperatures in the country range from hot and dry in the southeast near the border with Kenya and northeast near the border with Sudan, to temperate in the southern highlands. Average temperatures range between 18°C and 45°C and do not vary greatly with the change in season. The hottest month is generally March; the coldest is August (MoFA, 2018). January to March is dry, hot and clear skies with temperatures between 40°C to 45°C which at times triggers conflicts over access to grazing lands; April to June heavy rains, light cloud cover, heavy westerly winds and temperatures between 36 and 39°C; July to September with heavy rains, floods and muddy lands that are often impassable, high humidity and temperatures between 30°C and 35°C and the 4th season is in October to December with light rains, clearer skies and temperatures of between 20°C and 30°C. In September, the dry north easterlies begin to strengthen and to push south and by the end of December they cover the entire country. The far south, however, with only a short dry season, has uniformly high temperatures throughout the year.

The meteorological data shows that temperatures in South Sudan are rising and the weather is becoming drier and it is likely that these changes are related to global climate change. Since the mid-1970s, average temperatures have increased by 1°C, while some regions have experienced temperature rises of up to 0.4°C per decade. Since the mid-1970s, South Sudan has experienced a decline of between 10 to 20 per cent in average precipitation as well as increased variability in the amount and timing of rainfall from year to year. There is also some evidence that the onset of rain now occurs one month later. If the trend continues, by 2025 it is likely that the drying experienced in the north-eastern regions of Upper Nile, Jonglei and Eastern Equatoria will extend across the country, potentially affecting Bahr el Ghazal, Tonj and Unity in the North and Central Equatoria in the South.

4.1.3 Landforms and Topography

South Sudan is rich in natural resources and has an abundance of fertile agricultural areas with abundant water, as the country is bisected by the White Nile River and the many plains and plateaus are drained by its several tributaries. South Sudan is divided into several ecological zones; the rainforest, savannah woodland, flood plains, swamp and semi-desert. Physiographically, South Sudan is predominated by expansive flood plains and the Sudd wetlands, associated with the river Nile and its tributaries. The major geographical features are the White Nile which dominates the centre of the country and forms the vast Sudd Wetland/Swamp, one of the largest wetlands in the world. The Ironstone Plateau rises between the Nile and Congo watersheds and is characterised by numerous inselbergs. In the southern part of the country are the Imatong Mountains, rising to a height of 3,187m at Mount Kinyeti, the highest point in South Sudan. The southwestern part of the country has denser vegetation due to higher rainfall with tropical rainforest type of conditions.

4.1.4 Soils

The country's soils can be divided geographically into two categories. These are the clay soils of the central region, and the laterite soils of the south. Less extensive and widely separated, but of major economic importance, the third group consists of alluvial soils found along the lower reaches of the White Nile and Blue Nile rivers. Agriculturally, the most important soils are the clays in central South known as cracking soils because of the practice of allowing them to dry out and crack during the dry months to restore their permeability; they are used for irrigated cultivation.

4.1.5 Hydrology

The Nile and its main tributary, the White Nile (Al Bahr ElAbyad), drain South Sudan. The longest river in the world, the Nile flows for 6,737 kilometres from its furthest headwaters in central Africa to the Mediterranean and for centuries the river has been the lifeline for South Sudan. The White Nile flows north from central Africa, draining Lake Victoria and the highland regions of Uganda, Rwanda, and Burundi. At Bor, the great swamp of the Nile, known as Sudd begins. The river has no well-defined channel here; the water flows slowly through a labyrinth of small spillways and lakes choked with papyrus and reeds. Although the drainage area is extensive, evaporation takes most of the water from the slow moving 38 streams in this region, and the discharge of the Bahr al Ghazal into the White Nile is minimal. In the southeast, the Sobat River drains an area of western Ethiopia and the hills near the Sudan-Uganda border. The Sobat's discharge is considerable; at its confluence with the White Nile just south of Malakal, the Sobat accounts for half the White Nile's water.

South Sudan's water resources are unevenly distributed both spatially across the country, and temporally, since water quantities vary substantially between years depending on periodic major flood and drought events. The Nile River hydrological basin covers most of the country. Water is held in perennial rivers, lakes and wetland areas, in seasonal pools, ponds, rivers, streams and extensive floodplains. Water demand is still low given the country's relatively small population, density and the lack of industrial development but it is expected to increase rapidly in the future with projected population growth and economic development (South Sudan Ministry of Agriculture and Food Security (2018)).

4.1.6 Natural hazards and disasters

Natural hazards can be categorised as: geophysical (including earthquakes, volcanos, landslides, avalanches, tsunamis etc.); meteorological (such as storms, cyclones, hurricanes, typhoons, blizzards, etc.); hydrological (that include floods, storm surges, flush floods, etc.); climatic (including droughts, extreme temperatures, wildfires, etc.); and biological (epidemics, infestations, etc.). In South Sudan key hazards include; extreme weather conditions especially droughts, torrential rains and seasonal flooding which sometimes lead to other hazards such as disease outbreaks, pest infestation, etc.

4.2 Biological Environment

South Sudan has a variety of species and ecosystems that constitute the country's biological environment. A description of some of the key aspects of the country's biological environment is highlighted in the sections below (4.2.1-4.2.3). Additionally, Figure 4.2 provides an indication of the location of some of the country's sensitive ecosystems.

4.2.1 Vegetation

South Sudan is mostly covered with natural and semi-natural vegetation with variable tree density. Vegetation cover is mostly high in the southwest, with thick tropical forests in the Greater Equatoria region, and low in the southeast and north, where semi-arid savannah dominates. Grasslands, aquatic vegetation and open water occupy the wetter regions.

4.2.2 Fauna

South Sudan harbours an immense diversity of fauna species within and outside her protected areas. Some of the endemic fauna species in the country include: the Nile lechwe, Hoogstral's Striped Grass Mouse, Nile Sitatunga and a recently discovered African climbing mouse (*Dendromus ruppi*). Other notable species in the country include: white-eared Kob, Elephants, Giraffes, common Eland, giant Eland, Oryx, Lions, wild Dogs, Buffalo, and Topi (locally called Tiang), Nile crocodile among others. Most of these species are threatened by hunting pressure and habitat loss.

4.2.3 Sensitive habitats

The Sudd Swamp

This is among the world's largest tropical wetlands encompassing 5,700,000 hectares. It is a wetland of international significance (Site number 1622) under the Ramsar convention. The wetland is composed of various ecosystems, from open water and submerged vegetation to floating fringe vegetation, seasonally inundated woodland, rain-fed and river-fed grasslands, and floodplain scrubland. It is an important wintering ground for birds such as *Pelecanus onocrotalus*, *Balearica pavonina*, *Ciconia ciconia* and *Chlidonias nigra*, and home to some endemic fish, 400 bird species, 100 mammal species, 100 fish species and plant species. The swamp is threatened by oil exploration (*it contains South Sudan's largest oil reserves*).

The South Sudan Energy Access Project does not have components of the project occurring in the Sudd swamp and an exclusion criterion will be developed at the design stage to ensure that project facilities and associated facilities are not sited in critical ecosystems/habitats. This is due to project facilities and associated facilities that may cause long term, permanent and/or irreversible loss of natural habitats including habitats of wildlife and fisheries are not eligible for financing.

National Parks, Wildlife and Forest Reserves

South Sudan has six national parks that cover an estimated area of 51,760 Km², thirteen game reserves that cover an estimated area of 34,110 Km² and forest reserves which cover an estimated area of 1,160 Km². These protected areas cover more than 13% of the country's terrain/land surface. South Sudan is home to the world's second largest animal migration⁵ after the great Serengeti-Masai Mara wildebeest migration. Threats facing protected areas include; wildlife poaching and trafficking, deforestation, encroachment by human settlements, livestock expansion, oil development, mining, and climate change impacts. An exclusion criterion will be developed at the design stage to ensure that project facilities and associated facilities are not sited in the protected areas (national parks, wildlife and forest reserves).

⁵ The Wildlife Conservation Society (WCS) has estimated the migration to consist of 1.3 million Antelopes.

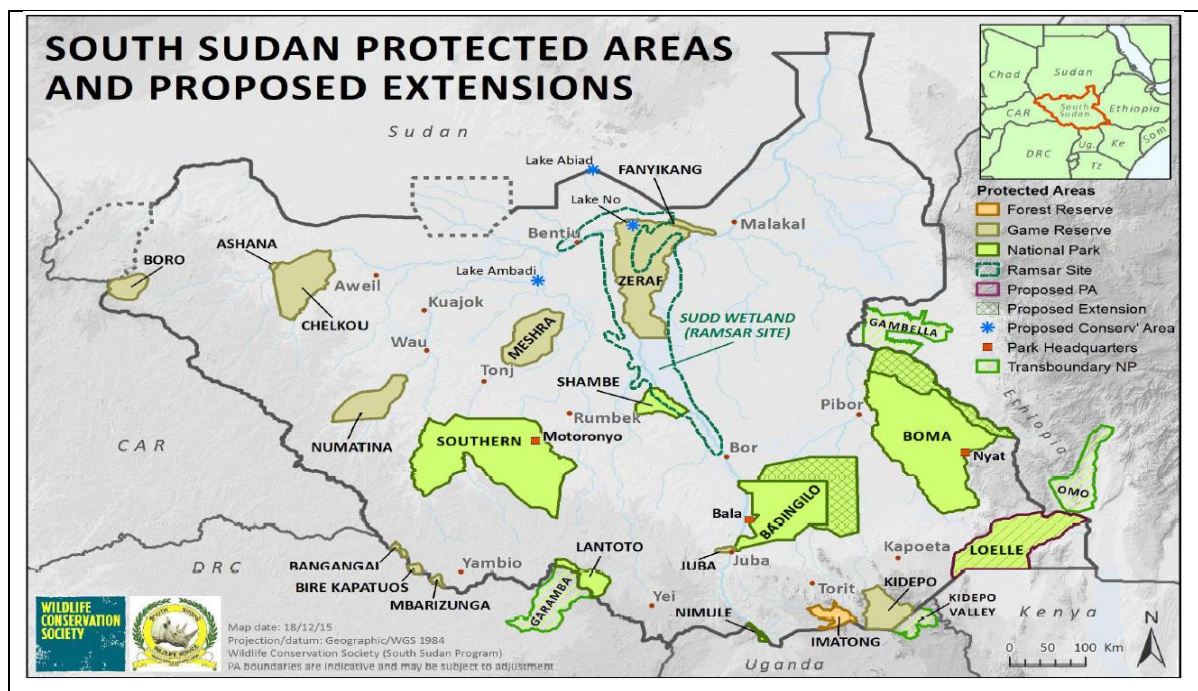


Figure 4.2: Location of South Sudan's protected areas (Source: South Sudan Fifth National Report to the Convention on Biological Diversity)

4.3 Socioeconomic

4.3.1 Population and economy

As of 1st January 2022, the population of South Sudan was estimated to be 12,054,642 people. This is an increase of 4.08 % (472,438 people) compared to the population of 11,582,204 the year before. In 2021 the natural increase was positive, as the number of births exceeded the number of deaths by 293,493. Due to external migration, the population increased by 178,945. The sex ratio of the total population was 1.015 (1,015 males per 1,000 females) which is lower than the global sex ratio. The global sex ratio in the world was approximately 1,016 males to 1,000 females as of 2021.

South Sudan's population density is 19.5 people per square kilometre (50.4/mi²) as of October 2022. The density of the population is calculated as the permanently settled population of South Sudan divided by the total area of the country. The total area is the sum of land and water areas within the international boundaries of South Sudan. The total area of South Sudan is 619,745 km² (239,285 mi²) according to the United Nations Statistics Division. The child dependency ratio for South Sudan is 89.3 %. The total life expectancy (both sexes) at birth in South Sudan is 55.1 years.⁶

4.3.2 Poverty and vulnerability (including situation of IDPs and refugees when applicable)

In 2009, slightly over half (51%) of South Sudan's population was living below the poverty line. 55% and 24% of the rural and urban populations, respectively, were living below the poverty line. Over 60% of the population in the former Northern Bahr el Ghazal, Unity and the Warrap States were living below the national poverty line compared to 25.7% in Upper Nile, 42.1% in Western Equatoria, and 43.2% in Western Bahr el Ghazal. While poverty levels were reduced to 47% in 2011, they reached 57% in 2014 and 2015. In 2015, 68% of the population was estimated to be living below the

⁶ https://countrymeters.info/en/South_Sudan#population_2022 (accessed on 14th October 2022)

poverty line. In the same year, the poorest households had up to 7.2 members, representing a higher dependency ratio compared to 4.9 household members in the richest households (*Global Initiative on Out of School Children, South Sudan Country Study (May 2018)*).

Recurring and unresolved conflict leading to displacement and the disruption of stable livelihoods, waves of food insecurity, and an almost undiversified economy have driven up poverty levels. Urban poverty rose by 20 percentage points from 49% in 2015 to 70% in 2016; three out of four households headed by females were living below the international poverty line and consuming 41% less than the international poverty line.

Poverty is more prevalent among female-headed households at 83%, compared to 73% for male-headed households. Women are also less likely than men to be employed as wage and salaried workers (38% vs 46%). In addition, with very limited or no access to livelihood or productive assets and control over household income, women face higher levels of intimate partner violence and marginalisation.

South Sudan has Africa's biggest and the world's third-largest refugee crisis. Since the outbreak of the South Sudanese War in 2013, almost four million South Sudanese have been displaced. As of September 2021, there were 1.7 million internally⁷ displaced persons in South Sudan. The states of Warrap, Jonglei, Central Equatoria, and Upper Nile accounted for over two hundred thousand displaced persons. Over two million South Sudanese sought safety in neighbouring Uganda, Kenya, Ethiopia, Sudan, and the Democratic Republic of the Congo⁸.

A total of 125,000 IDPs are sheltering in the two remaining Protection of Civilians sites. The spike in subnational violence and floods triggered new displacements in 2020. More than 16,000 South Sudanese fled the country and sought refuge mainly in Uganda, Sudan and Ethiopia in the first quarter of 2020. Refugee host countries include; Uganda (40.7 percent), Sudan (34.6 percent), Ethiopia (16.5 percent), Kenya (5.8 percent), and DRC (2.5 percent). South Sudan is host to over 316,000 refugees of whom 93 percent are from Sudan⁹.

4.3.3. Land uses and livelihoods

South Sudan's total land area is 619,745 square kilometers of which more than half is estimated to be suitable for agriculture although only 5% is currently utilized for that purpose. In addition, South Sudan has the second-largest wetland in Africa and the largest intact savanna ecosystem in East Africa. Natural forests and woodlands cover 29% of the total land area. Based on a number of studies from 1973 to 2007, the average annual rate of deforestation was approximately two percent. There are currently six national parks and 13 game reserves in South Sudan, covering 11% of the land area (90,755 square kilometers).

Approximately 78% of all households earn their livelihood from farming, pastoralism, or a mix of both. Farming is predominantly rainfed, and farmers cultivate their small plots with handheld tools. Some common agricultural products include pineapple, cotton, groundnuts, sorghum, millet, wheat, cotton, sweet potatoes, mangoes, pawpaw, sugarcane, cassava and sesame. Pastoralists hold approximately 8 million cattle. Additionally, there are millions of poultry, goats, pigs, horses, donkeys and sheep. Sedentary farming is on the rise in South Sudan, which has reduced the amount of grazing land available for pastoralists¹⁰.

⁷ Internally displaced persons are people who are forced to leave their houses but remain within their country's borders

⁸ <https://www.statista.com/statistics/1272567/number-of-internally-displaced-persons-in-south-sudan-by-state/> (accessed on 14th October 2022)

⁹ Global Initiative on Out School Children – Mya 2018

¹⁰ <https://www.land-links.org/country-profile/south-sudan/#key-issues> (accessed on 14th October 2022)

4.3.4. Access to public services (electricity, communication, transport, health facilities, water and sanitation)

Water and sanitation

Fifty percent (50%) of the population of South Sudan has access to basic drinking water sources, however, 30 to 50% of water facilities are non-functional at any point in time due to a lack of spare part supply chains, weak Water Sanitation and Hygiene (WASH) infrastructure maintenance capacity, poor overall WASH management practices, and/or inappropriate choice of technology. Thus, the actual level of access to an improved water source in rural areas is estimated to be only 34%, and this affects most of the country as over 80% live in rural areas, as well as 90% of those living in poverty. Only 2.2% of households have water on their premises with a twentyfold difference between the urban (9.3%) and rural (0.4%) population, while 34% travel more than 30 minutes to collect water. The laborious daily task of obtaining water is overwhelmingly completed by women. Adult women are most commonly the water carriers (85.6%), but female children under age 15 are also significant collectors (8.8%).

Education

South Sudan's General Education Act, 2012, articulates the three levels that comprise the country's Formal Education System, including pre-school, primary education, and secondary education. Pre-school involves two years of study and targets three- to five-year-old children. The primary education cycle is eight years, with the official entrance age set at six years old. Following completion of eight years of schooling, students sit for the primary school leaving certificate examinations, which are administered by the Ministry of General Education and Instruction (MoGEI) in coordination with the state Minister of Education. The secondary education cycle is comprised of four years in general education schools or technical and vocational education and training (TVET) centres, which award craft and artisan diplomas after the programs. Tertiary education in South Sudan includes; university programmes which lead to either a diploma, bachelor's degree, or master's degree or teacher training institute (TTI) programmes, which culminate in a teacher training certificate.

South Sudan has some of the lowest literacy rates in sub-Saharan Africa and the lowest in the geographical regions of East and Central Africa. In 2009, the literacy rate for 15-year-olds and above was 27%, almost 40 percentage points below the sub-Saharan Africa average (64%) and those between 15 and 24 years old fared slightly better with a 40% literacy rate, although clear disparities exist between rural (34.6%) and urban (65%) areas. South Sudan has the lowest proportion of female students enrolled in primary school and the second lowest in secondary school. Girls are grossly under-represented in South Sudan's education system.

Health facilities

Health services in Southern Sudan remained extremely weak during and after the war, causing the health status of the population to plummet to one of the poorest globally, the maternal mortality ratio is estimated at 2,037/100,000, the infant mortality rate at 150/1,000, the child mortality rate at 250/1,000, and the fertility rate at 6.7. Diseases and other aspects of maternal and child health are particular problems. Problems like high fertility, sexual violence, malaria, and poor coverage of skilled delivery care are detrimental to maternal health. Diarrheal and respiratory infections as well as vaccine-preventable diseases account for high levels of child morbidity and mortality¹¹.

South Sudan has some of the worst health indicators in the world. Although the under-five child mortality rate, which represents the probability of a child dying before five years of age, has declined significantly over the past decade, it still stood at 91 per 1,000 live births in 2016. The infant mortality rate or the number of deaths of children under one year old per 1,000 live births has also dropped in

¹¹ Global Initiative on Out of School Children – May 2018

the past decade but remains far above the global infant mortality rate of 30.5 (2016) at 59 per 1,000 live births in 2016. Maternal mortality rates are the fifth highest in the world, with complications during pregnancy and childbirth as the leading causes of death for women in South Sudan.

Electricity

Since attaining independence, South Sudan has struggled to shed off a myriad of problems from internal conflict, flash flooding, and widespread food insecurity in the country. Despite a long-lasting cessation of political conflict, South Sudan government signed a Memorandum of Understanding with Ethiopia for the purchase of 100 MW of electricity. Ethiopia and South Sudan will construct a 357 km, 230 kV transmission line that will connect Ethiopia's Gambella region to South Sudan's Malakal region. There are also plans to construct another 700 km line from Ethiopia's Tepi distribution centre to South Sudan's capital city, Juba.

The country's total installed power capacity is approximately 109 MW, all from thermal sources, of which around 76.5 MW is operational but only around 34.5 MW is available to the general public and 52 MW in the oil field. Juba has the only functional grid in the country. The city has a significant number of potential users, primarily households that are not yet connected to the grid. While Juba already has approximately 30,000 customers connected to the grid, JETCO estimates that there are such investment to connect more customers to the Juba grid also helps address the risk of oversupply in the Juba grid, which has 40 MW of solar capacity under construction and a solar IPP in the pipeline, in addition to the existing 33 MW thermal capacity, against recent peak demand of around 20 MW. In parallel, options to lower the retail tariff in the Juba grid will also be explored.

Additional 16,000 connections (for densification out of which 10,000 will be connected from existing idle 24 transformers), network strengthening (intensification) for up to additional 15,000 connections. According to the study carried out by SMEC (financed by the AfDB), 155kms of MV lines (172kms already exist), 890kms of LV lines (424.48kms already exist), and 462 distribution transformers (350 trafos already exist).

Grid customers in Juba pay an average tariff of US\$42 per kWh, which is among the highest in Sub-Saharan Africa. Even the lifeline segment of the tariff for residential customers consuming under 100 kWh per month is priced at US\$31.6 per kWh. This is exceptionally expensive compared to the regional peers (US\$3.6 per kWh in Ethiopia and US\$13 per kWh in Uganda in 2018).

Approximately 750,000 people, or 7% of the national population in South Sudan, are estimated to live in these cities. A geospatial analysis carried out identified these cities as strong candidates with significant concentration of potential electricity demand to be supplied with mini-grids in a cost-effective manner. These cities host critical public infrastructure, including hospitals, primary and secondary schools, and public buildings, as well as key economic hubs such as agricultural markets. Additional sites outside the regional capitals can also be considered if significant demand is identified.

Communication

Assessment findings show that the channels of communications available in South Sudan widely vary depending on the geographic areas where displaced people and hard-to-reach communities are located, due to uneven coverage of phone networks, internet, and FM radio infrastructure. In both displacement sites and hard-to-reach areas, direct communication in person is still the most widely used communication channel. Among those who primarily receive information in person or on the phone, friends and relatives were most frequently the primary sources of information.

While the telecommunications infrastructure of South Sudan is among the least developed in the world and the lack of phone network was cited as a major barrier to news and information access; surveyed IDPs and communities in hard-to-reach areas mostly cited barriers to news and information access that are rather contingent on social factors, such as language barriers, lack of trust and illiteracy. When it comes to more traditional forms of communication, a wide range of channels are

still used by communities in remote areas, including cattle horn blowing, drum beating, smoke signals, traditional dances and sending runners to neighbouring villages. However, reliance on these traditional forms of communication is declining due to continued displacement and the increasing penetration of devices that allow for timely sharing of information across longer distances¹².

Mobile networks in South Sudan are limited to major towns (about 20 percent of the country), cutting out the population of remote areas. Mobile coverage was much higher before the conflict, but the ensuing war led to the switch of telecom masts. The World Bank estimates that mobile cellular subscription in South Sudan has dropped from 22 percent in 2016 to only 12 percent in 2017.

At only 12 percent, also the Internet penetration rate of South Sudan remains low compared to other countries in the eastern Africa region. Although there has been seemingly a growth in the popularity of Internet services in the country, the continued conflict and low investments in telecommunication infrastructure have affected their expansion. Open-source data indicate that 2.2 million of the country's population are connected to the Internet, accounting for only 17 percent of the country's population estimated at 12.5 million¹³.

Transport

South Sudan has an estimated road network of 12,642 km; consisting of 7,369 km of Interstate roads, 1,451 km of State primary roads and 3,822 km of State secondary roads. South Sudan's road infrastructure was largely destroyed or left in disrepair during the protracted civil wars. After the signing of the Comprehensive Peace Agreement (CPA) in 2005, significant construction and rehabilitation projects were initiated and implemented including the Emergency Road Repair Program (ERRP) and Sudan Emergency Transport Infrastructure Development Project (SETIDP). The main objective of these projects was to restore and maintain basic links between major towns and regions in the country. As a result, around 5,000 km of trunk roads were constructed/rehabilitated to all-weather gravel roads standard.

Transport costs in the country are high, freight tariffs on trunk roads reach \$0.20 per ton km, roughly three and four times the average tariff of Eastern Africa and Southern African countries respectively. The poor infrastructure in the country also increases travel times, this coupled with a significant reduction of loads on several trucks for safety reasons substantially raises the transport costs per ton in South Sudan.

Heavy rains, increased levels of traffic, overloaded trucks and inadequate maintenance have often led to the deterioration of the rehabilitated roads in the country. As a result, only 40% of these improved trunk roads are in a good condition, the remaining 60% are deemed to be in a fair condition. The only paved roads are the Juba-Nimule link to Uganda (193 km), which is under construction to a Double Bituminous Surface Treatment (DBST) standard, the 65 km of urban roads that were recently rehabilitated or upgraded in Juba and a few sections of urban roads in Wau and Malakal. The remaining gravel roads, earth roads and tracks are in a state of disrepair with the majority being impassable during the rainy season¹⁴.

4.3.5. Gender and SEA/SH

Sixty five percent (65%) of women and girls have experienced physical and/or sexual violence in their lifetime, and some 51 % have suffered intimate partner violence. In addition, approximately one in three women has experienced sexual violence from a non-partner, often occurring during raids,

¹²<https://www.reach-initiative.org/what-we-do/news/south-sudan-challenges-and-opportunities-for-communication-with-disaster-affected-communities/> (accessed on 14th October 2022)

¹³ <https://medialandscapes.org/country/south-sudan/telecommunications/mobile-coverage>

¹⁴ South Sudan: An Infrastructure Action Plan; <https://pdfslide.net/documents/transport-infrastructure-and-services-transport-infrastructure-and-services.html?page=1> (accessed on 14th October 2022)

displacement, or abductions perpetrated by one ethnic tribe against another. Nearly 4 million people are displaced, including over 1.6 million who are internally displaced and 2.2 million who are living as refugees in neighbouring countries (Global Initiative on Out of School Children – May 2018).

4.3.6. Cultural heritage

Historically, the area that is now South Sudan was dominated by Central Sudanic-speaking ethnic groups. The Nilotic peoples dominated the occupation of South Sudan as early as 3000 BC. Their expansion began around the 14th century following the collapse of major Christian Nubian kingdoms in what is now Sudan. Prior to the expansion of Egypt into southern Sudan in the 19th century, there were many different types of polities in southern Sudan. They consisted of highly structured kingdoms, such as the Shilluk and Azande, which constituted powerful regional forces in the pre-colonial Horn of Africa and Central Africa.

There is no accurate demographic data on minorities and indigenous groups in South Sudan. In 2008, the census was rejected by the then governing semi-autonomous Government of Southern Sudan and a post-independence census has not been undertaken since 2011. With ethnic groups speaking more than 70 associated languages, there is substantial diversity in South Sudan. The main languages are English (official), Juba Arabic (lingua franca), diverse dialects of Nilotic, Nilo-Hamitic and Sudanic languages, including Dinka, Azande, Nuer and Shilluk. The main religions include Christianity, indigenous beliefs, and Islam. The largest linguistic groups define the Western Nilotes – Anuak, Dinka, Murle, Nuer, and Shilluk. They traditionally come from the Northern and Eastern areas of South Sudan, as well as from parts of South Kordofan, White Nile in Sudan and the Gambella region of Ethiopia. Further south in Equatoria, indigenous groups such as the Azande, Bari, Latuka, Madi, Moru, Taposa and Turkana can be found. They constitute a mixture of Sudanic, Eastern Nilotes, and other groups.

5 PROCEDURE OF THE ESMF

5.1 Overview of the Environmental Screening and Impact Assessment Process

The ESMF is designed to support application of the World Bank's ESS in combination with applicable South Sudan legislation related to environmental management and conservation. The World Bank's ESS1 stipulates that it is the responsibility of the borrower to screen, assess, manage and monitor Environmental and Social risks and impacts related to projects. The standard further indicates that the borrower should ensure compliance with national regulations and laws to screen and assess environmental and social risks and impacts.

The prime legislation for environmental and social assessment in South Sudan is the Draft South Sudan Environmental Protection Bill (2015). The Bill introduces requirements for Environmental Impact Assessments, Environmental Audits and Environmental Monitoring for projects. It is expected that requirements in the Bill will be followed and be augmented by the more stringent World Bank Environmental and Social Framework (ESF) requirements, during the implementation of project activities. The steps indicated below will be used to screen the subprojects under components 1, 2 and 3 of the projects.

The World Bank's Environmental and Social Framework provides a risk classification of projects into one of the four categories indicated and defined below:

- a) **High Risk:** Project has significant adverse or long term Environmental and or social risks and impacts that are diverse, irreversible, or unprecedented. These may require more specialised or financial means to manage them which the borrower may not have.
- b) **Substantial Risk:** Project has potential limited adverse environmental or social risks and/or impacts that are few in number, generally site specific, largely reversible, and readily addressed through mitigation measures.
- c) **Moderate Risk:** Project has minimal adverse environmental or social risks and/or impacts.
- d) **Low Risk:** Project has no adverse environmental and social risks and impacts.

The PIU will ensure that the environmental and social assessment of subprojects takes into account in an appropriate manner all issues relevant to the project, including:

- The country's applicable policy framework, national laws and regulations, and institutional capabilities (including implementation) relating to environment and social issues; variations in country conditions and project context; and obligations of the country directly applicable to the project under relevant international treaties and agreements;
- Applicable requirements under the ESSs (1,2-8 and 10); and
- *The Environment, Health and Safety Guidelines (EHSs) of the World Bank, and other relevant Good International Industry Practice (GIIP). EHSs that are applicable to the project include those related to the following aspects: (Air emissions and Ambient Air Quality, Energy Conservation, Wastewater and Ambient Water Quality, Water Conservation, Hazardous Materials Management, Waste Management, Noise Management etc). Moreover, the World Bank Group Environmental, Health, and Safety Guidelines for Electric Power Transmission and Distribution will be directly utilized.*

The environmental and social assessment will apply a mitigation hierarchy which will:

- a) Anticipate and avoid risks and impacts;
- b) Where avoidance is not possible, minimize or reduce risks and impacts to acceptable levels;
- c) Once risks and impacts have been minimised or reduced, mitigate; and

- d) Where significant residual impacts remain, compensate for or offset them, where technically and financially feasible.

The environmental and social assessment will also identify and assess, to the extent appropriate, the potential environmental and social risks and impacts of Associated Facilities¹⁵. There are associated facilities, which are associated with this project will include, the existing thermal power plant, the grid network that was established by the AfDB within Juba and the solar plant whose power is to be connected to the existing grid network.

5.2 The Screening Process

5.2.1 Step 1: Scoping/Screening

The screening process determines the level of environmental and social assessments (E&S) that is required for a given project. It is the first step to determine the environmental and social aspects of sub-projects so as to ascertain the type of environmental and social assessment required in accordance with ESS1 and consistent with the ESSs. The objectives of screening are to:

- i. Briefly identify the environmental and social risks and impacts of a subproject;
- ii. Determine the type/s of mitigation measures;
- iii. Specific plan(s) or safeguard instrument(s) to be prepared based on the outcomes of the screening; and
- iv. Identify eligible or ineligible project activities for further or no environmental and social assessment, respectively. This is done by analysing the proposed activities in relation to their environmental & social context using a checklist approach. An Environmental and Social Screening form is provided in Annexure II.

According to the current screening, the project falls under the **High risk** category since it will entail various potential environment, health and safety risks that can result from the construction and operation of the off-grid and mini-grid products and materials as well as associated civil works. Additionally, the High-risk rating of the project is further compounded by the fact that the institutional capacity on the project is constrained by personnel and equipment inadequacies.

The environmental and social categories that apply to the subproject components, will be deduced from the screening of environmental and social impacts, which takes place during the pre-appraisal of the investments. Environmental and social screening will be undertaken to ascertain the level of environmental and social impact studies and the details that will be considered/required in the project's environmental and social report.

It is anticipated that some of the South Sudan Energy Access project subprojects may have substantial, moderate or low potential environmental and social risks. For avoiding significant environmental and social risks at the planning stage, the following criteria would be under consideration to exclude subprojects from financing by Component 1, 2, and 3. These are:

- ❖ Construction of mini and off grid project components in environmentally sensitive areas such as National Parks, fragile ecosystems, and wildlife reserves;
- ❖ Subprojects causing significant conversion or degradation of critical cultural heritage sites and critical natural habitats including habitats of wildlife and fisheries.
- ❖ Activities that may cause any significant loss of biodiversity.

¹⁵ Associated Facilities" means facilities or activities that are not funded as part of the project and, in the judgment of the Bank, are: (a) directly and significantly related to the project; and (b) carried out, or planned to be carried out, contemporaneously with the project; and (c) necessary for the project to be viable and would not have been constructed, expanded or conducted if the project did not exist.

- ❖ Activities that involve removal or conversion of forests and other natural resources, including
- ❖ the quality or quantity of water or a waterway shared with other nations.
- ❖ Activities that involve land use changes such as drainage of wetlands and cultivation.
- ❖ Activities that involve in area of improper disposal of hazardous and non-hazardous waste.
- ❖ Activities that involve in areas prone to high natural disaster risks.
- ❖ Activities that have a high probability of causing serious adverse effects to human health and/or the environment.
- ❖ Activities that would disproportionately affect the historically underserved and vulnerable groups.
- ❖ Activities that may have significant adverse social impacts and/or may give rise to significant social conflict;
- ❖ Land acquisition and/or resettlement of a scale or nature that will have significant adverse impacts on affected people, or the use of forced evictions; and
- ❖ Activities that involve the use of forced or child labour.

The environmental and social screening will occur during the early planning of the South Sudan Energy Access project subprojects, as soon as the likely site locations and designs are known for the sub-projects. The screening form will be completed by the project E&S specialists in conjunction with technical staff who will be trained in the use of the checklist and fundamentals of what could constitute environmental and social risk.

5.2.2 Step 2: Assigning of Environmental and Social Risk Classification

Assigning of appropriate environmental and social risk classification to a sub-project activity shall be based on information obtained by completing the environmental and social screening form (Annexure II). The PIU E&S specialists shall undertake the environmental and social screening process and assign the appropriate risk classification for the subproject (s) – Low, Moderate, Substantial or High. The classification should be assigned based on the criteria provided in Annexure III. It is noted that subproject screening as high risk subproject should be excluded. Guidance for subproject risk categorization. Even though the South Sudan Environmental Protection Bill (2015) allows for some screening decision to be made based on a Project brief document (i.e., a document supposed to be equivalent with an E&S screening report), it is still at draft stage and has not been enacted by the legislative body of the South Sudan to become a binding law. Thus, the project will adhere to the World Bank guidance for subproject risk classification in the absence of a legally binding national system.

5.2.3 Step 3: Environmental and Social Assessment

Upon review and approval of the screening report and risk rating, the PIU will consult with the World Bank and decide on the type of additional E&S instrument to be undertaken. This is likely to be an Environmental and Social Impact Assessment (ESIA) for high and substantial risk or an Environmental and Social Management Plan (ESMP) for moderate or low risk (if any). The ESIA Study will entail a systematic investigation of all risks and impact areas as identified in the screening report. For High and Substantial risk subprojects, the environmental assessment will have to fulfil ESS 1 requirements elaborated under section 5 above. Again, the South Sudan draft Environmental Protection Bill (2015) allows for decisions to be made on the level of environmental assessment to be made based on the Project brief document (i.e., a document likely to be equivalent with an E&S screening report). Such decisions would have involved whether the subproject will need to further prepare an ESIA or a preliminary environmental assessment to provide more information to determine a screening decision. However, the draft environmental protection bill is still at draft stage and hasn't been enacted by the legislative body to become a national binding law. In this case, subprojects having moderate E&S risk category will have to follow only the World Bank procedures for determining the type of instruments to be prepared.

5.2.4 Step 4: Review and Approval

The E&S instruments (i.e., ESIA or ESMP) will be developed and their associated E&S monitoring plans, will be submitted to the Ministry of Environment and Forests for approval. However, the PIU and the World Bank will also undertake independent review and clearance of the same. The E&S Instruments (i.e., ESIA or ESMP) prepared will be reviewed by the Environmental and Social Specialists of the PIU. Thereafter they will be submitted to the World Bank for review and comment. When the World Bank ensures that all comments are addressed, it would give approval and clear the document. Once cleared by the World Bank, ESIA or ESMP will be submitted to the Directorate of Environment and Sustainable Development of the Ministry of Environment and Forest of South Sudan for obtaining “Letter of no objection”. The Ministry has responsibility for final approval after reviewing the draft environmental and social impact study and providing the project proponent with written comments. After review of the draft environmental social impact study and the Ministry is satisfied that it is complete, then it will issue a “Letter of no objection” for the ESIA study report. Where the Environmental and Social Impact Assessment study report is found to be inadequate, the Ministry shall return it to the proponent for revision, taking into consideration the comments and objections of the Ministry of Environment and Forest. The approved E&S monitoring and management plans will be included in project work bids and contracts so that it is part of the contractual obligation of successful bidders/contractors to prepare and implement Contractor ESMPs (C-ESMPs). Importantly, Contractors will be required to develop their own ESMPs for the activities that they will be undertaking. The developed ESMPs should be aligned with the ESMF/ESMP requirements and be compliant with the World Bank ESF. No work will /should be undertaken by a contractor before they receive PIU approval for the ESMPs that they have developed.

5.2.5 Step 5: Public Consultations and information Disclosure

Public consultations are required during the screening and the environmental and social assessment process and during the validation of the ESIA/ESMP. Public consultations should be conducted in a manner accessible to all project stakeholders including disadvantaged groups and given reasonable notice and taking into account the guidance set out in the project SEP and any other relevant guidance such as COVID 19 guidelines, the Technical Note: Public Consultations and Stakeholder Engagement in WB-supported operations when there are constraints on conducting public meetings. Supporting evidence of comprehensive public consultations shall be required, such as signed minutes of consultation meetings, attendance lists and filled questionnaires. The results of public consultations shall be incorporated and or influence the design of mitigation and monitoring measures. ESIA reports for the subproject shall be disclosed in-country by the PIU and in formats that are accessible to all project stakeholders and on the World Bank info shop website.

5.2.6 Step 6: Monitoring, Supervision and Reporting

Implementation, monitoring, supervision and reporting, will make reference to the various management and E&S monitoring and management plans that will be developed. Environmental and social risks and impacts monitoring seeks to check the effectiveness and relevance of planned mitigation measures through the implementation/operation phase. The PIU will monitor the environmental and social performance of the project in accordance with the Grant Agreement. The PIU Environment and Social specialists shall monitor implementation of E&S risk mitigation measures at the national level by coordinating and working closely with the E&S focal persons of the beneficiary state ministries for MoED, SSEC and MoFD. The C-ESMPs should be in place before commencement of any works in the field. The E&S focal persons at state ministries will undertake regular supervision of the subprojects during implementation and a contractor-ESMP (C-ESMP) report will be prepared before payment. The PIU E&S risk management specialists shall provide technical support to the state ministry E&S focal persons and ensure that the environmental and social screening process and C-ESMP development is undertaken appropriately.

The PIU will provide regular reports, as set out in the ESCP, to the Bank of the results of the monitoring. Quarterly, biannual and annual environmental and social risk management monitoring reports must be prepared by the PIU in collaboration with the beneficiary state ministry environment focal persons. The environmental and social risk management monitoring reports should be submitted to the energy sector

steering committee (MoED SSEC and MoFD) and the World Bank for review. Such reports will provide an accurate and objective record of project implementation, including compliance with the ESCP and the requirements of the ESSs. Such reports will include information on stakeholder engagement conducted during project implementation in accordance with ESS10.

The PIU in conjunction with the E&S focal persons of the beneficiary state ministry and the Contractors should notify the Bank promptly of any incident or accident (i.e., any serious injury or fatality) categorised as 'severe', within 48 hours to the World Bank. This may include cases of child abuse, gender-based violence, pesticide spills or misuse, diversion of pesticides or any dispute between local communities. The notification should provide sufficient details of the incident or accident, indicating immediate measures taken or planned to be taken to address its consequences, as well as any information provided by any contractor and supervising entity, as appropriate. Subsequently, as per the World Bank's request, the PIU team shall prepare a report of the incident or accident and propose measures to prevent its recurrence.

5.2.7 Step 7: Annual Reviews

The ESMF implementation will also be supported by conducting annual environmental and social performance audit (including audit of implementation of ESIA/ESMPs) that will be carried out by a third party. The third-party annual environmental and social performance audits will be conducted on the South Sudan Energy Access project subproject and associated facility activities to evaluate the overall implementation of the ESMF. The annual environmental and social performance audits will be considered to be the principal source of information to Project management for improving environmental and social performance. It is expected that these annual performance audits will be carried out by registered and licensed independent consultant firm that is not otherwise involved in the Project.

6 ENVIRONMENTAL AND SOCIAL IMPACTS AND MITIGATION MEASURES

This chapter describes the methodology by which potential project-related impacts and risks can be assessed and related mitigation measures suggested according to the mitigation hierarchy. Additionally, potential positive impacts/benefits and adverse/negative impacts of the project that could be deciphered at this stage, have been provided to guide the implementation of activities on the project's sub-projects. Considerations for cumulative impacts have been included in this chapter.

6.1 Impact Assessment Methodology

6.1.1 Impact description

A potential impact is both a description of the planned project activities and their effects on the environmental or social receptors. Relevant impact characteristics include:

- Adverse or beneficial;
- Direct or indirect;
- Short, medium, or long-term in duration; and permanent or temporary;
- Local, regional or global scale affect, including trans-boundary (neighbouring countries), and;
- Cumulative (such an impact results from the aggregated effect of more than one project occurring at the same time, or the aggregated effect of sequential projects. A cumulative impact is *“the impact on the environment which results from the incremental impact of the action when added to other past, present and reasonably foreseeable future action”*).

The relative intensity of the impacts can be assessed by these characteristics. The sensitivity of the environmental and social receptors can be determined by specialists by ranking the components of the baseline data collected during the ESIA.

6.1.2 Impact severity for planned activities

The impact severity can be determined by evaluating the intensity of the impact and the sensitivity of the environmental and social receptors. This is largely subjective but based on the professional judgement of the specialist team/personnel. This methodology requires assigning of numerical descriptors to the impact intensity, as well as the environmental and social receptors, for each potential impact. The numerical descriptors are 1, 2, 3, or 4; which are equivalent to very low, low, medium or high respectively. The impact severity is then calculated as the product of the two numerical descriptors, which is equivalent to negligible, minor, moderate or major, as indicated in Table 6.1. This is a semi-qualitative method designed to provide a broad ranking of the different potential impacts of a project.

6.1.3 Impacts of unplanned events (contingencies)

Impacts associated with unplanned events (or contingencies), such as vehicle accidents, earthquakes, floods or fires, are difficult to assess within the framework outlined above, because:

- The frequency of unplanned events is usually low, since operational procedures are designed to minimise the risk of an occurrence;
- The intensity of these impacts is difficult to quantify, since there is a wide range of possible events (i.e., the impact intensity is highly variable); and
- Unplanned events that may result in a severe environmental or social impact usually result in high financial, social and political liabilities and costs for the project developer. Therefore, the project has substantial built-in controls to avoid such occurrences. The probability of unplanned events (contingencies) occurring should always be low so they are not assessed (in terms of assigning a significance rating) in the impact assessment, whereas expected potential impacts are assessed.

6.1.4 Mitigation and residual significance

Potential impacts are assessed for severity and mitigation measures are designed to reduce the impact severity. The impact severity is then re-assessed, assuming application of the mitigation measures, to derive the “residual” impact severity.

Table 6.1: Determination of impact severity

			Sensitivity of receptor			
			Very low	Low	Medium	High
			1	2	3	4
Intensity of impact	Very low	1	1 Negligible	2 Minor	3 Minor	4 Minor
	Low	2	2 Minor	4 Minor	6 Moderate	8 Moderate
	Medium	3	3 Minor	6 Moderate	9 Moderate	12 Major
	High	4	4 Minor	8 Moderate	12 Major	16 Major

6.2 Positive impacts of the project

The major beneficial /positive impacts associated with implementation of the components of the South Sudan Energy Access project which will be implemented by the MoED are summarised below:

- **Improved reliability of electricity supply:** The Juba grid densification and extension component will improve the reliability of the electricity supply to project beneficiaries within Juba such as households, commercial and government installations, IDP camps as well as their host communities. The mini grid project components will improve the coverage of reliable electricity supply to refugee host communities and camps in Jamjang and Maban, while the Off-grid electrification project components will also improve the health and education facilities to get electrification access. The implementation of these components will decrease the cost of electricity to the beneficiaries who have been relying on diesel powered generators which are expensive to operate and require imported fuel and spare parts;
- **Improved access to clean and reliable electricity:** The proposed project will provide clean energy and reduce the use of diesel-powered generators by communities, commercial and public institutions;
- **Job Opportunities and Skills development:** The proposed project will create different job opportunities for skilled and unskilled manpower to be engaged in the construction and operation phase of the project. Furthermore, the project presents a good opportunity for skill development and capacity building of manpower that will be directly engaged on the project and associated with clean energy development technology. This will enhance basic skill levels regarding the grid and off grid technology within the energy sector of the country;
- **Improved standard of living:** Access to electricity will improve the standard of living of project beneficiaries within Juba such as households, commercial and government installations, IDP camps as well as their host communities. Project beneficiaries will be able to use domestic appliances like iron boxes, fridges, television sets, washing machines and other electrical equipment. Use of

electricity reduce smoking hazard due to kerosene lamps which predisposes people to respiratory diseases;

- **Improved Security and safety:** lighting enhances the security of community neighbourhoods. Regarding the enhancement of safety, electricity lighting will replace the traditional sources of light. This will reduce incidences of lighting-induced fire hazards within households as well as reduce indoor air pollution that is caused by smoke from wood fuels that are used for cooking. Additionally, improved night time lighting will help reduce the incidence of wild animal attacks and thefts at night;
- **Benefits to education and health facilities:** Electrification will lead to the Improvement of health and education services in remote areas, especially as these facilities will be able to open for longer or extended hours. Additionally, lighting will facilitate night-time school activities and improve studying conditions of school-age children;
- **Environmental benefit:** The project will promote the use of renewable energy which is an environmentally friendly source of energy that will reduce air pollution and pressure on natural resources that are being harvested for community biomass consumption to meet energy needs. Additionally, since the project will use concrete poles for power distribution lines instead of the wooden poles, this will reduce the need to fell trees that can then be used as electric poles;
- **Poverty reduction:** Affordable and stable electricity will enable project beneficiaries to be engaged in income generating activities, such as small and medium enterprises. This will improve the economic status of households and businesses through extension of working hours into the night and lowering the cost of doing business;
- **Reduced noise pollution and GHG emissions:** The project will lead to reduced noise pollution and the greenhouse gases that are released from a number of diesel generators that are operated to run businesses; and
- **Strengthening institutional capacity:** Strengthening of the regulatory framework of South Sudan's energy sector and improving efficiencies in the sector, coupled with creating good linkages with the East Africa Power Pool will see a strengthening of institutional capacity at the MoED, SSEC and for all personnel that will be engaged on the project.

6.3 Negative Impacts & Mitigation Measures

The South Sudan Energy Access project will greatly contribute to the enhancement of electricity access to project beneficiaries. However, despite the benefits that will be associated with the project, adverse/negative impacts could potentially result from the implementation of the different activities of the project. It should be noted that a detailed impact analysis and development of mitigation measures will be undertaken at the Environmental and Social Impact Assessment stage especially for components 1, 2 and 3. The impacts presented in this chapter were assessed through review of project related literature, and stakeholder consultations that were spearheaded by the MoED in South Sudan.

6.3.1 Adverse impacts of the Juba grid densification & extension

Power distribution and network strengthening in grid densification will mainly involve replacement of wooden poles, cables and re-conductoring. These activities will be undertaken using existing idle transformer(s). Among others, some of the activities during rehabilitation and upgrading of distribution lines are; selective vegetation removal, excavation of new pole sites, removal of timber poles, installation of new concrete poles and removal and replacement of conductors. The adverse impacts that could arise from the implementation of these activities are highlighted below.

A. ENVIRONMENT**1. Terrestrial habitat alteration****a) Selective clearance of vegetation and crops****Construction Phase**

This will be undertaken along the RoW, access roads to pole sites, at pole sites and staging areas among others. This impact will likely affect crops, scrub vegetation and to a small extent - mature trees and will result into loss of vegetation cover, soil erosion in cleared areas and displacement of species that use the cleared areas as habitats.

Proposed mitigation measures

- Land clearance should be restricted to that which is required for the project components to minimize the loss of vegetation;
- Restrict vehicle movements to and from the project site(s) to the project access road – offroad driving should be prohibited;
- Site restoration should be undertaken for areas where temporary project infrastructure will be established during the construction phase. The affected areas should be restored and only indigenous vegetation replanted. Intentional restoration using exotic plant species should be avoided; and
- Sensitize workers against unnecessary destruction, trampling and clearance of flora/crops

Operations and Maintenance Phase

During this phase, natural vegetation such as grass, shrubs and tree branches that are dangerously close to the distribution lines and poles will have to be maintained/trimmed/pruned.

The magnitude and severity of this impact in this phase is negligible.

Decommissioning Phase

If the temporary access roads to pole sites, pole sites and staging areas as well as the transmission line RoW are not adequately restored, this may result into soil erosion, bareness of areas that were previously crop farmland and proliferation of invasive plant species onto the sites.

Proposed Mitigation measures

- Landscape and plant indigenous plant species on areas that previously hosted access routes, pole sites and staging areas.

b) Avian and Bat Collisions and Electrocutions

Distribution networks are known to be a possible source of bird and bat strikes that get entangled to the lines causing their injury or even instant death. This is especially more significant when large flocks of birds migrate from one point to another and usually get struck by these distribution lines.

Construction Phase

During this phase, birds are not at risk of getting entangled in the power distribution lines since it will only involve replacement of wooden poles, cables and re-conductoring. Hence the potential impact magnitude is considered negligible in this phase. Additionally, the risk of electrocution of birds is expected to be none or minimal since it is expected that the distribution powerline will be insulated.

Proposed mitigation measures

- Transmission line corridors should be aligned corridors to avoid critical habitats (e.g., nesting grounds, heronries, rookeries, bat foraging corridors, and migration corridors);

- Maintaining 1.5-meter spacing between energised components and grounded hardware or, where spacing is not feasible, covering energised parts and hardware;
- Retrofitting existing transmission or distribution systems by installing elevated perches, insulating jumper loops, placing obstructive perch deterrents (e.g., insulated "V's"), changing the location of conductors, etc.; and
- Where necessary, installing visibility enhancement objects such as marker balls, bird deterrents, or diverters.
- Considering the proposed project where the powerline is insulated, this risk of electrocution expected to be none or minimal and no power line is pass through any known migratory bird routes.

Operations and Maintenance Phase

The impact magnitude of Potential Bird Strikes/Collusions and Electrocution along the distribution lines is negligible during the operations phases.

Decommissioning Phase

The impact is negligible during this phase.

c) Introduction of invasive species

Construction Phase

Invasive plant species may be introduced in the area as a result of implementation of the proposed project activities. Construction equipment that is not properly cleaned and sterilized has the potential to transport seeds and propagules of invasive species from other parts of South Sudan/or from outside South Sudan to the project work sites. The use of soil obtained from outside the project area, for restoration of scarred areas as well as failure to restore scarred areas, and use of exotic plant species for revegetation in areas that were stripped of vegetation, all promote the proliferation of invasive species which can displace desirable species and crops.

Proposed mitigation measures

- Potential sources of soil should first be inspected for the presence of invasive species and if any are found, these sources should not be excavated; and
- Invasive species should be monitored for sprout and if they appear along the access road or at the project site, they should be recorded and managed according to a prepared Invasive Species Management Plan; and
- Undertake revegetation of scarred project areas by using indigenous plant species that are preferably sourced from the immediate vicinity of the project area.

Operations and Maintenance Phase

Disturbances that facilitate the spread of invasive species will generally be infrequent or minimal during this phase. It is assumed that no soil will be needed during operations as is the case for the construction phase above and neither will there be any revegetation undertaken for scarred areas in this phase. Introduction/facilitation of the spread of invasive species is therefore considered non-significant during the operations phase and has therefore not been assessed further.

Decommissioning Phase

The change in activity and site conditions following project closure are likely to present an opportunity for the invasive plant species to blossom. Land will be left bare following the disassembling of project components and as such, present favorable conditions and new areas for the invasive species to colonise.

Proposed Mitigation measures

- Invasive species can be monitored for sprout and if they appear along the access road or at the project site they will be recorded and managed according to the Invasive Species Management Plan of the Project.
- Care should be taken to ensure all equipment is properly cleaned to avoid introduction of invasive species at project site from trucks, and other equipment used during this phase.

d) Soil erosion

Construction Phase

Site preparation activities may include selective clearance of vegetation within the footprint of the down areas, access road to the pole, and transmission line i.e., grubbing and scraping and general levelling of the whole site area. These activities may result in the stripping of vegetation and topsoil, which will need to be stockpiled, backfilled and/or spread on site. This can loosen the ground due to removal of plant roots and expose the ground to agents of erosion. Compaction of the ground will also result in accelerated rates of storm water runoff which directly increases the rate of soil erosion.

Proposed mitigation measures

- Site preparation should be undertaken in a systematic manner to reduce the risk of open ground to erosion;
- There should be controlled clearance of vegetation and this should be limited to only sections that are required for the establishment of project infrastructure;
- An efficient drainage system should be incorporated in the project design to cater for efficient and effective drainage of storm water from the project site and along the access road;
- Where possible, construction activities should not take place during heavy rain seasons;
- Disturbed areas should be rehabilitated using suitable indigenous cover grasses; and
- Landscaping of affected areas should be undertaken following completion of the construction phase to stabilize surfaces.

Operations and Maintenance Phase

Disturbances that facilitate the occurrence of soil erosion are generally minimal during this phase of the project. However, the drainage system and other mitigation measures as listed in the construction phase above will need to be monitored and maintained to ensure continuous storm water management and effectiveness especially around the electric poles.

Decommissioning Phase

During this phase of the project, the project site will be restored to as near to its original state as possible before implementation of project activities. Excavation, levelling and other earthworks may disturb the soil due to the removal of introduced soils.

Proposed Mitigation measures

- Reinststate soils and original drainage patterns of the area;
- Re-vegetate any areas used temporarily during construction; and
- No non-native species should be planted on-site.

e) Soil compaction and loss of soil functioning

Construction Phase

Soil compaction will result from earthmoving activities such as site clearance, excavation and the use of soil compactor machines. Movements of equipment, vehicles and delivery trucks are also likely to result in soil compaction along the footprint of the access road to the sites. Soil compaction alters soil physical and

chemical properties by reducing the composition of air, reducing the rate of infiltration and formation of a hard pan which increases soil resistance to root penetration. As a result, productivity of the soil decreases, hence loss of soil functioning.

Proposed mitigation measures

- Limit the project activities to the footprint of the required project area;
- Utilize vehicles with wide tires to minimize pressure exerted onto the ground;
- Prohibit off-road driving and parking outside of designated parking area;
- Stockpile the surface soil on the side of the project site for future use in landscaping; and
- Upon completion of work, the soil in any affected areas should be scarified to alleviate the effects of compaction.

Operations and Maintenance Phase

During the operations phase, only light vehicles will be utilized for operation and maintenance of the distribution power lines and poles. These will be restricted to the project access road. The extent of compaction likely to be caused is considered negligible.

Decommissioning Phase

Movement of decommissioning equipment, vehicles and trucks at the site are likely to result in soil compaction.

Proposed Mitigation measures

- Driving outside the designated working areas should be prohibited to prevent soil compaction and habitat disturbance or destruction; and
- Upon completion of work, the soil in any affected areas should be scarified to alleviate the effects of compaction.

f) Soil contamination

Construction Phase

Biodegradable and non-biodegradable wastes will be generated during the construction phase. These will include; stones, sand, steel (metallic bars), insulators and other construction materials. Plastic wastes such as; mineral water bottles, polythene bags, jerry cans, and other plastic accessories may be generated at the work centers. Organic wastes such as food stuff and human waste will also be generated at the work centers.

Oil and fuel leaks might occur from vehicles, equipment and machinery used during construction. These wastes, if not well managed, have the potential to contaminate the surrounding soil and alter both its chemical and physical properties thus affecting its productivity.

Proposed mitigation measures

- All wastes generated during construction activities should be collected and disposed of appropriately at designated sites;
- Undertake monitoring of the soil quality and devise corrective action when changes attributed to project implementation have been observed;
- The waste management hierarchy should be followed during the construction phase. According to this hierarchy, source reduction of waste will be the first option and disposal of unavoidable waste as the option of the last resort;
- Undertake routine preventive maintenance of motorized equipment to avoid any fuel leakage and spills; and

- Storage of fuels and oils should be undertaken in a manner that does not allow leakage to the soil as the fuel can readily infiltrate the soils polluting the soils, ground and surface water.

Operations and Maintenance Phase

Activities that facilitate the occurrence of this impact in this phase are generally negligible.

Decommissioning Phase

The cause of the impact in this phase, is similar to that described for the construction phase. In addition, accidental release of potentially contaminative solids, spillage and/or sewage may impact soil resources via dissolution or suspended transport, with consequences for human and faunal health.

Proposed Mitigation measures

- All organic waste generated at the project site such as food waste should be collected and managed responsibly;
- Undertake monitoring of the soil quality and devise corrective action when changes attributed to project implementation have been observed;
- Motorized equipment will undergo routine preventive maintenance of avoid any fuel leakage and spills; and
- All waste generated from decommissioning activities will be collected and disposed of in accordance with South Sudan's laws pertaining to waste disposal and management, the World Bank ESF requirements and international best practice.

2. Aquatic/terrestrial habitat alteration

Construction Phase

Power transmission and distribution lines, and associated access roads and facilities, may require construction of corridors crossing aquatic/terrestrial habitats that may disrupt watercourses and wetlands, and require the removal of riparian vegetation. In addition, sediment and erosion from construction activities and storm water runoff may increase turbidity of surface watercourses.

Proposed mitigation measures

- Site power transmission poles and substations to avoid critical aquatic habitat (e.g., watercourses and wetlands); and
- Minimize the clearing and disruption of riparian vegetation.

Operations and Maintenance Phase

Activities that facilitate the occurrence of this impact in this phase are generally negligible.

Decommissioning Phase

Activities that facilitate the occurrence of this impact in this phase are generally negligible. However, care must be taken to dispose wastes from the decommissioning process into aquatic habitats.

Proposed Mitigation measures

- Ensure that waste disposal does not occur in aquatic habitats.

3. Electric and Magnetic Fields (EMF) Impacts

Construction Phase

Electric and magnetic fields (EMF) are invisible lines of force emitted by and surrounding any electrical device (e.g., power lines and electrical equipment). This impact is not expected to occur during the construction phase since the powerlines and substations will not be energised at this stage.

Operations and Maintenance Phase

Electric fields are produced by voltage and increase in strength as the voltage increases. There is public and scientific concern over the potential health effects associated with exposure to EMF (e.g., from high voltage power lines and substations). As a matter of precaution, the following mitigation measures should be undertaken.

Proposed mitigation measures

- Evaluate potential exposure to the public against the reference levels developed by the International Commission on Non-Ionizing Radiation Protection (ICNIRP)^{16,17}. Average and peak exposure levels should remain below the ICNIRP recommendation for General Public Exposure¹⁸;
- Consider siting new facilities so as to avoid or minimize exposure to the public. Installation of transmission lines or other high voltage equipment above or adjacent to residential properties or other locations intended for highly frequent human occupancy, (e.g., schools or offices), should be avoided; and
- If EMF levels are confirmed or expected to be above the recommended exposure limits, application of engineering techniques should be considered to reduce the EMF produced by power lines, substations, or transformers. Examples of these techniques include:
 - Shielding with specific metal alloys;
 - Increasing height of transmission towers; and
 - Modifications to size, spacing, and configuration of conductors

Decommissioning Phase

This impact is not expected to occur during this phase of the project since the powerlines will be deenergized and workers will not be exposed to EMF thus the impact in this phase is negligible.

4. Hazardous materials and Waste

a) Spillage and leakages

Construction Phase

During this phase, there will be movement and maintenance of project vehicles and transportation of electrical components such as transformers and conductors that contain hazardous fluids. There is a possibility of leakages of fuels, and lubricants such as vehicle hydraulics and transformer oil, Polychlorinated biphenyls (PCBs) among others, that could be harmful to the exposed environment.

Proposed mitigation measures

- Ensure that all transformers are placed on drip trays during transportation, prior to and after installation;
- Prepare and implement an Oil Spill Response Plan;
- Prepare and implement an Emergency Preparedness and Response Plan;

¹⁶ ICNIRP is a non-governmental organization formally recognized by the World Health Organization (WHO), which published the "Guidelines for Limiting Exposure to Time-varying Electric, Magnetic, and Electromagnetic Fields" following reviews of all the peer-reviewed scientific literature, including thermal and non-thermal effects. The standards are based on evaluations of biological effects that have been established to have health consequences. The main conclusion from the WHO reviews is that exposures below the limits recommended by the ICNIRP international guidelines do not appear to have any known consequence on health.

¹⁷ An additional source of information is the Institute of Electrical and Electronics Engineers. See IEEE (2005).

¹⁸ The ICNIRP exposure guidelines for General Public Exposure are listed in Section 2.1 of the EHS Guidelines for Electric Power Transmission and Distribution.

- Vehicle maintenance and servicing should be done only on purpose-built impervious concrete platforms with oil and grease traps;
- Undertake vehicle inspection using a pre-developed vehicle inspection checklist for all project vehicles;
- Ensure that there is a gazetted washing area for all project vehicles;
- Ensure that all project vehicles are maintained in good condition;
- Train project staff in the management of spills; and
- Establish secondary containment for any spills for the gazetted parking area of project vehicles.

Operations and Maintenance Phase

Activities that facilitate the occurrence of this impact in this phase are generally negligible. However, monitoring should be undertaken at substations and transformer areas.

Decommissioning Phase

PCBs used to be widely used as insulators in electrical equipment, including transformers, capacitors, switches, voltage regulators etc. They are of concern because they are powerful toxins, even at low concentrations, and they persist and bio-accumulate in the environment creating adverse health impacts and adverse ecological changes. Sulphur hexafluoride, or SF₆, is widely used in the electrical industry to prevent short circuits and accidents. The non-flammable, SF₆ is a colorless, odorless, synthetic gas. It makes a hugely effective insulating material for medium and high-voltage electrical installations. SF₆ currently plays a key role as an insulating and arc-quenching medium, particularly in switchgear. In addition to its many advantages in terms of technical properties, SF₆ has the disadvantage of having a very high global warming potential (GWP). It is the most potent greenhouse gas known.

Proposed Mitigation measures

- Analyze the type of gases present in the transformers and other insulated equipment associated with PCB and SF₆;
- Refurbishment of any substations and upgrading/rehabilitation work of the power line will need to check whether any such old transformers/equipment will be replaced, and appropriate safeguards (appropriate storage, decontamination, and disposal of contaminated units), taken;
- Prior to final disposal, retired transformers and equipment containing PCB should be stored on a concrete pad with curbs sufficient to contain the liquid contents of these containers should they be spilled or leaked;
- Contract a licensed hazardous waste handler to safely transport and dispose of hazardous waste containing PCB;
- Surrounding soil exposed to PCB leakage from retired equipment should be assessed, and appropriate removal and/or remediation measures should be implemented;
- The project should consider use of alternative vacuum circuit breaker technologies; and
- The project should consider use of alternative fluorinated gas mixtures if possible.

b) The use of Wood Preservatives

Construction Phase

The impact related to this aspect is not expected to occur in this phase of the project since concrete and not wooden treated poles will be used.

Operations and Maintenance Phase

Activities that facilitate the occurrence of this impact in this phase are generally negligible.

Decommissioning Phase

The power distribution and network strengthening in grid densification project will mainly involve replacement of wooden poles and the installation of new concrete poles. Majority of wooden utility poles are treated with pesticide preservatives to protect against insects, bacteria, and fungi, and to prevent rot. The preservatives most commonly used for power poles are oil-based pesticides such as creosote, pentachlorophenol (PCP), and chromated copper arsenate (CCA) that could be harmful to the exposed environment. Activities related to replacement of electric poles, are relevant to the decommissioning phase of the project and have been discussed there under.

Proposed Mitigation measures

- Undertake appropriate disposal of used wooden poles that will be removed and replaced with concrete poles. Landfill facilities should be capable of handling wastes that may have chemical leaching properties. Disposal through incineration or through recycling should consider associated air emissions and secondary product residues of preservative chemicals;

c) Waste Management

Construction Phase

It is anticipated that different types of wastes will be generated during the extension of power distribution and transmission line networks. These include solid and liquid waste, spoils soils, scrap metals, cables, capacitor, wood, glass, packaging materials as well as hazardous wastes such as polychlorinated biphenyls (PCBs) from older imported transformers and capacitors, transformer parts & oils, fluorescent bulbs and a certain number of heavy metals (chromium, copper and arsenic). Unmanaged disposal and inadequate waste management could affect public health, land and water resource. Since South Sudan lacks the necessary infrastructure to deal with such waste effectively, proper handling of waste following international waste management strategy, particularly World Bank guideline requires to be applied.

Proposed Mitigation measures

- Develop a Waste Management Plan prior to the commencement of the project;
- Non-hazardous metals and cables could be sold to authorized collectors and recyclers
- As there are no known facilities to dispose of hazardous waste in the country. The Contractor should consider designing a temporary hazardous waste storage facility in consideration of the generated amounts and timing before final disposal by licensed hazardous waste handlers in accordance with the national legislative requirements and world Bank ESF requirements and GIIP practices;
- Maximize the re-use of all excavated materials in the construction works.
- Disposal of surplus material (spoil) only at designated sites approved by the responsible local authority and only by approved methods.
- No spoil should be disposed of in wetlands , near watercourses and other important habits
- Contract a licensed hazardous waste handler to safely transport and dispose of hazardous waste;
- Capacitate and support licensed personnel who are involved in hazardous waste disposal and management in all aspects including financial and technical supports.
- Identify the potential waste streams to be generated by the project activities, and how best they can be managed;
- All wastes shall be properly disposed of in accordance with the national legislative requirements and in accordance with ESF requirements and GIIP practices;
- Proper waste segregation, safe transport, and disposal at the authorized designated waste disposal.

- Ensure that there are ablution facilities along at each point of the project. This could be in form of mobile toilets or establishing an understanding to use the facilities owned by the project host communities;
- Provide adequate waste collection bins at each point of work to facilitate the segregation of waste; and
- Ensure that project personnel are trained in key aspects of waste management such as the waste management hierarchy and conduct regular awareness creation, training and sensitization for the project proponent, workers and community reside in the area on the potential negative impacts, health and safety risks, of solid wastes, proposer waste management practices, and processes.

Operations and Maintenance Phase

Due to the limited project activities and the reduced labor force, it is envisaged that waste to be generated during the operations phase will be negligible at the sites.

Decommissioning Phase

During decommissioning, a lot of waste such as electric wires, transformers, and electric poles, among other waste streams will be generated. If not properly managed, the waste will be left within the communities and result in pollution of the air, water, and the environment.

Proposed Mitigation measures

- In addition to the mitigation measures already discussed during the construction phase, the project developer should have a decommissioning plan in place that addresses aspects of waste management.

5. Noise and vibrations effects

Construction Phase

Construction activities such as line clearance, excavations, compaction at pole spots, and vehicles transporting materials, equipment, and workers. The construction activities typically, result in temporary and short-term duration increases in the noise levels, particularly during day time when activities tend to be at their peak.

The sensitive receptors of the noise and vibrations could be schools, health centers, and residential areas located within the vicinity of the project alignment.

Proposed mitigation measures

- Excessive noise levels should be restricted to the daytime and working hours, and equipment producing high levels of noise should be avoided when working within proximity to any sensitive noise receptors;
- Ensure that equipment and vehicles when not in use, are switched off to avoid noise emission;
- If particularly noisy works are scheduled, the nearest sensitive receptors will need to be informed of the timing and duration of the nuisance.
- Where possible, noise barriers should be employed to ensure that the maximum noise level at a 1m distance from a single source will not exceed nationally accepted permissible levels and World Bank's Environmental and Social Framework (ESF) requirements.

Operations and Maintenance Phase

Noise will be generated from vehicles used for the transportation of workers who will periodically undertake maintenance works along the transmission line RoW; however, this is unlikely to be significant due to the small number of vehicles and workers involved.

Additionally, noise in the form of buzzing or humming can often be heard around transformers. This low pitch persistent noise can be troubling to nearby residents.

Proposed Mitigation measures

- Locate transformers away from human receptors, to the extent possible; and
- Apply noise barriers or noise-cancelling acoustic devices on the transformers.

Decommissioning Phase

The decommissioning and site restoration process will generate noise since heavy machinery will be required and metal structures may need to be disassembled. However, this will be temporary and impact of minor magnitude

6. Alteration of ambient air quality**Construction Phase**

There will be vehicular movement transporting materials and workers in this phase of the project. Additionally, there could be small scale land/vegetation clearance especially in areas where associated facilities are to be set up. These activities will lead to the generation of dust which affects human health. Additionally, the use of generators will also lead to emission of smoke and pollution of air.

Proposed mitigation measures

- Undertake dust control and suppression measures including the regular application of water on or near construction sites, settlement areas to reduce dust generation and observing traffic speed limits;
- Maintain all machinery and equipment in good working order to ensure minimum emissions;
- Install humps along the project roads as well as haulage routes to reduce the speed of trucks;
- Prohibit the burning of garbage in the workers' camp and along the roads; and
- Undertake timely servicing of vehicles so as to control the emission of gases from vehicles and equipment.

Operations and Maintenance Phase

The impact of project activities on air quality during this phase, is insignificant because the minigrids, standalone solar power facilities and the Juba grid will not produce air emissions.

Decommissioning Phase

The cause of this impact during the decommissioning phase is the same as that described for the construction phase above only that in this case, impacts on air quality levels will be from the disassembling of associated metal structures and their associated transportation along the access roads.

Proposed Mitigation measures

- Make all reasonable efforts to suppress dust during earthworks. Specific actions may include continually watering dusty construction areas with a water bowser;
- Installation of humps along the project roads as well as haulage routes to reduce the speed of trucks; and
- Burning of garbage and any resultant waste in the workers' camp and along the roads should be prohibited. The waste should instead be responsibly disposed of.
- Alteration of ambient air quality due to gaseous emissions

B. OCCUPATIONAL HEALTH AND SAFETY

1. Working at height on Poles

Construction Phase

Workers may be exposed to occupational hazards when working at elevations during the construction phase which entails accessing the highest points of electric poles in order to connect the conducting wires.

Proposed mitigation measures

- The project should have Environment, Health and Safety roles assigned to trained personnel;
- The project should have an Occupational Health and Safety Plan;
- Conducting Job risk assessments and instituting permit to work provisions for activities that are undertaken at a height;
- Activities at a height should only be undertaken by well trained personnel;
- Testing structures for integrity prior to undertaking work;
- Implementation of a fall protection program that includes training in climbing techniques and use of fall protection measures; inspection, maintenance, and replacement of fall protection equipment; and rescue of fall-arrested workers, among others;
- Hoisting equipment should be properly rated and maintained and hoist operators properly trained; and
- An approved tool bag should be used for raising or lowering tools or materials to workers on structures.

Operations and Maintenance Phase

Workers may be exposed to occupational hazards when working at elevations during the maintenance of conducting wires and components of the grid that are located at a height.

Proposed Mitigation measures

- Conducting Job risk assessments and instituting permit to work provisions for activities that are undertaken at a height;
- Testing structures for integrity prior to undertaking work; and
- Maintenance activities at a height should only be undertaken by trained personnel;

Decommissioning Phase

The impact of this aspect in this phase is negligible. However, should it be necessary to work at height, the measures as suggested for the construction phase will apply to this phase too.

Proposed Mitigation measures

- Conducting Job risk assessments and instituting permit to work provisions for activities that are undertaken at a height.

2. Exposure to Polychlorinated biphenyls (PCBs) and SF6 Impacts

Decommissioning Phase

PCBs used to be widely used as insulators in electrical equipment, including transformers, capacitors, switches, voltage regulators etc. They are of concern because they are powerful toxins, even at low concentrations, and they persist and bio-accumulate in the environment creating adverse health impacts and adverse ecological changes. Sulphur hexafluoride, or SF6, is widely used in the electrical industry to prevent short circuits and accidents. The non-flammable, SF6 is a colorless, odorless, synthetic gas. It makes a hugely effective insulating material for medium and high-voltage electrical installations. SF6 currently

plays a key role as an insulating and arc-quenching medium, particularly in switchgear. In addition to its many advantages in terms of technical properties, SF6 has the disadvantage of having a very high global warming potential (GWP). It is the most potent greenhouse gas known.

Proposed mitigation measures

- Analyse the type of gases present in the transformers and other insulated equipment associated with PCB and SF6.
- Refurbishment of any substations and upgrading/rehabilitation work of the power line will need to check whether any such old transformers/equipment will be replaced, and appropriate safeguards (appropriate storage, decontamination, and disposal of contaminated units) taken.
- Prior to final disposal, retired transformers and equipment containing PCB should be stored on a concrete pad with curbs sufficient to contain the liquid contents of these containers should they be spilled or leaked.
- Contract a licensed hazardous waste handler to safely transport and dispose of hazardous waste containing PCB;
- Surrounding soil exposed to PCB leakage from retired equipment should be assessed, and appropriate removal and/or remediation measures should be implemented
- The project should use alternative vacuum circuit breaker technologies; and
- The project should use alternative fluorinated gas mixtures if possible.

3. Other Occupational Health and Safety Risks

Construction activities like power distribution activities could pose potential risks to the health and safety of project construction work forces. These risks include those associated during operation of project machinery, vehicles, plant, and equipment. Freak accidents may occur which can result in injury and fatalities.

Generally, workers on construction sites are highly exposed to injuries, falls, fatalities caused by machinery and/or transport, struck by falling object and risks from manual handling of heavy loads.

Uncontrolled growth of tall trees or vegetation within the transmission RoW may aggravate and cause an increased risk of electrocution, due to contact of branches and trees with live distribution lines which creates, ignition of forest and brush fires that ultimately danger to workers who are on duty.

Generally, workplaces and health and safety risks include:

- Electrocution hazard during installation and maintenance of power distribution lines.
- Injury from falls from falling objects.
- Injury or fatality from heavy construction equipment.
- Improper use and lack of availability of the required Personal Protective Equipment (PPE).
- Injury during excavation for mini grid structure, tower erection, etc.
-

Mitigation Measures

Specifically, to avoid these safety hazards and risks, the following general safety need to be considered during project implementation period.

- Ensure safe handling and use of PPE.
- Ensure the availability and proper use of PPE by the contractors, laborer who are engaged in the construction, installation and operation and maintenance of the proposed project
- Monitor regularly the use and availability of PPE and other protective tools and materials by the project coordination unit at all phases of the project.
- All workers entering the construction site must be equipped with PPE including goggles, safety shoes, overalls, gloves, dust masks, among others. The PPE should be those that follow the
- international standards of PPE.

- ONLY competent workers and staff should be allowed to operate any machinery and equipment to reduce the incidents of accidents.
- During the construction, the project site should be completely sealed off and warning signs erected informing the public to keep off the construction site when construction is in progress.
- Personal protection gear applicable to the activities must be provided and its use made compulsory to all.
- Fire risks are possible due to improper storage facilities and lack of fire drill, and this requires provision of regular training and awareness creation to the workers
- For any incidents of leakage or spill during installation, temporary containment structure is required to clean-up accidental spills.
- Provide regular OHS induction training for staffs before mobilization to work
- Personal protection gear will be provided, and its use made compulsory to all. The entire workforce should be trained in the use of protective gear, handling of chemical products and acid storage cells, electric safety equipment, procedures for entering enclosed areas, fire protection and prevention, emergency response and care procedures.
- Training given to the employees should be backed by regular on- site training in safety measures.
- Machines and Equipment must be operated only by qualified staff and a site supervisor should be on site at all times to ensure adherence.
- The contractor must develop workers' Health and Safety Manual for which all the workers should be conversant with for response in case of accidents.
- Cut trees to a height shall be as per the national standards, limit the ROW at the recommended width for both 33 kV and 15 kV. However, the undergrowth in the ROW should be allowed while only leaving a narrow strip to be completely cleared to allow stringing of the line conductors.

4. Traffic Impact

Construction phase

The activities of the project during the construction phase triggers certain issues about potential traffic accidents. An increased movement of vehicles could lead to potential impacts on the project workers and livestock of the local communities and the communities as well.

Proposed Mitigation measures

- Use speed control devices to control the speed of vehicles
- Periodic supervision of the management of vehicle movement to access tower foundations should be done.
- Provide awareness training for drivers and workers.
- Improving driving skills and requiring licensing of drivers.
- Adopting limits for trip duration and arranging driver rosters to avoid overtiredness.

Operation and maintenance phase

The traffic impacts are expected due to the vehicle transportation.

Proposed mitigation measures

The mitigation measures for the operation phase are the same as those described for the construction phase above.

Decommissioning phase

The movement of vehicle during decommissioning phase also occurs.

Proposed mitigation measures

The mitigation measures for the decommissioning phase are the same as those described for the construction phase above. However, the traffic safety management plan for decommissioning phase should be prepared and considered.

C. COMMUNITY HEALTH AND SAFETY

1. Electrocutation

Construction Phase

This impact may occur during the installation of power distribution lines. However, if care is taken to ensure that the lines are always de-energised during works on them, this risk can be reduced to As low as reasonably practicable.

Operations and Maintenance Phase

Activities during this phase will entail maintenance/trimming/pruning of the vegetation or trees near the electric poles or those that are within the transmission lines' RoW. This phase will also entail undertaking works on faulty power lines.

Proposed Mitigation measures

- Undertake risk assessments for powerlines that have been reported to be faulty;
- Assign works on faulty powerlines to competent personnel;
- Sensitize community members to avoid illegal connections to the grid. Additionally, information should be provided to communities to report any cases of fallen electric wires to the responsible authorities; and
- Issue the right PPE to personnel that will be tasked with works on faulty powerlines.

Decommissioning Phase

The impact of this risk in this phase is negligible.

2. Landscape and Visual Impact

Construction Phase

There are expected visual landscape changes due to land clearance, increase in the number of vehicles in the project sites and erection of concrete poles and presence of transmission lines in the neighborhoods of Juba. Visual resources (visual characteristics of a place which include both natural and man-made attributes) are very important to people living in the area and people going through an area. The installation of more transmission lines is likely to affect the visual amenity of Juba City.

Proposed mitigation measures

- Create community awareness on issues related to the project activities;
- Liaise with community members to ensure that access to the sites is restricted for the duration of the construction and installation of the transmission lines;
- All construction activities should be limited to the required project footprint;
- Journey management should be undertaken in order to ensure that only the necessary trips required for the construction activities are made; and
- Undertake landscaping of the project site and restoration of affected area following completion of the construction phase.

Operations and Maintenance Phase

The impact of this risk in this phase is negligible.

Decommissioning Phase

The decommissioning phase for this component of the project will include but not be limited to the following activities; Construction equipment dismantling, demolishing, fence removal, excavation and back filling. Whereas the temporary facilities are expected to be decommissioned, the electricity grid is expected to be a long-term project.

Proposed Mitigation measures

- Create community awareness on the related issues prior to decommissioning of temporary facilities;
- Liaise with community members to ensure that access to the project site is restricted for the duration of decommissioning until the site is restored close to its original state; and
- Limit the decommissioning activities to the project foot print; and
- Undertake re-vegetation in decommissioned areas.

3) Noise and Ozone

Transformer may generate noise in the form of buzzing or humming and this noise can often be heard around transformers or high voltage power lines producing corona. Ozone, a colorless gas with a pungent odor, may also be produced. The acoustic noise produced by transmission lines is greater with high voltage power lines (400-800 kilo volts [kV]) and even greater with ultra-high voltage lines (1000 kV and higher), Noise from transmission lines reaches its maximum during periods of precipitation, including rain, sleet, snow or hail, or as the result of fog.

Mitigation Measures

- Locate rights-of-way away from human receptors to the extent possible is a good mitigation measures at project planning stages.
- Use of noise barriers or noise canceling acoustic devices should be considered as necessary.

4) Aircraft Navigation Safety**Construction Phase**

Impacts associated with aircraft navigation safety at construction phase is negligible.

Operations and Maintenance Phase

Impacts associated with aircraft navigation safety at Operations and maintenance phase is negligible.

Decommissioning Phase

If a power transmission tower of the proposed project located near an airport or known flight paths, can impact aircraft safety directly through collision or indirectly through radar interference.

Mitigation measures

- ❖ Consider aircraft navigation impact during the planning stage of power transmission tower.
- ❖ Avoiding the siting of transmission lines and towers close to airports and outside of known flight path envelopes;
- ❖ Consultation with regulatory air traffic authorities prior to installation;
- ❖ Adherence to regional or national air traffic safety regulations;
- ❖ Use of buried lines when installation is required in flight sensitive areas.

5. Soil, groundwater, and surface water drainage

Construction Phase

The use of construction machinery may degrade soils and modify local drainage flows through a combination of compaction and physical disturbance, creating trenches along tire tracks, and from excavations and stockpiling material. This could result in the turbidity of the nearby surface water receptors.

Oil/fuel/lubricant leaks and spills from the use of construction machinery, and refueling activities have the potential to result in localized soil and groundwater pollution.

Effluent will be generated from the operation of the base camp where workers will be present. Blackwater, grey water, and kitchen water will be generated within the Project Site.

Proposed mitigation measures

- Place clear markers indicating stockpiling areas of excavated materials to restrict equipment and personnel movement, thus limiting the physical disturbance to land and soils in adjacent areas;
- Undertake routine maintenance of motorized equipment to avoid any fuel leakage and spills;
- Storage of fuels and oils should be undertaken in a manner that does not allow leakage to the soil as the fuel can readily infiltrate the soil polluting the soil, ground, and surface water; and
- All waste generated from project activities should be collected and disposed of following the relevant national laws and international industry best practices.

Operations and Maintenance Phase

Impacts associated with soil, surface and groundwater are minimal during the operation phase of the project.

Decommissioning Phase

The impact of project activities on soil, groundwater and surface water drainage is considered negligible in this phase since the installation activities here are expected to be short-lived. None the less, the mitigation measures below have been suggested.

Proposed Mitigation measures

- Sensitize drivers to keep vehicles on defined tracks; and
- Undertake rehabilitation of excavated areas/formerly cleared sites/areas.

6. Increased traffic

Construction Phase

Typical civil engineering construction equipment will need to be brought to the site (e.g., excavators, trucks, graders, compaction equipment, cranes, etc.) as well as poles and transmission wires/conductors. This equipment will be transported to the site using national, provincial, and local roads. Haulage of construction materials will result in increased traffic on the existing roads. Increased traffic and transportation of heavy loads may damage the existing roads leaving them in a worse state, and there are secondary impacts upon air quality (in terms of both dust and air emissions), and noise, particularly in the vicinity of the site and along the access road. The increased volume of traffic to the sites may also increase the potential for accidents especially along the roads in the community leading to and from the proposed project sites where poles will be planted.

Proposed mitigation measures

- Travel in convoys and at designated times to decrease and avoid peak travel/ movement times within Juba City;

- Journey-specific risk assessments which will include the identification of potentially sensitive receptors along the traffic routes should be conducted. For significant traffic movements, including transport of construction materials to site, any affected communities/residents along the route should be sensitized, and wherever possible, attempts made to undertake the traffic movements at the least busy times of day;
- When travelling in community areas, speed limits on transportation routes should be maintained at 40km/hr for light vehicles and 30km/hr for heavy vehicles;
- Only approved drivers should be allowed to operate vehicles;
- Construction materials should wherever possible, be preferentially sourced locally in a manner that reduces environmental and social impacts (e.g., transport distances) and maximizes local economic development opportunities;
- All roads should have clear and visible signage especially in community areas, around schools and hospitals to minimize the risk of accidents;
- Each road junction near the project sites should have a traffic controller or signal person to monitor and direct traffic flow;
- All staff should undergo an Environment, Health and Safety induction process which includes rules for safe driving, including speed limits in community areas; and
- Construction equipment should be maintained on site until the construction is complete to reduce on vehicle movement (Taking into consideration, their security).

Operations and Maintenance Phase

Operation and maintenance crew vehicles will contribute to increase of traffic flow in the area associated with O&M staff commutes. These commutes however, are expected to be infrequent and mostly responsive to alerts about defects on the distribution lines. This impact is therefore considered insignificant during the operations phase and has therefore not been assessed further.

Decommissioning Phase

During the implementation of decommissioning phase, traffic in the area will increase as a result of project related vehicular movements associated with the offsite transportation of the decommissioned equipment and debris from dismantled surfaces. Furthermore, increased traffic and transportation of heavy decommissioned loads may damage the existing roads leaving them in a worse state.

Proposed Mitigation measures

The mitigation measures for the decommissioning phase are the same as those described for the construction phase above.

D. SOCIAL ASPECTS

1. Conflict between Local and Migrant Workers

Construction Phase

The power distribution, off-grid, and mini-grid projects will create job opportunities for skilled and unskilled labourers during the construction phase of the project resulting in the immigration of workers to the project site. This could potentially lead to conflict between the local community and workers that do not originate/reside in the project area. Additionally, compensation of Project Affected Persons (PAPs) could increase conflicts between women and men, resulting into increased cases of domestic violence. Unfair employment processes and non-use of local labor might also be source of conflict. Furthermore, workers may involve themselves in certain culturally unacceptable behaviors that were either rare or non-existent in the project area, before the project.

Proposed mitigation measures

- Involve, encourage, and maximize use of local skilled and unskilled labor provided that it is compatible with the contractor's skill requirements; and
- Ensure fair and transparent hiring and staff management procedures and culturally appropriate communication with local communities about available employment opportunities.

Operations and Maintenance Phase

The cause of this impact will be the same as that described under the construction phase above. However, at this stage, there will be few workers employed by the project compared to the construction phase. In comparison to the construction phase above, this impact is considered non-significant during the operations phase and has, therefore, not been assessed further.

Decommissioning Phase

The cause of this impact during the decommissioning phase is the same as that described for the construction phase above only that in this case, the conflict between local and migrant workers will be attributed to the decommissioning phase.

Proposed Mitigation measures

- Involve, encourage, and maximize use of local skilled and unskilled labor provided that it is compatible with the contractor's skill requirements; and
- Ensure fair and transparent hiring and staff management procedures and culturally appropriate communication with communities regarding employment opportunities.

2. Labor Influx**Construction Phase**

Although the project labor requirements could be fulfilled from local community except few skilled labourers, it is anticipated that In-migration into Juba could be happen due to perceived employment opportunities, which may exert pressure on existing social services; result in poor sanitation due to poor waste disposal, and spikes in crime rates among others. The potential for influx of immigrant labor to the proposed project areas is expected to be relatively low. However, there may be risks related to interaction between project workers and local communities such as: Increase in cases of Sexual Exploitation and Abuse/Sexual Harassment (SEA/SH) if the necessary social protection measures are not put in place by the project. In such a way, Gender-Based Violence (GBV) will increase.

Proposed mitigation measures

- Develop and implement a Labor Influx management strategy;
- Develop and implement the Gender Based Violence Management Plan;
- Develop and implement a Sexual Exploitation and Abuse/Sexual Harassment (SEA/SH) Management Plan;
- Develop and implement a grievance mechanism to address grievances from local stakeholders; and
- PIU shall ensure that an area/ site specific assessment of GBV/SEA/SH risks is undertaken within subsequent project ESIA/ESMPs and that prevention and response measures are put in place.

Operations and Maintenance Phase

During the operations phase, there will be very few workers required to operate and maintain the project infrastructure. It is assumed however, that by this stage, the local community members will have already been sensitized and trained during the construction phase and thus have the necessary skills. Therefore,

this impact is considered to be insignificant during the operations phase and has therefore not been assessed further.

Decommissioning Phase

The cause of this impact during the decommissioning phase is the same as that described for the construction phase above only that in this case, the Labour Influx will be attributed to the decommissioning phase activities.

Proposed Mitigation measures

- Develop and implement a Labour Influx management strategy;
- Develop and implement the GBV management plan;
- Develop and implement the Sexual Exploitation and Abuse/Sexual Harassment (SEA/SH) management plan; and
- Develop and implement a grievance mechanism to address grievances from local stakeholders.

3. Poor sanitation due to improper waste management

Construction Phase

There is a potential for the waste generated during project activities to be poorly handled and result in a decline in the sanitation levels within the project area and sites. Construction waste to be generated during this phase may include emptied cement containers, used oils from construction vehicles, machinery and equipment, packaging materials in the form of plastics and paper. In addition, domestic wastes that may include food waste, food packaging materials brought to site by construction workers, and sewage and human waste, among others. If not properly handled, domestic and construction waste may turn out to be a sanitation hazard as well as attract vermin such as rodents and plastic wastes could affect the health of livestock if ingested and impact water courses/sources.

Proposed mitigation measures

- All waste generated from construction activities should be properly collected and handled prior to disposal. Biodegradable, non-biodegradable, hazardous and non-hazardous wastes should be segregated accordingly during collection;
- All waste collected should be disposed of appropriately e.g., a licensed waste collector should be contracted to transport waste material from site to the designated disposal area;
- The on-site ablution facilities on campsites should be serviced on a regular basis;
- Anti-vermin safeguards (such as covering bins with lids) should be put in place; and
- Operations should aim to reduce, re-use and recycle waste in preference to disposal.

Operations and Maintenance Phase

The operation of the Juba grid will not lead to generation of waste during its operation, except for example waste associated with components that have been replaced during maintenance activities. This impact during the operations phase is therefore considered insignificant and has not been assessed further

Decommissioning Phase

The cause of this impact during the decommissioning phase is the same as that described for the construction phase above only that in this case, waste generation will be from the disassembling of temporary facilities that were being used during the extension of the grid network. Additionally, domestic waste may be generated by decommissioning phase workers.

Proposed Mitigation measures

These are similar to those listed for the construction phase above; however, in this case, the measures will be related to the decommissioning phase activities.

4. Increased pressure on the social service sector**Construction Phase**

Population increases in the project area due to in-migration of people in search for jobs and economic opportunities will exert increased pressure on local and public resources. There is a likelihood of increased pressure on already strained social service infrastructures like housing, health, water sources and sanitation.

Proposed mitigation measures

- As give-back, the project may invest in rehabilitation of social service resources such as health centers, water sources among other, as part of Corporate Social Responsibility (CSR) initiatives in order to improve their availability for both the local community members and project workers;
- Adequate and appropriate sanitary facilities should be constructed for use by the construction workers at the construction site;
- A water source should be established to supply water demands for the project activities where a base camp is expected to be constructed;
- Hygiene and sanitation campaigns should be undertaken as a way of sanitation awareness in a bid to control outbreaks of diseases.

Operations and Maintenance Phase

This impact is considered insignificant during the operations phase since very few workers will be required to maintain the grid compared to the construction phase.

Decommissioning Phase

The cause of this impact during the decommissioning phase is the same as that described for the construction phase above only that in this case, the increase of pressure on social service sector will be attributed to the decommissioning crew.

Proposed Mitigation measures

These are similar to those listed for the construction phase above; however, in this case, the measures will be related to the decommissioning phase activities.

5. Increased spread of sexually transmitted diseases and other communicable diseases**Construction Phase**

Physical and social interactions between the construction workers and local community members may negatively impact on public health with an increase in the spread of Sexually Transmitted diseases as a result of the socialisation between the locals and project workers, and boosted prostitution.

Proposed mitigation measures

- Awareness and sensitization campaigns should be undertaken on the dangers of sexually transmitted diseases including HIV/AIDS and methods of spread and control. The HIV/AIDS awareness trainer should collaborate with local Non-Government Organizations (NGOs), Community Based Organizations (CBOs) and District Health Officers for sustainability and integration of activities into the existing structures of the local health institutions;
- The workforce should be provided with access to primary health care, insecticide-treated mosquito nets if they are housed in a project camp, prescriptions, prophylactics and basic testing for TB, and STDs including HIV/AIDS;

- The project should engage an NGO to prepare community institutions for any influx of in-migrants (for example, by developing by-laws and community policing systems for larger numbers of in-migrants);
- The project should provide support to local healthcare facilities through training of local healthcare professionals, regular supply of medical supplies and up to date equipment through Corporate Social Responsibility initiatives;
- The project should establish a community health Programme including providing support to existing or new local programmes such as mother and child nutrition, community health awareness, HIV/AIDS awareness, hygiene and immunisation, malaria control measures (indoor spraying of insecticides, personal protection measures, and control of mosquito larvae), and local Voluntary Counselling and Testing (VCT) programmes; and
- All Project workers should be inducted in relevant codes of conduct that minimize exposure to risky life styles including unsafe sex practices.

Operations and Maintenance Phase

The number of workers in this phase will be considerably lower than that in the construction phase. As such, this impact is considered to be insignificant during the operations phase and has therefore not been assessed further.

Decommissioning Phase

The cause of this impact during the decommissioning phase is the same as that described for the construction phase above only that in this case, the increased spread of sexually transmitted diseases will be attributed to the decommissioning crew.

Proposed Mitigation measures

- The project should undertake awareness and sensitization campaigns on the dangers of sexually transmitted disease including HIV/AIDS and methods of spread and control. The HIV/AIDS awareness trainer should collaborate with local NGOs, CBOs and District Health Officers for sustainability and integration of activities into the existing structures of the local health institutions; and
- Project workers should be inducted in relevant codes of conduct that minimize exposure to risky life styles including unsafe sex practices.

6. Cultural Heritage

Construction phase

The presence of heritage site can influence the project site selection, design, construction, and implementation. If the proposed project is not properly sited, project construction activities might affect or damage cultural heritage, architectural, archaeological, cultural & historical, ritual and burial sites.

Proposed Mitigation Measures

- Screen & identify known heritage sites in consultation with local community & relevant institutions
- Avoid locations where the project would displace, alter or render inaccessible important cultural heritage sites including historical sites/monuments, graves, churches and mosques etc.
- A chance finds procedure should also be considered if no site is identified at the early stage of the proposed projects

Operation phase

- The impact of this risk during this phase is negligible.

Decommissioning phase

- The impact of this risk during this phase is negligible.

6.3.2 Adverse impacts of setting up mini-grids and off-grid Standalone solar systems

This component will entail electrifying refugee host communities with a solar hybrid with battery storage or a diesel backup as well as electrifying health and educational facilities that are outside major cities with no grid access. Other public facilities such as government administration buildings and publicly shared water supply facilities may also be supported.

A. ENVIRONMENT

1. Terrestrial habitat alteration

a) Selective clearance of vegetation and crops

Construction Phase

During this phase, activities such as clearance of vegetation in areas that will host facilities such as solar power plants, will have adverse impacts on the existing fauna and flora species and ultimately affect the biodiversity of the area

Proposed mitigation measures

- The project should have a Biodiversity Management Plan;
- Implementing sub project activities near protected areas and critical habitats should be avoided.
- Land clearance should be restricted to that which is required for the project components to minimize the loss of vegetation;
- Restrict vehicle movements to and from the project site(s) to the project access road – offroad driving should be prohibited;
- Site restoration should be undertaken for areas where temporary project infrastructure will be established during the construction phase. The affected areas should be restored and only indigenous vegetation replanted. Intentional restoration using exotic plant species should be avoided; and
- Sensitize workers against unnecessary destruction, trampling and clearance of flora/crops

Operations and Maintenance Phase

During this phase, natural vegetation such as grass, shrubs and tree branches that are dangerously close to the solar facilities should be maintained/trimmed/pruned.

The magnitude and severity of this impact in this phase is negligible.

Decommissioning Phase

If the temporary access roads are not adequately restored, this may result into soil erosion, bareness of areas that were previously crop farmland and proliferation of invasive plant species onto the sites.

Proposed Mitigation measures

- Landscape and plant indigenous plant species on areas that previously hosted access routes, pole sites and staging areas.

b) Avian and Bat Collisions and Electrocutions

During construction and operation phase, solar systems can disturb wildlife especially birds through noise and light disturbance at night. It can also confuse water bodies. Furthermore, low, and medium voltage power transmission lines could pose a number of threats to variety of birds including mortality through collision, electrocution and habitat disturbance. Increased lighting may lead to disorientation of birds that utilise the East-Asian/East African flyway which crosses South Sudan and connects breeding ranges in central-Europe and Asia with winter ranges to the South. The impact of avian and bat collisions should be

further assessed in the site-specific baseline studies of ESIA. All these threats could result in the loss and reduction of the local birds' population.

Mitigation measures

- Transmission line corridors should be aligned corridors to avoid critical habitats (e.g., nesting grounds, heronries, rookeries, bat foraging corridors, and migration corridors);
- Maintaining 1.5-meter spacing between energized components and grounded hardware or, where spacing is not feasible, covering energized parts and hardware;
- Retrofitting existing transmission or distribution systems by installing elevated perches, insulating jumper loops, placing obstructive perch deterrents (e.g., insulated "V's"), changing the location of conductors, etc.; and
- Where necessary, installing visibility enhancement objects such as marker balls, bird deterrents, or diverters.
- Considering the proposed project where the powerline is insulated, this risk of electrocution expected to be none or minimal and no power line is pass through any known migratory bird routes.
- Demarcation and avoidance of areas of conservation of interest (high value, species, feeding or breeding sites, migration routes);
- Making power lines present less of an obstacle for birds to collide with and high-visibility markers should be installed to make the lines more visible to birds;
- To mitigate habitat disturbance and alteration as much as possible the size of the area to be cleared and used for the project should be minimized.

c) Introduction of invasive species

Construction Phase

Invasive plant species may be introduced in the area as a result of implementation of the proposed project activities. Construction equipment that is not properly cleaned and sterilized has the potential to transport seeds and propagules of invasive species from other parts of South Sudan/or from outside South Sudan to the project work sites. The use of soil obtained from outside the project area, for restoration of scarred areas as well as failure to restore scarred areas, and use of exotic plant species for revegetation in areas that were stripped of vegetation, all promote the proliferation of invasive species which can displace desirable species and crops.

Proposed mitigation measures

- Potential sources of soil should first be inspected for the presence of invasive species and if any are found, these sources should not be excavated; and
- Invasive species should be monitored for sprout and if they appear along the access road or at the project site, they should be recorded and managed according to a prepared Invasive Species Management Plan; and
- Undertake revegetation of scarred project areas by using indigenous plant species that are preferably sourced from the immediate vicinity of the project area.

Operations and Maintenance Phase

Disturbances that facilitate the spread of invasive species will generally be infrequent or minimal during this phase.

Decommissioning Phase

The change in activity and site conditions following project closure are likely to present an opportunity for the invasive plant species to blossom. Land will be left bare following the disassembling of project components and as such, present favorable conditions and new areas for the invasive species to colonise.

Proposed Mitigation measures

- Invasive species can be monitored for sprout and if they appear along the access road or at the project site they will be recorded and managed according to the Invasive Species Management Plan of the Project.
- Care should be taken to ensure all equipment is properly cleaned to avoid introduction of invasive species at project site from trucks, and other equipment used during this phase.

d) Soil erosion**Construction Phase**

Site preparation activities may include selective clearance of vegetation within the footprint of the down areas, access road to the sites and general levelling of the whole site area. These activities may result in the stripping of vegetation and topsoil, which will need to be stockpiled, backfilled and/or spread on site. This can loosen the ground due to removal of plant roots and expose the ground to agents of erosion. Compaction of the ground will also result in accelerated rates of storm water runoff which directly increases the rate of soil erosion.

Proposed mitigation measures

- Site preparation should be undertaken in a systematic manner to reduce the risk of open ground to erosion;
- There should be controlled clearance of vegetation and this should be limited to only sections that are required for the establishment of project infrastructure;
- An efficient drainage system should be incorporated in the project design to cater for efficient and effective drainage of storm water from the project site and along the access road;
- Where possible, construction activities should not take place during heavy rain seasons;
- Disturbed areas should be rehabilitated using suitable indigenous cover grasses; and
- Landscaping of affected areas should be undertaken following completion of the construction phase to stabilize surfaces.

Operations and Maintenance Phase

Disturbances that facilitate the occurrence of soil erosion are generally minimal during this phase of the project. However, the drainage system and other mitigation measures as listed in the construction phase above will need to be monitored and maintained to ensure continuous storm water management and effectiveness especially around the electric poles.

Decommissioning Phase

During this phase of the project, the project site will be restored to as near to its original state as possible before implementation of project activities. Excavation, levelling and other earthworks may disturb the soil due to the removal of introduced soils.

Proposed Mitigation measures

- Reinststate soils and original drainage patterns of the area;
- Re-vegetate any areas used temporarily during construction; and
- No non-native species should be planted on-site.

e) Soil compaction and loss of soil functioning**Construction Phase**

Soil compaction will result from earthmoving activities such as site clearance, excavation and the use of soil compactor machines. Movements of equipment, vehicles and delivery trucks are also likely to result in soil compaction along the footprint of the access road to the sites. Soil compaction alters soil physical and chemical properties by reducing the composition of air, reducing the rate of infiltration and formation of a hard pan which increases soil resistance to root penetration. As a result, productivity of the soil decreases, hence loss of soil functioning.

Proposed mitigation measures

- Limit the project activities to the footprint of the required project area;
- Utilize vehicles with wide tires to minimize pressure exerted onto the ground;
- Prohibit off-road driving and parking outside of designated parking area;
- Stockpile the surface soil on the side of the project site for future use in landscaping; and
- Upon completion of work, the soil in any affected areas should be scarified to alleviate the effects of compaction.

Operations and Maintenance Phase

During the operations phase, only light vehicles will be utilized for operation and maintenance of the distribution power lines and poles. These will be restricted to the project access road. The extent of compaction likely to be caused is considered negligible.

Decommissioning Phase

Movement of decommissioning equipment, vehicles and trucks at the site are likely to result in soil compaction.

Proposed Mitigation measures

- Driving outside the designated working areas should be prohibited to prevent soil compaction and habitat disturbance or destruction; and
- Upon completion of work, the soil in any affected areas should be scarified to alleviate the effects of compaction.

2. Electric and Magnetic Fields (EMF) Impacts**Construction Phase**

Electric and magnetic fields (EMF) are invisible lines of force emitted by and surrounding any electrical device (e.g., power lines and electrical equipment). This impact is not expected to occur during the construction phase since the powerlines and substations will not be energised at this stage.

Operations and Maintenance Phase

Electric fields are produced by high voltage and increase in strength as the voltage increases. There is public and scientific concern over the potential health effects associated with exposure to EMF (e.g., from high voltage power lines and substations). As a matter of precaution, the following mitigation measures should be undertaken.

Proposed mitigation measures

- Evaluate potential exposure to the public against the reference levels developed by the International Commission on Non-Ionizing Radiation Protection (ICNIRP)^{19,20}. Average and peak exposure levels should remain below the ICNIRP recommendation for General Public Exposure²¹;
- Consider siting new facilities so as to avoid or minimize exposure to the public. Installation of transmission lines or other high voltage equipment above or adjacent to residential properties or other locations intended for highly frequent human occupancy, (e.g., schools or offices), should be avoided; and
- If EMF levels are confirmed or expected to be above the recommended exposure limits, application of engineering techniques should be considered to reduce the EMF produced by power lines, substations, or transformers. Examples of these techniques include:
 - Shielding with specific metal alloys;
 - Increasing height of transmission towers; and
 - Modifications to size, spacing, and configuration of conductors

Decommissioning Phase

This impact is not expected to occur during this phase of the project since the powerlines will be deenergized and workers will not be exposed to EMF thus the impact in this phase is negligible.

3. Hazardous materials and Waste**a) Spillage and leakages****Construction Phase**

During the construction of standalone solar systems, oil spill, leakage and improper disposal of used oil, and automotive fluids including brake fluid, transmission fluid, grease, other lubricants, and petroleum-based cleaning solvent wastes used during operation and maintenance of project vehicles and heavy machineries, could cause significant environmental pollution including damaging aquatic ecosystems and habitats.

Proposed mitigation measures

- Vehicle maintenance and servicing should be done only on purpose-built impervious concrete platforms with oil and grease traps;
- Avoid leakages from vehicles and construction plant by regular and effective maintenance, and accidental spills through good practice by ensuring all equipment is in good condition, clean and free from leaks;
- Undertake vehicle inspection using a pre-developed vehicle inspection checklist for all project vehicles;
- Do not wash vehicles in wetlands, lakes, streams or rivers;

¹⁹ ICNIRP is a non-governmental organization formally recognized by the World Health Organization (WHO), which published the "Guidelines for Limiting Exposure to Time-varying Electric, Magnetic, and Electromagnetic Fields" following reviews of all the peer-reviewed scientific literature, including thermal and non-thermal effects. The standards are based on evaluations of biological effects that have been established to have health consequences. The main conclusion from the WHO reviews is that exposures below the limits recommended by the ICNIRP international guidelines do not appear to have any known consequence on health.

²⁰ An additional source of information is the Institute of Electrical and Electronics Engineers. See IEEE (2005).

²¹ The ICNIRP exposure guidelines for General Public Exposure are listed in Section 2.1 of the EHS Guidelines for Electric Power Transmission and Distribution.

- In case of an oil spill or leaks, contaminated topsoil should be scooped and disposed of appropriately;
- Establish temporary and/or permanent waste spill containment structures;
- Prepare and implement emergency preparedness and response plans related to oil spill emergencies;
- Ensure that all equipment containing fluids such as generators and batteries are placed on drip trays during transportation and prior to installation;
- Establish secondary containment for any spills for the gazetted packing area for project vehicles; and
- Ensure that the fuel storage tanks have secondary containment.

Operations and Maintenance Phase

During the operations phase, the on-site project maintenance vehicles could leak fuel and hydraulic fluids which if not contained could harm the environment. The lead acid solar batteries could also lead acid into the environment.

Proposed Mitigation measures

It is envisaged that during the operations phase, project staff will have been trained in spill response, there will be bunding around the fuel storage areas, the vehicle packing area will be concretized, and have containment for any fuel spills, among others. As such there are no additional mitigation measures other than those already proposed under the construction phase.

Decommissioning Phase

The decommissioning phase will entail dismantling the fuel storage areas, and generator storage areas, and disassembling the solar panels among others. This will pose a risk of spills of fuel, vehicle hydraulics, and battery acids among others which could impact the environment.

Proposed Mitigation measures

- Ensure to have a decommissioning plan that covers aspects of spill control in place; and
- Ensure to place the batteries, and any other equipment with the potential for leakages on drip trays during disassembling and transportation.

b) Hazardous Materials

Construction Phase

The impact related to this aspect is not expected to occur in this phase of the project since concrete and not wooden treated poles will be used.

Proposed Mitigation Measures:

- Due to the fact that most solar PV systems employ lead acid batteries, retrieval and recycling programs need to be incorporated to assure that the disposal of batteries does not result in environmental impact. Hence:
 - These wastes should be collected, segregated and temporarily stored at designated waste disposal sites;
 - As there are no known facilities to dispose of hazardous waste in the country. The Contractor should consider designing a temporary hazardous waste storage facility in consideration of the generated waste amounts and timing before final disposal by licensed hazardous waste handlers in accordance with the national legislative requirements and world Bank ESF requirements and GIIP practices.

- Procurement of electronic equipment from credible manufacturers with no or minimum adverse environmental impacts;
- Undertake trainings on waste management processes, awareness creation and sensitization program for the proponent and end users about potential negative impacts;
- All wastes shall be properly disposed of in accordance with the national and international legislative requirements; and
- Capacitate and support licensed companies involved in hazardous waste management in all aspects including financial and technical supports where possible

Operations and Maintenance Phase

The impact of this risk during this phase is negligible.

Decommissioning Phase

During decommissioning, a lot of hazardous waste such as electric wires, used and damaged batteries, used solar panels, batteries, etc. will be generated. Poor management of these hazardous wastes would impose adverse impact on the environment (soil, and ground and surface water contamination), and human health.

Proposed Mitigation Measures:

- In addition to the mitigation measures already discussed during the construction phase, the project developer should have a decommissioning plan in place that addresses aspects of waste management.

c) Waste Management

Construction Phase

Construction activities will produce considerable amount of waste including waste generated by construction works and other associated facilities. Indiscriminate disposal and/or storage of solid and liquid wastes including recycled batteries, used/burned transformers, other used and/or damaged solar panel and lantern parts, packages, and leftover construction materials and cements, have the potential to generate an adverse impact on the nearby environment and health and safety of the workers, local community and the beneficiaries. In addition, Solid wastes could also be generated from work sites, campsites, offices, cafeteria, workshops & stores. These include excavated soil material, paper wrapping, polythene, containers for various construction materials and plastics, metal scraps and packing materials and food leftovers among others will cause pollution and littering of the immediate and localized environment.

Unmanaged disposal & inadequate solid waste management could affect productive lands, the accumulation of solid waste on open lands, in water ways and drains which will be the source of pests and diseases & environmental pollution & clogging of drains, the creation of erosion, sedimentation, drainage problems and flooding.

Food wastes also attract scavengers (rodents, birds, dogs, cats) some of which are potential vectors of diseases including cholera, diarrhea etc. and may create nuisance to the local community.

Proposed Mitigation measures

- Personnel should aim to reduce, re-use, and recycle waste in preference to disposal;
- Undertake Proper waste segregation and storage;
- Provide solid waste handling facilities such as separate waste bins for biodegradable and non-degradable wastes until waste generated is disposed of at authorized dumping sites;
- Final domestic and/or other nonhazardous wastes, after proper segregation, should be disposed of safely at the designated waste disposal site;

- Maximize the re-use of all excavated materials in the construction works;
- Disposal of surplus material (spoil) only at designated sites approved by the responsible local authority and only by approved methods;
- No spoil should be disposed of in wetlands, near watercourses and other important habitats;
- Conduct regular awareness creation, training and sensitization for the project proponent, workers and community reside in the area on the potential negative impacts, health and safety risks, of solid wastes, proposer waste management practices, and processes;
- All wastes shall be properly disposed of in accordance with the national legislative requirements and world Bank ESF requirements and GIIP practices;
- The contractor should engage a refuse handling company to remove the wastes from the site to the approved dumping site and authorized landfill sites;
- The contractor should erect warning signs against littering and dumping sites within the construction site;
- Excavated topsoil should be used as backfill by the contractor; and
- The contractor shall develop a waste management plan in line with the national policies, standards and guidelines as well as international standards, including World Bank Group Environmental, Health, And Safety (EHS) Guidelines GENERAL EHS GUIDELINES: Environmental Waste Management.

Operations and Maintenance Phase

The stand-alone solar plants are not envisaged to generate waste during day-to-day operations, except for example waste associated with components that have been replaced during maintenance activities. However, poor management of domestic waste could cause poor sanitation. Additionally, during the operations phase, it is expected that there will be a limited number of people on site, this phase will also involve washing the solar panels once or twice annually, or as required, using local labour, and water with a low concentration of salts.

Additionally, although domestic and sanitary waste will also be generated during operations and maintenance of the power plants including; foodstuffs, plastics, paper, and human waste, it is assumed that at this stage, permanent waste management facilities/services e.g. the septic tank for management of sewage, and waste storage and management areas, including a licensed waste contractor who handles and disposes of waste, will have been established for the project and will be fully functional. Therefore, no further mitigation measures have been proposed.

Decommissioning Phase

The cause of this impact during the decommissioning phase is the same as that described for the construction phase above only that in this case, waste generation will be from the disassembling of the power plant in addition to domestic waste generated by decommissioning phase workers.

Proposed Mitigation measures

- The measures are similar to those listed above in the construction phase section.

d) Impacts on water quality

Construction phase

Accidental spillage or leakage of polluting materials like oil spill, leakage and improper disposal of used oil and inadequate provision of sanitary and waste facilities would have adverse effect to the ground and surface water quality.

Proposed Mitigation Measures

- Following the national standard of water quality (if the water quality standard available) to meet required standards adequate provision for treatment and disposal of sanitary and other liquid

waste in such a way as will not result in any form of pollution of water resources. In case of absence of national water quality standard, the world bank ESHG will be applicable. If the national water quality standard available, the most stringent requirements between local and WB standards shall prevail.

- Take all reasonable precautions to prevent spillages and leakage.
- Prohibit washing of project vehicles, plant, and machinery in or adjacent to any water sources.
- All washing to be carried out at designated areas away from water sources.

Operation phase

Operations and Maintenance Phase

Accidental spillage or leakage of polluting materials slightly occur during decommissioning phase due to used oils from vehicles transporting

Mitigation

- The measures are similar to those listed above in the construction phase section.

Decommissioning Phase

Accidental spillage or leakage of polluting materials slightly occur during decommissioning phase.

Proposed mitigation measures

- In addition to the mitigation measures already discussed during the construction phase, the project developer should have a decommissioning plan in place that addresses aspects of water quality management.

4. Noise and vibrations effects

Construction Phase

The major sources of noise and vibration during the construction of the off-grid electrification through standalone solar systems will be mainly from construction equipment and the construction crew. Some of these noise sources are continuous e.g., all access road construction activities, while others are intermittent, such as earthworks, piling, site levelling, ramming of the PV mounting structures etc.

Proposed mitigation measures

- Prior notice/community awareness will be undertaken for the local community members to keep them informed of what will take place/schedules of the project activities so that they are able to plan accordingly;
- Construction activities will be limited to only daytime hours;
- Noise monitoring will be undertaken within the area and at nearby sensitive receptor sites during construction;
- Use of well-maintained and serviced equipment that generates low noise levels will be emphasized;
- Workers involved in construction activities will be provided with requisite Personal Protective Equipment; and
- Idling of machinery including vehicles will be prohibited unless necessary.

Operations and Maintenance Phase

Noise emissions during the operations phase will be from vehicles transporting the operations and maintenance crew. Additionally, low levels of noise may result from the transmission of electricity at connection points and where electricity is transferred to the grid. Such noises are likely to be insignificant, as is the noise likely to be generated from the limited number of operation and maintenance personnel, as well as the few light vehicles that will be utilized during this phase of the project.

The impact is considered non-significant and has therefore not been assessed further

Decommissioning Phase

The cause of this impact during the decommissioning phase is the same as that described for the construction phase above only that in this case, the increase in noise and vibrations will be a result of disassembling of the power plant and where necessary transportation of the project infrastructure/equipment like the solar panels.

Proposed mitigation measures

The mitigation measures for the decommissioning phase are the same as those listed for the construction phase above; however, in this case, the measures will be related to the decommissioning phase activities.

5. Alteration of ambient air quality**Construction Phase**

The most significant sources of gaseous emissions during the construction phase are expected to be from the operation of vehicles and equipment. With regards to the construction equipment, the construction equipment will include but will not be limited to; cranes, cherry pickers, forklifts, trucks, drill machines (optional), excavators, scrapers, and roller compactor machines. The gaseous emissions caused by the project based on the above-listed equipment, are expected to include; CO₂, NO₂, SO₂, volatile organic compounds and BTEX since most of the construction equipment and machinery will be powered by diesel engines.

Significant receptors as far as any changes in ambient air quality are concerned, will be the local community members surrounding the proposed project area and all construction sites. It is also important to note that, gaseous emissions are not restricted to the project area, they can spread to a wider area as determined by the direction of the wind.

Proposed mitigation measures

- Ensure construction equipment deployed at the project site is in good condition and routinely maintained to ensure they are efficient and emit relatively low exhaust fumes;
- Discourage open burning of waste; and
- Operate emission-producing equipment only when necessary and avoid unnecessary idling of equipment.

Operations and Maintenance Phase

Gaseous emissions during this phase may majorly arise from light vehicles transporting the operation and maintenance crew to and from the sites. The actual operation of the Off-grid electrification through standalone solar systems is not expected to have pollutant emissions implications because the plant is designed to generate power without combustion.

These emissions are thus considered insignificant and have therefore not been assessed further

Decommissioning Phase

The cause of this impact during the decommissioning phase is the same as that described for the construction phase above only that in this case, increased gaseous emissions will be from the disassembling of the power plant and associated transportation along the access roads.

Proposed Mitigation measures

The mitigation measures for the decommissioning phase are the same as those described for the construction phase above.

B. OCCUPATIONAL HEALTH AND SAFETY

1. Working at height on Poles

Construction Phase

Workers may be exposed to occupational hazards when working at elevations during the construction phase which entails accessing the high points of buildings or poles in order to install solar panels.

Proposed mitigation measures

- The project should have Environment, Health and Safety roles assigned to trained personnel;
- The project should have an Occupational Health and Safety Plan;
- Conducting Job risk assessments and instituting permit to work provisions for activities that are undertaken at a height;
- Activities at a height should only be undertaken by well trained personnel;
- Testing structures for integrity prior to undertaking work;
- Implementation of a fall protection program that includes training in climbing techniques and use of fall protection measures; inspection, maintenance, and replacement of fall protection equipment; and rescue of fall-arrested workers, among others;
- Hoisting equipment should be properly rated and maintained and hoist operators properly trained; and
- An approved tool bag should be used for raising or lowering tools or materials to workers on structures.

Operations and Maintenance Phase

Workers may be exposed to occupational hazards when working at elevations during the maintenance of conducting wires and components of the grid that are located at a height.

Proposed Mitigation measures

- Conducting Job risk assessments and instituting permit to work provisions for activities that are undertaken at a height;
- Testing structures for integrity prior to undertaking work; and
- Maintenance activities at a height should only be undertaken by trained personnel.

Decommissioning Phase

The impact of this aspect in this phase is negligible. However, should it be necessary to work at height, the measures as suggested for the construction phase will apply to this phase too.

Proposed Mitigation measures

- Conducting Job risk assessments and instituting permit to work provisions for activities that are undertaken at a height.

2. Other occupational health and safety risks and impacts

The off-grid and mini-grid project may cause falls, injuries, and fatalities etc. There is potential for impacts on human health and safety to occur because of accidents and unplanned events that may occur during the construction and installation of the proposed project components and potential occupational injuries and accidents could exist in all stages, including during construction and operation phases.

Mitigation Measures: -

- ✚ The construction contractors should develop environmental; health and safety (EHS) management plans which outline procedures for avoiding health and safety incidents and emergency medical treatment. This requirement should be achieved by making it as part of project contractual agreements.
- ✚ Introducing & implementing proactive preventive measures including minimizing the hazard: through design of safe work systems and administrative or institutional control measures such as training on safe work procedures, workplace monitoring, regular safety inspections, limiting exposure or work duration.
- ✚ Providing all necessary personal protective equipment (PPE) in conjunction with training, use, and maintenance of the PPE to the workers and enforce that PPEs are used for the safety and health of workers.
- ✚ The project implementation unit shall engage dedicated personnel competent on the basis of appropriate education, training, and experience to manage and oversee the health, safety and environment (HSE) aspects of the project.
- ✚ The HSE personnel shall ensure that the project and contractors operate in accordance with the applicable national and international regulatory HSE requirements and plans; and also monitor implementation of environmental and social protection measures,

C. COMMUNITY HEALTH AND SAFETY**1. Electrocution****Construction Phase**

This impact may occur during the installation of power distribution lines on the minigrids as well as during installation of solar power panels. However, if care is taken to ensure that the lines are always de-energised during works on them, this risk can be reduced to as low as reasonably practicable.

Operations and Maintenance Phase

Activities during this phase will entail maintenance/trimming/pruning of the vegetation or trees near the power distribution lines and solar panels. This phase will also entail undertaking works on faulty power lines and replacing defective/damaged solar panels.

Proposed Mitigation measures

- Undertake risk assessments for powerlines and solar panels that have been reported to be faulty;
- Assign works on faulty powerlines and solar panels to competent personnel;
- Sensitise community members to avoid illegal connections to the grid. Additionally, information should be provided to communities to report any cases of fallen electric wires and broken panels to the responsible authorities; and
- Issue the right PPE to personnel that will be tasked with works on faulty powerlines.

Decommissioning Phase

The impact of this risk in this phase is negligible.

2. Soil, groundwater, and surface water drainage**Construction Phase**

The principal sources of soil, surface and groundwater contaminants during the construction phase are expected to be diesel, and motor oil and grease leaks from construction vehicles and equipment. Lubricants and other toxic materials such as sulphuric acid used in equipment and machinery, discharge of silt-laden runoff and improper disposal of waste and wastewater from the construction sites may also negatively impact surface and groundwater quality.

Contaminated run-off from spill sites could have an adverse impact on water quality if it drained into surface water bodies or infiltrated the groundwater. The extent of this impact will vary depending on the size, frequency, and timing of spills (if any) and leaks in relation to conditions in the receiving surface water bodies, soil properties at the point source, and the nature of the materials involved, including their toxicity.

Inappropriate disposal of waste and wastewater from the construction site also has the potential to have negative effects on soil, surface, and groundwater quality. However, the extent of this potential impact will also vary depending on the location and properties of soil at discharge points and the dilution/mixing regime possible in the receiving waters.

Proposed mitigation measures

- Undertake routine preventive maintenance of motorised equipment to control oil leakages;
- Inspection of the condition of vehicles will be undertaken on a daily basis to ensure they are in good working condition and no leakages are registered. Equipment identified with any leakage will be repaired before being used again;
- As part of emergency preparedness, a spill contingency plan will be put in place and staff trained in the use of spill-cleaning equipment for proper management of fuel and chemical spillages;
- Secondary containment measures in areas where fuels, oils, lubricants, and construction materials such as cement are stored and loaded or unloaded, including fueling points will be installed;
- The onsite substation will be lined with sand to absorb any chemical spillages from equipment;
- In case of oil pollution, sedimentation and siltation, halt construction activities immediately and recover the pollutant before it reaches the receiving water sources. In addition, avoid washing construction equipment at the transfer station to avert pollution of receiving water sources;
- Design and install a septic tank system for human sanitary purposes; and
- Provide disposal facilities for wastes.

Operations and Maintenance Phase

Sources of soil and water contaminants during the operations phase will result from spillage of fuels, lubricants, and other toxic materials from project equipment such as transformers and maintenance vehicles.

Domestic and sanitary waste will also be generated during operations and maintenance of the power plant even though there will be a limited number of project personnel at the site. Additionally, maintenance activities such as the washing of the PV modules once or twice annually, or as required, using local labour will generate wastewater, although the quality of water required for cleaning of panels should have a low concentration of salts and no additives and it is therefore unlikely that this water will result in contamination.

Proposed Mitigation measures

- Regular and routine monitoring and maintenance will be undertaken to ensure that all project equipment is in good working condition at all times; and
- Regular maintenance of operations vehicles off-site thus minimising the potential for leakages.

Decommissioning Phase

The principal sources of soil and water contaminants during the decommissioning phase are the same as those described for the construction phase above. However, unlike the construction phase, the decommissioning phase will involve the dismantling of the solar array and equipment.

Proposed Mitigation measures

- Undertake routine preventive maintenance of motorised equipment to control oil leakages;

- Inspection of the condition of vehicles will be undertaken on a daily basis to ensure they are in good working condition and no leakages are registered. Equipment identified with any leakage will be repaired before being used again;
- In case of oil pollution, sedimentation and siltation, halt demolition activities immediately and recover the pollutant before it reaches the receiving water sources; and
- Provide disposal facilities for wastes.

3. Increased traffic

Construction Phase

The transportation of materials and machinery may lead to an increase in traffic congestion and road accidents. Typical civil engineering construction equipment will need to be brought to the site (e.g., trucks, graders, compaction equipment, cement trucks, etc.) to make concrete electricity poles as well as components required for the establishment of the stand-alone solar systems. This equipment will be transported to the site using national, provincial, and local roads. Haulage of construction materials will result in increased traffic on the existing roads national and community roads. The increased traffic and transportation of heavy loads may damage the existing roads leaving them in a worse state and may also increase the potential for accidents, especially along the roads in the community leading to and from the proposed project site.

Proposed mitigation measures

- Travel in convoys and at designated times to decrease and avoid peak travel/ movement times within the project area;
- Journey-specific risk assessments which will include the identification of potentially sensitive receptors along the traffic routes should be conducted. For significant traffic movements, including transport of construction materials to site, any affected communities/residents along the route should be sensitised, and wherever possible, attempts made to undertake the traffic movements at the least busy times of day;
- When travelling in community areas, speed limits on transportation routes should be maintained at 40km/hr for light vehicles and 30km/hr for heavy vehicles;
- Only approved drivers should be allowed to operate vehicles;
- Construction materials should wherever possible, be preferentially sourced locally in a manner that reduces environmental and social impacts (e.g., transport distances) and maximises local economic development opportunities;
- All roads should have clear and visible signage especially in community areas, around schools and hospitals to minimise the risk of accidents;
- Each road junction near the project sites should have a traffic controller or signal person to monitor and direct traffic flow;
- All staff should undergo an Environment, Health and Safety induction process which includes rules for safe driving, including speed limits in community areas; and
- Construction equipment should be maintained on site until the construction is complete to reduce on vehicle movement (Taking into consideration, their security).

Operations and Maintenance Phase

The cause of this impact will be the same as that described under the construction phase above. However, at this stage, there will be few workers employed by the project compared to the construction phase. In comparison to the construction phase above, this impact is considered non-significant during the operations phase and has therefore, not been assessed further.

Decommissioning Phase

During the implementation of decommissioning phase, traffic in the area will increase as a result of project related vehicular movements associated with the offsite transportation of the decommissioned equipment and debris from dismantled surfaces. Furthermore, increased traffic and transportation of heavy decommissioned loads may damage the existing roads leaving them in a worse state.

Proposed Mitigation measures

The mitigation measures for the decommissioning phase are the same as those described for the construction phase above.

D. SOCIAL ASPECTS

1. Conflict between Local and Migrant Workers

Construction Phase

The power distribution, off-grid, and mini-grid projects will create job opportunities for skilled and unskilled labourers during the construction phase of the project resulting in the immigration of workers to the project site. This could potentially lead to conflict between the local community and workers that do not originate/reside in the project area. Additionally, compensation of Project Affected Persons (PAPs) could increase conflicts between women and men, resulting into increased cases of domestic violence. Unfair employment processes and non-use of local labour might also be source of conflict. Furthermore, workers may involve themselves in certain culturally unacceptable behaviors that were either rare or non-existent in the project area, before the project.

Proposed mitigation measures

- Involve, encourage, and maximise use of local skilled and unskilled labour provided that it is compatible with the contractor's skill requirements; and
- Ensure fair and transparent hiring and staff management procedures and culturally appropriate communication with local communities about available employment opportunities.

Operations and Maintenance Phase

The cause of this impact will be the same as that described under the construction phase above. However, at this stage, there will be few workers employed by the project compared to the construction phase. In comparison to the construction phase above, this impact is considered non-significant during the operations phase and has, therefore, not been assessed further.

Decommissioning Phase

The cause of this impact during the decommissioning phase is the same as that described for the construction phase above only that in this case, the conflict between local and migrant workers will be attributed to the decommissioning phase.

Proposed Mitigation measures

- Involve, encourage, and maximise use of local skilled and unskilled labour provided that it is compatible with the contractor's skill requirements; and
- Ensure fair and transparent hiring and staff management procedures and culturally appropriate communication with communities regarding employment opportunities.

2. Labour Influx

Construction Phase

Although the project labour requirements could be fulfilled from local community except few skilled labourers, it is anticipated that In-migration into project areas could happen due to perceived employment

opportunities, which may exert pressure on existing social services; result in poor sanitation due to poor waste disposal, and spikes in crime rates among others. The potential for influx of immigrant labour to the proposed project areas is expected to be relatively low. However, there may be risks related to interaction between project workers and local communities such as: Increase in cases of Sexual Exploitation and Abuse/Sexual Harassment (SEA/SH) if the necessary social protection measures are not put in place by the project. In such a way, Gender-Based Violence (GBV) will increase.

Proposed mitigation measures

- Develop and implement a Labour Influx management strategy;
- Develop and implement the Gender Based Violence Management Plan;
- Develop and implement a Sexual Exploitation and Abuse/Sexual Harassment (SEA/SH) Management Plan;
- Develop and implement a grievance mechanism to address grievances from local stakeholders; and
- PIU shall ensure that an area/ site specific assessment of GBV/SEA/SH risks is undertaken within subsequent project ESIA/ESMPs and that prevention and response measures are put in place.

Operations and Maintenance Phase

During the operations phase, there will be very few workers required to operate and maintain the project infrastructure. It is assumed however, that by this stage, the local community members will have already been sensitised and trained during the construction phase and thus have the necessary skills. Therefore, this impact is considered to be insignificant during the operations phase and has therefore not been assessed further.

Decommissioning Phase

The cause of this impact during the decommissioning phase is the same as that described for the construction phase above only that in this case, the Labour Influx will be attributed to the decommissioning phase activities.

Proposed Mitigation measures

- Develop and implement a Labour Influx management strategy;
- Develop and implement the GBV management plan;
- Develop and implement the Sexual Exploitation and Abuse/Sexual Harassment (SEA/SH) management plan; and
- Develop and implement a grievance mechanism to address grievances from local stakeholders.

3. Increased pressure on the social service sector

Construction Phase

Population increases in the project area due to in-migration of people in search for jobs and economic opportunities will exert increased pressure on local and public resources. There is a likelihood of increased pressure on already strained social service infrastructures like housing, health, water sources and sanitation.

Proposed mitigation measures

- As give-back, the project may invest in rehabilitation of social service resources such as health centers, water sources among other, as part of Corporate Social Responsibility (CSR) initiatives in order to improve their availability for both the local community members and project workers;
- Adequate and appropriate sanitary facilities should be constructed for use by the construction workers at the construction site;

- A water source should be established to supply water demands for the project activities where a base camp is expected to be constructed; and
- Hygiene and sanitation campaigns should be undertaken as a way of sanitation awareness in a bid to control outbreaks of diseases.

Operations and Maintenance Phase

This impact is considered insignificant during the operations phase since very few workers will be required to maintain the grid compared to the construction phase.

Decommissioning Phase

The cause of this impact during the decommissioning phase is the same as that described for the construction phase above only that in this case, the increase of pressure on social service sector will be attributed to the decommissioning crew.

Proposed Mitigation measures

These are similar to those listed for the construction phase above; however, in this case, the measures will be related to the decommissioning phase activities.

4. Increased spread of sexually transmitted diseases and other communicable diseases

Construction Phase

Physical and social interactions between the construction workers and local community members may negatively impact on public health with an increase in the spread of Sexually Transmitted diseases as a result of the socialisation between the locals and project workers, and boosted prostitution.

Proposed mitigation measures

- Awareness and sensitisation campaigns should be undertaken on the dangers of sexually transmitted diseases including HIV/AIDS and methods of spread and control. The HIV/AIDS awareness trainer should collaborate with local Non-Government Organisations (NGOs), Community Based Organisations (CBOs) and District Health Officers for sustainability and integration of activities into the existing structures of the local health institutions;
- The workforce should be provided with access to primary health care, insecticide-treated mosquito nets if they are housed in a project camp, prescriptions, prophylactics and basic testing for TB, and STDs including HIV/AIDS;
- The project should engage an NGO to prepare community institutions for any influx of in-migrants (for example, by developing by-laws and community policing systems for larger numbers of in-migrants);
- The project should provide support to local healthcare facilities through training of local healthcare professionals, regular supply of medical supplies and up to date equipment through Corporate Social Responsibility initiatives;
- The project should establish a community health Programme including providing support to existing or new local programmes such as mother and child nutrition, community health awareness, HIV/AIDS awareness, hygiene and immunisation, malaria control measures (indoor spraying of insecticides, personal protection measures, and control of mosquito larvae), and local Voluntary Counselling and Testing (VCT) programmes; and
- All Project workers should be inducted in relevant codes of conduct that minimise exposure to risky life styles including unsafe sex practices.

Operations and Maintenance Phase

The number of workers in this phase will be considerably lower than that in the construction phase. As such, this impact is considered to be insignificant during the operations phase and has therefore not been assessed further.

Decommissioning Phase

The cause of this impact during the decommissioning phase is the same as that described for the construction phase above only that in this case, the increased spread of sexually transmitted diseases will be attributed to the decommissioning crew.

Proposed Mitigation measures

- The project should undertake awareness and sensitization campaigns on the dangers of sexually transmitted disease including HIV/AIDS and methods of spread and control. The HIV/AIDS awareness trainer should collaborate with local NGOs, CBOs and District Health Officers for sustainability and integration of activities into the existing structures of the local health institutions; and
- Project workers should be inducted in relevant codes of conduct that minimize exposure to risky life styles including unsafe sex practices.

5. Vandalism of solar and mini-grid equipment**Construction Phase**

Vandalism of solar systems, due to the political instability and high crime rate in some areas in South Sudan. Solar systems might be vandalized especially the solar panels and batteries which will cause financial loss to the government of South Sudan while replacing the vandalized solar systems, and also affect the sustainable supply of electricity to public facilities and community members.

Proposed mitigation measures

- The PIU should work closely with the Ministry of National Security to provide security to the project infrastructure;
- Work with local government institutions in the hard-to-reach areas to provide security updates to the PIU; and
- Establish good working relations with local authorities and communities and encourage them to ensure the security of the solar equipment.

Operations and Maintenance Phase

There could be cases of maintenance workers vandalizing solar power equipment when undertaking maintenance works.

Proposed mitigation measures

- Workers should be monitored and proper work schedules designed so that workers undertake tasks where they have been deployed.

Decommissioning Phase

- The impact of this risk in this phase is negligible.

7 ENVIRONMENTAL & SOCIAL MANAGEMENT AND MONITORING PLAN

To avoid, minimise or manage impacts that could be associated with the project and its attendant components, mitigation measures must be implemented to ensure compliance with South Sudan's legal requirements and the World Bank ESF. At the implementation stage, each project component (especially components 1 – 3) should have a sub-project/component ESMP that clearly details mitigation measures that are related to specific activities. A generic template outline of an ESMP is provided under Annexure III.

The project should have an Environmental and Social Management System (ESMS) – (*See indicative outline of an ESMS in Annexure I*), which governs all of its operations. As part of the ESMS, a number of standard plans and operating procedures should be instituted/put in place to address environmental and social protection. These procedures should form part of the management regime under which the proposed project will be undertaken.

Annexure XII indicates the specific measures to be undertaken during the mobilisation and implementation of activities during the construction phase, operations phase and decommissioning phase respectively. These tables also include monitoring measures designed to ensure that compliance with the plans can be checked and recorded during implementation and assign responsibility for these actions. Table 7.1 and Table 7.2 show the summary of environmental and social management plan useful for mitigating the key environmental and social impact and risks of The South Sudan energy access project.

The environmental and social management plans of the proposed project indicates that most of the responsibilities lies with the contractor. Therefore, the contractor shall prepare and submit a construction environmental and social management plan which include the below management strategies implementation plans but not limited to :-

- Occupational Health and Safety Management Plan
- Community Health and Safety Management Plan
- Noise and Vibration Management Plans
- Landscaping and Site Restoration Plan
- Labor influx management plan
- Waste management plan, with a more focus on hazardous wastes
- Traffic safety management plan
- Emergency preparedness and response plan

7.1. Summary of Environmental & Social Management Plan for Adverse impacts of the Juba grid densification & extension

Impacts	Main Mitigation measures	Implementing body/Responsibility
Construction phase		
Selective clearance of vegetation and crops	<ul style="list-style-type: none"> • Land clearance should be restricted to that which is required for the project components to minimize the loss of vegetation; • Restrict vehicle movements to and from the project site(s) to the project access road – offroad driving should be prohibited; • Site restoration should be undertaken for areas where temporary project infrastructure will be established during the construction phase. The affected areas should be restored and only indigenous vegetation replanted. Intentional restoration using exotic plant species should be avoided; and • Sensitize workers against unnecessary destruction, trampling and clearance of flora/crops • Development of Biodiversity management plans when needed. • Implementing projects in protected areas and other critical habitats should be excluded 	Contractors
Avian and Bat Collisions and Electrocutions	<ul style="list-style-type: none"> • Transmission line corridors should be aligned corridors to avoid critical habitats (e.g., nesting grounds, heronries, rookeries, bat foraging corridors, and migration corridors); • Maintaining 1.5-meter spacing between energised components and grounded hardware or, where spacing is not feasible, covering energised parts and hardware; • Retrofitting existing transmission or distribution systems by installing elevated perches, insulating jumper loops, placing obstructive perch deterrents (e.g., insulated “V’s”), changing the location of conductors, etc.; and • Where necessary, Installing visibility enhancement objects such as marker balls, bird deterrents, or diverters. • Considering the proposed project where the powerline is insulated, this risk of electrocution expected to be none or minimal and no power line is pass through any known migratory bird routes. 	Contractors
Introduction of invasive species	<ul style="list-style-type: none"> • Potential sources of soil should first be inspected for the presence of invasive species and if any are found, these sources should not be excavated; and • Invasive species should be monitored for sprout and if they appear along the access road or at the project site, they should be recorded and managed according to a prepared Invasive Species Management Plan; and • Undertake revegetation of scarred project areas by using indigenous plant species that are preferably sourced from the immediate vicinity of the project area. 	Contractors

<p>Soil erosion</p>	<ul style="list-style-type: none"> • Site preparation should be undertaken in a systematic manner to reduce the risk of open ground to erosion; • There should be controlled clearance of vegetation and this should be limited to only sections that are required for the establishment of project infrastructure; • An efficient drainage system should be incorporated in the project design to cater for efficient and effective drainage of storm water from the project site and along the access road; • Where possible, construction activities should not take place during heavy rain seasons; • Disturbed areas should be rehabilitated using suitable indigenous cover grasses; and • Landscaping of affected areas should be undertaken following completion of the construction phase to stabilize surfaces. 	<p>Contractors</p>
<p>Soil compaction and loss of soil functioning</p>	<ul style="list-style-type: none"> • Limit the project activities to the footprint of the required project area; • Utilize vehicles with wide tires to minimize pressure exerted onto the ground; • Prohibit off-road driving and parking outside of designated parking area; • Stockpile the surface soil on the side of the project site for future use in landscaping; and • Upon completion of work, the soil in any affected areas should be scarified to alleviate the effects of compaction. 	<p>Contractors</p>
<p>Soil contamination</p>	<ul style="list-style-type: none"> • All wastes generated during construction activities should be collected and disposed of appropriately at designated sites; • Undertake monitoring of the soil quality and devise corrective action when changes attributed to project implementation have been observed; • The waste management hierarchy should be followed during the construction phase. According to this hierarchy, source reduction of waste will be the first option and disposal of unavoidable waste as the option of the last resort; • Undertake routine preventive maintenance of motorized equipment to avoid any fuel leakage and spills; and • Storage of fuels and oils should be undertaken in a manner that does not allow leakage to the soil as the fuel can readily infiltrate the soils polluting the soils, ground and surface water. 	<p>Contractors</p>
<p>Aquatic/terrestrial habitat alteration</p>	<ul style="list-style-type: none"> • Site power transmission poles and substations to avoid critical aquatic habitat (e.g., watercourses and wetlands); and • Minimize the clearing and disruption of riparian vegetation. 	<p>Contractors</p>
<p>Spillage and leakages</p>	<ul style="list-style-type: none"> • Ensure that all transformers are placed on drip trays during transportation, prior to and after installation; • Prepare and implement an Oil Spill Response Plan; • Prepare and implement an Emergency Preparedness and Response Plan; 	<p>Contractors, MoED, PIU</p>

	<ul style="list-style-type: none"> • Vehicle maintenance and servicing should be done only on purpose-built impervious concrete platforms with oil and grease traps; • Undertake vehicle inspection using a pre-developed vehicle inspection checklist for all project vehicles; • Ensure that there is a gazetted washing area for all project vehicles; • Ensure that all project vehicles are maintained in good condition; • Train project staff in the management of spills; and • Establish secondary containment for any spills for the gazetted parking area of project vehicles 	
Waste Management	<ul style="list-style-type: none"> • Develop a Waste Management Plan prior to the commencement of the project; • Non-hazardous metals and cables could be sold to authorized collectors and recyclers • As there are no known facilities to dispose of hazardous waste in the country. The Contractor should consider designing a temporary hazardous waste storage facility in consideration of the generated amounts and timing before final disposal by licensed hazardous waste handlers in accordance with the national legislative requirements and world Bank ESF requirements and GIIP practices; • Maximize the re-use of all excavated materials in the construction works. • Disposal of surplus material (spoil) only at designated sites approved by the responsible local authority and only by approved methods. • No spoil should be disposed of in wetlands , near watercourses and other important habits • Contract a licensed hazardous waste handler to safely transport and dispose of hazardous waste; • Capacitate and support licensed personnel who are involved in hazardous waste disposal and management in all aspects including financial and technical supports. • Identify the potential waste streams to be generated by the project activities, and how best they can be managed; • All wastes shall be properly disposed of in accordance with the national legislative requirements and in accordance with ESF requirements and GIIP practices 	Contractors, MoED, PIU, licenced private company
Noise and vibrations effects	<ul style="list-style-type: none"> • Excessive noise levels should be restricted to the daytime and working hours, and equipment producing high levels of noise should be avoided when working within proximity to any sensitive noise receptors; • Ensure that equipment and vehicles when not in use, are switched off to avoid noise emission; • If particularly noisy works are scheduled, the nearest sensitive receptors will need to be informed of the timing and duration of the nuisance. <p>Where possible, noise barriers should be employed to ensure that the maximum noise level at a 1m distance from a single source will not exceed nationally accepted permissible levels and World Bank’s Environmental and Social Framework (ESF) requirements.</p>	Contractors

<p>Alteration of ambient air quality</p>	<ul style="list-style-type: none"> • Undertake dust control and suppression measures including the regular application of water on or near construction sites, settlement areas to reduce dust generation and observing traffic speed limits; • Maintain all machinery and equipment in good working order to ensure minimum emissions; • Install humps along the project roads as well as haulage routes to reduce the speed of trucks; • Prohibit the burning of garbage in the workers’ camp and along the roads; and • Undertake timely servicing of vehicles so as to control the emission of gases from vehicles and equipment. 	<p>Contractors</p>
<p>Working at height on Poles</p>	<ul style="list-style-type: none"> • The project should have Environment, Health and Safety roles assigned to trained personnel; • The project should have an Occupational Health and Safety Plan; • Conducting Job risk assessments and instituting permit to work provisions for activities that are undertaken at a height; • Activities at a height should only be undertaken by well trained personnel; • Testing structures for integrity prior to undertaking work; • Implementation of a fall protection program that includes training in climbing techniques and use of fall protection measures; inspection, maintenance, and replacement of fall protection equipment; and rescue of fall-arrested workers, among others; • Hoisting equipment should be properly rated and maintained and hoist operators properly trained; and • An approved tool bag should be used for raising or lowering tools or materials to workers on structures. 	<p>Contractors</p>
<p>Other Occupational Health and Safety Risks</p>	<ul style="list-style-type: none"> ➤ Ensure safe handling and use of PPE. ➤ Ensure the availability and proper use of PPE by the contractors, laborer who are engaged in the construction, installation and operation and maintenance of the proposed project ➤ Monitor regularly the use and availability of PPE and other protective tools and materials by the project coordination unit at all phases of the project. ➤ All workers entering the construction site must be equipped with PPE including goggles, safety shoes, overalls, gloves, dust masks, among others. The PPE should be those that follow the international standards of PPE. ➤ ONLY competent workers and staff should be allowed to operate any machinery and equipment to reduce the incidents of accidents. ➤ During the construction, the project site should be completely sealed off and warning signs erected informing the public to keep off the construction site when construction is in progress. ➤ Personal protection gear applicable to the activities must be provided and its use made compulsory to all. ➤ Fire risks are possible due to improper storage facilities and lack of fire drill, and this requires provision of regular training and awareness creation to the workers ➤ For any incidents of leakage or spill during installation, temporary containment structure is required to clean-up accidental spills. ➤ Provide regular OHS induction training for staffs before mobilization to work 	<p>Contractors</p>

	<ul style="list-style-type: none"> ➤ Personal protection gear will be provided, and its use made compulsory to all. The entire workforce should be trained in the use of protective gear, handling of chemical products and acid storage cells, electric safety equipment, procedures for entering enclosed areas, fire protection and prevention, emergency response and care procedures. ➤ Training given to the employees should be backed by regular on- site training in safety measures. ➤ Machines and Equipment must be operated only by qualified staff and a site supervisor should be on site at all times to ensure adherence. ➤ The contractor must develop workers’ Health and Safety Manual for which all the workers should be conversant with for response in case of accidents. ➤ Cut trees to a height shall be as per the national standards, limit the ROW at the recommended ➤ width for both 33 kV and 15 kV. However, the undergrowth in the ROW should be allowed while only leaving a narrow strip to be completely cleared to allow stringing of the line conductors. 	
Landscape and Visual Impact	<ul style="list-style-type: none"> • Create community awareness on issues related to the project activities; • Liaise with community members to ensure that access to the sites is restricted for the duration of the construction and installation of the transmission lines; • All construction activities should be limited to the required project footprint; • Journey management should be undertaken in order to ensure that only the necessary trips required for the construction activities are made; and • Undertake landscaping of the project site and restoration of affected area following completion of the construction phase. 	Contractors
Soil, groundwater, and surface water drainage	<ul style="list-style-type: none"> • Place clear markers indicating stockpiling areas of excavated materials to restrict equipment and personnel movement, thus limiting the physical disturbance to land and soils in adjacent areas; • Undertake routine maintenance of motorized equipment to avoid any fuel leakage and spills; • Storage of fuels and oils should be undertaken in a manner that does not allow leakage to the soil as the fuel can readily infiltrate the soil polluting the soil, ground, and surface water; and • All waste generated from project activities should be collected and disposed of following the relevant national laws and international industry best practices. 	Contractors, MoED, PIU, licenced private company
Conflict between Local and Migrant Workers	<ul style="list-style-type: none"> • Involve, encourage, and maximize use of local skilled and unskilled labor provided that it is compatible with the contractor’s skill requirements; and • Ensure fair and transparent hiring and staff management procedures and culturally appropriate communication with local communities about available employment opportunities. 	Contractors, MoED, PIU
Labor Influx	<ul style="list-style-type: none"> • Develop and implement a Labor Influx management strategy; • Develop and implement the Gender Based Violence Management Plan; • Develop and implement a Sexual Exploitation and Abuse/Sexual Harassment (SEA/SH) Management Plan; 	Contractors, MoED, PIU

	<ul style="list-style-type: none"> • Develop and implement a grievance mechanism to address grievances from local stakeholders; and • PIU shall ensure that an area/ site specific assessment of GBV/SEA/SH risks is undertaken within subsequent project ESAs/ESMPs and that prevention and response measures are put in place. 	
<p>Increased traffic</p>	<ul style="list-style-type: none"> • Travel in convoys and at designated times to decrease and avoid peak travel/ movement times within Juba City; • Journey-specific risk assessments which will include the identification of potentially sensitive receptors along the traffic routes should be conducted. For significant traffic movements, including transport of construction materials to site, any affected communities/residents along the route • should be sensitized, and wherever possible, attempts made to undertake the traffic movements at the least busy times of day; • When travelling in community areas, speed limits on transportation routes should be maintained at 40km/hr for light vehicles and 30km/hr for heavy vehicles; • Only approved drivers should be allowed to operate vehicles; • Construction materials should wherever possible, be preferentially sourced locally in a manner that reduces environmental and social impacts (e.g., transport distances) and maximizes local economic development opportunities; • All roads should have clear and visible signage especially in community areas, around schools and hospitals to minimize the risk of accidents; • Each road junction near the project sites should have a traffic controller or signal person to monitor and direct traffic flow; • All staff should undergo an Environment, Health and Safety induction process which includes rules for safe driving, including speed limits in community areas; and • Construction equipment should be maintained on site until the construction is complete to reduce on vehicle movement (Taking into consideration, their security). 	<p>Contractors</p>
<p>Poor sanitation due to improper waste management</p>	<ul style="list-style-type: none"> • All waste generated from construction activities should be properly collected and handled prior to disposal. Biodegradable, non-biodegradable, hazardous and non-hazardous wastes should be segregated accordingly during collection; • All waste collected should be disposed of appropriately e.g., a licensed waste collector should be contracted to transport waste material from site to the designated disposal area; • The on-site ablution facilities on campsites should be serviced on a regular basis; • Anti-vermin safeguards (such as covering bins with lids) should be put in place; and • Operations should aim to reduce, re-use and recycle waste in preference to disposal. 	<p>Contractors, MoED, PIU, licenced private company</p>

<p>Increased pressure on the social service sector</p>	<ul style="list-style-type: none"> • As give-back, the project may invest in rehabilitation of social service resources such as health centers, water sources among other, as part of Corporate Social Responsibility (CSR) initiatives in order to improve their availability for both the local community members and project workers; • Adequate and appropriate sanitary facilities should be constructed for use by the construction workers at the construction site; • A water source should be established to supply water demands for the project activities where a base camp is expected to be constructed; • Hygiene and sanitation campaigns should be undertaken as a way of sanitation awareness in a bid to control outbreaks of diseases 	<p>Contractors, MoED, PIU,</p>
<p>Increased spread of sexually transmitted diseases and other communicable diseases</p>	<ul style="list-style-type: none"> • Awareness and sensitization campaigns should be undertaken on the dangers of sexually transmitted diseases including HIV/AIDS and methods of spread and control. The HIV/AIDs awareness trainer should collaborate with local Non-Government Organizations (NGOs), Community Based Organizations (CBOs) and District Health Officers for sustainability and integration of activities into the existing structures of the local health institutions; • The workforce should be provided with access to primary health care, insecticide-treated mosquito nets if they are housed in a project camp, prescriptions, prophylactics and basic testing for TB, and STDs including HIV/AIDS; • The project should engage an NGO to prepare community institutions for any influx of in-migrants (for example, by developing by-laws and community policing systems for larger numbers of in-migrants); • The project should provide support to local healthcare facilities through training of local healthcare professionals, regular supply of medical supplies and up to date equipment through Corporate Social Responsibility initiatives; • The project should establish a community health Programme including providing support to existing or new local programmes such as mother and child nutrition, community health awareness, HIV/AIDS awareness, hygiene and immunisation, malaria control measures (indoor spraying of insecticides, personal protection measures, and control of mosquito larvae), and local Voluntary Counselling and Testing (VCT) programmes; and • All Project workers should be inducted in relevant codes of conduct that minimize exposure to risky lifestyles including unsafe sex practices. 	<p>Contractors, MoED, PIU, health officers,</p>
<p>Operation phase</p>		
<p>Electric and Magnetic Fields (EMF) Impacts</p>	<ul style="list-style-type: none"> • Evaluate potential exposure to the public against the reference levels developed by the International Commission on Non-Ionizing Radiation Protection (ICNIRP) • Average and peak exposure levels should remain below the ICNIRP recommendation for General Public Exposure; 	<p>Contractors</p>

	<ul style="list-style-type: none"> Consider siting new facilities so as to avoid or minimize exposure to the public. Installation of transmission lines or other high voltage equipment above or adjacent to residential properties or other locations intended for highly frequent human occupancy, (e.g., schools or offices), should be avoided; and If EMF levels are confirmed or expected to be above the recommended exposure limits, application of engineering techniques should be considered to reduce the EMF produced by power lines, substations, or transformers. Examples of these techniques include: <ul style="list-style-type: none"> Shielding with specific metal alloys; Increasing height of transmission towers; and Modifications to size, spacing, and configuration of conductors. 	
Noise and vibrations effects	<ul style="list-style-type: none"> Locate transformers away from human receptors, to the extent possible; and Apply noise barriers or noise-cancelling acoustic devices on the transformers. 	Contractors
Working at height on Poles	<ul style="list-style-type: none"> Conducting Job risk assessments and instituting permit to work provisions for activities that are undertaken at a height; Testing structures for integrity prior to undertaking work; and Maintenance activities at a height should only be undertaken by trained personnel; 	Contractors
Electrocution	<ul style="list-style-type: none"> Undertake risk assessments for powerlines that have been reported to be faulty; Assign works on faulty powerlines to competent personnel; Sensitize community members to avoid illegal connections to the grid. Additionally, information should be provided to communities to report any cases of fallen electric wires to the responsible authorities; and Issue the right PPE to personnel that will be tasked with works on faulty powerlines. 	Contractors
Decommissioning phase		
Lack of adequate rehabilitation	Landscape and plant indigenous plant species on areas that previously hosted access routes, pole sites and staging areas protect from soil erosion and bareness of areas	Contractors, MoED, PIU,
Introduction of invasive species	<ul style="list-style-type: none"> Invasive species can be monitored for sprout and if they appear along the access road or at the project site they will be recorded and managed according to the Invasive Species Management Plan of the Project. Care should be taken to ensure all equipment is properly cleaned to avoid introduction of invasive species at project site from trucks, and other equipment used during this phase 	Contractors
Soil erosion	<ul style="list-style-type: none"> Reinstate soils and original drainage patterns of the area; Re-vegetate any areas used temporarily during construction; and No non-native species should be planted on-site. 	Contractors
Soil compaction and loss of soil functioning	<ul style="list-style-type: none"> Driving outside the designated working areas should be prohibited to prevent soil compaction and habitat disturbance or destruction; and 	Contractors

	<ul style="list-style-type: none"> • Upon completion of work, the soil in any affected areas should be scarified to alleviate the effects of compaction. 	
Soil contamination	<ul style="list-style-type: none"> • All organic waste generated at the project site such as food waste should be collected and managed responsibly; • Undertake monitoring of the soil quality and devise corrective action when changes attributed to project implementation have been observed; • Motorized equipment will undergo routine preventive maintenance of avoid any fuel leakage and spills; and • All waste generated from decommissioning activities will be collected and disposed of in accordance with South Sudan’s laws pertaining to waste disposal and management, the World Bank ESF requirements and international best practice. 	Contractors, MoED, PIU, licenced private company
Aquatic/terrestrial habitat alteration	<ul style="list-style-type: none"> • Ensure that waste disposal does not occur in aquatic habitats 	Contractors
Spillage and leakages	<ul style="list-style-type: none"> • Analyze the type of gases present in the transformers and other insulated equipment associated with PCB and SF6; • Refurbishment of any substations and upgrading/rehabilitation work of the power line will need to check whether any such old transformers/equipment will be replaced, and appropriate safeguards (appropriate storage, decontamination, and disposal of contaminated units), taken; • Prior to final disposal, retired transformers and equipment containing PCB should be stored on a concrete pad with curbs sufficient to contain the liquid contents of these containers should they be spilled or leaked; • Contract a licensed hazardous waste handler to safely transport and dispose of hazardous waste containing PCB; • Surrounding soil exposed to PCB leakage from retired equipment should be assessed, and appropriate removal and/or remediation measures should be implemented; • The project should consider use of alternative vacuum circuit breaker technologies; and • The project should consider use of alternative fluorinated gas mixtures if possible. 	Contractors, MoED, PIU
Use of Wood Preservatives	<ul style="list-style-type: none"> • Undertake appropriate disposal of used wooden poles that will be removed and replaced with concrete poles. • Landfill facilities should be capable of handling wastes that may have chemical leaching properties. • Disposal through incineration or through recycling should consider associated air emissions and secondary product residues of preservative chemicals; 	Contractors, MoED, PIU

Waste Management	<ul style="list-style-type: none"> The project developer should have a decommissioning plan in place that addresses aspects of waste management. 	Contractors, MoED, PIU
Alteration of ambient air quality	<ul style="list-style-type: none"> Make all reasonable efforts to suppress dust during earthworks. Specific actions may include continually watering dusty construction areas with a water bowser; Installation of humps along the project roads as well as haulage routes to reduce the speed of trucks; and Burning of garbage and any resultant waste in the workers' camp and along the roads should be prohibited. The waste should instead be responsibly disposed of. 	Contractors
Working at height on Poles	<ul style="list-style-type: none"> Conducting Job risk assessments and instituting permit to work provisions for activities that are undertaken at a height. 	Contractors
Exposure to Polychlorinated biphenyls (PCBs) and SF6 Impacts	<ul style="list-style-type: none"> Analyze the type of gases present in the transformers and other insulated equipment associated with PCB and SF6. Refurbishment of any substations and upgrading/rehabilitation work of the power line will need to check whether any such old transformers/equipment will be replaced, and appropriate safeguards (appropriate storage, decontamination, and disposal of contaminated units) taken. Prior to final disposal, retired transformers and equipment containing PCB should be stored on a concrete pad with curbs sufficient to contain the liquid contents of these containers should they be spilled or leaked. Contract a licensed hazardous waste handler to safely transport and dispose of hazardous waste containing PCB; Surrounding soil exposed to PCB leakage from retired equipment should be assessed, and appropriate removal and/or remediation measures should be implemented The project should use alternative vacuum circuit breaker technologies; and The project should use alternative fluorinated gas mixtures if possible. 	Contractors, MoED, PIU
Landscape and Visual Impact	<ul style="list-style-type: none"> Create community awareness on the related issues prior to decommissioning of temporary facilities; Liaise with community members to ensure that access to the project site is restricted for the duration of decommissioning until the site is restored close to its original state; and Limit the decommissioning activities to the project foot print; and Undertake re-vegetation in decommissioned areas. 	Contractors
Noise and Ozone	<ul style="list-style-type: none"> Locate rights-of-way away from human receptors to the extent possible is a good mitigation measures at project planning stages. Use of noise barriers or noise canceling acoustic devices should be considered as necessary. 	Contractors
Aircraft Navigation Safety	<ul style="list-style-type: none"> ❖ Consider aircraft navigation impact during the planning stage of power transmission tower. ❖ Avoiding the siting of transmission lines and towers close to airports and outside of known flight path envelopes; 	Contractors

	<ul style="list-style-type: none"> ❖ Consultation with regulatory air traffic authorities prior to installation; ❖ Adherence to regional or national air traffic safety regulations; ❖ Use of buried lines when installation is required in flight sensitive areas. 	
Soil, groundwater, and surface water drainage	<ul style="list-style-type: none"> • Sensitize drivers to keep vehicles on defined tracks; and • Undertake rehabilitation of excavated areas/formerly cleared sites/areas. 	Contractors, MoED, PIU
Conflict between Local and Migrant Workers	<ul style="list-style-type: none"> • Involve, encourage, and maximize use of local skilled and unskilled labor provided that it is compatible with the contractor’s skill requirements; and • Ensure fair and transparent hiring and staff management procedures and culturally appropriate communication with communities regarding employment opportunities. 	Contractors, MoED, PIU
Labor Influx	<ul style="list-style-type: none"> • Develop and implement a Labor Influx management strategy; • Develop and implement the GBV management plan; • Develop and implement the Sexual Exploitation and Abuse/Sexual Harassment (SEA/SH) management plan; and • Develop and implement a grievance mechanism to address grievances from local stakeholders. 	Contractors, MoED, PIU
Increased traffic	<ul style="list-style-type: none"> • should be sensitized, and wherever possible, attempts made to undertake the traffic movements at the least busy times of day; • When travelling in community areas, speed limits on transportation routes should be maintained at 40km/hr for light vehicles and 30km/hr for heavy vehicles; • Only approved drivers should be allowed to operate vehicles; • Construction materials should wherever possible, be preferentially sourced locally in a manner that reduces environmental and social impacts (e.g., transport distances) and maximizes local economic development opportunities; • All roads should have clear and visible signage especially in community areas, around schools and hospitals to minimize the risk of accidents; • Each road junction near the project sites should have a traffic controller or signal person to monitor and direct traffic flow; • All staff should undergo an Environment, Health and Safety induction process which includes rules for safe driving, including speed limits in community areas; and • Construction equipment should be maintained on site until the construction is complete to reduce on vehicle movement (Taking into consideration, their security). 	Contractors
Poor sanitation due to improper waste management	<ul style="list-style-type: none"> • All waste generated from construction activities should be properly collected and handled prior to disposal. Biodegradable, non-biodegradable, hazardous and non-hazardous wastes should be segregated accordingly during collection; • All waste collected should be disposed of appropriately e.g., a licensed waste collector should be contracted to transport waste material from site to the designated disposal area; 	Contractors

	<ul style="list-style-type: none"> • The on-site ablution facilities on campsites should be serviced on a regular basis; • Anti-vermin safeguards (such as covering bins with lids) should be put in place; and • Operations should aim to reduce, re-use and recycle waste in preference to disposal. 	
<p>Increased pressure on the social service sector</p>	<ul style="list-style-type: none"> • As give-back, the project may invest in rehabilitation of social service resources such as health centers, water sources among other, as part of Corporate Social Responsibility (CSR) initiatives in order to improve their availability for both the local community members and project workers; • Adequate and appropriate sanitary facilities should be constructed for use by the construction workers at the construction site; • A water source should be established to supply water demands for the project activities where a base camp is expected to be constructed; • Hygiene and sanitation campaigns should be undertaken as a way of sanitation awareness in a bid to control outbreaks of diseases 	<p>Contractors</p>
<p>Increased spread of sexually transmitted diseases and other communicable diseases</p>	<ul style="list-style-type: none"> • Awareness and sensitization campaigns should be undertaken on the dangers of sexually transmitted diseases including HIV/AIDS and methods of spread and control. The HIV/AIDS awareness trainer should collaborate with local Non-Government Organizations (NGOs), Community Based Organizations (CBOs) and District Health Officers for sustainability and integration of activities into the existing structures of the local health institutions; • The workforce should be provided with access to primary health care, insecticide-treated mosquito nets if they are housed in a project camp, prescriptions, prophylactics and basic testing for TB, and STDs including HIV/AIDS; • The project should engage an NGO to prepare community institutions for any influx of in-migrants (for example, by developing by-laws and community policing systems for larger numbers of in-migrants); • The project should provide support to local healthcare facilities through training of local healthcare professionals, regular supply of medical supplies and up to date equipment through Corporate Social Responsibility initiatives; • The project should establish a community health Programme including providing support to existing or new local programmes such as mother and child nutrition, community health awareness, HIV/AIDS awareness, hygiene and immunisation, malaria control measures (indoor spraying of insecticides, personal protection measures, and control of mosquito larvae), and local Voluntary Counselling and Testing (VCT) programmes; and • All Project workers should be inducted in relevant codes of conduct that minimize exposure to risky lifestyles including unsafe sex practices. 	<p>Contractors</p>

Table 7.2. Adverse impacts of setting up mini-grids and off-grid Standalone solar systems

Impacts	Main Mitigation measures	Implementing body/Responsibility
Construction phase		
Selective clearance of vegetation and crops	<ul style="list-style-type: none"> • The project should have a Biodiversity Management Plan; • Implementing sub project activities near protected areas and critical habitats should be avoided. • Land clearance should be restricted to that which is required for the project components to minimize the loss of vegetation; • Restrict vehicle movements to and from the project site(s) to the project access road – offroad driving should be prohibited; • Site restoration should be undertaken for areas where temporary project infrastructure will be established during the construction phase. The affected areas should be restored, and only indigenous vegetation replanted. Intentional restoration using exotic plant species should be avoided; and • Sensitize workers against unnecessary destruction, trampling and clearance of flora/crops. 	Contractors
Avian and Bat Collisions and Electrocutions	<ul style="list-style-type: none"> • Transmission line corridors should be aligned corridors to avoid critical habitats (e.g., nesting grounds, heronries, rookeries, bat foraging corridors, and migration corridors); • Maintaining 1.5-meter spacing between energized components and grounded hardware or, where spacing is not feasible, covering energized parts and hardware; • Retrofitting existing transmission or distribution systems by installing elevated perches, insulating jumper loops, placing obstructive perch deterrents (e.g., insulated “V’s”), changing the location of conductors, etc.; and • Where necessary, Installing visibility enhancement objects such as marker balls, bird deterrents, or diverters. • Considering the proposed project where the powerline is insulated, this risk of electrocution expected to be none or minimal and no power line is pass through any known migratory bird routes. • Demarcation and avoidance of areas of conservation of interest (high value, species, feeding or breeding sites, migration routes); • Making power lines present less of an obstacle for birds to collide with and high-visibility markers should be installed to make the lines more visible to birds; • To mitigate habitat disturbance and alteration as much as possible the size of the area to be cleared and used for the project should be minimized. 	Contractors

<p>Introduction of invasive species</p>	<ul style="list-style-type: none"> • Potential sources of soil should first be inspected for the presence of invasive species and if any are found, these sources should not be excavated; and • Invasive species should be monitored for sprout and if they appear along the access road or at the project site, they should be recorded and managed according to a prepared Invasive Species Management Plan; and • Undertake revegetation of scarred project areas by using indigenous plant species that are preferably sourced from the immediate vicinity of the project area. 	<p>Contractors</p>
<p>Increased rates of soil erosion</p>	<ul style="list-style-type: none"> • Site preparation should be undertaken in a systematic manner to reduce the risk of open ground to erosion; • There should be controlled clearance of vegetation and this should be limited to only sections that are required for the establishment of project infrastructure; • An efficient drainage system should be incorporated in the project design to cater for efficient and effective drainage of storm water from the project site and along the access road; • Where possible, construction activities should not take place during heavy rain seasons; • Disturbed areas should be rehabilitated using suitable indigenous cover grasses; and • Landscaping of affected areas should be undertaken following completion of the construction phase to stabilize surfaces. 	<p>Contractors</p>
<p>Soil compaction and loss of soil functioning</p>	<ul style="list-style-type: none"> • Limit the project activities to the footprint of the required project area; • Utilize vehicles with wide tires to minimize pressure exerted onto the ground; • Prohibit off-road driving and parking outside of designated parking area; • Stockpile the surface soil on the side of the project site for future use in landscaping; and • Upon completion of work, the soil in any affected areas should be scarified to alleviate the effects of compaction. 	<p>Contractors</p>
<p>Spillage and leakages</p>	<ul style="list-style-type: none"> • Vehicle maintenance and servicing should be done only on purpose-built impervious concrete platforms with oil and grease traps; • Avoid leakages from vehicles and construction plant by regular and effective maintenance, and accidental spills through good practice by ensuring all equipment is in good condition, clean and free from leaks; • Undertake vehicle inspection using a pre-developed vehicle inspection checklist for all project vehicles; • Do not wash vehicles in wetlands, lakes, streams or rivers; • In case of an oil spill or leaks, contaminated topsoil should be scooped and disposed of appropriately; • Establish temporary and/or permanent waste spill containment structures; • Prepare and implement emergency preparedness and response plans related to oil spill emergencies; 	<p>Contractors, MoED, PIU</p>

	<ul style="list-style-type: none"> • Ensure that all equipment containing fluids such as generators and batteries are placed on drip trays during transportation and prior to installation; • Establish secondary containment for any spills for the gazetted packing area for project vehicles; and • Ensure that the fuel storage tanks have secondary containment. 	
<p>Hazardous Materials</p>	<ul style="list-style-type: none"> ○ Due to the fact that most solar PV systems employ lead acid batteries, retrieval and recycling programs need to be incorporated to assure that the disposal of batteries does not result in environmental impact. Hence: ○ These wastes should be collected, segregated and temporarily stored at designated waste disposal sites; ○ As there are no known facilities to dispose of hazardous waste in the country. The Contractor should consider designing a temporary hazardous waste storage facility in consideration of the generated waste amounts and timing before final disposal by licensed hazardous waste handlers in accordance with the national legislative requirements and world Bank ESF requirements and GIIP practices. ○ Procurement of electronic equipment from credible manufacturers with no or minimum adverse environmental impacts; ○ Undertake trainings on waste management processes, awareness creation and sensitisation program for the proponent and end users about potential negative impacts; ○ All wastes shall be properly disposed of in accordance with the national and international legislative requirements; and ○ Capacitate and support licensed companies involved in hazardous waste management in all aspects including financial and technical supports where possible 	<p>Contractors, MoED, PIU, licenced private company</p>
<p>Waste Management</p>	<ul style="list-style-type: none"> • Personnel should aim to reduce, re-use, and recycle waste in preference to disposal; • Undertake Proper waste segregation and storage; • Provide solid waste handling facilities such as separate waste bins for biodegradable and non-degradable wastes until waste generated is disposed of at authorized dumping sites; • Final domestic and/or other nonhazardous wastes, after proper segregation, should be disposed of safely at the designated waste disposal site; • Maximize the re-use of all excavated materials in the construction works; • Disposal of surplus material (spoil) only at designated sites approved by the responsible local authority and only by approved methods; • No spoil should be disposed of in wetlands, near watercourses and other important habits; 	<p>Contractors, MoED, PIU, licenced private company</p>

	<ul style="list-style-type: none"> • Conduct regular awareness creation, training and sensitization for the project proponent, workers and community reside in the area on the potential negative impacts, health and safety risks, of solid wastes, proposer waste management practices, and processes; • All wastes shall be properly disposed of in accordance with the national legislative requirements and world Bank ESF requirements and GIIP practices; • The contractor should engage a refuse handling company to remove the wastes from the site to the approved dumping site and authorised landfill sites; • The contractor should erect warning signs against littering and dumping sites within the construction site; • Excavated topsoil should be used as backfill by the contractor; and • The contractor shall develop a waste management plan in line with the national policies, standards and guidelines as well as international standards, including World Bank Group Environmental, Health, And Safety (EHS) Guidelines GENERAL EHS GUIDELINES: Environmental Waste Management. 	
<p>Noise and vibrations effects</p>	<ul style="list-style-type: none"> • Prior notice/community awareness will be undertaken for the local community members to keep them informed of what will take place/schedules of the project activities so that they are able to plan accordingly; • Construction activities will be limited to only daytime hours; • Noise monitoring will be undertaken within the area and at nearby sensitive receptor sites during construction; • Use of well-maintained and serviced equipment that generates low noise levels will be emphasized; • Workers involved in construction activities will be provided with requisite Personal Protective Equipment; and • Idling of machinery including vehicles will be prohibited unless necessary. 	<p>Contractors</p>
<p>Alteration of ambient air quality</p>	<ul style="list-style-type: none"> • Ensure construction equipment deployed at the project site is in good condition and routinely maintained to ensure they are efficient and emit relatively low exhaust fumes; • Discourage open burning of waste; and • Operate emission-producing equipment only when necessary and avoid unnecessary idling of equipment. 	<p>Contractors</p>
<p>Working at height on Poles</p>	<ul style="list-style-type: none"> • The project should have Environment, Health and Safety roles assigned to trained personnel; • The project should have an Occupational Health and Safety Plan; • Conducting Job risk assessments and instituting permit to work provisions for activities that are undertaken at a height; • Activities at a height should only be undertaken by well trained personnel; • Testing structures for integrity prior to undertaking work; 	<p>Contractors</p>

	<ul style="list-style-type: none"> • Implementation of a fall protection program that includes training in climbing techniques and use of fall protection measures; inspection, maintenance, and replacement of fall protection equipment; and rescue of fall-arrested workers, among others; • Hoisting equipment should be properly rated and maintained and hoist operators properly trained; and • An approved tool bag should be used for raising or lowering tools or materials to workers on structures. 	
<p>Soil, groundwater, and surface water drainage</p>	<ul style="list-style-type: none"> ✚ The construction contractors should develop environmental; health and safety (EHS) management plans which outline procedures for avoiding health and safety incidents and emergency medical treatment. This requirement should be achieved by making it as part of project contractual agreements. ✚ Introducing & implementing proactive preventive measures including minimizing the hazard: through design of safe work systems and administrative or institutional control measures such as training on safe work procedures, workplace monitoring, regular safety inspections, limiting exposure or work duration. ✚ Providing all necessary personal protective equipment (PPE) in conjunction with training, use, and maintenance of the PPE to the workers and enforce that PPEs are used for the safety and health of workers. ✚ The project implementation unit shall engage dedicated personnel competent on the basis of appropriate education, training, and experience to manage and oversee the health, safety and environment (HSE) aspects of the project. ✚ The HSE personnel shall ensure that the project and contractors operate in accordance with the applicable national and international regulatory HSE requirements and plans; and also monitor implementation of environmental and social protection measures, 	<p>Contractors, MoED, PIU</p>
<p>Soil, groundwater, and surface water drainage</p>	<ul style="list-style-type: none"> • Undertake routine preventive maintenance of motorised equipment to control oil leakages; • Inspection of the condition of vehicles will be undertaken on a daily basis to ensure they are in good working condition and no leakages are registered. Equipment identified with any leakage will be repaired before being used again; • As part of emergency preparedness, a spill contingency plan will be put in place and staff trained in the use of spill-cleaning equipment for proper management of fuel and chemical spillages; • Secondary containment measures in areas where fuels, oils, lubricants, and construction materials such as cement are stored and loaded or unloaded, including fueling points will be installed; • The onsite substation will be lined with sand to absorb any chemical spillages from equipment; • In case of oil pollution, sedimentation and siltation, halt construction activities immediately and recover the pollutant before it reaches the receiving water sources. In addition, avoid washing construction equipment at the transfer station to avert pollution of receiving water sources; • Design and install a septic tank system for human sanitary purposes; and • Provide disposal facilities for wastes. 	<p>Contractors, MoED, PIU</p>

<p>Conflict between Local and Migrant Workers</p>	<ul style="list-style-type: none"> • Involve, encourage, and maximise use of local skilled and unskilled labour provided that it is compatible with the contractor’s skill requirements; and • Ensure fair and transparent hiring and staff management procedures and culturally appropriate communication with local communities about available employment opportunities. 	<p>Contractors, MoED, PIU, licenced private company</p>
<p>Labor Influx</p>	<ul style="list-style-type: none"> • Develop and implement a Labour Influx management strategy; • Develop and implement the Gender Based Violence Management Plan; • Develop and implement a Sexual Exploitation and Abuse/Sexual Harassment (SEA/SH) Management Plan; • Develop and implement a grievance mechanism to address grievances from local stakeholders; and • PIU shall ensure that an area/ site specific assessment of GBV/SEA/SH risks is undertaken within subsequent project ESIA/ESMPs and that prevention and response measures are put in place. 	<p>Contractors, MoED, PIU, licenced private company</p>
<p>Increased traffic</p>	<ul style="list-style-type: none"> • Travel in convoys and at designated times to decrease and avoid peak travel/ movement times within the project area; • Journey-specific risk assessments which will include the identification of potentially sensitive receptors along the traffic routes should be conducted. For significant traffic movements, including transport of construction materials to site, any affected communities/residents along the route should be sensitised, and wherever possible, attempts made to undertake the traffic movements at the least busy times of day; • When travelling in community areas, speed limits on transportation routes should be maintained at 40km/hr for light vehicles and 30km/hr for heavy vehicles; • Only approved drivers should be allowed to operate vehicles; • Construction materials should wherever possible, be preferentially sourced locally in a manner that reduces environmental and social impacts (e.g., transport distances) and maximises local economic development opportunities; • All roads should have clear and visible signage especially in community areas, around schools and hospitals to minimise the risk of accidents; • Each road junction near the project sites should have a traffic controller or signal person to monitor and direct traffic flow; • All staff should undergo an Environment, Health and Safety induction process which includes rules for safe driving, including speed limits in community areas; and • Construction equipment should be maintained on site until the construction is complete to reduce on vehicle movement (Taking into consideration, their security). 	<p>Contractors</p>

<p>Increased pressure on the social service sector</p>	<ul style="list-style-type: none"> • As give-back, the project may invest in rehabilitation of social service resources such as health centers, water sources among other, as part of Corporate Social Responsibility (CSR) initiatives in order to improve their availability for both the local community members and project workers; • Adequate and appropriate sanitary facilities should be constructed for use by the construction workers at the construction site; • A water source should be established to supply water demands for the project activities where a base camp is expected to be constructed; and • Hygiene and sanitation campaigns should be undertaken as a way of sanitation awareness in a bid to control outbreaks of diseases. 	<p>Contractors</p>
<p>Increased spread of sexually transmitted diseases and other communicable diseases</p>	<ul style="list-style-type: none"> • Awareness and sensitisation campaigns should be undertaken on the dangers of sexually transmitted diseases including HIV/AIDS and methods of spread and control. The HIV/AIDS awareness trainer should collaborate with local Non-Government Organizations (NGOs), Community Based Organizations (CBOs) and District Health Officers for sustainability and integration of activities into the existing structures of the local health institutions; • The workforce should be provided with access to primary health care, insecticide-treated mosquito nets if they are housed in a project camp, prescriptions, prophylactics and basic testing for TB, and STDs including HIV/AIDS; • The project should engage an NGO to prepare community institutions for any influx of in-migrants (for example, by developing by-laws and community policing systems for larger numbers of in-migrants); • The project should provide support to local healthcare facilities through training of local healthcare professionals, regular supply of medical supplies and up to date equipment through Corporate Social Responsibility initiatives; • The project should establish a community health Programme including providing support to existing or new local programmes such as mother and child nutrition, community health awareness, HIV/AIDS awareness, hygiene and immunisation, malaria control measures (indoor spraying of insecticides, personal protection measures, and control of mosquito larvae), and local Voluntary Counselling and Testing (VCT) programmes; and • All Project workers should be inducted in relevant codes of conduct that minimize exposure to risky life styles including unsafe sex practices. 	<p>Contractors</p>
<p>Vandalism of solar and mini-grid equipment</p>	<ul style="list-style-type: none"> • The PIU should work closely with the Ministry of National Security to provide security to the project infrastructure; • Work with local government institutions in the hard-to-reach areas to provide security updates to the PIU; and 	<p>Contractors</p>

	<ul style="list-style-type: none"> Establish good working relations with local authorities and communities and encourage them to ensure the security of the solar equipment. 	
Operation phase		
Electric and Magnetic Fields (EMF) Impacts	<ul style="list-style-type: none"> Evaluate potential exposure to the public against the reference levels developed by the International Commission on Non-Ionizing Radiation Protection (ICNIRP) Average and peak exposure levels should remain below the ICNIRP recommendation for General Public Exposure; Consider siting new facilities so as to avoid or minimize exposure to the public. Installation of transmission lines or other high voltage equipment above or adjacent to residential properties or other locations intended for highly frequent human occupancy, (e.g., schools or offices), should be avoided; and If EMF levels are confirmed or expected to be above the recommended exposure limits, application of engineering techniques should be considered to reduce the EMF produced by power lines, substations, or transformers. Examples of these techniques include: <ul style="list-style-type: none"> Shielding with specific metal alloys; Increasing height of transmission towers; and Modifications to size, spacing, and configuration of conductors 	Contractors
Working at height on Poles	<ul style="list-style-type: none"> Conducting Job risk assessments and instituting permit to work provisions for activities that are undertaken at a height; Testing structures for integrity prior to undertaking work; and Maintenance activities at a height should only be undertaken by trained personnel. 	Contractors
Soil, groundwater, and surface water drainage	<ul style="list-style-type: none"> Regular and routine monitoring and maintenance will be undertaken to ensure that all project equipment is in good working condition at all times; and Regular maintenance of operations vehicles off-site thus minimizing the potential for leakages. 	Contractors
Vandalism of solar and mini-grid equipment	<ul style="list-style-type: none"> Workers should be monitored, and proper work schedules designed so that workers undertake tasks where they have been deployed. 	Contractors
Decommissioning phase		
Introduction of invasive species	<ul style="list-style-type: none"> Invasive species can be monitored for sprout and if they appear along the access road or at the project site they will be recorded and managed according to the Invasive Species Management Plan of the Project. Care should be taken to ensure all equipment is properly cleaned to avoid introduction of invasive species at project site from trucks, and other equipment used during this phase. 	Contractors
Soil erosion	<ul style="list-style-type: none"> Reinstate soils and original drainage patterns of the area; Re-vegetate any areas used temporarily during construction; and 	Contractors

	<ul style="list-style-type: none"> No non-native species should be planted on-site. 	
Soil compaction and loss of soil functioning	<ul style="list-style-type: none"> Driving outside the designated working areas should be prohibited to prevent soil compaction and habitat disturbance or destruction; and Upon completion of work, the soil in any affected areas should be scarified to alleviate the effects of compaction. 	Contractors
Spillage and leakages	<ul style="list-style-type: none"> Ensure to have a decommissioning plan that covers aspects of spill control in place; and Ensure to place the batteries, and any other equipment with the potential for leakages on drip trays during disassembling and transportation. 	Contractors, MoED, PIU, licenced private company
Hazardous Materials	<ul style="list-style-type: none"> These wastes should be collected, segregated and temporarily stored at designated waste disposal sites; As there are no known facilities to dispose of hazardous waste in the country. The Contractor should consider designing a temporary hazardous waste storage facility in consideration of the generated waste amounts and timing before final disposal by licensed hazardous waste handlers in accordance with the national legislative requirements and world Bank ESF requirements and GIIP practices. Procurement of electronic equipment from credible manufacturers with no or minimum adverse environmental impacts; Undertake trainings on waste management processes, awareness creation and sensitisation program for the proponent and end users about potential negative impacts; All wastes shall be properly disposed of in accordance with the national and international legislative requirements; and Capacitate and support licensed companies involved in hazardous waste management in all aspects including financial and technical supports where possible. The project developer should have a decommissioning plan in place that addresses aspects of waste management. 	Contractors, MoED, PIU, licenced private company
Waste Management	<ul style="list-style-type: none"> Personnel should aim to reduce, re-use, and recycle waste in preference to disposal; Undertake Proper waste segregation and storage; Provide solid waste handling facilities such as separate waste bins for biodegradable and non-degradable wastes until waste generated is disposed of at authorised dumping sites; Final domestic and/or other nonhazardous wastes, after proper segregation, should be disposed of safely at the designated waste disposal site; Maximise the re-use of all excavated materials in the construction works; Disposal of surplus material (spoil) only at designated sites approved by the responsible local authority and only by approved methods; No spoil should be disposed of in wetlands, near watercourses and other important habits; 	Contractors, MoED, PIU, licenced private company

	<ul style="list-style-type: none"> • Conduct regular awareness creation, training and sensitization for the project proponent, workers and community reside in the area on the potential negative impacts, health and safety risks, of solid wastes, proposer waste management practices, and processes; • All wastes shall be properly disposed of in accordance with the national legislative requirements and world Bank ESF requirements and GIIP practices; • The contractor should engage a refuse handling company to remove the wastes from the site to the approved dumping site and authorised landfill sites; • The contractor should erect warning signs against littering and dumping sites within the construction site; • Excavated topsoil should be used as backfill by the contractor; and • The contractor shall develop a waste management plan in line with the national policies, standards and guidelines as well as international standards, including World Bank Group Environmental, Health, And Safety (EHS) Guidelines GENERAL EHS GUIDELINES: Environmental Waste Management. 	
Noise and vibrations effects	<ul style="list-style-type: none"> • Prior notice/community awareness will be undertaken for the local community members to keep them informed of what will take place/schedules of the project activities so that they are able to plan accordingly; • Construction activities will be limited to only daytime hours; • Noise monitoring will be undertaken within the area and at nearby sensitive receptor sites during construction; • Use of well-maintained and serviced equipment that generates low noise levels will be emphasized; • Workers involved in construction activities will be provided with requisite Personal Protective Equipment; and • Idling of machinery including vehicles will be prohibited unless necessary. 	Contractors
Alteration of ambient air quality	<ul style="list-style-type: none"> • Ensure construction equipment deployed at the project site is in good condition and routinely maintained to ensure they are efficient and emit relatively low exhaust fumes; • Discourage open burning of waste; and • Operate emission-producing equipment only when necessary and avoid unnecessary idling of equipment. 	Contractors
Working at height on Poles	<ul style="list-style-type: none"> • Conducting Job risk assessments and instituting permit to work provisions for activities that are undertaken at a height. 	Contractors
Soil, groundwater, and surface water drainage	<ul style="list-style-type: none"> • Undertake routine preventive maintenance of motorised equipment to control oil leakages; • Inspection of the condition of vehicles will be undertaken on a daily basis to ensure they are in good working condition and no leakages are registered. Equipment identified with any leakage will be repaired before being used again; 	Contractors, MoED, PIU, licenced private company

	<ul style="list-style-type: none"> In case of oil pollution, sedimentation and siltation, halt demolition activities immediately and recover the pollutant before it reaches the receiving water sources; and Provide disposal facilities for wastes. 	
Conflict between Local and Migrant Workers	<ul style="list-style-type: none"> Involve, encourage, and maximise use of local skilled and unskilled labour provided that it is compatible with the contractor’s skill requirements; and Ensure fair and transparent hiring and staff management procedures and culturally appropriate communication with communities regarding employment opportunities. 	Contractors, MoED, PIU
Labor Influx	<ul style="list-style-type: none"> Develop and implement a Labour Influx management strategy; Develop and implement the GBV management plan; Develop and implement the Sexual Exploitation and Abuse/Sexual Harassment (SEA/SH) management plan; and Develop and implement a grievance mechanism to address grievances from local stakeholders. 	Contractors, MoED, PIU
Increased traffic	<ul style="list-style-type: none"> Travel in convoys and at designated times to decrease and avoid peak travel/ movement times within the project area; Journey-specific risk assessments which will include the identification of potentially sensitive receptors along the traffic routes should be conducted. For significant traffic movements, including transport of construction materials to site, any affected communities/residents along the route should be sensitised, and wherever possible, attempts made to undertake the traffic movements at the least busy times of day; When travelling in community areas, speed limits on transportation routes should be maintained at 40km/hr for light vehicles and 30km/hr for heavy vehicles; Only approved drivers should be allowed to operate vehicles; Construction materials should wherever possible, be preferentially sourced locally in a manner that reduces environmental and social impacts (e.g., transport distances) and maximises local economic development opportunities; All roads should have clear and visible signage especially in community areas, around schools and hospitals to minimise the risk of accidents; Each road junction near the project sites should have a traffic controller or signal person to monitor and direct traffic flow; All staff should undergo an Environment, Health and Safety induction process which includes rules for safe driving, including speed limits in community areas; and Construction equipment should be maintained on site until the construction is complete to reduce on vehicle movement (Taking into consideration, their security). 	Contractors

<p>Increase pressure on the social service sector</p>	<ul style="list-style-type: none"> • As give-back, the project may invest in rehabilitation of social service resources such as health centers, water sources among other, as part of Corporate Social Responsibility (CSR) initiatives in order to improve their availability for both the local community members and project workers; • Adequate and appropriate sanitary facilities should be constructed for use by the construction workers at the construction site; • A water source should be established to supply water demands for the project activities where a base camp is expected to be constructed; and • Hygiene and sanitation campaigns should be undertaken as a way of sanitation awareness in a bid to control outbreaks of diseases. 	<p>Contractors</p>
<p>Increased spread of sexually transmitted diseases and other communicable diseases</p>	<ul style="list-style-type: none"> • The project should undertake awareness and sensitisation campaigns on the dangers of sexually transmitted disease including HIV/AIDS and methods of spread and control. • The HIV/AIDs awareness trainer should collaborate with local NGOs, CBOs and District Health Officers for sustainability and integration of activities into the existing structures of the local health institutions; and • Project workers should be inducted in relevant codes of conduct that minimise exposure to risky life styles including unsafe sex practices. 	<p>Contractors, MoED, PIU</p>

8 PUBLIC CONSULTATION, PARTICIPATION AND DISCLOSURE

8.1 Stakeholder mapping (identification and analysis)

8.1.1 Stakeholder identification

Stakeholder identification aims to establish which organisations and individuals, including vulnerable groups, may be directly or indirectly affected (*positively or negatively*) by the project or have an interest in it. Stakeholder identification is an on-going process that is regularly reviewed and updated throughout project planning and implementation.

The stakeholder identification process took into account:

- Organisations and individuals that are directly and or indirectly involved in or likely to be affected by the Project's operations in line with E&S management;
- Organisations or individuals that have fundamental interest in the Project's E&S management processes; and
- Organisations or individuals that have the potential to influence/contribute to E&S impacts in relation to the implementation of the Project.

Table 8.1 below summarises the key project stakeholders that were identified and their specific relevance to/interest in the Project

Table 8.1: Stakeholders identified during the ESMF preparation

Stakeholder Group	Stakeholders	Interest and Influence on Project activities based on the Stakeholder Impact Matrix	Level of Engagement Required based on the Stakeholder Impact Matrix
Government Ministries	Ministry of Energy and Dams	High Influence/High Interest	In-depth engagement
	Ministry of Environment and Forestry		In-depth engagement
	Ministry of Finance and Economic Planning		In-depth engagement
	Ministry of Health	Medium Influence/High Interest	In-depth engagement.
	Ministry of Higher Education, Science and Technology	Medium Influence/High Interest	In-depth engagement
	Ministry of Lands, Housing and Urban Development	Medium Influence/High Interest	In-depth engagement
	Ministry of Humanitarian Affairs and Disaster Management	Medium Influence/High Interest	In-depth engagement
	Ministries of Foreign Affairs and International Cooperation	Medium Influence/High Interest	In-depth engagement
	Ministry of Internal Affairs	Medium Influence/High Interest	In-depth engagement
	Ministry of National Security	Medium Influence/High Interest	In-depth engagement
	Ministry of Gender, Social Welfare and Religious Affairs	Medium Influence/High Interest	In-depth engagement
	Ministry of Public Service and Human Resource Development	Medium Influence/High Interest	Focused engagement
	Ministry of Labour	Medium Influence/High Interest	Focused engagement
Selected social institutions	Hospitals, health care centres, secondary and primary schools as well as key economic hubs such as agricultural markets.	Medium Influence/High Interest	Focused engagement
Institutions of higher learning	<ul style="list-style-type: none"> • The University of Juba; • University of Upper Nile; and • Catholic University of Juba. 	Low Influence/low Interest	Information disclosure

Public facilities	Management of Government administration buildings and water supply facilities	Low Influence/High Interest	Focused engagement
Electricity Bodies/Utilities (Public and Private)	<ul style="list-style-type: none"> • South Sudan Electricity Corporation (SSEC); and • Juba Electric Distribution Company (JEDCO). 	Medium Influence/High Interest	In-depth engagement
Refugee camps and host communities	Jamjang village and Maban county	Low Influence/High Interest	Focused engagement
Government of Uganda represented by Ministry of Energy and Mineral Development (MEMD)	Minister of Energy and Mineral Development	Medium influence/Medium Interest	Informed engagement
Government of Ethiopia	Government entities responsible for the energy sector	Medium influence/Medium Interest	Informed engagement
Development Partners (Financing Agencies)	World Bank, UN Agencies (UNHCR, UNICEF, UNDP), EU Mission in South Sudan, AfDB, FCDO	High Influence/High Interest	In-depth engagement
Renewable Energy Companies'	Solar Energy Companies	Low Influence/low Interest	Information disclosure
Civil Society Organisations	International Development NGOs, UN Agencies (UNHCR, UNICEF, and UNDP) National NGO's such as Young Positives and Men to Women	Medium Influence/Medium Interest	Focused engagement
Project Affected local communities	Community members within the project area of influence. Vulnerable Groups and their representatives.	Low Influence/High Interest	Focused engagement
Media (Avenues/entities of dissemination of	Ministry of Energy and Dams, Ministry of Higher Education, Science and Technology, Ministry of Environment, World Bank, SSEC and National NGO's (Young Positives, and Men to Women)	Low Influence/low Interest	Information disclosure

<i>information about the project)</i>			
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8.1.2. Stakeholder Mapping

Following identification of stakeholders, stakeholder mapping was undertaken to understand a stakeholder or stakeholder group's influence and potential interest in relation to the Project's E&S management activities so that tailored consultation approaches could be developed.

a) Assessing Stakeholder Interest

Stakeholder interest in this case is defined as the extent to which the interests of a stakeholder are affected by or affect the Project's E&S management activities. The stakeholders' interests in the Project may be legal, financial, social, scientific or technical. These interests can be either positive or negative and can lead to either an improvement or deterioration in the management of E&S aspects on the Project. Stakeholder interest was assessed using the criteria shown in Table 8.2.

Table 8.2: Assessing Stakeholder Interest

Level of Interest	Definition
High	The Project or its E&S management activities potentially have a significant positive or negative impact on the interests of the stakeholder. The impact is considered significant and the stakeholders are highly sensitive to the impact.
Medium	The Project or its E&S management activities have a moderate positive or negative impact on the interests of the stakeholder. The impact is considered medium and stakeholders are moderately sensitive to the impact.
Low	The Project or its E&S management activities potentially have a minor positive or negative impact on the interests of the stakeholder. The impact is considered minor and stakeholders are not considered sensitive to the impact.

a) Assessing Stakeholder Influence

Stakeholder influence refers to the power that a stakeholder has over the Project's development process or E&S management activities and outcomes. Influence can be direct or indirect. Indirect influence is from a stakeholder's ability to influence others or their access to important information. Direct influence is their ability to directly affect decision-making through, for example, the issue of government approval and permitting decisions. The assessment is qualitative and based on the criteria presented in Table 8.3.

Table 8.3: Assessing Stakeholder Influence

Level of influence	Definition
High	The stakeholder or stakeholder group is considered highly influential and has the capacity to significantly impact the Project and its E&S management activities.
Medium	The stakeholder or stakeholder group is considered to have moderate influence and moderate capacity to influence the Project and its E&S management activities.
Low	The stakeholder or stakeholder group is isolated and has limited capacity to exert influence over the Project and its E&S management activities.

Engagement methods were prioritised based on the stakeholders' **influence** and **interest** on the Project and its related E&S management activities (Table 8.4 below). The overall aim was to ensure that all stakeholders were identified and engagement approaches tailored in order to:

- Drive effective communication of information related to the Project;

- Support confirmation that information had been understood;
- Facilitate feedback from stakeholders; and
- Enable stakeholder input and participation in decisions affecting their activities.

High Influence/High Interest. This group primarily includes stakeholders such as MoED, Ministry of Environment and Forestry, Ministry of Finance and Economic Planning and Development Partners that are directly associated with the Project or its E&S management activities. The level of engagement for stakeholders in this category is *In-depth engagement*.

High Influence/Low Interest. This group includes local Non-Government Organisations. The level of engagement for stakeholders in this category is *Informed Engagement*.

Low Influence/High Interest. This group includes energy companies operating in South Sudan, Refugee camps and host communities, management of public facilities, Project Affected local communities and selected social institutions. The level of engagement for stakeholders in this category is *Focused Engagement*.

Low Influence/Low Interest. This group includes other project beneficiaries such as Institutions of higher learning (The University of Juba, University of Upper Nile and Catholic University of Juba). The level of engagement for stakeholders in this category is *Information Disclosure*.

Medium Influence/High Interest. This group includes; Ministry of Health, Ministry of Higher Education, Science and Technology, Ministry of Lands, Housing and Urban Development, Ministry of Humanitarian Affairs and Disaster Management, Ministries of Foreign Affairs and International Cooperation, Ministry of Internal Affairs, Ministry of National Security, Ministry of Gender, Social Welfare and Religious Affairs, Ministry of Public Service and Human Resource Development, Selected social institutions and Ministry of Labour. The level of engagement for stakeholders in this category is; *In-depth engagement*. **Medium influence/Medium.** This group includes; Government of Ethiopia and Government of Uganda represented by Ministry of Energy and Mineral Development (MEMD). The level of engagement for stakeholders in this category is *Informed engagement*.

Table 8.4 below highlights stakeholders or stakeholder groups that have been identified and mapped at this stage of the assignment. This is in relation to the Project and its related management of E&S aspects. The corresponding proposed level of engagement is indicated accordingly

Table 8.4: Stakeholder influence and project impact analysis matrix

Stakeholder Group	Project Impacts						Vulnerability			Influence the Project over						Level of Engagement
	Positive			Negative						Positive			Negative			
	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	
Government of South Sudan Ministries	Red					Blue			Blue	Red					Blue	Inform/Consult/ Involve & Collaborate
Regional Capital Cities	Red					Blue			Blue		Yellow					Inform/Consult/ Involve & Collaborate
Selected social institutions	Red					Blue			Blue		Yellow					Inform/Consult/ Involve & Collaborate
Public facilities	Red					Blue			Blue		Yellow					Inform/Consult/ Involve & Collaborate
Electricity Bodies/Utilities (Public and Private)	Red					Blue			Blue		Yellow					Inform/Consult/ Involve & Collaborate
Refugee camps and host communities	Red					Blue		Yellow				Blue				Inform/Consult/Involve
Government of Uganda represented by MEMD		Yellow				Blue			Blue			Blue				Involve/Collaborate & Consult
Government of Ethiopia		Yellow				Blue			Blue			Blue				Involve/Collaborate & Consult
Development Partners (Financing Agencies)		Yellow				Blue			Blue	Red					Blue	Inform/Consult/ Involve & Collaborate
Civil Society		Yellow				Blue			Blue		Yellow				Blue	Involve/Collaborate & Consult
Project Affected local communities	Red				Yellow		Red					Blue			Blue	Involve/Collaborate/Consult & Empower
Academic Institutions			Blue			Blue			Blue			Blue			Blue	Involve & Consult

Stakeholder Group	Project Impacts						Vulnerability	Influence over the Project						Level of Engagement		
	Positive			Negative				Positive			Negative					
	H	M	L	H	M	L		H	M	L	H	M	L			
Media																Involve

8.2. Stakeholder consultation during the preparation of the ESMF

Stakeholder consultations are pivotal with regards to:

- Sharing of information about the proposed project with relevant stakeholders;
- Securing the necessary stakeholder buy-in for the planned interventions;
- Identifying and verifying the significance of environmental, social and health impacts;
- Understanding the socio-economic dynamics of the operating environment;
- Shaping the decision-making process through inclusivity;
- Establishment of robust communication channels; and
- Laying a foundation for sustainable results.

The stakeholder consultation process was undertaken under three phases as highlighted in Table 8.5 below and further detailed in sections 8.2.1 and 8.2.2.

Table 8.5: Phases of stakeholder Consultation during the preparation of the ESMF

Phases of Consultation	Objective	Key Activities	Key Outputs
Phase 1: Preparation of the ESMF / Collection of E&S data	To collect/attain Environmental and Social baseline information to update the ESMF.	Meetings with key stakeholder groups in Juba.	<ul style="list-style-type: none"> • Updated Draft ESMF Report; and • Records of engagement activities undertaken to date.
Phase 2: Disclosure of the ESMF	To present the draft ESMF to the selected stakeholders. To obtain comments and input from stakeholders regarding the ESMF.	Validation meeting/workshops with a wider stakeholder group.	<ul style="list-style-type: none"> • Final ESMF Report.
Phase 3: ESMF implementation stage	To provide stakeholders with details regarding the undertakings, routines, status and progress of the project.	Communication of project progress and other key aspects that should be highlighted to stakeholders.	<ul style="list-style-type: none"> • New/updated project information.

8.2.1 Phase 1: Preparation of the ESMF / Collection of E&S data

The MoED team involved in development of the Environmental and Social Safeguards had meetings with government bodies (Ministry of Public Service and Human Resource Development; Ministry of Higher Education; The South Sudan Electricity Corporation (SSEC); Ministry of Labour; Ministry of Environment and Forestry; Ministry of Lands, Housing and Urban Development; and the Ministry of Gender and Social Welfare) as well as Donors/Development partners in South Sudan and representatives of Civil Society Organisations (“Young Positives” – youths living with HIV and AIDS, and

“Men to women” – NGO empowering men to fight gender-based-violence) and representatives of the local media.

8.2.2. Phase 2: Disclosure of the ESMF

It is planned to organise a workshop with all stakeholder ministries and governmental bodies of South Sudan, where the MoED will present the work done on development of Environmental and Social Safeguards in mid-December 2022. This will help validating the developed documents by the relevant ministries (particularly Ministry of Environment & Forestry, Ministry of Gender and Social Affairs, Ministry of Lands, Housing and Urban Development and Ministry of Labour) and will ensure the buy-in from the Government of South Sudan.

A final validation workshop is planned for the second or third week of January 2023 during which the updated versions (following World Bank review) of the Environmental and Social Safeguards will be presented. It is hoped that this workshop will be open to a wider group of stakeholders. The validated documents can subsequently be disclosed on the Bank’s website for further stakeholder input. Feedback received from stakeholders on the project impacts, mitigation and monitoring plans and other aspects will receive a response, and where appropriate, will be incorporated into the final copy of the ESMF.

Key objectives of stakeholder consultation at this stage will be to:

- Provide stakeholders with an update on the energy access project and details of the final project description;
- Provide stakeholders with a summary of the ESMF report findings;
- Provide stakeholders with details of the mitigation and enhancement measures proposed to minimise negative project impacts and maximise potential project benefits;
- Solicit stakeholder feedback on the accuracy of the ESMF impact assessment and the appropriateness of the mitigation measures; and
- Incorporate comments from stakeholders into the final ESMF report.

The ESMF will be disclosed via the following avenues:

- National and local media (radio and newspapers);
- Direct distribution to stakeholders by hand, post and email;
- World Bank and MoED websites; and
- Physical meetings held with stakeholders within the project area (s).

8.2.3. Phase 3: ESMF implementation stage

Engagement of stakeholders in this phase entails providing important details on the undertakings, routines, status and progress of the project. Key activities in this phase will involve tracking of commitments made to stakeholder groups and communicating progress made against these commitments on a regular basis. The methods and frequency of reporting to stakeholders is provided in Table 8.6 below.

Table 8.6: Methods and frequency of reporting to stakeholders during the ESMF implementation stage

Reporting Party	Reporting Method	Stakeholder	Reporting Information	Frequency
Project Implementation Unit (PIU)	<ul style="list-style-type: none"> • Induction; • Toolbox talks; and • Via project tender information. 	<ul style="list-style-type: none"> • New groups of workers; and • Project contractors. 	<ul style="list-style-type: none"> • Environmental and social project requirements; • EHS requirements; and • Grievance mechanism. 	From commencement of project activities Monthly
PIU	Formal meeting	<ul style="list-style-type: none"> • Government authorities and agencies; • Local authorities; • Local community members; and • Project affected persons. 	<ul style="list-style-type: none"> • Project status/progress; • EHS requirements; and • Grievance management progress. 	Quarterly meeting
South Sudan Government Ministries	Print media	<ul style="list-style-type: none"> • Project affected communities; • NGOs; and • General public. 	<ul style="list-style-type: none"> • Land acquisition plans; • Project status/progress; and • Grievance mechanism. 	Bi-annually
PIU	Public Meeting; One-on-one meetings; and Focus Group Discussions (FGDs) and Key Informant Interviews (KIIs)	Project Affected persons and communities.	<ul style="list-style-type: none"> • Land acquisition plans; • Project progress; • Grievance management progress; • Feedback on commitments; and • Feedback on other issues affecting community members. 	When need arises or monthly. Ad hoc or throughout the life of the project.
	Website and social media Press release	International Development NGOs and UN	<ul style="list-style-type: none"> • Project status; 	When changes to the project

		Agencies (UNHCR, UNICEF, UNDP, etc.); General public; and Other local and international stakeholders.	<ul style="list-style-type: none"> • Changes and key issues; and • Frequently Asked questions (FAQs). 	occur or annually.
PIU	Monthly Progress reports	Local community members and project affected persons.	<ul style="list-style-type: none"> • Grievances from the local communities. 	Monthly

8.3. COVID-19 protocol during stakeholder consultation activities

Stakeholder consultation activities were planned and aligned to COVID -19 prevention guidelines as issued by the South Sudan Government, Ministry of Health as well as internationally recognised health bodies such as the World Health Organisation (WHO). The COVID-19 protocol that was followed during the stakeholder consultations, entailed the following considerations:

- Identifying essential stakeholder engagement activities and assessing the purpose of the engagement activities and the desired outcomes;
- Prioritising critical engagement activities and considering virtual, hybrid²² and remote alternatives that best met the objectives of the planned activities;
- Analysing factors such as access to and quality of internet and electricity connectivity, use of social media platforms, mobile phone coverage, internet access, availability of mobile network providers and language barriers to provide a range of options to meet different stakeholders’ needs; and
- Evaluating options for providing alternative secure channels for grievances to protect complainants against potential retaliation.

In the event of a physical meeting, a pre-engagement brief was to be considered to highlight to the participants, the precautions that have to be adhered to throughout the meeting. The precautions included:

- Social distancing (2m);
- Wearing a facemask by participants;
- Hand washing and/or sanitisation; and
- Temperature and COVID-19 symptom screening.

Where meetings could not be held outdoors, ensuring that meeting rooms have adequate ventilation (*high roofs, lots of unobstructed windows, fans – this applied to the national level consultations*).

²² Physical meetings that were blended with virtual attendance of some participants.

9 GRIEVANCE REDRESS MECHANISM

A Grievance mechanism provides a formal way for affected stakeholders to engage with the project implementers on issues of concern and/or unaddressed impacts. A Grievance is a formal complaint by an individual or a group who believes that their interests have been affected adversely in a way that they consider inappropriate. Grievances can arise from a range of development-related activities such as land acquisition or breaches of community health, safety and security commitments causing death, damage or injury. Identifying and responding to grievances supports the development of positive relationships between project implementers and affected stakeholders.

A key requirement of the World Bank ESS10 is to respond to concerns and grievances of project-affected parties related to the environmental and social performance of the project in a timely manner.

Effective implementation of a grievance mechanism is crucial to the management of potential risks and impacts of the project. The Concerns and Grievance mechanisms procedure will be communicated by the PIU to all stakeholders throughout the lifetime of the project to ensure that stakeholders understand the process but also provide feedback and comments on whether it is effective and fit for purpose.

Projects may have a range of potential adverse impacts to people and the environment in general, identifying grievances and ensuring timely resolution is therefore very necessary. As such, the ESMF has developed a grievance management process to serve as a guide during project implementation.

9.1 Grievance Channels

Stakeholders will be informed about the grievance mechanism throughout the project implementation through avenues such as public/community meetings, letters/ leaflets, and via the Project website. Resolutions may also be presented at the meetings.

Stakeholders will be able to lodge a grievance in person, by email, telephone or letter. Grievances may also be passed through local community leaders to the responsible project personnel.

9.2 Grievance Mechanism Procedure

The grievance mechanism will involve seven (7) stages that are highlighted below. Figure 9.1 shows the grievance mechanism process.

Stage 1: Grievance Identification

Stakeholders will be able to lodge grievances in writing using the grievance form (Annexure IV). If a stakeholder is unable to submit a written grievance, they can submit it verbally and it will be recorded on their behalf by the project Implementation Unit (PIU) representatives or via a local community leader or grievance management committee members.

Stage 2: Registration and Categorisation

All grievances received will be recorded in the grievance log (Annexure V). The grievance log will be developed in *Microsoft Excel* and will be used for logging, tracking and managing the grievance mechanism.

The significance of the grievance will be assessed and the grievance will be categorised as:

- Low priority grievance: a local, isolated or one-off complaint;
- Medium priority grievance: widespread and/ or ongoing complaint, e.g., noise, vibration and dust during construction; and
- Critical priority grievance: potential for significant breach of the World Bank ESF, national legislation and international conventions that the government of South Sudan has ratified.

This categorisation will be updated and refined over the life of the project as required.

Table 9.1 outlines the process for responding to categories of grievances. The response timeframe refers to the time period for responding to a stakeholder's grievance and starting the process of resolving the grievance. PIU representatives will aim to close the grievance as far as possible within the response timeframes in Table 9.1, otherwise it is anticipated that PIU representatives will close out grievances within 30 days of receiving a grievance, in as much as possible.

Table 9.1: Grievance Categorisation and Response

Grievance Priority	Description	Response Timeframe	Type of Action
Low Priority Complaint	Local, isolated or one-off complaint.	Grievance response within 14 days.	PIU representatives to coordinate internal response to grievance.
Medium Priority Complaint	Widespread and/ or ongoing complaint, i.e., noise, vibration and dust.	Grievance response within 7 days.	PIU representatives to investigate complaint.
Critical Priority Complaint	Potential for significant breach of World Bank ESF, national legislation and international conventions that the government of South Sudan has ratified and/ or negative media attention.	Grievance response/action within 3 days.	PIU representatives arrange priority team to investigate the complaint as a matter of urgency. Project activities may be halted for the investigation and to allow mitigation measures to be determined.

Stage 3: Acknowledgement

Upon submission of a grievance, regardless of the method used, stakeholders will receive a Letter of Acknowledgement (Annexure VI) informing them that their grievance has been received and logged within 24 hours. Information on the next course of action and an indicative timeframe for resolution of the grievance will be provided.

Stage 4: Investigation and Consultation

Following assignment of a grievance by the PIU, an investigation will be conducted into the issue raised, including consultation with the concerned person/party to identify measures to resolve the grievance as appropriate.

Stage 5: Communication of Resolution

The outcome of the investigation will be communicated to the complainant and feedback will be requested on the resolution. All grievances will be responded to within the timeframes indicated in Table 9.1 above. This initial response will include a summary of what is planned and when it is likely to be implemented, or an explanatory note clarifying why action is not required. The response will be in writing, although a verbal response will also be provided where appropriate.

Stakeholders submitting the grievance will be asked to give their feedback on the proposed course of action. If the feedback is negative, negotiation meetings will be organised with the project

stakeholders in order to reach agreement. All actions will be logged in the grievance form and the grievance log.

Stage 6: Recourse to a Third Party

If a resolution of the grievance cannot be achieved, the project will consider establishing an amicable resolution mechanism through the setting up of a Conflict Resolution Committee. The Committee will be made up of PIU and local authority representatives who will settle disputes amicably and manage complex grievance issues. If still unresolved, the dispute will ultimately be sent to the relevant government body.

Stage 7: Effectiveness Review

When corrective actions are agreed upon by the project and the complainant, the project will be responsible for ensuring that corrective actions are implemented. Stakeholders will be informed on the progress of the implemented corrective actions. If no further attention is required, then the PIU can close the grievance and record this in the grievance log. Final decisions and details of closed grievances will be approved and signed off by the PIU representatives.

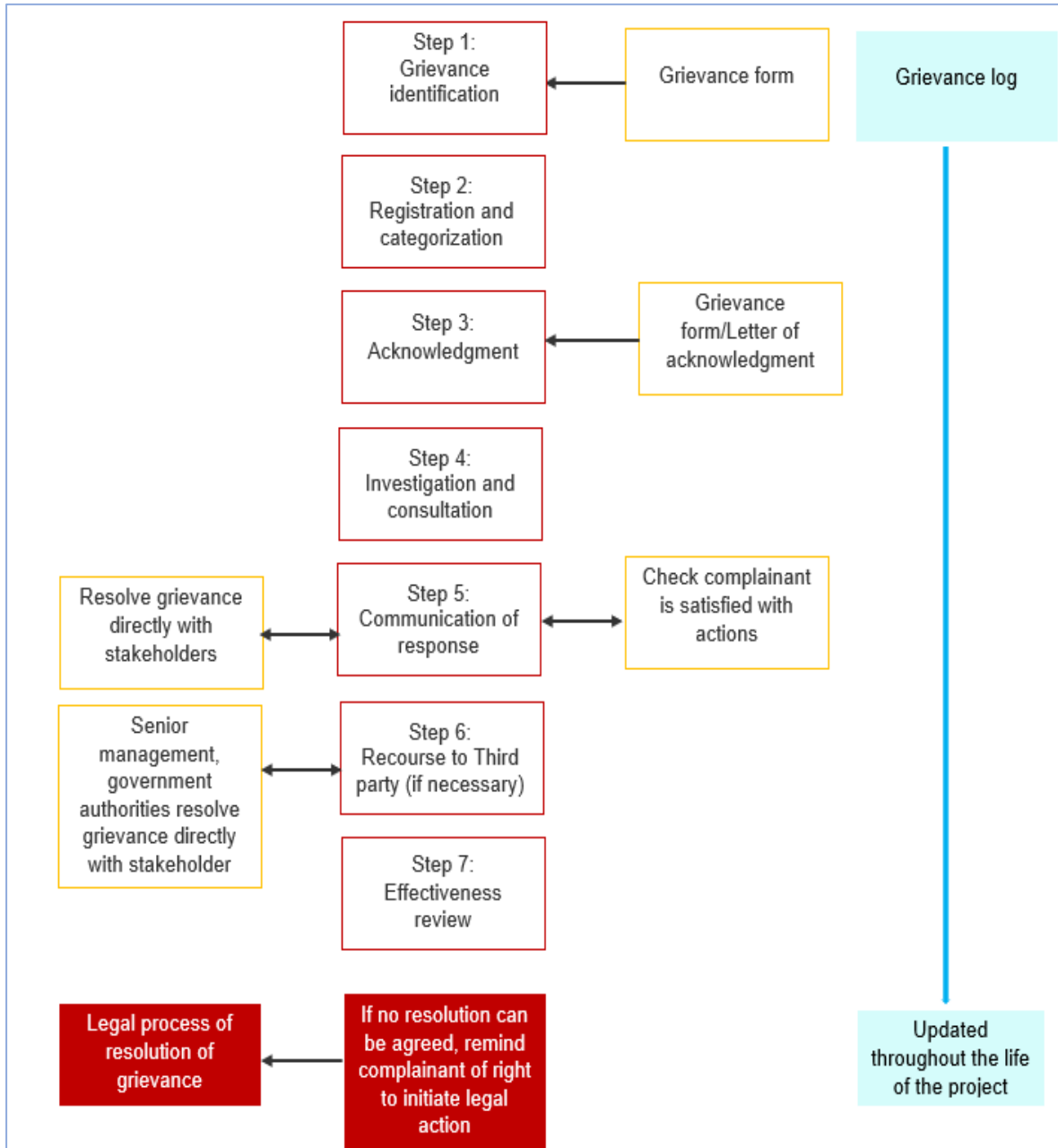


Figure 9.1: Grievance Flow Chart

9.2.1 Grievance Log

The Grievance Log will be filled out by the PIU representative who is responsible for tracking and managing grievances. Wherever possible, grievances will be logged as soon as they are received to ensure proper tracking and management of the grievance mechanism.

10 MONITORING AND EVALUATION

Monitoring environmental and social aspects on the project provides for continuous assessment of compliance with the WB ESF and national requirements. This is in line with propagating continuous improvement on the project.

10.1 Monitoring schedule and reporting obligations

A multi-sectoral approach to monitoring the project will be adopted. The approach will involve entities that have an interest in the implementation of E&S aspects on the project such as: ministries, government agencies, lower tier governments, donor agencies, UN agencies and national NGO's. The monitoring schedule will entail daily, weekly, monthly, quarterly and annual monitoring and reporting routines. MoED will ensure that monitoring reports prepared are shared with relevant stakeholders including the WB.

10.1.1 Monitoring during construction

During the implementation of project activities, hired E&S consultants together with personnel from the MoED, will be responsible for monitoring and ensuring that the E&S mitigation/enhancement measures – which include health and safety measures, are being implemented. Besides general monitoring activities, important environmental parameters to be monitored should include: noise levels and dust suppression, waste generation, water and soil quality, vibration, accidents, incidents and near misses, biodiversity considerations, sexual abuse and exploitation (rape, defilement, Gender Based Violence and Violence against Children).

The schedule and frequency to be adopted for monitoring will entirely be based/depend on the subproject being undertaken. Subproject activities that have been determined to have medium – or high – risk impacts will require more stringent monitoring. When monitoring is done, a report should be prepared by the MoED to facilitate reporting to the PIU, based on the template provided in Annexure VIII. Contractors undertaking works shall be required to include EHS aspects in their routine progress/monitoring reports as required by their contracts.

10.1.2 Monitoring during operation

During the operational phase, monitoring of environmental parameters will be required for subproject activities.

10.2 Monitoring and performance indicators

The evaluation of results of implementation of environmental and social mitigation measures can be carried out by comparing data that was collected at the baseline stage in the initial project planning phases, with targets and post project phases. A number of performance indicators have to be used to determine the status of project affected people, stakeholders and the project host biophysical environment. The key performance indicators are number of complaints, number of hazardous waste management licensed companies involved, Type & number of waste handling facilities, developed waste management plan (WMP) and hazardous waste handling and disposal protocol, Contractor's EHS plan document, number & type of PPE distributed, Spill response plan prepared, awareness given to the employees involved in maintenance of equipment's and developed emergency preparedness and response plan.

To assess whether the project goals have been/were met, the PIU will assign E&S personnel who will highlight the parameters to be monitored, institute monitoring milestones and provide resources to carry out the monitoring activities.

Highlighted below, are some pertinent parameters and verifiable indicators/questions to be used to measure the ESMF process, mitigation plans and performance.

- Have the Environment and Social consultants trained local social and environmental specialists?
- Has the ESMP's and Final Designs been cleared by South Sudan's Ministry of Environment and Forestry?
- Have the Civil Works Contractors got considerable legal muscle to enforce the ESMP?
- At what rate are the civil works been monitored by MoED and by the MoEF?
- How many violations of the contractors have been recorded and at what rate are they occurring?
- How many recorded grievance cases have been settled within one year?

11 PROJECT IMPLEMENTATION ARRANGEMENTS, RESPONSIBILITIES AND CAPACITY BUILDING

The effective implementation of this ESMF will require adept technical capacity in the human resource base of implementing institutions (MoED SSEC and MoFP) as well as logistical facilitation and the necessary institutional linkages with other Government agencies and administrations of state/local governments who have a role in the management of E&S risks and impacts.

Whereas it was highlighted during the stakeholder consultations that the MoED faces considerable constraints in its ability to implement the project, it is important that the agency assigns personnel that possess the requisite understanding of all the inherent E&S issues and values on the project including; evaluation of E&S aspects on the project, screening, impact/risk identification, and mitigation and monitoring.

11.1 Roles and responsibilities for the implementation of the ESMF

This section considers the institutional arrangements that are required to implement the E&S actions on the project. The estimated cost of implementing these actions is highlighted in section 11.4 under the ESMF budget. Actual costs of implementing the actions will be determined during the preparation of E&S management plans for each project component and specific activities/subprojects related to the components.

The Project Implementation Unit (PIU) as established by the Government of South Sudan will assume the overall implementation of the project. The "tentative" PIU structure is as indicated in Figure 3.1 and will include seconded staff from relevant entities such as SSEC and JEDCO as well as contracted project staff/specialists that may be supported by external consultants as a way of plugging project implementation capacity gaps. The consultants that will be engaged by the MoED will include personnel that possess the relevant backgrounds in areas such as; social development, gender, security, financial management (FM) and procurement, among others. Additionally, the Commission for Refugee Affairs, UNHCR, UNICEF, MoH and the World Bank (WB), will have roles in the implementation of the ESMF as indicated in Table 11.1 below.

Overall, the World Bank will undertake project implementation support and supervision missions to ensure effective environmental and social safeguards management on the project.

Table 11.1: Roles and responsibilities for implementation of the ESMF

S/No.	Activity/Task	Responsibility
1.	Preparation of E&S brief assessments for subprojects	MoED, WB, PIU
2.	Screening of E&S Risks and Impacts on subprojects	MoED, Consultants
3.	Preparation of Terms of Reference	MoED, WB, PIU, MoFP
4.	Approval of Terms of Reference	MoFP, WB
5.	ESIA Studies	Consultants hired by MoED and the WB
6.	Review of ESIA Report (s)	MoED, PIU, WB
7.	Approval of ESIA's and issuance of ESIA completion certificates	MoED, WB (In coordination with the Ministry of Environment and Forestry)
8.	Implementation of the ESMF	MoED/PIU

9.	Review and update of sub-project ESMPs before commencement of civil works for the respective project components	Contractors
10.	Implementation of the ESMPs	Contractors and E&S consultants hired by MoED
11.	Supervision of project implementation through field activities	MoED, PIU, WB
12.	Monitoring of E&S safeguards implementation	Consultants hired by MoED, PIU, UNHCR, MoH, UNICEF, WB, Participating state/local government administrations, SSEC

11.2 Identification of capacity building needs

The MoED and SSEC will have responsibilities for steering the project and its implementation. However, the entities have limited technical capacity to conduct regular operations due to high staff turnover resulting from the lack of financial resources to adequately compensate technical and engineering professionals especially under components 1 and 2. It is important to know that under component 4, a range of capacity building activities, including recruitment of international consultants will be supported by the Project.

The following capacity building needs have been identified at this stage.

- Strengthening the adequacy of existing systems and opportunities (*This consists of aspects such as: external enabling environment; organisational policy, procedures, structures and culture; human resources; budgets, equipment and means*);
- Human Resource Capacities for E&S Risks Management. (*This consists of aspects such as: appropriate credentials, trainings and experience to carry out tasks; existence of workplans, terms of reference for key positions; sufficient budgets to support E&S tasks; existence of human resource policies to efficiently recruit and retain staff, staff understanding their roles and having adequate resources to complete tasks*);
- Strengthening linkages between institutions that have E&S roles on the project (*This consists of aspects such as institutional arrangements and linkages that the MoED has with other Government institutions that have a role in the management of project-related E&S risks and impacts*);
- Establishment of systems for E&S risks and impact management (*This consists of aspects such as: environment and social assessment processes; environmental and social impacts mitigation planning; implementation of environmental and social management measures; land acquisition and resettlement planning (preparation of resettlement policy framework [RPF] and/or resettlement Action plan [RAP]); land acquisition and resettlement implementation (including financing); and stakeholder engagement planning and implementation*); and
- Capacity development needs with respect to implementation of the World Bank ESF.

11.3 Training program and tentative timelines

11.3.1 Personnel from MoED, SSEC and other Government of South Sudan agencies

It is recommended that prior to project commencement, a 2–3-day workshop is held in Juba targeting MoED, SSEC and other Government agencies that are closely associated with the project. The Workshop (whose outline is as detailed in Table 11.2), aims at providing attendees with basic skills for

implementing the guidelines provided in the ESMF combined with the use of appropriate tools, such as the screening form, ESMP template and the ESMF annual reporting form. Refresher trainings should be held as need arises during the course of the project.

Table 11.2: Proposed Training format for ESMF implementation

Module	Duration/days
Day 1 Introduction <ul style="list-style-type: none"> a) Objectives of the ESMF b) Key stakeholders with a role in the ESMF c) Relevant legislative and regulatory requirements and the World Bank ESF d) Baseline Environmental and Social Conditions e) Structure and roles of Project Implementation units and relevant government authorities 	1
Day 2 Summary of guidelines <ul style="list-style-type: none"> a) Environmental and Social Screening and Impact Assessment b) Stakeholder Consultations and Engagement c) Environmental and Social Impacts and Mitigation Measures d) Monitoring and Reporting e) Grievance Redress Mechanism f) ESMP & ESMS 	1
Day 3 Capacity building and project implementation budgets <ul style="list-style-type: none"> a) Capacity Building and Implementation Budgets b) Capacity building requirements c) Budgeting for the implementation of ESMPs, ESMS, RAPs and other safeguard management plans d) Q&A session 	1
Total	3 days

11.3.2 Training of contractors, JEDCO, Private energy companies, supervising consultants

The training will also cover some of the safeguard areas of specific interest, including but not limited to: Development & Implementation of Contractor's ESMP, Health and Safety Management systems (both Occupational and Community Safety), management and use of Auxiliary Facilities (Equipment Storage Yard), environmental and social due diligence, Labour influx management and use of Code of Conduct, Child abuse/defilement, Grievance Redress Management, Incident notification and reporting under the Project, among others.

A proposed format for a 2-day training is provided in table 11.3 below

Table 11.3: Awareness Raising and Training for Contractors, Private Energy Companies and Supervision Consultants

Module	Duration/days
Day 1 Awareness raising <ul style="list-style-type: none"> a) Environmental & Social awareness and the importance of effective mitigation b) Sound Practice for Environmental and Social mitigation measures c) Compliance with WB ESF and local legislation on OHS, ESIA and ESMP requirements d) Stakeholder engagements e) SEA, GBV and VAC f) Contract management requirements 	0.5
Day 2 Summary of guidelines <ul style="list-style-type: none"> a) Development/Implementation & scope of Contractors' ESMPs b) Environmental, Health & Safety Management onsite c) Acquisition & management of auxiliary facilities and construction materials sites d) Labour influx management and child abuse e) Grievance Redress Mechanism, Process and Committees f) Implementation of the ESMP (contract clauses) g) Monitoring and Reporting of ESMPs (and RAPs) h) Climate change i) Biodiversity 	1.5
Total	2 days

11.3.3 Training of safeguards implementation staff

During the Implementation of the project and as part of capacity building for support towards the Implementation of this ESMF and its associated tools, safeguard specialist(s) will undergo the following trainings: -

- a) Occupational Health and Safety Management System ISO 45001:2018 (Lead implementers and Auditors)
- b) Environmental Management System ISO 14005:2019 (Lead Implementers and Auditors).
- c) Quality Management System 9001 (Lead Implementer and Auditors).
- d) Labour Management practices by ILO.
- e) NEBOSH
- f) Land acquisition and management related courses

- g) SEA, GBV and VAC training
- h) Stakeholder engagement related training.
- i) Attend international conferences on climate change, biodiversity, impact assessments to share and learn best practices for replication on the project.

Table 11.4: Tentative schedule for continuous training during construction and operation

No.	Training Topics	Description	Schedule	
			Construction Phase	Operation Phase
1	Introduction to project components	This topic will introduce about the background of the proposed project & major components of South Sudan Energy access project	Once at the early stage of project implementation (for 1 day)	
2	Introduction to Environmental & Social Management & monitoring Plans	This session will introduce participants about ESMF, principles, application & rational for preparation of ESMF -describes the range of E&S issues associated with the projects & corresponding management strategies to be employed to mitigate potential adverse impacts	Once at the early stage of project implementation (for two days)	
3	National Environmental Laws and Legislation & International Financial Institutions Safeguard Policies and standards	This section will discuss & introduce application of relevant national policies, legal & institutional frameworks, guidelines as well as international policies, environmental & social standards	Twice a year (for 2 days)	Once the early operation phase (for Two days)
4	Screening	Introduction to ESIA process <input type="checkbox"/> Application of the screening checklist <input type="checkbox"/> Project screening methods & application of the screening checklist	Once the early stage of construction phase (1 day)	
5	E &S impacts & mitigation measures	This topic will key potentially beneficial impacts & adverse impacts associated with	Once a year (2 days)	Once a year (2 days)

		development projects including the proposed project □ Mitigation & benefit enhancement measures: e.g. battery and solar panel handling and disposal, STD and other transmitted disease, GBV/SH, Project GRM, Occupational Health and Safety Issues etc.		
6	Public consultation	This topics will introduce the need for stakeholder engagement for public consultation and the objectives and approaches of public consultation	Once a year (1 day)	Once a year (1 day)

11.4 ESMF Budget

This section presents the budget estimates for implementation of the Environmental and Social Management Framework (ESMF). However, detailed budgets for the project components and related specific works/sub-components will be developed at a later stage for components 1, 2 and 3.

Table 11.4 below shows a budget breakdown of the cost for implementing the ESMF.

Table 11.5: Budget Estimate for implementing the ESMF

E&S Management Aspect	Implementation stage	Timing and frequency	Cost Estimate (US \$)
Undertaking Environmental and Social Impact Assessment studies	Prior to project implementation	Once	100,000
Preparation of subproject ESMPs		Once	50,000
Environmental and Social Audits	During the construction phase and every year during the operation and maintenance (O&M) phase especially for solar power stations	Once during the construction phase and every year during the O&M phase	50,000
Third party monitoring-Multisectoral monitoring committee meetings and management tours	During project implementation	Quarterly	200,000
COVID-19 testing and implementation of prevention measures (<i>Procurement of materials and undertaking awareness</i>)	During project implementation	Quarterly	20,000

Training and capacity building focusing on: <ul style="list-style-type: none"> - Labour management procedures; - ESMS implementation (including plans); - Training for E&S safeguards personnel; - Training of project implementing partners, contractors and refugee hosting communities. 	Throughout the project implementation stage	To be conducted once, during early stages of project activities.	150,000
Procurement of equipment and retooling	During project implementation	Throughout the project cycle	300,000
Undertaking a Strategic Environmental Assessment for the Energy Sector Master Plan as highlighted under component 4 of the Project	Prior to project implementation	Once	100,000
Contingency costs			50,000
Grand Total			850,000

12 REFERENCES

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13 ANNEXES

Annexure I: Indicative guidance on development of an Environmental and Social Management System (ESMS)

Background:

An Environmental and Social Management System (ESMS) is a set of processes and practices that enable an organisation to monitor and manage the environmental and social risks and impacts of their activities.

Purpose of an ESMS:

The main purpose of an ESMS is to highlight systems and procedures that are designed to integrate measures in projects in order to avoid (or minimise) environmental and social (including health, safety and security) impacts, and to enhance positive impacts to the maximum extent possible.

General Benefits of an ESMS:

Some of the general benefits of an ESMS include:

- It enables an organisation to consistently foresee and address environmental and social (including health, safety and security) risks and impacts;
- It provides clear and transparent human resource policies which improve communication between an organisation's management, implementing partners such as development partners, employees, project host communities (for projects), and contractors; and
- Enhances the direct correlation between management of environmental and social (including health, safety and security) risks and impacts, and profitability (e.g., through conservation of energy and materials usage, mitigation of reputation risks, ensuring local project ownership, among others.

Guidelines for the Development of an ESMS

Generally, an ESMS may be developed following different guiding documents that include the following:

- a) Relevant national legislation;
- b) World Bank Environmental and Social Framework;
- c) IFC's requirements for an Environmental and Social Management System;
- d) ISO 14001:2015 (Environmental Management System); and
- e) ISO 45001:2018 (Occupational Health and Safety Management).

The ESMS is developed around the concept of Plan-Do-Check-Act (PDCA) Cycle (as illustrated in the Figure 1 below), which also forms the basis for the ESMS structure that is described by international standards such as ISO 14001:2015 (Environmental Management System), ISO 45001:2018 (Occupational Health and Safety Management System), and IFC's requirements for an Environmental and Social management System²³.

²³ IFC Environmental and Social Management System Implementation Handbook, November 2015.

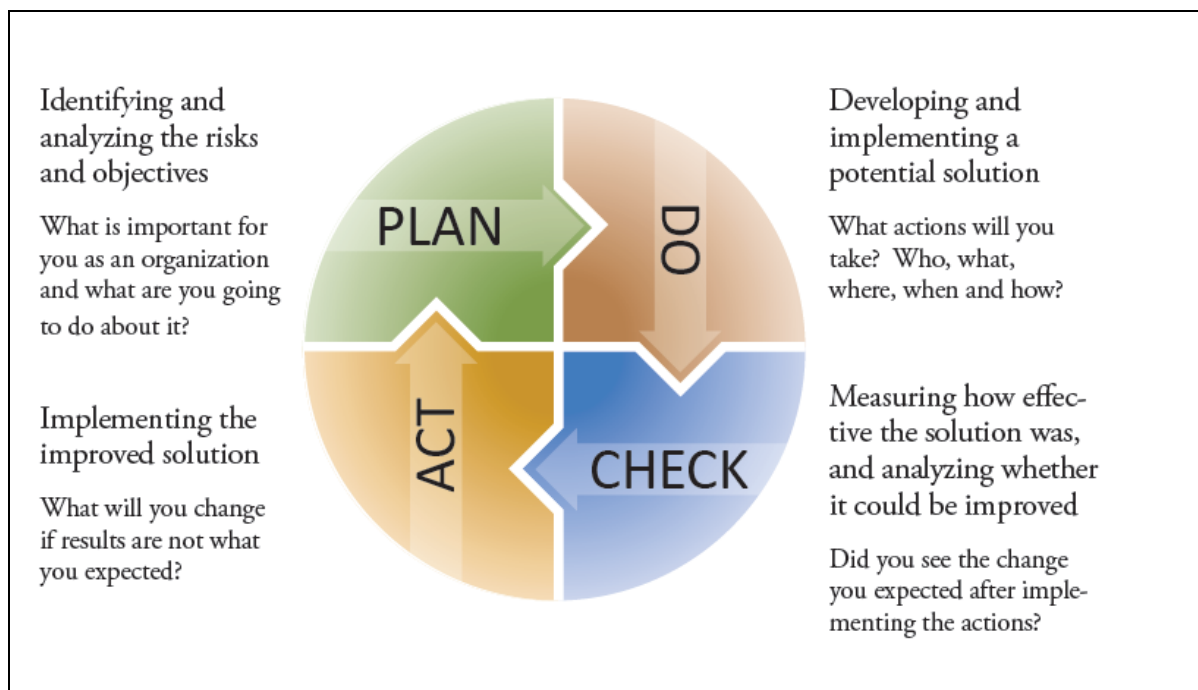


Figure 1: PDCA Cycle Source: IFC Environmental and Social Management System Implementation Handbook, November 2015.

Development process of an ESMS

A typical ESMS is developed in four, yet related phases. These are:

- a) Phase 1: Project Inception;
- b) Phase 2: Gap Analysis;
- c) Phase 3: Preparation of the ESMS Policy, Manual, and associated protocols; and
- d) Phase 4: Capacity building (Training) in Implementation of the ESMS.

A brief description into what each phase entails is provided in Figure 2 below:

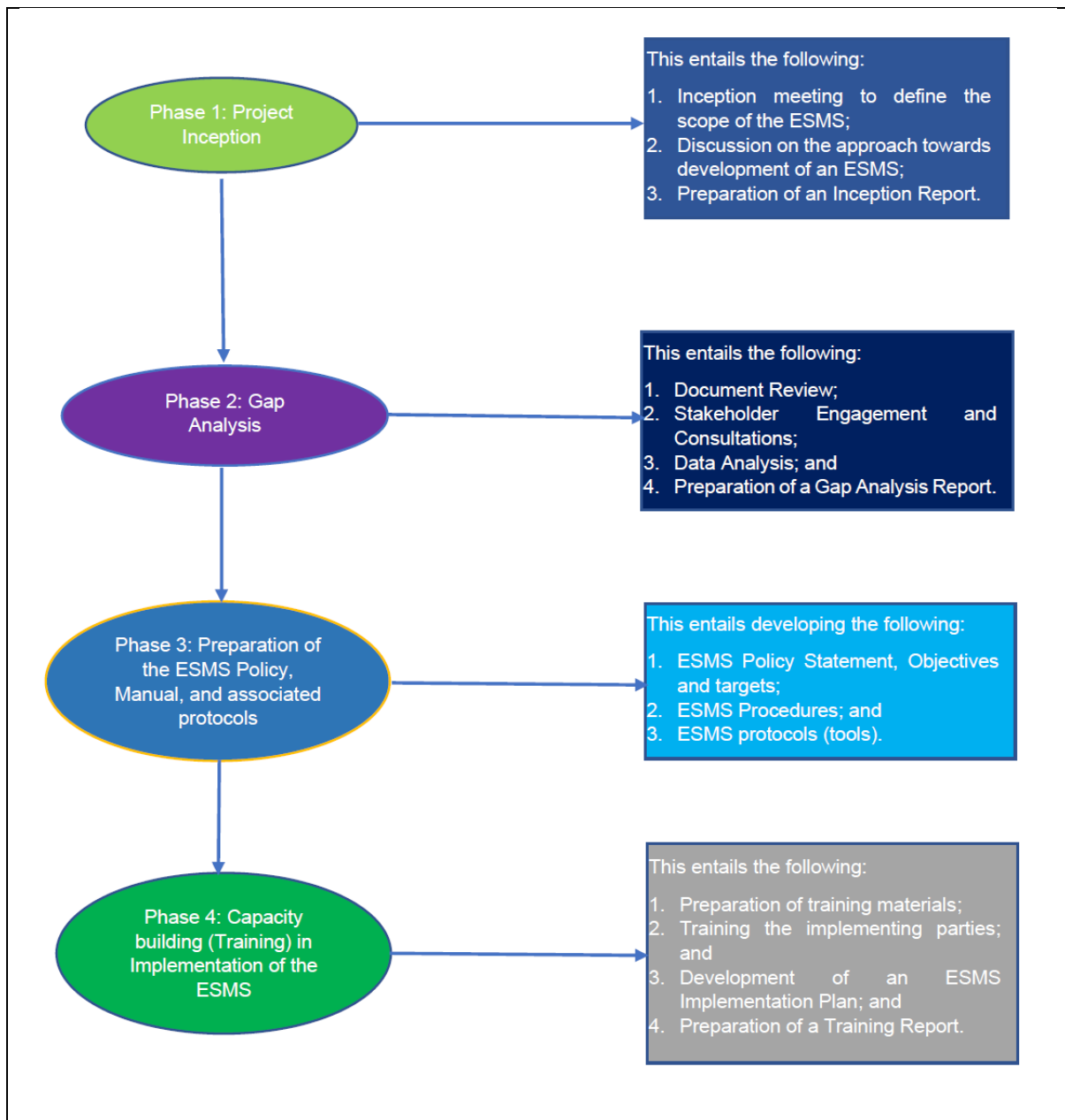


Figure 2: Flow Chart illustrating the ESMS Development Process

The Outline of an ESMS Manual is as shown below:

1	INTRODUCTION
1.1	Background
1.3	Purpose of the Environmental and Social Management System (ESMS)
1.4	General Scope and Limitation of the ESMS
1.5	Implementation Requirements for the ESMS
2	THE ESMS COMPONENTS
3	THE ESMS POLICY

3.1	Policy Approach
3.2	Policy Statement
3.3	Policy Objectives and Targets
4	E&S PROCEDURES
6	E&S CAPACITY REQUIREMENTS
6.1	Roles and Responsibilities in Implementing the organisation's ESMS
6.2	Training
7	BUDGET
ANNEXURES	
APPENDICES	

Some of the core E&S Procedures may include the following:

- a) Procedure for developing an Environmental and Social (E&S) Policy;
- b) Procedure for setting E&S Objectives, Targets for the organisation and Planning to Achieve them;
- c) Procedure for Planning for Environmental and Occupational Health & Safety;
- d) Procedure for Environmental and Social Screening (for the case of World Bank and IFC funded projects);
- e) Procedure for Environmental and Social Risk Categorisation and Impact Identification;
- f) Procedure for Determining Legal/Compliance Obligations;
- g) Procedure for Environmental and Social Monitoring;
- h) Procedure for Reporting on Environmental and Social Performance;
- i) Procedure for Organisational Capacity Competence and Training;
- j) Procedure for Stakeholder Engagement and Information Disclosure;
- k) Procedure for Grievance Management;
- l) Procurement of Goods and Services;
- m) Procedure for Emergency Preparedness and Response;
- n) Procedure for Internal Audit;
- o) Procedure for Management Review; and
- p) Procedure for Incident, Non-Conformity Reporting and Investigation and Determining Corrective and Preventive Actions.

Some of the E&S protocols (tools) to operationalise the E&S procedures include the following:

- a) List of Excluded Activities;
- b) E&S Risk Rating Criteria for the Projects;
- c) E&S Risk Register;
- d) Legal Register;
- e) Grievance Redress Mechanism;
- f) Internal Audit Checklist; and
- g) Non-conformity/Incident/Accident Corrective Action Log

Annexure II: Environmental and Social Screening Form

This form is to be used to ascertain the environmental and social risk rating of the project components or subprojects, determine the relevance of World Bank environmental and social Standards (ESS) to the project, and the instruments to be prepared.

Project Name:		District/City:	
Project Location:		Nature/Size:	
Type of activity: (e.g., New Construction, Expansion, Installation, Periodic maintenance):			
Name & Signature of Evaluator:		Date of Field Evaluation:	

		Appraisal	Risk / Significance rating					
		Yes/No	None	Low	Moderate	Substantial	High	unknown
1	Environmental Screening (ESS3 and ESS6)							
	Will the project generate the following impacts?							
1.1	Loss of trees							
1.2	Soil erosion/siltation in the area							
1.3	Pollution to land by diesel, oils etc.							
1.4	Dust emissions							
1.5	Solid and liquid wastes							
1.5	Borrow pits and pools of stagnant water							
1.6	Rubble/heaps of excavated soils							
1.7	Emergence of wildfire							
1.8	Invasive tree species							
1.9	Long term depletion of water							
1.10	Exposure to hazardous chemicals including PCBs							
1.11	Nuisance from noise or smell							
1.12	Loss of soil fertility							
1.13	Generation of hazardous waste including solar batteries							
1.14	Cross through, located within or nearby environmentally sensitive							

	areas (e.g., national parks, intact natural forests, wetlands, etc.)?							
1.15	Cause poor water drainage and increase the risk of water-related diseases such as malaria or bilharzias?							
1.16	Risk of exposing the workers to extremely hazardous working conditions.							
2	Resettlement Screening (ESS5)							
	Will the project generate the following negative social and economic impacts?							
2.1	Loss of land by households							
2.2	Loss of properties –houses, structures							
2.3	Loss of perennial trees, fruit trees by households							
2.4.	Loss of crops by people							

		Appraisal	Significance					
			None	Low	Moderate	Substantial	High	unknown
3	ESS5, ESS8, ESS4, ESS2	Yes/No						
3.1	Loss of access to river/forests/grazing area							
3.2	Impact heritage site, graveyard land							
3.3	Conflicts over use of local water resources							
3.4	Disruption of important pathways, footpath/roads							
3.5	Loss of communal facilities – churches							
3.6	Loss of livelihood system							
3.7	Risk of encouraging child labour							
3.8	Risk of workers to extreme exposure for GBV							
3.9	Spread of HIV/AIDS and other STI's							

Categorisation & Recommendations:

After compiling the above, determine which risk category the sub-project falls under based on the environmental risk categories: High, Substantial, Moderate and Low risk. If the sub-project falls under “Substantial, Moderate or low” risk categories, proceed to identify the category of the sub-project based on the National EIA guidelines issued by the respective Countries.

a. World Bank ESF Categorisation

Place Tick in applicable box	Category	Details
	High Risk	Sub-project of the South Sudan Energy Access Project likely to fall under “High Risk” rating. In the likely event that subproject falls under “High Risk” the Environmental and social Assessment should be conducted in accordance with the World Bank Environmental and Social Standards (ESSs) by preparing an ESIA study report.
	Substantial Risk	Sub-project of the South Sudan Energy Access Project likely to fall under “Substantial Risk” rating. In the likely event that subproject falls under “Substantial Risk” the Environmental and Social Assessment of the subproject should be conducted in accordance with any requirements of the ESSs that the Bank deems relevant to such subprojects by preparing an ESIA study report.
	Moderate Risk	Environmental and Social Assessment of the subproject should be conducted in accordance with any requirements of the ESSs that the Bank deems relevant to such subprojects by preparing an ESMP.
	Low Risk	Sub-project is not subject to environmental assessment as no potential impacts are anticipated.

Annexure III: Guidance for Subproject Risk Categorization

Pursuant to the ES Policy, subprojects are classified as *High Risk*, *Substantial Risk*, *Moderate Risk* or *Low Risk* taking into account relevant potential risks and impacts.

1. A Project is classified as **High Risk** after considering, in an integrated manner, the risks and impacts of the Project, taking into account the following, as applicable.
 - a. The Project is likely to generate a wide range of significant adverse risks and impacts on human populations or the environment. This could be because of the complex nature of the Project, the scale (large to very large) or the sensitivity of the location(s) of the Project. This would take into account whether the potential risks and impacts associated with the Project have the majority or all of the following characteristics:
 - (i) Long term, permanent and/or irreversible (e.g., loss of major natural habitat or conversion of wetland), and impossible to avoid entirely due to the nature of the Project;
 - (ii) High in magnitude and/or in spatial extent (the geographical area or size of the population likely to be affected is large to very large);
 - (iii) Significant adverse cumulative impacts;
 - (iv) Significant adverse transboundary impacts; and
 - (v) a high probability of serious adverse effects to human health and/or the environment (e.g., due to accidents, toxic waste disposal, etc.);
 - b. The area likely to be affected is of high value and sensitivity, for example sensitive and valuable ecosystems and habitats (legally protected and internationally recognized areas of high biodiversity value), lands or rights of Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities and other vulnerable minorities, intensive or complex involuntary resettlement or land acquisition, impacts on cultural heritage or densely populated urban areas.
 - c. Some of the significant adverse ES risk and impacts of the Project cannot be mitigated or specific mitigation measures require complex and/or unproven mitigation, compensatory measures or technology, or sophisticated social analysis and implementation.
 - d. There are significant concerns that the adverse social impacts of the Project, and the associated mitigation measures, may give rise to significant social conflict or harm or significant risks to human security.
 - e. There is a history of unrest in the area of the Project or the sector, and there may be significant concerns regarding the activities of security forces.
 - f. The Project is being developed in a legal or regulatory environment where there is significant uncertainty or conflict as to jurisdiction of competing agencies, or where the legislation or regulations do not adequately address the risks and impacts of complex projects, or changes to applicable legislation are being made, or enforcement is weak.
 - g. The past experience of the implementing agencies in developing complex Projects is limited; their track record regarding ES issues would present significant challenges or concerns given the nature of the Project's potential risks and impacts.
 - h. There are significant concerns related to the capacity and commitment for, and track record of relevant Project parties, in relation to stakeholder engagement.
 - i. There are a number of factors outside the control of the Project that could have a significant impact on the ES performance and outcomes of the Project.
2. A Project is classified as **Substantial Risk** after considering, in an integrated manner, the risks and impacts of the Project, taking into account the following, as applicable.

- a. the Project may not be as complex as High Risk Projects, its ES scale and impact may be smaller (large to medium) and the location may not be in such a highly sensitive area, and some risks and impacts may be significant. This would take into account whether the potential risks and impacts have the majority or all of the following characteristics:
- (i) They are mostly temporary, predictable and/or reversible, and the nature of the Project does not preclude the possibility of avoiding or reversing them (although substantial investment and time may be required);
 - (ii) there are concerns that the adverse social impacts of the Project, and the associated mitigation measures, may give rise to a limited degree of social conflict, harm or risks to human security;
 - (iii) they are medium in magnitude and/or in spatial extent (the geographical area and size of the population likely to be affected are medium to large);
 - (iv) the potential for cumulative and/or transboundary impacts may exist, but they are less severe and more readily avoided or mitigated than for *High Risk* Projects; and
 - (v) there is medium to low probability of serious adverse effects to human health and/or the environment (e.g., due to accidents, toxic waste disposal, etc.), and there are known and reliable mechanisms available to prevent or minimize such incidents;
- b. The effects of the Project on areas of high value or sensitivity are expected to be lower than High Risk Projects.
- c. Mitigatory and/or compensatory measures may be designed more readily and be more reliable than those of High Risk Projects.
- d. The Project is being developed in a legal or regulatory environment where there is uncertainty or conflict as to jurisdiction of competing agencies, or where the legislation or regulations do not adequately address the risks and impacts of complex Projects, or changes to applicable legislation are being made, or enforcement is weak.
- e. The past experience of the implementing agencies in developing complex Projects is limited in some respects, and their track record regarding ES issues suggests some concerns which can be readily addressed through implementation support.
- f. There are some concerns over capacity and experience in managing stakeholder engagement but these could be readily addressed through implementation support.
3. A project is classified as **Moderate Risk** after considering, in an integrated manner, the risks and impacts of the Project, taking into account the following, as applicable:
- a. the potential adverse risks and impacts on human populations and/or the environment are not likely to be significant. This is because the Project is not complex and/or large, does not involve activities that have a high potential for harming people or the environment, and is located away from environmentally or socially sensitive areas. As such, the potential risks and impacts and issues are likely to have the following characteristics:
- (i) Predictable and expected to be temporary and/or reversible;
 - (ii) Low in magnitude;
 - (iii) Site-specific, without likelihood of impacts beyond the actual footprint of the Project; and
 - (iv) Low probability of serious adverse effects to human health and/or the environment (e.g., do not involve use or disposal of toxic materials, routine safety precautions are expected to be sufficient to prevent accidents, etc.).
- b. The Project's risks and impacts can be easily mitigated in a predictable manner.

4. A project is classified as ***Low Risk*** if it's potential adverse risks to and impacts on human populations and/or the environment are likely to be minimal or negligible. These Projects, with few or no adverse risks and impacts and issues, do not require further ES assessment following the initial screening.

Annexure IV: Environmental and Social Management Plan (ESMP) Template

Note: The template provided in this section is not meant to be this project’s ESMP but a template to indicate a general structure of details that should be captured in a subproject’s ESMP, when necessary.

Key Activities	Potential E&S Issues and Risks	Proposed Mitigation Measures	Responsibilities	Timeline	Budget
Environmental and Social Risks and Mitigation Measures during the Construction Stage					
Environmental and Social Risks and Mitigation Measures during the Operational Stage					
Environmental and Social Risks and Mitigation Measures during Decommissioning					

Annexure V: Grievance Form

SOUTH SUDAN ENERGY ACCESS PROJECT			
GRIEVANCE FORM			
COMPLAINANT DETAILS			
Reference Number	Date Received	How was Grievance Submitted	Received by:
Name of Complainant	Address	Telephone Number	Email
DETAILS OF GRIEVANCE			
Person Responsible for Addressing Grievance	Description of Grievance		
Grievance Priority (Critical, Medium, Low)	Evidence of the Issue		
ACTION TAKEN / REQUIRED			
Acknowledgement sent to Complainant (YES / NO)	Date of Acknowledgement	Date Set for Resolution of Grievance	
Description of Action Taken			
Person Responsible for Implementing Action		Date of Completion	
COMMUNICATION OF ACTION			
Method and Date of Feedback to Complainant		Complainant Response to Action	
EFFECTIVENESS REVIEW			
Were Actions Effective in Resolving the Grievance (ACCEPTED/REJECTED)	Grievance Closed (Y/N)	Date	Signature of Complainant
Approved By	Date		

Annexure VII: Letter of Acknowledgement

Insert complainant's address

Insert DDMMYY

Insert complainant's address

Insert DDMMYY

RE: GRIEVANCE/COMPLAINT ACKNOWLEDGEMENT

Dear *insert complaints full names*

I am writing to inform you that we have received your grievance/complaint about *insert outline of grievance/complaint*.

We are currently investigating the circumstances surrounding the problem and you will hear from us again no later than *insert DDMMYY*

Thank you for informing us about your concern, and for your patience while we explore this matter.

If you have any questions concerning this letter or would like to discuss the complaint further, please contact us *insert the contact details*.

Yours sincerely

Insert staff name

Insert position

Annexure VIII: Environmental, EHS clauses for construction contractors

General EHS Considerations (*Specific EHS clauses will be drafted at the implementation stage and be tailored to the activities being undertaken*)

5. Contractors shall comply with any specific Environmental and Social Management Plans for the works/activities that they will be undertaking. The contractors shall inform themselves about such ESMPs and prepare their work strategy and plan to fully take into account relevant provisions of the ESMPs.
6. Importantly, Contractors will be required to develop their own ESMPs for the activities that they will be undertaking. The developed ESMPs should be aligned with the ESMF/ESMP requirements and be compliant with the World Bank ESF. No work will /should be undertaken by a contractor before they receive PIU approval for the ESMPs that they have developed.
7. Should the contractors fail to implement the approved ESMPs after written instruction by the supervising personnel on the project, the MoED/PIU reserves the right to sanction any disciplinary measures on the contractors.
8. Notwithstanding the obligation of the contractors as stated above, the contractors shall implement all measures necessary to avoid undesirable adverse environmental and social impacts wherever possible, restore work sites to acceptable standards and abide by any environmental performance requirements specified in an ESMP.

The ES measures to be considered by contractors include, but are not limited to;

- Minimising the effect of dust on the surrounding environment resulting from earth mixing sites, vibrating equipment, vehicles transporting project materials etc. to ensure safety, health and the protection of workers and communities living in the vicinity of dust producing activities;
- Ensure that noise levels emanating from machinery, vehicles and noisy civil works/construction activities are kept at a minimum for the safety, health and protection of workers within the vicinity of high noise levels and nearby communities;
- Ensure that existing water flow regimes in rivers, streams and other natural or irrigation channels is maintained and/or re-established where they are disrupted due to works being carried out;
- Prevent bitumen, oils, lubricants and waste water used or produced during the execution of works from entering into rivers, streams, irrigation channels and other natural water bodies/reservoirs, and also ensure that stagnant water in uncovered borrow pits is treated in the best way to avoid creating possible breeding grounds for mosquitoes;
- Prevent and minimise the impacts of quarrying, earth borrowing, piling and building of temporary construction camps on the biophysical environment including protected areas and arable lands; local communities and their settlements. In as much as possible restore/rehabilitate all sites to acceptable standards;

- **Upon discovery of ancient heritage, relics or anything that might or is believed to be of archeological or historical importance during the execution of works, the Chance Find Procedures²⁴ should be followed;**
- **Discourage construction workers from engaging in the exploitation of natural resources such as hunting, fishing, and collection of forest products or any other activity that might have a negative impact on the social and economic welfare of the local communities within the project areas;**
- **Implement soil erosion control measures in order to prevent surface run off that could lead to siltation in waterbodies, wetlands etc.;**
- **Construction workers camps should be provided with garbage skip, sanitation and drinking water facilities;**
- **As much as possible/practicable, materials for civil works should be locally sourced to avoid importation of foreign materials which would entail long distance transportation;**
- **Ensure public safety, and meet set traffic safety requirements for the operation of work activities to prevent/avoid accidents;**

Material excavation and deposit

9. **Where applicable, contractors shall obtain appropriate licenses/permits from relevant authorities to operate quarries or borrow areas.**

Health and safety

10. **Prior to the commencement of construction works, contractors should undertake health awareness and hygiene campaigns. These campaigns should include messages on HIV/AIDS, COVID-19 etc.;**
11. **Adequate and appropriate signage should be installed to warn pedestrians and motorists about existing hazards;**
12. **Construction vehicles shall not exceed the maximum set speed limit;**

Rehabilitation and prevention of soil erosion

13. **To the extent practicable, contractors shall rehabilitate scarred sites**
14. **To the extent practicable, natural drainage patterns that have been damaged by works, should be reinstated where they have been altered or impaired.**

Water Resources management

15. **Contractor shall at all costs avoid conflicting with water demands of local communities.**
16. **Abstraction of both surface and underground water shall only be done with the consultation of the local community and after obtaining a permit from the relevant Water Authority.**

²⁴ A Chance Finds Procedures is attached to this document in Annexure IX

- 17. Abstraction of water from wetlands shall be avoided. Where necessary, authority has to be obtained from relevant authorities.**
- 18. Temporary damming of streams and rivers shall be done in such a way that avoids disrupting water supplies to communities downstream, and maintains the ecological balance of the river system.**
- 19. No construction water containing spoils or site effluent, especially cement and oil, shall be allowed to flow into natural water drainage courses.**
- 20. Wash water from washing out of equipment shall not be discharged into water courses**
- 21. Site spoils and temporary stockpiles shall be located away from the drainage system, and**
- 22. surface run off shall be directed away from stockpiles to prevent erosion.**

Repair of Private Property

- 23. Where the contractors deliberately or accidentally damage private property, they shall (at their own cost) repair the property to the owner's satisfaction.**
- 24. Where compensation for inconveniences, damage of crops etc. are claimed by the owner, the MoED has to be informed by the Contractor.**

Annexure IX: Template for Quarterly and Annual ES Performance Reports

Company/Contractor Details (Name, Address, location)		
Report Period:		
General Aspects		
Is the project materially compliant with all applicable environmental and social laws and regulations?	Yes/No	If no, please provide details of any material non-compliances:
Have there been any accidents or incidents that have caused damage to the environment, brought about injuries or fatalities, affected project labour or local communities, affected cultural property, or created liabilities for the company?	Yes/No	If yes, please describe, including details of actions to repair and prevent reoccurrence:
Have there been any changes to environment, social, labour or health and safety laws or regulations that have materially affected the company?	Yes/No	If yes, please describe:
How many inspections did you receive from the environmental authorities during the reporting period?	Yes/No	Please provide details of these visits, including number and nature of any violations found

How many inspections did you receive from the health and safety authorities during the reporting period?	Yes/No	Please provide details of these visits, including number and nature of any violations found
How many inspections did you receive from the labour authorities during the reporting period?	Yes/No	Please provide details of these visits, including number and nature of any violations found
Have these visits resulted in any penalties, fines and/or corrective action plans?	Yes/No	If yes, please describe, including status of implementing corrective actions to address any violations found
Has the Company engaged any contractors for project-related work in the reporting period?	Yes/No	If yes, please state for which types of work, and how the company has monitored the compliance of contractors with the Environmental and Social Action Plan:
Were any of the violations stated above the responsibility of contractors?	Yes/No	If yes, please provide details, including how the Company is ensuring that corrective actions are implemented by the Contractor?
Have any operations been reduced, temporarily suspended or closed down due to environmental, health, safety or labour reasons?	Yes/No	If yes, please describe:

Please describe any environment or social programmes, initiatives or sub-projects undertaken during the reporting period to improve the company's environmental or social performance and/or management systems:

Please indicate the level of associated expenditure (capital expenditure and operating expenditure), and whether this relates to the requirements of the Environmental and Social Action Plan, or to any other initiative:

Environmental Monitoring Data

Provide details of the types and amounts of solid wastes generated by the project. Indicate where wastes are classified as hazardous. Indicate the final re-use, recycle or disposal method for each waste type.

Provide details of the types and amounts of waste water generated by the project. Indicate the final re-use, recycle or disposal method for the waste water.

Other measurements for which measurements may be done include: Air emissions and Noise, environmental liabilities, traffic, security and biodiversity, resource efficiency.

Resource usage and Product Output

Provide indications on the amounts of fuels used i.e., Oil, Gas, grid electricity etc.

Occupational Health and Safety Data

Provide leading and lagging statistics for direct and contracted employees.

Stakeholder engagement

Name/Contact of Project Community Engagement Manager:

Provide information on the implementation of the stakeholder engagement plan and summarise interaction with stakeholders during the reporting period, including:

- *Meeting or other initiatives to engage with members of the public or public organisations during the report period,*
- *information provided to members of the public and other stakeholders during the report period relating to environmental, social or safety issues;*
- *coverage in media;*
- *and interaction with any environmental or other community groups.*

Describe any changes to the Stakeholder Engagement Plan:

Community interaction and Development

Summarize any social or community development initiatives undertaken by the company during the reporting period, and any associated expenditure:

Report verified and validated by company representative

Name:

Signature:

Date:

Annexure X: Chance Find Procedure**1. PURPOSE**

The main objective of this procedure is to guide the PIU, contractors and sub-contractors on the management of cultural heritage properties should they be found as chance finds during the implementation of the project. The procedure set out here covers the reporting and management of such finds.

According to the Environmental and Social Standard (ESS) 8, cultural heritage refers to:

- **Tangible cultural heritage, which includes movable or immovable objects, sites, structures, groups of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance. Tangible cultural heritage may be located in urban or rural settings, and may be above or below land or under the water; and**
- **Intangible cultural heritage, which includes practices, representations, expressions, knowledge, skills - as well as the instruments, objects, artefacts and cultural spaces associated therewith – that communities and groups recognize as part of their cultural heritage, as transmitted from generation to generation and constantly recreated by them in response to their environment, their interaction with nature and their history.**

The objectives of Environmental and Social Standard 8 are;

- **To protect cultural heritage from the adverse impacts of project activities and support its preservation;**
- **To address cultural heritage as an integral aspect of sustainable development;**
- **To promote meaningful consultation with stakeholders regarding cultural heritage; and**
- **To promote the equitable sharing of benefits from the use of cultural heritage.**

The purpose of this procedure is, therefore, to provide clear guidelines to be followed in the event of a chance find due to the energy access project construction activities.

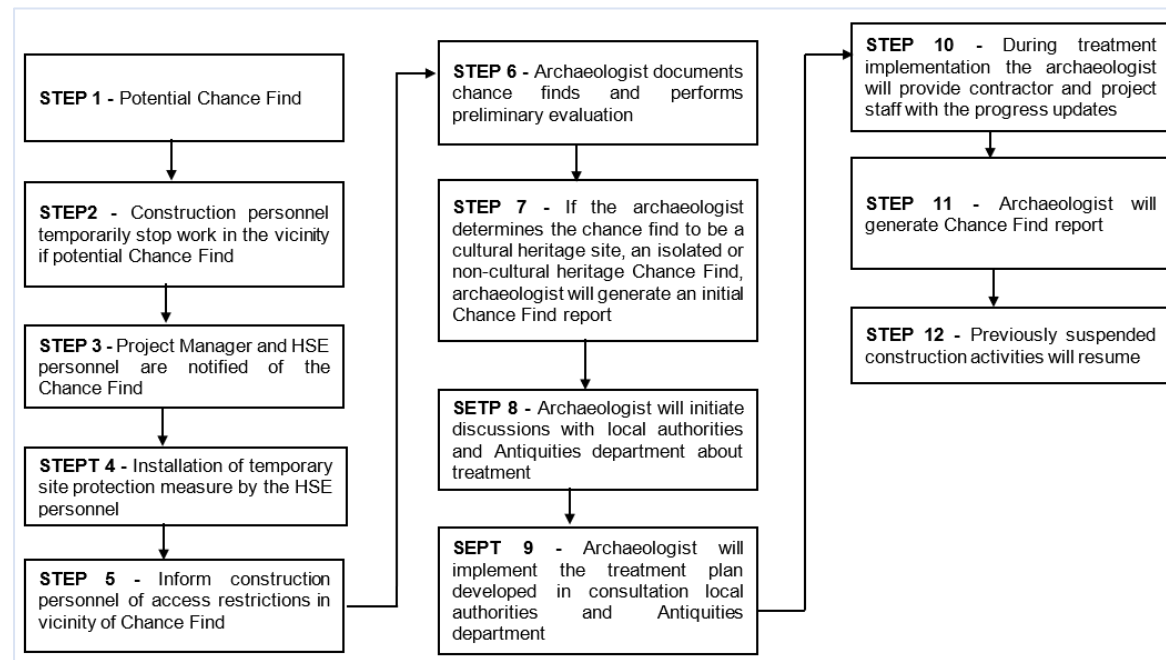
2. SCOPE

The chance finds procedure covers the systematic steps to be followed in the event that an element which may reasonably be considered to be of cultural heritage importance is encountered during the life of operations in the energy access project.

In the context of this chance find procedure, the term *“element of cultural heritage”* includes burial grounds, archaeological, paleontological, ethnographical, and historical and/or items/sites of traditional interest. The chance finds procedure covers the actions to be taken from the discovery of a heritage site or item to its investigation and assessment by a trained archaeologist or another appropriately qualified person.

a. Environmental and Social Standard 8: Cultural Heritage

This is the principal international guideline for cultural heritage. The Environmental and Social Standard 8 recognises that cultural heritage provides continuity in tangible and intangible forms between the past, present and future. This Environmental and Social Standard sets out measures designed to protect cultural heritage throughout the project life-cycle. The Environmental and Social Standard sets out the need for a CFP according to this provision, *‘...the Borrower will engage cultural heritage experts to assist in the identification, valuation assessment and protection of cultural heritage ...’*



Schematic representation of the Chance Finds Procedure - CFP**3. CHANCE FIND PROGRAMME**

- 1. It will be a requirement on the project, that teams contracted to undertake activities on Components 1, 2 and 3, should undergo inductions and trainings on cultural heritage.**
- 2. Personnel in the PIU that are identified as being at the forefront of project implementation, should undergo a training on cultural heritage to ensure that they can recognise a cultural heritage find and comply with this procedure. The training should be undertaken by a cultural heritage specialist.**
- 3. Project implementation personnel must be instructed on the need to watch out for potential cultural heritage elements that may be exposed/encountered in the course of their work.**
- 4. Project Personnel that find potential cultural items or sites, as defined under this procedure, are to report this find to the designated personnel (e.g., Project manager/HSE staff), who will in turn report the same to the PIU. If a chance find is encountered, the following steps will be followed:**
 - The heritage resource will be avoided and all activities in the immediate vicinity of the chance find will be suspended;**
 - The person who discovers the chance find should record the following information; position (GPS coordinates), and the digital image of the find;**
 - The PIU must be immediately notified of the chance find encountered;**
 - The HSE/designated personnel must ensure that the site is delineated and secured to prevent any damage or loss of removable objects and undertake any other measures as may be reasonable for its protection. These measures will include fencing off the area of finds or sites;**
 - The contractor must Inform the archaeologist of the chance find and facilitate the project archaeologist to assess whether or not the chance find is of cultural/archaeological significance;**
 - If the discovered element is of cultural/archaeological significance, the project archaeologist must then inform the PIU;**
 - The PIU must notify, ideally within 2 days, but not more than a maximum of 14 days, the Antiquities department and request expert verification. The project cultural heritage officer/archaeologist should also be notified as soon as reasonable by the contractor.**

Decisions on how to handle the finding shall be taken by the Antiquities department. This could include conservation, preservation, restoration and salvage/rescue;

- If the expert verification (Antiquities department) confirms that the discovery falls within the heritage resource description, he/she will report and recommend suitable measures for its preservation and protection of the item/site;
- The Antiquities department will be notified of any need for relocation work of sacred or cultural sites and will be invited for any planned ceremonies or rituals for entering sacred or cultural sites in order to conduct ethnographic investigations;
- In the case of discovered human remains the local authorities will have to be notified who may decide that the remains are taken for forensic investigation. The Antiquities department and the project archaeologist should also be notified so that they may assess whether or not the remains are of archaeological significance. If the remains are deemed not to be of significance for the responsible authorities or archaeological purposes, the local authorities should be notified for them to sanction the reburial of the remains at another location in line with the local customs. The community cultural leaders and community members who used to stay at that location would also be notified of the find. PIU will meet the relocation and reburial expenses, including any traditional ceremonies;
- Previously suspended project activities may resume only after authorisation is given by the responsible local authorities;
- The project archaeologist will then write, within 14 days, a chance find report according to the *template below*. Where the item(s)/site(s) are archaeological. The report will detail the:
 - Date and time of discovery;
 - Location of the discovery;
 - Description of the chance find including photographs; and
 - Actions that were taken in responding to the chance find.
- The PIU will review and approve the chance find report and distribute it to the relevant lead agencies and other key stakeholders. The report will be included in the project database.

CHANCE FINDS REPORT TEMPLATE			
1. INITIAL DETAILS			
Location of find	Date of find:	Person who identified the find:	
GPS coordinates	Zone:	X:	Y:
Description of chance find			
Photo Taken:			
<i>Insert at least one photo of the chance find</i>			
Was work stopped near the find?			
Yes	No		
Was an archaeologist contacted?			
Yes	No		
If yes, state the name of the archaeologist			
Statement of Significance (scientific, spiritual, historic, aesthetic and emotive)			

Detailed Description of Find		
<i>(e.g., approximate size of the site (area, length, height), description of site and vegetation, description of artefacts and number amongst others)</i>		
2. IMPACT ASSESSMENT		
Is the site/artefact destroyed?		
Yes	No	
Can further impacts on the chance find be avoided?		
Yes	No	
Avoidance and mitigation measures discussed		
<i>Outline the different avoidance and mitigation measures discussed.</i>		
Impact to find (avoidance and mitigation outcome)		
<i>Outline the course of action taken and the reason for choosing these measures.</i>		
Date completed form lodged	A person who lodged the form	Signature
Report form verified and validated by the project manager		
Name:	Signature:	Date:

Annexure XI: Indicative Outline of the contents of an ESIA Report

1. INTRODUCTION

1.1. Objectives

1.2. ESIA Scope

1.3. Approach and Methodology

1.3.1. The ESIA process

1.3.2. ESIA methodology

1.3.2.1. Literature review

1.3.2.2. Site visits

1.3.2.3. Stakeholder Consultations

2. DESCRIPTION OF THE PROPOSED PROJECT

3. POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

4. BASELINE DESCRIPTION

5. ANALYSIS OF PROJECT ALTERNATIVES

6. PROJECT IMPACT IDENTIFICATION AND MITIGATION

7. PUBLIC DISCLOSURE AND STAKEHOLDER CONSULTATION

8. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

9. REFERENCES

Annexure XII: Specific measures to and commitments to be undertaken during project implementation

Management commitment	Applicable to the following Environmental/Social components	Responsibility for commitment	Monitoring indicator	Frequency of monitoring
Construction Phase				
Install secondary containment measures (such as bunded and impermeable lined surfaces) in areas where fuels, oils, lubricants and construction materials such as cement are stored and loaded or unloaded, including fuelling points	Water resources Soils and geology	Contractor’s Site Manager	Secondary containment measures installed at unloading and storage areas.	During construction
Line the onsite substation with sand to absorb any chemical spillages from equipment	Water resources Soils and geology	Contractor’s Site Manager	Onsite substation lined with sand.	During construction
In case of oil leakages, spillages, sedimentation and siltation, halt construction activities, and recover the pollutant immediately	Water resources Soils and geology Socio-economic	Contractor Site Manager	Clearly defined spillage management procedure available. Training in spill management and records of training having taken place. Presence of spill clean-up kits on-site. A record of spills and how these were managed, if any included in the incidents register.	Throughout construction
Design a spill contingency plan	Water resources Soils and geology	Contractor’s Environment Management System Officer	Spill contingency plan available	Prior to construction

Environmental and Social Management Framework (ESMF)

Train staff in the use of spill cleaning equipment	Water resources Soils and geology	Contractor’s Environment Management System Officer	Readily available records of training having taken place	Prior to construction
Inspect project vehicles and equipment on a daily basis to ensure they are in good working condition	Water resources Soils and geology Socio-economic Air	Contractor’s Health and Safety Officer	Readily available vehicle and equipment inspection records	Daily
Undertake routine preventive maintenance of motorised equipment, and service machinery and vehicles in accordance with the manufacturers ‘specifications	Water resources Soils and geology Socio-economic Air	Contractor’s Health and Safety Officer	Routine maintenance and servicing of motorized equipment schedule available. Readily available preventive maintenance and servicing records.	As per the maintenance schedule

Management commitment	Applicable to the following environmental/social components	Responsibility for commitment	Monitoring indicator	Frequency of monitoring
Ensure that the local community ‘s water supply is not adversely affected	Ground water resources Socio-economic	Contractor’s Community liaison Officer	Record of regular consultations with the local community and records of any complaints related to water supply from the local community	Throughout construction

<p>Ensure that all wastes generated from construction activities are properly collected in a designated area and handled prior to disposal. Provide separate waste skips for collection of different categories of waste (biodegradable, non-biodegradable, hazardous and non-hazardous wastes))</p>	<p>Socio-economic Water resources Soils and geology</p>	<p>Contractor’s Site Manager</p>	<p>Clearly defined designated area for the collection of waste (waste shade) Properly labelled waste skips for collection of different categories of waste Evidence of contracted licensed waste handler available on site. Waste slips indicating the management of hazardous wastes</p>	<p>Throughout construction</p>
<p>Install adequate and appropriate sanitary facilities for use by the workers at the construction site</p>	<p>Water resources Soils and geology Socio-economic</p>	<p>Contractor’s Site Manager</p>	<p>Onsite sanitary facilities constructed. Onsite sanitary facilities are adequate (in terms of number of facilities in relation to the size of the construction crew), and appropriate</p>	<p>Prior construction</p>
<p>Put in place anti-vermin safeguards (such as covering bins with lids)</p>	<p>Socio-economic Air</p>	<p>Contractor’s Site Manager</p>	<p>Anti-vermin safeguards in place</p>	<p>Throughout construction</p>
<p>Prior to project implementation, sensitise local communities about the project, the process of land acquisition – where this will be undertaken, as well as the potential project nuisances such as noise, dust and increased traffic.</p>	<p>Socio-economic Air</p>	<p>Contractor’s Community liaison Officer</p>	<p>Readily available records of community sensitization having taken place</p>	<p>Prior construction</p>
<p>Limit the project footprint including materials lay down areas and material storage areas to only that which is required</p>	<p>Socio-economic Vegetation Soils and geology</p>	<p>Contractor’s Site Manager</p>	<p>Project activities limited to within the boundaries of the acquired land</p>	<p>Throughout construction</p>

Management commitment	Applicable to the following environmental/social components	Responsibility for commitment	Monitoring indicator	Frequency of monitoring
Conduct journey-specific risk assessments to include the identification of potentially sensitive receptors along the project traffic routes	Socio-economic Air	Contractor’s Health and Safety Officer	Risk assessment matrices for approved project routes	Throughout construction
Sensitise communities/residents along the route about significant traffic movements, including transportation of construction materials to site	Socio-economic Air	Contractor’s Community Liasson Officer	Readily available records of community sensitisation having taken place	Prior to scheduled significant traffic movements
Wherever possible, undertake traffic movements at the least busy times of the day	Socio-economic	Contractor’s Health and Safety Officer	Availability of Journey Management Plans (JMPs) Readily available records indicating when traffic movements took place	Throughout construction
Monitor employment activities (encompassing those of the contractor), including number of jobs created by employment type (skilled / semi-skilled / unskilled); number of jobs by gender, employment type and geographical area; total man hours and wages paid, by employment type, gender and geographical area; and rate of employee turnover by gender and area	Socio-economic	Contractor’s Human Resources Manager	Employment records available	Throughout construction
Maximise the participation of local community members during the construction phase. Recruit unskilled labour exclusively from directly affected communities and recruit semi-skilled labour preferentially from such communities, provided	Socio-economic	Contractor’s Human Resources Manager	Employment records available providing clear indication of the employees from the project’s area of influence	Throughout construction

that they have the requisite skills, competence and desired experience.				
Undertake awareness and sensitisation campaigns on the dangers of sexually transmitted diseases including HIV/AIDS and methods of spread and control. The HIV/AIDs awareness trainers are expected to collaborate with local NGOs, CBOs and District Health Officers for sustainability and integration of activities into the existing structures of the local health institutions.	Socio-economic	Contractor’s Human Resources Manager	Records of awareness and sensitisation campaigns available.	Bi-monthly
Provide the workforce with access to basic first aid onsite	Socio-economic	Contractor’s Health and Safety Officer	Basic first aid services available onsite	Throughout construction

Management commitment	Applicable to the following environmental/social components	Responsibility for commitment	Monitoring indicator	Frequency of monitoring
Maintain equipment on site within the designated equipment parking yard for the duration of construction to reduce on vehicle movements	Socio-economic Air	Contractor’s Site Manager	Availability of a parking yard for construction equipment Readily available records of equipment movements	Throughout construction
Induct all workers in relevant codes of conduct that minimise exposure to risky life styles including unsafe sex practices.	Socio-economic	Contractor’s Health and Safety Officer	Readily available records of inductions to be documented, including a list of participants.	Bi-monthly

Restrict vehicle movements to and from the project site to the project access road and prohibit off-road driving.	Vegetation Socio-economic Soils and geology	Contractor’s Health and Safety Officer	Availability of clearly demarcated access routes to and from the project site. Grievances and complaints associated with off-road driving recorded in the complaints register.	Throughout construction
Restore sites where temporary project infrastructures were established during the construction phase such as by replanting affected areas with indigenous vegetation and avoiding intentional restoration using exotic plant species	Vegetation	Contractor’s Environment Management System Officer	Re-vegetation of lay down areas following the completion of the construction phase Indigenous vegetation replanted and use of exotic plant species avoided	At the end of the construction phase
Inspect and examine potential sources of soil for the presence of invasive species and avoid excavation ²⁵ or otherwise completely eliminate the invasive species before excavation from these sources if any are found	Vegetation	Contractor’s Environment Management System Officer	Readily available records identifying the location of the murrum source and an indication that murrum extraction points did not contain invasive species	Prior to murrum extraction
Monitor invasive species for sprout and manage them accordingly	Vegetation	Contractor’s Environment Management System Officer	Monitoring report on invasive species	Throughout construction

²⁵ If a location has invasive plant species, there is still potential for the soils to have their seeds even if the shoots are uprooted.

Management commitment	Applicable to the following environmental/social components	Responsibility for commitment	Monitoring indicator	Frequency of monitoring
Maintain a speed limit of 40km/hr for light vehicles and 30km/hr for heavy vehicles on routes used to access the construction site, and where possible install speed calming measures along project routes	Air Socio-economic	Contractor’s Health and Safety Officer	Signage indicating the speed limits along project routes erected Speed calming measures such as humps installed along project routes Grievances related to speeding along project routes as recorded in the complaints register	Throughout construction
Operate all emission generating equipment only when necessary, including avoidance of unnecessary idling of equipment	Air Socio-economic Fauna	Contractor’s Site Manager	Availability of work instructions for the management of motorized equipment Readily available records of incidences associated with unnecessary operation of emission generating equipment	Throughout construction
Develop and implement a grievance mechanism to address grievances from local stakeholders	Air Socio-economic	Contractor’s Community Liasson Officer	Grievance mechanism in place Grievance/ complaints register maintained	Prior construction Throughout construction
Schedule noise events for appropriate times of the day to avoid disturbance of any programmed community gatherings	Socio-economic	Contractor’s Community Liasson Officer	Readily available records of complaints/grievances associated with noise events	Throughout construction

Environmental and Social Management Framework (ESMF)

<p>Limit construction activities to only day time hours</p>	<p>Socio-economic</p>	<p>Contractor’s Site Manager</p>	<p>Develop a project activity schedule</p> <p>Readily available records checking progress against the activity schedule</p> <p>Readily available records of complaints/grievances associated with nuisances such as noise events, made outside daytime hours</p>	<p>Prior construction</p> <p>Throughout construction</p> <p>Throughout construction</p>
<p>Prohibit unnecessary noise from the construction crew (such as loud vocalisations and music)</p>	<p>Socio-economic</p>	<p>Contractor’s Site Manager</p>	<p>Records of induction of workers</p>	<p>Prior to construction</p>
<p>Provide workers involved in construction activities with the requisite Personal Protective Equipment</p>	<p>Socio-economic</p>	<p>Contractor’s Site Manager</p>	<p>Requisite PPE provided to workers</p> <p>Requisite PPE worn by all workers at all times as required.</p> <p>Readily available records of incidents associated with poor use and/or poor quality of PPE.</p>	<p>Prior construction</p> <p>Throughout Construction</p> <p>Throughout construction</p>

Management commitment	Applicable to the following environmental/social components	Responsibility for commitment	Monitoring indicator	Frequency of monitoring
Operations Phase				
Ensure development, maintenance and update of the project spill contingency plan.	Water resources Soils and geology	Contractor’s Environment Management System Officer	Spill contingency plan available onsite and regularly updated, as and when necessary	Throughout operations
Train staff in the use of spill cleaning equipment	Water resources Soils and geology	Contractor’s Environment Management System Officer	Readily available records of training having taken place available	Prior to operations
Continue to ensure that the local community’s water supply is not adversely affected	Ground water resources Socio-economic	Contractor’s Community Liaison Officer	Record of regular consultations with the local community and no record of complaints related to water supply from the local community	Throughout operations
Ensure that all waste generated from O&M activities is properly collected in a designated area (provide separate waste skips for collection of different categories of waste (biodegradable, non-biodegradable, hazardous and non-hazardous wastes)), and handled prior to disposal.	Socio-economic Water resources Soils and geology	Contractor’s Site Manager	Clearly defined designated area for the collection of waste (waste shade) Properly labelled waste skips for collection of different categories of waste. Contracted licensed waste handler available on site.	Throughout operations

			Waste slips indicating the management of hazardous wastes	
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Management commitment	Applicable to the following environmental/social components	Responsibility for commitment	Monitoring indicator	Frequency of monitoring
Decommissioning Phase				
Halt demolition activities, and recover the pollutant immediately in the event of oil leakages, spillages, sedimentation and siltation	Water resources Soils and geology Socio-economic	Contractor’s Site Manager	Clearly defined spillage management procedure. Training in spill management and records of training having taken place. Presence of spill clean-up kits. A record of spills and how these were managed included in the incidents register.	Throughout the duration of decommissioning
Install mobile sanitation facilities for use by the demolition crew and empty them regularly.	Water resources Soils and geology Socio-economic	Contractor’s Site Manager	Availability of mobile sanitation facilities on site.	Throughout the duration of decommissioning

<p>Ensure that all waste generated from decommissioning activities is properly collected in a designated area (provide separate waste skips for collection of different categories of waste (biodegradable, non-biodegradable, hazardous and non-hazardous wastes)), and handled prior to disposal.</p>	<p>Socio-economic Water resources Soils and geology</p>	<p>Contractor’s Site Manager</p>	<p>Clearly defined designated area for the collection of waste (waste shade) Properly labelled waste skips for collection of different categories of waste. Contracted licensed waste handler available on site.</p>	<p>Throughout the decommissioning phase</p>
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