MINISTRY OF ENERGY

REPUBLIC OF KENYA

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSEMENT REPORT FOR THE PROPOSED NAMUKUSE SOLAR MINI-GRID

PROJECT: KENYA OFF-GRID SOLAR ACCESS PROJECT

SUB-PROJECT: COMPONENT 1. MINI-GRIDS FOR COMMUNITY FACILITIES, ENTERPRISES, AND HOUSEHOLDS

LOCATION: NAMUKUSE LOCATION,
TURKANA CENTRAL SUB COUNTY, TURKANA COUNTY

2023

CERTIFICATION

This ESIA project report for the proposed Namukuse Off-Grid Solar Project was prepared in accordance with the Environmental Management and Coordination Act (EMCA), 1999 and the Environmental (Impact Assessment and Audit) regulations, 2003 and their subsequent amendments EMCA (amendments), 2015 and EIA/EA regulations (amendments), 2019, the World Bank operational procedures (OP) and Environmental Safeguards Standards (ESS) for submission to the National Environment Management Authority (NEMA). We hereby certify that to the best of our knowledge and belief, the information and particulars provided in this report are correct and true.

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Disclaimer:
This ESIA report is strictly confidential to MoE (the Proponent) and any use of the materials thereof should strictly be in accordance with the agreement between the Proponent and the consultants; Norken International Limited and Centric Africa Limited (the Environmental Impact Assessor). It is, however, subject to conditions in the Environmental (Impact Assessment and Audit) Regulations, 2003 under the Kenya Gazette Supplement No. 56 of 13th June 2003

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Abbreviations

ACRONYM	DEFINITION
ADR	Alternative Dispute Resolution
AoI	Area of Influence
CBOs	Community Based Organizations
CoK	Constitution of Kenya
CDI	County Development Index
CEMP	Construction Environmental Management Plan
CGRCs	County Grievance Redress Committees
CRA	Commission on Revenue Allocation
CSR	Customer Social Responsibility
CIDP	County Integrated Development Plan
CPS	Country Partnerships Strategy
DOSHS	Directorate of Occupational Safety and Health Services
EHS	Environment Health and Safety
EIA	Environmental Impact Assessment
EPRA	Energy Petroleum Regulatory Authority
EPT	Energy and Petroleum Tribunal
EPRA	Energy and Petroleum Regulatory Authority
ESI	Electrical Supply Industry
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
ESMMP	Environmental and Social Management and Monitoring Plan
EMCA	Environmental Management and Coordination Act
EMF	Electromagnetic Field
FGD	Focus Group Discussions
GDC	Geothermal Development Company
GoK	Government of Kenya
HDPE	High Density Poly Ethylene
IAs	Implementing Agencies
IPPs	Independent Power Procedures
IPs	Indigenous Peoples
JV	Joint Venture
KETRACO	Kenya Electricity Transmission Company
KII	Key Informant Interviews
KOSAP	Kenya Off-Grid Solar Access Project
KPLC	Kenya Power and Lighting Company
LEP	Labour and Employment Plan
LGRCs	Local Grievance Redress committee
MGs	Mini Grids
MOE	Ministry of Energy
MSDS	Material Safety Datasheet
NEMA	National Environmental Management Authority
NGOs	Non-Governmental Organizations
NLC	National Land Commission
NTSA	National Transport and Safety Authority
OHS	Occupational Health and Safety

OM	Operation and Maintenance
OP	Operational Policies
PAD	Project Appraisal Document
PAPs	Project Affected Persons
PCU	Project Co-ordination Unit
PPAs	Power Purchase Agreements
PPEs	Personal Protective Equipment
PV	Photo-voltaic
REREC	Rural Electrification and Renewable Energy Corporation
RPF	Resettlement Policy Framework
SA	Social Assessment
SEA	Strategic Environmental Assessment
SERC	Standards and Enforcement Review Committee
SHS	Solar Home Systems
SIA	Social Impact Assessment
SOP	Safe Operation Procedure
STDs	Sexually Transmitted Diseases
STI	Science, technology and innovation
SMMP	Social Management and Monitoring Plan
ToR	Terms of Reference
VMGF	Vulnerable and Marginalised Groups Framework
VMGs	Vulnerable and marginalized groups
VMGP	Vulnerable and Marginalised Group Plan
WB	World Bank
WMP	Waste Management Plan
WRA	Water Resources Authority

EXECUTIVE SUMMARY

E-1- Introduction and Project Brief

The Ministry of Energy (MOE) hereinafter refer to as proponent is implementing the Kenya Off-Grid Solar Access Project (KOSAP) in 14 underserved counties in Kenya. The aim of the project is to provide clean and modern energy services through off-grid solar solutions. The Proponent is coordinating the implementation of the project through the implementing agencies; Kenya Power (KP) and the Rural Electrification and Renewable Emergency Corporation (REREC). The project is funded by the World Bank Group with $150 million and a $5 million grant from the Carbon Initiative for Development. The goal of the project is to bring electricity to around 250,000 households, 476 community facilities, and 380 boreholes in the target counties, benefiting low-income groups. It also includes the sale and installation of 150,000 efficient cook stoves. The project focuses on marginalized areas based on the County Development Index (CDI) and aims to address infrastructure deficits, lack of access to roads, electricity, water, and social services in these underserved counties. To ensure sustainability, the project relies on public funding, local community participation, and the institutional capacity of KP, REREC, and the MOE.

The KOSAP consists of four main components. The first component, focuses on the implementation of mini-grids to provide electricity to community facilities, enterprises, and households in areas where mini-grids are the most cost-effective option. The second component, aims to electrify households through standalone solar systems in areas without load clusters where standalone systems are the best technical and financial solution. The third component, supports the electrification of public institutions and community facilities using standalone solar systems. It also includes the installation of solar PV-powered water pumps for consumptive purposes. Lastly, the fourth component, provides funding for implementation support, technical assistance, and capacity building activities to ensure the sustainability and impact assessment of the interventions carried out under the other components of KOSAP.

In Turkana County, one of the target counties, the Proponent is proposing to develop 23 No. mini grid facilities including Namukuse Mini Grid discussed in this report. In order to adhere to both national and donor requirements, the Proponent engaged the services to the consortium of Norken International Limited and Centric Africa Limited to undertake the ESIA. The ESIA has been conducted following the requirements outlined in the Environmental Management and Coordination Act (EMCA) 1999 and its amendments, as well as international environmental and social policies such as the World Bank's OP 4.01 on environmental assessment.

E-2- Project Categorization and Justification

In the World Bank context, there have been several projects supported by the organization that aim to provide electricity to communities located far from the national grid. These projects utilize off-grid approaches, meaning they are independent of a national or regional grid. The experience gained from these projects provides valuable guidance for designing sustainable off-grid electrification initiatives, particularly those targeting dispersed and economically disadvantaged communities. The Namukuse proposed site aligns with this category of projects that the World Bank has been involved in.

In the Kenyan context, the Environmental Management and Coordination Act (EMCA) of 1999, as amended in April 2019 through Legal Notice No. 31, classifies solar power farms and plants as medium risk projects. This categorization provides a framework for assessing and managing the potential environmental and social impacts associated with such projects. By categorizing the Namukuse site as a solar power facility, it falls within the medium risk project category as per the Kenyan legislative framework.

E-3 Approach and Methodology

The Environmental and Social Impact Assessment (ESIA) for the proposed project followed a structured process, beginning with kick-off meetings and online discussions involving the Proponent, Implementing agencies, and the World Bank Environmental and Social Safeguard Team. These consultations were instrumental in establishing the project's scope, deliverables, timeline, and methodology. Subsequently, screening and scoping exercises were conducted to evaluate potential social and environmental risks. A thorough desk-based review was also undertaken to assess existing project documentation, legal requirements, and relevant plans.

The study employed a comprehensive approach to gather primary and secondary data for the project. Both qualitative and quantitative methods were utilized, with secondary data obtained through literature reviews. Primary data collection involved various techniques, including physical observations, photography, interviews, and stakeholder consultations. This comprehensive approach enabled a comprehensive examination of the project's environmental and social aspects, ensuring a holistic understanding of its potential impacts.

The study further involved the identification and assessment of potential impacts throughout the project's life cycle. Key areas of evaluation included land use, water resources, biodiversity, air quality, noise levels, community health and safety, and socio-economic conditions. To mitigate adverse effects, the study developed environmental and social management and monitoring plan, aiming to address both positive and negative impacts that may arise from the project. These measures aimed to ensure the project's sustainability and enhance its overall environmental and social performance.

E-4 Legislative Regulatory Framework

The evaluation, planning, and implementation of the proposed project is guided by the World Bank's Environmental and Social Framework, the national legislative framework, and the project's safeguard instruments. These measures aim to ensure environmental sustainability, protect the rights and needs of indigenous peoples and marginalized groups, and minimize adverse impacts through effective management and mitigation measures.

The Government of Kenya established the Environmental Management and Coordination Act (EMCA) in 1999, providing a legal framework for environmental management. EMCA takes precedence over other sectoral laws related to the environment. In 2013, the government formulated a national Environmental Policy with the goal of promoting sustainable management and use of the environment.

Collaboration and consultation among government agencies and stakeholders are essential for coordinating environmental management effectively. Key institutions in Kenya responsible for environmental issues include the National Environment Management Authority (NEMA), County Environment Committees, National Environmental Complaints Committee, National Environment Action Plan Committee, Standards and Enforcement Review Committee, National Environment Tribunal, and National Environment Council (NEC).

The project also adheres to the World Bank Safeguard Policies, which aim to improve decision-making processes, promote sustainable project options, and involve affected people in consultations. The applicable operational policies for this project include Environment Assessment, Natural Habitats, Indigenous Peoples, and Involuntary Resettlement. The Environmental and Social Impact Assessment (ESIA) considers these policies and addresses potential environmental and social concerns.

Additionally, the ESIA references other Safeguard Instruments prepared under the Kenya Off-Grid Solar Access Project (KOSAP), including the Environmental and Social Management Framework (ESMF), Resettlement Policy Framework (RPF), and Vulnerable and Marginalized Groups Framework (VMGF). These instruments provide procedures and guidelines for assessing and managing environmental and social aspects specific to the proposed subprojects under KOSAP.

E-5 Environmental Setting

The project area in Namukuse Sub-location, Turkana County, exhibits a semi-arid climate Apart from fishing, Pastoralism is the preferred pattern of livelihood in this exceptionally hot, dry and arid environment. However, most households are also dependent on a combination of self-employment activities (charcoal, firewood, handicrafts, mat making, motorbikes, etc). They also depend on land for wild fruits.
The land on project site does not and cannot support growth of pasture hence it is rarely used as feeding ground for cattle..

The project area landscape is arid and vegetation is limited. Acacias, doum palm trees and other small trees are spotted on the landscape, shrubs and grasses cover the ground, which normally turn a vibrant green when it rains.

The area is characterized by high levels of poverty, unemployment, and limited access to essential services such as education and healthcare. Livestock herding and small-scale enterprises are the primary economic activities, but opportunities for economic growth are constrained. Gender disparities persist, with women having limited decision-making power and economic empowerment. Infrastructure development, including roads, electricity, and water supply, is insufficient to meet the needs of the community.

E-6 Project Description

The Namukuse Mini Grid project aims to provide electricity to approximately 463 residential and 5 nonresidential consumers in Namukuse Village at Namukuse Location, Turkana County. The project will utilize solar photovoltaic panels, a Battery Energy Storage System, and a Diesel Generator to generate electricity.

At the core of the project, solar panels with a minimum capacity of 120 kWp will capture solar energy. Solar power, harnessed from the abundant sunlight in the region, is a clean and sustainable energy source. A minimum usable battery capacity of 300 kWh will store excess solar energy for use during night time and periods of low solar irradiation, ensuring a consistent and reliable power supply. The project incorporates PV inverters with a minimum capacity of 120 kW, along with a maximum string inverter capacity of 50 kW. These inverters convert DC electricity from the solar panels into AC electricity suitable for consumer use. The proposed monthly energy demand for the project is 11,260 kWh, which effectively caters to the energy requirements of the local community.

The project aims to satisfy a daily energy demand of 375 kWh, ensuring a consistent and stable power supply for various uses. The system is designed to accommodate a peak demand of 70 kW, effectively addressing high-demand periods and ensuring uninterrupted access to electricity. A 13.45-kilometer LV network will be established to distribute power efficiently to consumers, ensuring a stable and reliable power supply. The project features a 1.42-kilometer MV network, which connects the generation sources to the LV network. This helps ensure robust power transmission and distribution.

A 100 kVA step-up transformer is included in the project to adjust voltage levels as needed, optimizing power transmission. Two 50 kVA step-down transformers will be deployed for further voltage adjustment, ensuring optimal power distribution and accessibility. The estimated cost of the project is around **USD 548,895** although this amount may change as more detailed plans are developed.
The project consists of two main components: Hybrid Mini-Grids and power line reticulation lines. The Hybrid Mini-Grids will combine solar panels and diesel power generation. These energy sources will be integrated through a centralized photovoltaic plant connected to a 3-

phase AC busbar line. The configuration is designed to prioritize direct supply from the solar generator during daylight hours, reducing reliance on battery storage. The battery storage will primarily be used when solar generation is low, or demand is high. The construction of power line reticulation lines will ensure the efficient distribution of electricity to residential, commercial, and other consumers, ensuring a reliable and efficient power supply.

To develop the Namukuse Mini Grid approximately 1.143 hectares of land will be acquired from the community in line with the national laws and World Bank provisions. In accordance with the World Bank's Operation Policy (OP) 4.12 on Involuntary Resettlement, an abbreviated Resettlement Action Plan (A-RAP) was prepared, outlining the principles and procedures for land acquisition and compensation. This plan is annexed to this ESIA.

E-7 Project Alternatives

Solar energy is identified as a non-polluting and site-specific option, and the proposed site for Namukuse MG is chosen as the most suitable location for the mini grid based on factors such as sunlight availability and the community's lack of grid connectivity. The use of wind power, thermal power, fossil fuels, and power import from neighboring countries are considered as alternative methods of power generation but are found to have limitations or environmental concerns. Solar energy is favored due to its low production costs, versatility, clean nature, and economic savings. The "No Project" alternative is deemed unfavorable as it would maintain the current lack of electricity access and hinder socio-economic development. The project will be constructed using modern materials and technology, with a focus on public health, safety, security, and environmental requirements. The technology will involve a Battery Energy Storage System.

E-8 Stakeholder Engagement

It is important to highlight that two forms of stakeholder engagement were carried out for the project. The first form as noted earlier, focused on the acquisition of land for the project and involved the Proponent and the implementing agency (KPLC). The second form of engagement was conducted specifically for the Environmental and Social Impact Assessment (ESIA) study.

For the ESIA study, various methods were employed to engage stakeholders, taking into consideration their different categories. Face-to-face discussions were held with government officials and key stakeholders, while separate focused group discussions were conducted with men, women, and youth. Additionally, a public baraza or meeting was organized to allow community members to participate.

During the ESIA stakeholder engagement public meeting, which took place on 14th January 2022, a total of 90 stakeholders attended. The meeting provided an opportunity to discuss project details, including the preliminary design, positive and negative impacts, and mitigation measures. Stakeholders were encouraged to share their views and provide feedback on the project.

Some of the concerns raised by stakeholders included the type of fence to be constructed around the project site, the treatment of the community regarding the land acquired for the mini-grid construction, and the connection of community boreholes to electricity. The study team addressed these concerns by assuring stakeholders that a chain-link fence supported by concrete poles would be constructed. They also stated that additional projects would be undertaken for the community as compensation, based on their priorities. Furthermore, public facilities such as schools, health centers, and boreholes would be connected to the electricity supply.

E-9 – Impacts and Mitigation Measures

The Environmental and Social Impact Assessment (ESIA) for the proposed Solar Mini-grid project has identified both positive and negative impacts across its different phases: pre-construction, construction, operation, and decommissioning. In the construction phase, positive

impacts include local employment opportunities, boosting local businesses, and sourcing materials locally. During the operation phase, positive impacts encompass reliable power supply, economic improvement, education, health benefits, improved living standards, and enhanced security and communication. Similarly, the decommissioning phase offers positive impacts such as local employment and sourcing.

On the negative side, the pre-construction phase involves minor impacts like land acquisition, while the construction phase encompasses various minor to moderate impacts such as vegetation clearance, soil erosion, dust emissions, and occupational health and safety concerns. Challenges related to stakeholder engagement, labor influx, child labor, and exclusion of vulnerable individuals are also anticipated. In the operation phase, negative impacts include waste generation, increased oil consumption, fire outbreaks, occupational health and safety concerns, and inadequate stakeholder engagement. Issues of exclusion, inadequate grievance management, and public health concerns may arise as well.

During the decommissioning phase, negative impacts primarily relate to solid waste generation, noise and vibration, and challenges in stakeholder engagement, labor influx, child labor, gender-based violence, and exclusion of vulnerable individuals and households.

Tables 1 to 3 below present summaries of anticipated impacts and their corresponding levels of significance, both pre- and post-mitigation.

Table 1: Summary of Pre-construction Impacts

Impact	**Significance Of Impact (Pre-Mitigation)**	**Residual Impacts (Post-Mitigation)**
Land acquisition	Minor	Negligible
Way leaves	Minor	Negligible
Stakeholder identification and consultations	Major	Minor

Table 2: Summary of Construction and Decommissioning Phases Impacts

Impact	**Pre-construction**	**Construction phase**	**Decommissioning phase**
Impacts on Local Economy and Employment	Not Applicable	Positive	Positive
Change in land use	Not Applicable	Moderate	Positive
Site rehabilitation	Not Applicable	Not Applicable	Positive
Topography	Not Applicable	Minor	Not Applicable
Soil environment	Not Applicable	Minor	Minor
Air Quality	Not Applicable	Moderate	Moderate

Impact	Pre-construction	Construction phase	Decommissioning phase
Ambient noise	Not Applicable	Minor	Minor
Visual intrusion and change in landscape	Not Applicable	Minor	Positive
Waste generation and soil contamination	Not Applicable	Minor	Minor
Impact on water environment	Not Applicable	Minor	Not Applicable
Impacts from hazardous materials	Not Applicable	Minor	Not Applicable
Fire hazards	Not Applicable	Moderate	Minor
Impacts of construction material sourcing	Not Applicable	Moderate	Not Applicable
Energy consumption	Not Applicable	Negligible	Not Applicable
Occupational safety and health	Not Applicable	Moderate	Moderate
Community safety and health	Not Applicable	Moderate	Moderate
Labor influx	Not Applicable	Minor	Minor
Child labor	Not Applicable	Minor	Negligible
Cultural heritage	Not Applicable	Minor	Not Applicable
Gender based violence, SEA and SH	Not Applicable	Minor	Minor
Exclusion of VMGs, Vulnerable individuals and households	Not Applicable	Major	Major
Risk of communicable diseases	Not Applicable	Minor	Minor
Increased water demand		Negligible	Negligible

Impact	Pre-construction	Construction phase	Decommissioning phase
Forced labor		Minor	Negligible

Table 3: Summary of Operation Phase Impacts

Impact	Significance Of Impact (Pre-Mitigation)	Residual Impacts (Post-Mitigation)
Impact On Economy and Employment	Positive	Positive
Quality, reliable power supply	Positive	Positive
Reduction of pollution associated with thermal power generation, kerosine and wood fuel usage	Positive	Positive
Education	Positive	Positive
Health benefits	Positive	Positive
Improved standard of living	Positive	Positive
Security	Positive	Positive
Communication	Positive	Positive
Soil environment	Minor	Negligible
Waste generation and management	Minor	Negligible
Water environment	Negligible	Negligible
Landscape and visual impacts	Minor	Negligible
Increased oil consumption	Minor	Negligible
Increased storm water flow	Minor	Negligible
Fire outbreaks	Moderate	Minor
Water demand	Negligible	Negligible
Sanitary waste	Negligible	Negligible
Flooding	Negligible	Negligible
Noise and Vibration	Negligible	Negligible
Electric and magnetic fields (EMFs)	Negligible	Negligible
Dust Emission	Negligible	Negligible
Vehicle Exhaust emission	Minor	Negligible
Collision and electrical hazards from distribution infrastructure	Minor	Negligible

Impact	Significance Of Impact (Pre-Mitigation)	Residual Impacts (Post-Mitigation)
Occupational safety and health	Moderate	Minor
Community safety and health	Moderate	Minor
Gender based violence, SEA and SH	Minor	Negligible
Exclusion of VMGs, Vulnerable individuals and households	Major	Minor
Risk of communicable diseases	Minor	Negligible
Shocks and electrocution to the beneficiaries	Moderate	Minor
Risks related to poor and inadequate stakeholder engagement (conflict)	Minor	Negligible

E-10 Environmental and Social Management and Monitoring Plan

A comprehensive set of mitigation measures in the form of an Environmental and Social Management and Monitoring Plan (ESMMP) have been prepared for the project. The ESMMP serves as a comprehensive framework for the integrated management of all environmental and social impacts throughout the project's lifecycle. It has been prepared to ensure that the social and environmental impacts and risks identified during the Environmental and Social Impact Assessment (ESIA) process are appropriately managed during the construction, operations, and decommissioning phases of the project. It specifies the mitigation and management measures that the project proponent and contractor are committed to implementing and outlines how organizational capacity and resources will be mobilized to achieve these measures. The ESMMP also ensures compliance with the relevant laws, regulations within Kenya, as well as the environmental and social sustainability requirements of the World Bank's Operational Policies (OPs).

These measures emphasize a proactive approach, prioritizing prevention rather than reaction. They encompass various aspects such as proper waste handling and disposal to prevent pollution, engaging stakeholders to address grievances, providing personal protective equipment (PPE) for workers, ensuring adequate supervision, and emphasizing good workmanship from the contractor. Specific plans are also outlined to address specific issues that may arise. The ESMMP also highlights environmental performance indicators that should be regularly monitored. Monitoring serves as a means to detect and draw attention to any changes or problems in environmental quality. It involves continuous or periodic reviews of the ESMMP implementation progress, allowing for adjustments and improvements as necessary.

While accommodating the recommended mitigation measures to the extent practical and economically viable, the project proponent and contractor should ensure that the measures do not compromise the economic viability of the project or have long-lasting adverse impacts on the environment.

For the mitigation measures to be successful, it is imperative that the Kenya Power and Lighting Company (KPLC) allocates sufficient resources for the implementation of the ESMMP. Adequate resources will enable the proper execution of the proposed measures and ensure their effectiveness in minimizing the identified negative impacts.

Following the project's commissioning, it is mandatory to conduct statutory Environmental and Safety Audits in accordance with national legal requirements. These audits serve to evaluate

the environmental performance of the site operations and assess their compliance with the recommended mitigation measures.

E- 11 Conclusion

Based on the assessment findings, the consultant concludes that there are no substantial reasons to hinder the proposed project from progressing to the next stage of planning and development. However, this progression is conditional upon the implementation of the recommended mitigations and the monitoring of potential environmental and socio-economic impacts as outlined in the ESMMP.

It is in the opinion of the Environmental expert that the anticipated negative impacts can readily and effectively be mitigated and on the whole the proposed project does not pose any significant threat to the Environment and may be licensed to proceed

1 INTRODUCTION

The Ministry of Energy (MOE) Kenya is coordinating the implementation of the Kenya Off-Grid Solar Access Project (KOSAP) to provide access to clean and modern energy services through off-grid solar to 14 underserved counties. Mandera, Wajir, Garissa, Tana River, Turkana, Isiolo, Marsabit, West Pokot, Turkana, Taita Taveta, Kwale, Kilifi and Lamu.

K-OSAP directly promotes the achievement of these objectives by supporting the use of solar and clean cooking Solutions to drive electrification of households (including host communities), enterprises, community facilities, and water pumps in Turkana County as one of the counties in Kenya that have been defined as "marginalized areas" based on the County Development Index (CDI) by the Commission on Revenue Allocation (CRA). According to the CRA as the communities in the marginalized areas have been excluded from social and economic life of Kenya for different reasons" (CRA, 2013).

Turkana County and other identified underserved counties, collectively represent 72% of the Country's total land area and 20% of the Country's population, including historically nomadic societies that even today continue to rely on pastoralism. Their population is highly dispersed, at a density four times lower than the national average. They present profound infrastructure deficits, including lack of access to roads, electricity, water, and social services. There is also significant insecurity in certain areas, giving rise to substantial numbers of displaced persons and livelihood adaptations that further undermine economic prosperity.

1.1 CONTEXT

This ESIA report has been prepared based on Site visit baseline survey, desktop survey, documentation review, consultation with stakeholders and in accordance Environmental Management and Co-ordination Act (EMCA), 1999 and its amendments; the Environmental Management and Coordination (Amendment) Act, 2015 and World Bank's Environmental and Social Operational policies. The study has also assessed the requirement of the project with respect to the local and national regulations relevant to the project.

Norken International Limited in Joint Venture with Centric Africa Limited were appointed by Ministry of Energy to undertake consultancy services for the Environmental and Social Impact Assessment (ESIA), Social Assessment (SA) and Vulnerable and Marginalized Groups Plan (VMGP) as per the standard TOR and NEMA and WB Operational policies. The two firms are licensed by National Environment Management Authority (NEMA) to undertake environmental impact assessment studies. As reported, land acquisition has not resulted in any economic or physical displacement and no resettlement is envisaged for the proposed project.

Due to the remoteness and sometimes dispersed nature of the target populations and considering the lifestyles and socio-economic status of those residing in underserved Counties, the Project is designed to address low affordability of the potential users, and sustainability of service provision. Therefore, sustainability of the proposed approach to energy access expansion beyond the Nationally owned power network is predicated on two primary factors - public funding, local community participation; and institutional capacity of Kenya Power and, Rural Electrification and Renewable Energy Corporation (REREC) and the Ministry of Energy (MOE) as the implementing agencies.

The project components are:

- Component 1- US$40M: Mini-grids for Community Facilities, Enterprises, and Households -This component will support electrification of areas where electricity supply through mini-grids represents the least cost option from a country perspective.
- Component 2- US$48M: Stand-alone Solar Systems and Clean Cooking Solutions for Households; This component will support electrification of households using standalone solar systems in areas where load clusters do not exist and the best technical and financial solution is standalone solar systems.
- Component 3- US$40M: Stand-alone Solar Systems and Solar Water Pumps for Community Facilities; This component will support electrification of public institutions and community facilities using standalone systems. This component will also support the installation of solar PV-powered water pumps for consumptive purposes.
- Component 4- US$22M: Implementation Support and Capacity Building; This component will finance various technical assistance and capacity building activities to ensure the sustainability and measure the impact of the interventions devised and implemented within the other components of K-OSAP.

The MOE provides overall coordination of the project as well as lead in the implementation of components 2 and 4. Components 1 and 3 (A&B) will be implemented by the Kenya Power and Lighting Company (KPLC) and the Rural Electrification and Renewable Energy Corporation (REREC), respectively. KP will be responsible for implementation of a total of 99 mini-grid sites including the Namukuse mini-grid which is the subject of this report while REREC will be responsible for a total of 57 mini-grids.

1.2 PROJECT OVERVIEW

The identified power Mini-grid site is located on Unregistered Community Land- Land set aside for public use in Namukuse in the Western shore of Lake Turkana, Namukuse Location, Turkana County on GPS Coordinates of latitude 3°29'21.44"N and Longitude 35°55'47.28"E
The proposed solar mini grid will be located on a 1.143 Hectares piece of land. The solar mini grid will comprise Solar panels, batteries, invertors, perimeter fence and a distribution line.

Figure 1: Map showing the exact location of the site

1.3 PURPOSE AND SCOPE OF WORK

This report discusses the environmental and social baseline within which the proposed solar power project is commissioned and assesses the potential adverse and beneficial impacts that the project could have, along with suitable mitigation measures and an Environmental and Social Management Plan (ESMP) for the project. The report also evaluates the potential environmental and social risks associated with the project and recommends mitigation measures to avoid adverse impacts for the remainder of the project's lifecycle. The project has to comply with international standards(World Bank Environmental and Social Operational Policies) along with applicable national, and local regulations.

1.4 ESIA METHODOLOGY

1.4.1 Screening and Scoping

Evaluation of ESIA procedure was undertaken as a fundamental procedure to implementation of the solar power minigrid development project which is systematically mainstreamed into the project's Cycle. World Banks Social OPs underpin and demonstrate this commitment. The main aim of this is to enhance positive social opportunities and benefits as well as ensure that adverse social and environmental risks and impacts are avoided, minimized, and mitigated.

1.4.2 Environmental Impact Assessment

The steps below were followed in the preparation of this ESIA Report.

1.4.2.1.1 Kick-off Meeting

Norken and Centric team had a brief kick-off meeting with the Proponent on 12th July 2021 followed by subsequent online meetings and discussion on various aspects of the project up to 5th August, 2021 and 15th September, 2021. The meetings addressed varied deliverables and thresholds to be achieved and maintained during this assessment in terms of scope of work, deliverables, timeline and the methodology. All communication and meetings were done online. Courtesy call meeting to the county commissioner of Turkana was also done as the team

dispersed for field assessment.

1.4.2.1.2 Desk based review and baseline assessment

A comprehensive description of the KOSAP Component 1: project includes a desktop review of all the existing project documentation provided by the Proponent including: the Project Appraisal Document and the four main safeguard framework documents prepared under KOSAP- these are Social Assessment, Vulnerable and Marginalized Group Framework, Resettlement Policy Framework and the Environmental and Social Management Framework.

1.4.2.1.3 Project Description

The consultant has concisely described the project location including its geographical, ecological and the general layout of associated infrastructure including maps at an appropriate scale where necessary. Location of all project related development sites, including proximal offsite investments; general layout; flow diagrams/drawings of facilities/operation design basis, size, capacity, flow-through of unit operations, including pollution control technology included if any; pre-construction activities and construction activities; construction schedule; staffing size and support; facilities and services around; commissioning, operation and maintenance activities and plan.

1.4.2.1.4 Baseline Condition

This entails description and collection of relevant primary data within the project site's bio-physical, socio-economic and cultural profile with respect to the biodiversity profile, land use types, cultural heritage and practices, social and economic issues likely to be affected, expected project activities to be involved during the design, construction and operation of the proposed facility. The information also includes description of the community social structure, employment and labour market, sources and distribution of income, cultural/religious sites and properties, vulnerable groups and indigenous populations. This also covers description of the sites' physical environment including their topography, land cover, geology, climate and meteorology, air quality and hydrology. This entailed use of secondary data sources and for some specific environmental parameters the deployment of specialized equipment to measure and record the environmental readings as primary data for analysis and inclusion in the ESIA report. The ecological and biophysical environment will focus on describing the flora and fauna resident in the Turkana county and at the mini-grid site level. This was based on observation of flora and fauna, KPIs on local indigenous knowledge on historical and current status of rare, endemic and endangered plant and animal species known to occur in the project area. Vegetation assessment was done to gain an understanding of the mini-grid sites habitat type. This has provided for an in depth description of existing land use type and their linked socio-economic activities.

1.4.2.1.5 Impact Assessment (IA) Prediction

The anticipated impacts generated by the project and subsequent evaluation of their significance is provided by this report. A suite of field data collection methods was deployed including public forums discussions, Focus Group Discussions, Key Informant Interviews incorporating questionnaires for social risks assessment. Based on the outcome of the evaluation, the need for emphasis on critical areas was discussed. In order to accomplish this task an initial listing of the range of all issues and concerns identified during the study has been undertaken subsequently followed by analysis of the identified potential environmental and social impacts in terms of type (direct, indirect, cumulative, positive, negative), magnitude (local, widespread, random, severity) and duration (temporary, permanent, long term, short term). Consequently, an evaluation system was used to categorize these impacts and evaluate

them. This aided in determining the significance of the identified potential impacts in relation to established criteria or standards, geographic extent of effects, cumulative nature of the impact, community tolerance and preferences, etc. This culminated into generation of a short list of the most critical issues in terms of environmental, ecological and social impacts both positive and negative associated which the different phases of the project activities that are likely to affect the baseline environmental and social conditions presently occurring at the mini-grid sites.

Socio-cultural risks linked to Component 1 of KOSAP were identified during the assessment. These include, Labour influx, Gender Based Violence, Sexual Exploitation and Abuse, workplace Sexual Harassment, Spread of HIV/AIDS, STDs & other communicable diseases, Gender biases and inequality exclusion of vulnerable and marginalized groups (VMGs) and vulnerable individuals and households from accessing project decision making and governance structures, engagement processes, opportunities and benefits. The vulnerable individuals and households identified included: the poor, elderly persons, PWDs, the sick, poor women, poor female headed households, child-headed households. The VMG's include ethnic minority communities that are present in Namukuse area.

The impacts and risks were identified in relation to free, prior and informed comprehensive stakeholder consultations on land acquisition for construction of mini-grid, contractor's facilities e.g., yard and workers camp site, way leave acquisition for the power line distribution network; restricted access to grazing lands, water resources, soils and tree resources, economic/livelihoods displacement etc.

1.4.3 Environmental and Social Management Plan (ESMP)

The ESMP as the implementation instrument of the ESIA has captured all the parameters that need to be monitored on a routine basis. The parameters are indicated in an Environmental and Social Management and Monitoring Plan (ESMMP) matrix, a detailed description of the implementation and monitoring program.

The ESMMP has a detailed arrangement of responsibilities for managing and monitoring the implementation of mitigation measures and the impacts of the project during construction, operation and decommissioning. This include: a description of monitoring methodology, specific operations, and features to be monitored, monitoring reporting relationships and arrangements to ensure that monitoring is effective. Simple and straightforward monitoring processes established for ease of implementation throughout the project cycle. This Plan follows through a description of the impacts and areas affected, key mitigation measures, monitor-able indicators, timeframe, responsibilities, and budget implications.

The ESMP include an implementation schedule and budget cost estimates for the mitigation measures. It also describes institutional arrangements with regard to the implementation of the ESMP among the implementing agencies, and the mini-grid contractor(s). This has specific responsibilities, procedures and resources required by each institutional actor engaged in implementing the ESMP.

The "Chance Find Procedures" has also been included in the ESMP as part of prevention and mitigation measures that will be implemented in the event physical cultural resources are encountered during project implementation.

Additionally, the ESMP has a component on contracting management that will ensure the implementation of the ESMP by all contractors and subcontractors. A contracting mechanism

is included in the ESMP to incentivize contractors and their subcontractors to comply with the ESMP or alternatively penalize them for failure to comply with the ESMP. It also includes contractor clauses that will cover worksite health and safety, the environmental and social management of construction sites; labour camps/out of area workers, HIV/AIDS and other Sexually Transmitted Diseases (STDs), stakeholder engagement plans, grievance redress mechanism, child protection, gender equity and sexual harassment, labour rights and the employment of community members. The ESMP also have a budget to guide the contractor on resources required for the implementation and monitoring of the ESMP.

Figure 2 is a summary of the methodology the consultant adopted in undertaking environmental and social impacts assessment for the proposed Namukuse ESIA project.

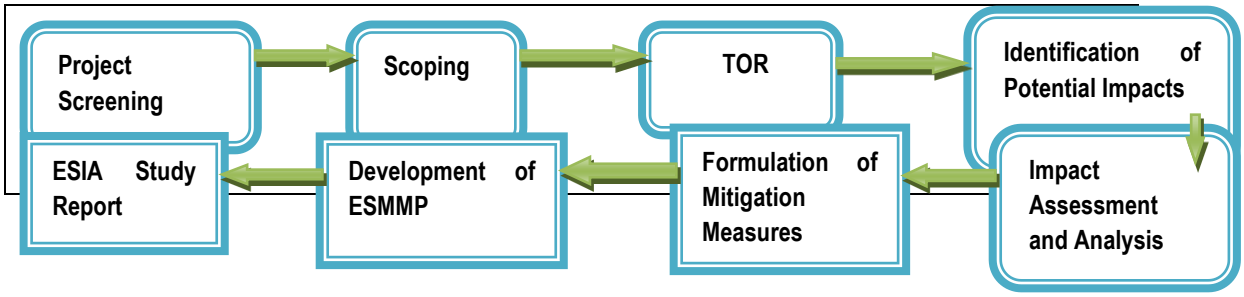

Figure 2: Summary of Environmental and Social Impact Assessment Methodology

1.4.4 Screening and ESIA Study Team

This ESIA process was conducted by 2 teams of experts that comprised the following professionals

Team 1 – 12/03/2021-first round of detailed consultations with the community was done during the screening process and it involved disseminating the project information to the community, site identification and screening for the mini-grid and constitution of the GRM and selection of GRM committee.

1. Kioko Maithya - Social Safeguards Officer (REREC)
2. Irene Kawira - Senior Environmentalist (REREC)
3. Caleb Ewoi - CREO (MOE)
4. Agnes Gachoki - Senior Surveyor (REREC)
5. Lawrence Lorika - Technician (KPLC (lodwar)
6. Myra Mukulu - Technical Advisor Cook Stoves (MOE)

Team 2 -14/01/2022- progressed the ESIA study.

NAME	ORGANISATION
Kennedy Shisoka	Ministry of Energy Engineer
Lydia Komen	EIA Expert-Norken International
Japheth Kipsang Bor	EIA Expert Norken International
Umulkheir Abdi	EIA Expert-Centric Africa Limited

1.5 LIMITATIONS/UNCERTAINTIES

The limitation experienced during the study are illustrated below.

- ✓ Some data which the consultants sought from the community could not be assertained eg. the number of the VMG's, orphans,rate of HIV infections, number of cases of GBV etc.
- ✓ Risk of being infected or transmitting COVID-19. The teams had to adopt preventive measures by wearing face mask and providing the community members with face mask and sanitizers during the public meetings and interactions.
- ✓ Due to drought that was being experienced the community member were engaged in looking for water and pasture thus delaying in attending public participation meetings. This was mitigated by starting the meeting early enough
- ✓ The risk of having mechanical failure due to poor roads. This was mitigated by making sure the team uses an off road vehicle adaptive to this terrain.

1.6 LAYOUT OF THE REPORT

Table 4: Structure of the ESIA Report

SECTION	TITLE	DESCRIPTION
Section 1	Introduction	Introduction to the Project and ESIA scope and methodology adopted.
Section 2	Project Description	Technical description of the Project & related infrastructure and activities.
Section 3	Applicable Legal and Regulatory Framework	Discusses the applicable environmental and social regulatory framework and its relevance for the Project.
Section 4	Environmental, Ecology and Social Baseline	Outlines Environmental, Ecology and Social Baseline status in the study area of the Project
Section 5	Stakeholder Engagement and Grievance Redress	Provides an overview of the stakeholder engagement activities undertaken during the ESIA, stakeholder categorization and profiling Additionally, it details the provision of Grievance Redress Mechanism for the project
Section 6	Impact Assessment and Mitigation Measures	This section includes details of identified environmental impacts and associated risks due to Project activities, assessment of significance of impacts and presents mitigation measures for minimizing and /or offsetting adverse impacts identified.
Section 7	Environmental and Social Management Plan	Outline of the ESMP taking into account identified impacts and planned mitigation measures and monitoring requirements.
Section 8	Impact Summary and Conclusion	Summary of impacts identified for the Project and conclusion of the study.

2 PROJECT DESCRIPTION

2.1 INTRODUCTION

This section provides a description of the Project in terms of location, facilities and associated Project infrastructure and activities during the Project lifecycle. It also presents the potential impacts on resources and receptors that could result from Project activities during the pre-construction, construction, operation and decommissioning stages.

Table 5 below provides a summary of the pertinent information of the proposed Namukuse solar mini grid;

Table 5: Summary Information of the proposed Namukuse Solar Mini-grid

S. NO.	PARTICULARS	DESCRIPTION
1.	Project location	The power Mini-grid site is located Namukuse in the Western shore of Lake Turkana, Namukuse location, Turkana Central Sub County, Turkana County. Geographically, the site is located on 3°29'21.44"N, 35°55'47.28"E.
2	Land Size/Tenure	The proposed solar mini grid will be located on an approximate 1.43 Ha piece of land. The proposed project site is 0.07Km from Namukuse Primary School. The site is on unregistered community Land- Land set aside for public use.
	Approx. population	23900
	Households	8600
	Dominant ethnic group	Turkana
	Other minor ethnic groups	Kalenjin, Kikuyu, Luhya, Luo, Congolese
3.	MV network	1.42 km
4.	LV network	13.45 km
6.	Target Consumers	468 (463 Residential and 5 Non-Residential)
7.	Climatic condition	The site area has a hot, dry climate with temperatures ranging between 20ºC and 41ºC and with a mean of 30.5ºC. Rainfall in the area is bimodal and highly variable. The long rains occur between April and July and the short rains between October and November. Annual rainfall is low, ranging between 52 mm and 480 mm with a mean of 200 mm Rain patterns and distributions are erratic and unreliable. Rain usually comes in brief, violent storms that result in flash floods. The driest periods (akamu) are in January, February and September and the county is highly prone to drought. 80% of the county is categorised as either arid or very arid.
9.	Site Conditions	The site comprises of sandy soil and minimal vegetation-olive plants
10.	Road Accessibility	Murram road
11.	Nearest Airport	None
12.	River/canal/nallah/ pond present in project footprint	None
13.	NGO's in the area	Mary's Meal Feed the Children Save the Children

S. NO.	PARTICULARS	DESCRIPTION
13.	Protected areas (National Park/ Sanctuary)/ Forest land within 10 kms	None

2.2 PROJECT LOCATION

The proposed Mini-grid site will sit on a 1.143 Ha of land. The project site is located in Namukuse in the Western shore of Lake Turkana, Namukuse Location, Turkana Central Sub County, Turkana County. Geographically, the site is located on coordinates 3°29'21.44"N, 35°55'47.28"E.

The proposed project site is 700m from Namukuse Primary school. The proposed project site is generally flat; the area is characterised by highly permeable sandy soils and minimal olive plants and palm trees.

Figure 4 and 5 below present the location of the proposed project site.

Figure 3: Project Location

Figure 4: Project site picture

2.2.1 Project site setting

The proposed Namukuse mini grid is in Turkana County. It falls under Lot 1 comprised of West Pokot and Turkana Counties. Geographically, Namukuse site falls on coordinates 3°29'21.44"N, 35°55'47.28"E.

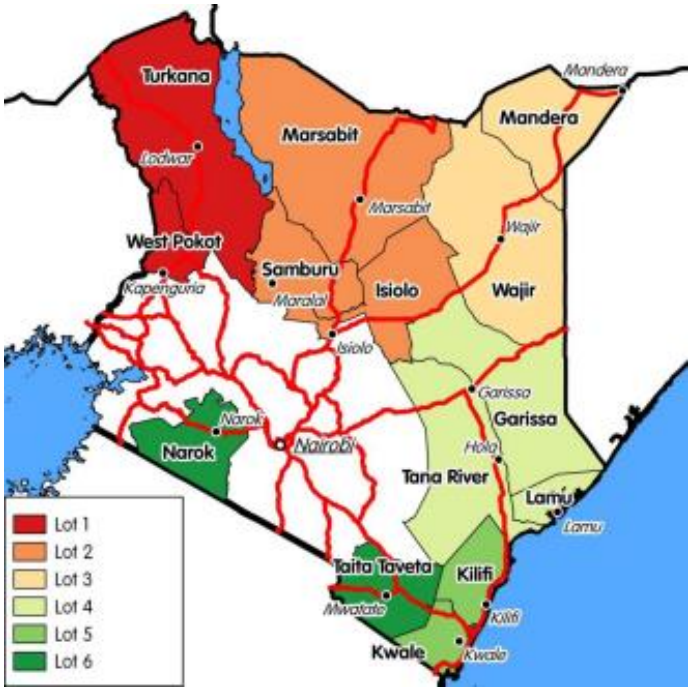

Figure 5: Map Showing the KOSAP Counties Lot 1

2.3 DESCRIPTION OF PROJECT FACILITIES, COMPONENTS AND ACTIVITIES

2.3.1 Project Components

2.3.1.1 Solar PV modules

The project will use PV Array (DC-kW) 90 polycrystalline silicon module with three strings connected in series. Each string will have five sets of panels connected in series, with output converged at the six-way combiners. The life expectancy of the PV modules is estimated at 25-30 years.

Solar Panels: At the core of the project, solar panels with a minimum capacity of 120 kWp will capture solar energy. Solar power, harnessed from the abundant sunlight in the region, is a clean and sustainable energy source.

Batteries: A minimum usable battery capacity of 300 kWh will store excess solar energy for use during night time and periods of low solar irradiation, ensuring a consistent and reliable power supply.

Inverters: The project incorporates PV inverters with a minimum capacity of 120 kW, along with a maximum string inverter capacity of 50 kW. These inverters convert DC electricity from the solar panels into AC electricity suitable for consumer use.

Perimeter Fence: To secure the site and protect the infrastructure, a perimeter fence will be constructed to ensure safety and reliability.

Distribution Line: A distribution line will be established to transmit electricity to consumers effectively, ensuring an efficient power distribution system.

2.3.1.2 Power Demand and Networks

Monthly Energy Demand: The proposed monthly energy demand for the project is 11,260 kWh, which effectively caters to the energy requirements of the local community.

Daily Energy Demand: The project aims to satisfy a daily energy demand of 375 kWh, ensuring a consistent and stable power supply for various uses.

Peak Demand: The system is designed to accommodate a peak demand of 70 kW, effectively addressing high-demand periods and ensuring uninterrupted access to electricity.

Low Voltage (LV) Network: A 13.45-kilometer LV network will be established to distribute power efficiently to consumers, ensuring a stable and reliable power supply.

Medium Voltage (MV) Network: The project features a 1.42-kilometer MV network, which connects the generation sources to the LV network. This helps ensure robust power transmission and distribution.

Step-Up Transformer: A 100 kVA step-up transformer is included in the project to adjust voltage levels as needed, optimizing power transmission.

Step-Down Transformers: Two 50 kVA step-down transformers will be deployed for further voltage adjustment, ensuring optimal power distribution and accessibility.

2.3.1.3 Backup Power Source

Diesel Gen-Set: A diesel generator with a prime rating of 82 kVA will be integrated into the system to provide backup power during periods of low solar generation or high demand. This generator ensures a continuous and uninterrupted power supply.

Fuel Tank: A fuel tank with a capacity of 2,000 liters will store diesel fuel for the generator, ensuring the provision of electricity during extended periods of low solar generation or unexpected events.

2.3.1.4 Battery Energy Storage System

The Battery Energy Storage System (BESS) will comprise of Lithium-ion Battery pack that conforms to IEC standards with warranty of 10 years, 3,000 cycles minimum. The Lithium-ion Battery Power Packs will be used to cater for required energy capacity, or equivalent as per approved design, minimum 80% DOD for Lithium-Ion. Batteries will be capable of at least C/4 charge and discharge rate. Batteries will be charged by Battery Inverter / Charger.

The batteries will be stored separately at site on a suitable leak proof base before being collected and transported by NEMA licensed waste collector for proper disposal.

2.3.1.5 Inverters

The Inverters shall be designed for continuous, reliable power supply as per specification and shall have internal protection arrangement against any sustained fault in the feeder line and against lightning strikes in the feeder line. The inverters shall be capable of complete automatic operation including wake-up, synchronization & shut down independently & automatically.

2.3.1.6 Distribution lines

Namukuse site will have a distribution line circuit of 8.53 km in total. Supply of concrete poles for the distribution lines will be based on detailed survey and accessories like phase plates, circuit plates, number plates, danger plates, anti-climbing devices as per KPLC requirements/specifications. Erection of the Poles, fixing of insulator strings, stringing of conductor and earth wires along with all necessary line accessories and earthing will be as per KPLC requirements/specifications.

Table 6: Namukuse Distribution Line Circuit

2.3.1.7 Project Activities

The main project activities include site clearance and leveling, civil works and construction of utilities and structures for the facilities, installation and connection of the power plant.

2.3.1.8 Construction Procedures

The project will be constructed based on applicable standards of Kenya, environmental guidelines and health and safety measures in line with OSHA Act 2007.

The project inputs will include the following;

-Construction of raw materials will include solar modules, inverter, wires, metals, among others. All these will be obtained from licensed dealers and especially those that have complied with the environmental management guidelines and policies.

-Construction machines will include machinery such as trucks, and other relevant construction equipment. These will be used for the transportation of materials, clearing of resulting construction debris.

- A construction labour force of both skilled and non-skilled workers will be required.

Construction activities will include the following:

-Contractor mobilization;

-Site Preparation;

-Procurement of construction material from approved dealers and transport to the site.

-Storage of PV modules delivery and their installation;

- Laying of internal electrical connections;

- Installation of inverters, Battery Energy storage system and transformers;

2.3.1.9 Project Cost

Namukuse project cost is estimated at **USD. 548,895.**

2.3.1.10 Land Tenure

Land in Turkana is communally owned; any purchase/lease/rent of land must pass through the local leaders-chiefs, village elders and the community-who must be informed as well authorize the land acquisition process.

The proposed site is on Unregistered Community Land- Land set aside for public use in the area. The project site identified was barren, there wasn't any archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance as well as is not located within the vicinity of recognized cultural heritage sites and the land was communal.

2.4 RESOURCE REQUIREMENT

2.4.1 Workforce Requirement

Approximately 40 skilled, semi-skilled and unskilled laborers will be required at the construction stage. During the operation phase, about 15 no. staff will be required of which 8 will be skilled staff comprising: 0ne operations and maintenance head, 2 engineers, 5 technicians and 2 security guards. Unskilled staff will be approximately 5 and will be hired for grass cutting and module cleaning.

2.4.2 Water Requirement and Source

2.4.2.1 Construction Phase

It has been estimated that approximately 50,000 Litres of water will be required per day for civil works during construction stage. Further, water will be required for workers at project site. However, this quantity of water requirement will vary depending on the mobilisation of construction workers at site. The water for the construction phase will be supplied by local water vendors.

2.4.2.2 Operation Phase

The water required during operation phase of the project will be mainly for washing the face of the solar modules, minimal water will be used for this purpose. The quantity of Water requirement during operational phase of the project is not known at this stage of the project. The water for the construction phase will be purchased from the vendors in the area.

As noted previously, approximately, employees (direct and contractual) will be working during operation phase. For this workforce, approximately 10,000 Litres of water will be required for domestic consumption.

2.4.3 Raw Material Requirement

2.4.3.1 Construction Phase

The major raw materials required for the construction phase will be solar modules, fencing materials, construction materials like cement, sand and aggregate. The fencing materials and the construction materials will be sourced from the local hardware facilities. Solar Modules for the project along with associated structures will be obtained from suppliers in in the Country or if not available imported from suppliers outside the country.

2.4.3.2 Operation Phase

There will be no major requirement of raw materials during operation phase. Only maintenance spares will be required at this phase.

2.4.4 Power Requirement

Power requirement during the construction phase will be met through Diesel Generators sets.

The exact number of Diesel Generator sets to be used, as well as the quantity of fuel, will be ascertained once the project design is finalized.

2.4.5 Fire Safety and Security

2.4.5.1 Construction Phase

Appropriate firefighting system and equipment shall be provided throughout the construction period. The fire extinguishers will be well distributed according to the fire risks and will be available in areas such as the site office, security area, storage yard etc. A comprehensive emergency response plan with all the emergency numbers will be well displayed at the project site.

2.4.5.2 Operation Phase

Suitable fire protection and fighting systems that will include portable fire extinguishers, automatic fire detection system and means of fire communication will be made available at the entire PV array area, inverter stations, main control room and switchyard.

The systems and equipment's will align to the Kenyan Fire Reduction Rules of 2007. The Fire protection and fighting systems will be maintained and serviced after every 6 months. The team managing the site will be trained on Fire safety as per the requirement on Fire Risk reduction rules. Further the proponent will be required to undertake Annual OSH Audits, Fire audits and Risk assessment as per the requirement of OSHA 2007 and the relevant subsidiary legislation.

3 ANALYSIS OF ALTERNATIVES AND PROJECT JUSTIFICATION

This section analyses the project alternatives in terms of site and technology. Solar projects are non -polluting energy generation projects which are site specific and dependent on the availability of solar irradiance resource. The current site selected is a high solar power potential site with high irradiation and consistent sunny days throughout the year.

3.1.1 Site Selection

Solar projects are non-polluting energy generation projects which are site-specific and dependent on the availability of solar irradiance resource.

The proponent identified one location for the proposed solar project in Namukuse. The site was identified based on the location of settlement areas, commercial/ public facilities in Namukuse. The site is at the center of Namukuse commercial and institutional areas.

Further details on the other locations identified were not available.

- The project site is 700m from Namukuse Primary school.
- No settlement present in the project site;
- The project site land is predominantly on Unregistered community land that has been set aside for public facility use.
- The project site has scarce vegetation
- The project site land is on flat terrain and characterized by sandy soils

The proposed project site has the following location advantages:

- The land is unoccupied and is within land allocated for development of public facilities
- No cultural property of archeological importance within 5 km radius and
- No close area is connected to the national grid.

PROPOSED SITE AND PROXIMITY TO CONSUMERS

3.1.2 Power Scenario in Namukuse

The existing sources of energy at Namukuse according to the Men and Women FGDs include solar powered appliances supplied by private enterprises such as D-light for lighting and charging phones. The current energy availability provided by the solar appliances is insufficient and does not meet the objective of the aim of project. Wood fuel is utilized for cooking and heating water.

The use of firewood contributes to massive environmental degradation, increased health risks and additional workload for women and girls, and increased emissions of carbon content. Moreover, low enrollment, retention and transition for girls is partly attributed to increased workload related to energy search (firewood).

The county has a huge potential for renewable energy which can tapped through wind and solar energy and hence be channeled to productive sectors within the county as well as export to other counties. Failure to construct and operate the minigrid in Namukuse will lead to the failure of achieving one of the Kenya's national long-term development policies that aims to transform Kenya into a newly industrializing, middle-income country, by providing a high quality of life to all its citizens by 2030 in a clean and secure environment. Beneficiaries will be households, public and community institutions, enterprises and community facilities that cannot access electricity through the national grid and whose use of electricity will replace kerosene and other fuels for lighting and other activities like pumping water.

3.1.3 Alternative Sources of Energy

The possible alternatives to electrical energy could be solar power, wind power, thermal power, fossil fuel and firewood. Power import from neighbouring countries is another option. Wind power is also a source of clean energy.

The problems in operation of wind power are lack of time series data of wind, trained human resources to intricate design of wind power etc. In addition, providing wind power for Namukuse residents is technically and financially challenging.

Thermal power plants are associated with serious environmental problems like air pollution, waste pollution, noise pollution, temperature pollution etc. Besides coal and petroleum products, the basic input required for the conventional thermal power plants will have to be imported. Therefore, thermal power option based on coal and petroleum products is not a viable option for Namukuse.

The use of firewood and solid waste for electricity generation by the use of thermal technology is another option. But the issue of air pollution and forest degradation already are environmental problems of serious concern which will further aggravate the natural environment. For these reasons, the thermal power options evaluated above seem inappropriate for Namukuse on environmental as well as economic grounds.

Solar energy was a desirable option because:

- It has low energy-production costs
- Versatile installation
- It is a clean source of energy hence minimal impact on the environment air quality
- Economic savings.

3.1.4 Zero or No Project Alternative

The No Project option in respect to the proposed project implies that the status quo is maintained. This option is the most suitable alternative from an extreme environmental perspective as it ensures non-interference with the existing conditions. This option will however, involve several losses both to Namukuse centre and the community as a whole. The area will continue to have no electricity and this will not help maximize usage and utilization of this centre. It will involve several losses to Namukuse location. The village and the surrounding

area will continue to have no electricity and this will not help in maximizing and utilizing the area facilities. The No Project Option is the least preferred from the socio-economic and partly environmental perspective due to the following factors:

- The economic status of residents and the local people would remain unchanged.
- No employment opportunities will be created for Kenyans who will work in the project area.
- Increased rural poverty and crime in area.
- Discouragement for investors and loaners

From the analysis above, it becomes apparent that the No Project alternative is no alternative to the local people and the Government of Kenya.

3.1.5 Alternate Location for Project Site

The identification of potential Mini-grid site for the proposed Namukuse Solar Mini-grid involved site visits to the study area, preliminary site assessments and consultations among the concerned departments of the KPLC and MOE.

The appropriateness of potential Mini-grid sites identified by the KPLC during the initial site visits was assessed in terms of various suitability criteria and technical restrictions stipulated by KPLC, as outlined below:

- Load growth - the location of Mini-grid first and foremost is informed by the existing and also load growth of an area. Technical studies show that the area will experience load growth over time and there is need to supply electricity.
- Size – proposed potential sites need to be sufficient for the average size of Solar Mini-grid and associated auxiliary facilities. Therefore, the size acquired must meet the required size. The proposed site is 1.143 hectares.
- Topography – consideration is given to the topography of potential sites whereby flat or gently sloping topography is preferred. An ideal gradient for the natural ground is 1:100. A gentle slope facilitates surface drainage and movement of vehicles and people on-site during construction. A steep slope requires costly levelling (cut and fill) for the construction of the solar Mini-grid. In addition, a steep slope inhibits movement, makes vehicle access problematic and increases the potential for environmental impacts during construction as well as operation e.g., steeper slopes have higher surface water flow rates and therefore higher erosive potential. The proposed site is flat and cost-effective during construction.
- Hydrology – consideration is given to the proximity of potential sites to adjacent water courses and wetlands where there may be potential impacts in terms of erosion and siltation of water courses, as well as implications associated with storm-water control at the Solar Mini-grid site. The site is not close to water resources or wetland and so no impact to water sources through siltation. Further, construction of drainage is not complicated.
- Geology and soils – consideration is given to the soil type present within the potential site whereby stable soil and founding conditions are preferable. Less stable soils, i.e., shallow, dispersive soils and soils with poor drainage present an erosion hazard if not managed correctly, and also require the instalment of additional, costly foundation infrastructure. The soils at the site are well drained.
- Flora and fauna – potential sites need to be assessed in terms of their ecological value at both a macro and micro scale i.e., within the site and the environment surrounding the site. Both a faunal and floral investigation may be required, with particular emphasis on ensuring the protection of endemic and red data species and their habitat, should they be present. An identified site that has a high ecological value may be excluded from the list of potential sites. The site is not of a high ecological value.

- Visibility – highly visible sites i.e., on a ridge / elevated terrain are considered less favourable in that they have a high visual impact on the surrounding landscape. Sites that are hidden or out of site e.g., behind a hill, may be considered more suitable; the site is on flat part near chief's office and may not create sharp visual impact because it is not on an elevated point.
- Access – it is preferable that potential sites are located in close proximity to existing public roads so as to avoid the need for construction of new access roads of considerable length. Access is also important particularly as it relates to the transportation of the solar panels, batteries and generator to the site, which are heavy weights and requires the use of a low-bend vehicle. As such, long access routes with sharp bends are to be avoided and the site should not be located in an area that has excessively steep inclines or declines that could hinder access, particularly during periods of heavy rainfall; the site is well accessible as it along the road.
- Adjacent land use – adjacent land use has implications for access and required clearances for the power lines extending from the solar plant site, i.e., it is important that the land surrounding the Mini-grid is relatively clear of obstructions which might otherwise inhibit / obstruct the path of the power lines out of the Mini-grid. Current and future development planning of adjacent land use should therefore also be considered. The site and the developments around do not pose a hindrance for incoming and outgoing feeders.
- Public acceptability – public acceptance criteria relate to such issues as the possible adverse impact on public health, quality of life, and local land and property values. During the public consultations there was overwhelming support for the project with mitigation measures being put in place for the negative impacts.

Based on the above-mentioned suitability criteria and technical requirements, the proponent decides to put up the Solar Mini-grid within Namukuse. Relocation option to a different site is an option available to the proponent. The project proponent can look for alternative land to accommodate the scale and size of the project. However, this will be a costly venture, may take a long time although there is no guarantee that the land would be available in the targeted area. It is recommendable that the proponent be allowed to install the project in the proposed site

3.1.6 Analysis of Alternative Construction Materials and Technology

The proposed project will be constructed using modern, locally and internationally accepted materials to achieve public health, safety, security and environmental aesthetic requirements. The materials will include all consumables, tools, testing instruments or any other equipment required for successful commissioning of the project.These may not be desirable from a cost and durability perspective. The technology to be adopted will be the most economical and one sensitive to the environment. The technology will involve a Battery Energy Storage System (including battery Inverter and charger).

3.1.7 Solid waste Management Alternatives

A lot of solid wastes will be generated from the proposed project site. An integrated solid waste management system is recommendable. First, the proponent will give priority to reduction at source of the materials. This option will demand a solid waste management awareness program in the management and the staff. Recycling and reuse options of the waste will be the second alternative in priority. This will call for a source separation program to be put in place. The third priority in the hierarchy of options is combustion of the waste that is not recyclable. In this regard, a NEMA registered solid waste handler would have to be engaged. This is the most

practical and feasible option for solid waste management considering the delineated options.

3.1.8 Conclusion

The proposed project should be approved to support the local community based on community need assessment and alternatives discussed above.

4 APPLICABLE AND REGULATORY FRAMEWORK

4.1 INTRODUCTION

This Chapter outlines the existing national and international environmental and social legislation, policies and institutions applicable to energy generation that guide the development of the Project.

As Kenya is a signatory to various international conventions and laws, national projects need to be aligned with their requirements; relevant international conventions and laws are therefore presented in this chapter.

Finally, a summary of the World Bank (WB) Environmental and Social operational policies. relevant to this Project are presented.

4.2 KENYA ELECTRICITY SUPPLY INDUSTRY (ESI)

The Kenya Electricity Supply Industry (ESI) is one of the sub-sectors in the energy sector which the Ministry of Energy and Petroleum oversees on behalf of the Government of Kenya (GoK). Relevant stakeholders in the ESI are briefly described below.

- **Kenya Power Company:** responsible for distribution and retail supply of electrical energy to end users. Kenya Power purchases power in bulk from the Kenya Electricity Generating Company Limited (KenGen) and the Independent Power Producers (IPPs) through bilateral contracts or Power Purchase Agreements (PPAs) approved by the Energy and Petroleum Regulatory Authority (EPRA).

  KPLC will be responsible for implementing the project, construction of the generation systems and distribution network for the Namukuse site. Supply of power will be through KPLC and same tariffs will be charged for each category.

- **Ministry of Energy and Petroleum:** aims to facilitate provision of clean, sustainable, affordable, reliable, and secure energy services for national development while protecting the environment.

  The ministry will be responsible for not only implementing the community projects like water and cooking stations from the proposed project but also the overall coordination of project implementation and oversight.

- **The Rural Electrification and Renewable Energy Corporation (REREC):** is established under Section 43 of the Energy Act, 2019 as a corporate body. The Corporation is the successor to the Rural Electrification Authority established under section 66 of the Energy Act No. 12 of 2006 (now repealed) and subject to this Act, all rights, duties, obligations, assets and liabilities of the Rural Electrification Authority existing at the commencement of this Act is to be automatically and fully transferred to the Corporation and any reference to the Rural Electrification Authority in any contract or document shall, for all purposes, be deemed to be a reference to the Corporation.

- **The Kenya Electricity Transmission Company (KETRACO**): Was incorporated on 2nd December 2008 and registered under the Companies Act, Cap 486 pursuant to Sessional paper No. 4 of 2004 on Energy. KETRACO's mandate is to design, construct, operate and maintain new high voltage electricity transmission infrastructure that will form the backbone of the National Transmission Grid, in line with Kenya Vision 2030

- **Energy and Petroleum Tribunal (EPT):** The tribunal is established under section 25 of The Energy Act, 2019. The tribunal is established for the purpose of hearing and

determining disputes and appeals in accordance with The Energy Act, 2019 or any other written law. In relation to the proposed Project, any disputes or appeals if they arise will need to be addressed by the EPT.

4.3 NATIONAL LEGAL FRAMEWORK REVIEW

The applicable legal framework is illustrated in table 7 below.

Table 7: National Legal Framework

No	Legislation/ Guidelines	Description of the Legislation/Guideline	Relevance of the legislation/regulations in terms of license, permits, and other requirements
	NATIONAL POLICY FRAMEWORK		
1	Vision 2030	Kenya Vision 2030 is the current national blueprint for development from its inception in 2008 until the milestone year of 2030. This plan is the national long-term development policy that aims to transform Kenya into a newly industrialised, middle-income country by 2030. The Vision is comprised of three key pillars (economic, social, and political), two of which are projected to be positively affected by project implementation.	Under Vision 2030, Energy is identified as one of the key sectors that form the foundation for socio-political and economic growth. Promoting equal opportunities across the entire Kenyan territory and enhancing access to competitively priced, reliable, quality, safe and sustainable energy is essential to the achievement of this vision.
1	The Poverty Reduction Strategy Paper (PRSP) of 2001	The PRSP has the twin objectives of poverty reduction and enhancing economic growth. The paper articulates Kenya 's commitment and approach to fighting poverty; with the basic rationale that the war against poverty cannot be won without the participation of the poor themselves.	• The proposed project aims at provision and access of renewable electricity geared towards improved economic performance and thus will contribute to poverty alleviation in the project area.
2	National Environmental Action Plan (NEAP) of 1994	The NEAP for Kenya was prepared in mid 1990s. It was a deliberate policy whose main effort is to integrate environmental considerations into the country 's economic and social development. The integration process was to be achieved through multi-sectoral approach to develop a comprehensive framework to ensure that environmental management and the conservation of natural resources forms an integral part of societal decision-making.	• The NEMA does not approve a development project unless the impacts of the proposed project are evaluated and mitigation measures proposed for incorporation in the project 's development plan, which is in line with the requirements of the NEAP. • The project will be reviewed by NEMA for approval before implementation.

3	Environmental and Development Policy (Session Paper No.6 1999)	As a follow-up to the foregoing, the goal of this policy is to harmonize environmental and developmental goals so as to ensure sustainability. The paper provides comprehensive guidelines and strategies for government action regarding environment and development. The Government will: • Ensure Strategic Environment Assessment (SEA), Environmental Impact Assessment, Social Impact Assessment and Public participation in the planning and approval of infrastructural projects. • Develop and implement environmentally-friendly national infrastructural development strategy and action plan. • Ensure that periodic Environmental Audits are carried out for all infrastructural projects	The proponent: • is undertaking an Environmental Impact Assessment, Social Impact Assessment and Public participation as part of the planning and approval of infrastructural projects. • Will ensure that periodic Environmental Audits are carried out for the project
4	The National Energy and Petroleum Policy 2015	The overall objective of the energy and petroleum policy is to ensure affordable, competitive, sustainable and reliable supply of energy to meet national and county development needs at least cost, while protecting and conserving the environment. This policy stipulates the transformation of the Rural Electrification Authority (REA) to Rural Electrification and Renewable Energy Corporation (REREC) to be the lead agency for development of renewable energy resources.	The policy is relevant to the project in the sense that the project will provide sustainable and reliable energy supply and measures will be put in place to protect and conserve the environment during its development. REREC will be in charge of the development of the minigrid and maintenance.

5	The Gender and Development Policy (Sessional paper no.2 2019)	The overall goal of this policy is to achieve gender equality by creating a just society where women, men, boys and girls have equal access to opportunities in the political, economic, cultural and social spheres of life. The anticipated outcome of this policy as enshrined in the Constitution that aligns to the project include: a) Equality and economic empowerment will be of both genders, b) Women and men will have equality of opportunity to participate in decision making and to contribute to the political, social, economic and cultural development agenda; c) Sexual and Gender based Violence will abate and men, women, boys and girls will live with dignity	• In the absence of appropriate measures, the project can exacerbate gender inequalities and sexual and gender based violence. In adherence to this policy, measures will be put in place to: • ensure gender inclusivity in decision making, employment opportunity and access to the energy generated from the Mini-Grid • mitigate social risks including sexual and gender based violence, and any form of discriminations
6	The HIV/ AIDS Policy 2009	In summary, the policy aims at: i. Establishing and promoting programmes to ensure non-discrimination and non- stigmatization of the infected; ii. Contributing to national efforts to minimize the spread and mitigate against the impact of HIV and AIDS; iii. Ensuring adequate allocation of resources to HIV and AIDS interventions;	• The proposed project is to be implemented in a rural setting at Namukuse area. The area is not economically empowered hence few HIV/AIDS prevention resources are available. The area has high HIV/AIDs rates due to the sex exploitation related to fishing. This policy shall provide a framework to both the project proponent and contractor to address issues related to HIV/AIDS during the entire project phase.
LAWS AND LEGISTLATIONS			
1.	The Constitution of Kenya, 2010	The Constitution of Kenya promulgated in 2010 is the supreme law of the republic and binds all persons and all State organs at all levels of government. The Constitution provides the broad framework regulating all existence and development aspects of interest to the people of Kenya, and along which all national and sectoral legislative documents are drawn.	The proposed project complies with the Constitution by proposing a structure in its ESIA on how to deal with Social, Health, safety and environmental issues for sustainable development

7	ENVIRONMENTAL MANAGEMENT AND COORDINATION ACT, 1999 (AND THE AMENDMENTS OF 2015)	The EMCA is a framework environmental law in Kenya. This Act (assented to on January 14, 2000) provides a structured approach to environmental management in Kenya. With the EMCA coming into effect, the environmental provisions within the sectoral laws were not superseded; instead, the environmental provisions within those laws were reinforced to better manage Kenya's ailing environment.	• The proposed project will be undertaken in accordance with relevant sections of the EMCA, specifically Clauses 58 – 63. These sections of the Act are operationalised by subsidiary legislation promulgated under the Act and specifically Legal Notice (L.N.) 101: Environment (Impact Assessment and Audit) Regulations, 2003.
8	L.N. 101: EIA/EA REGULATIONS, 2003 AND 2016 AMENDMENTS	These regulations provide the framework for undertaking EIAs and EAs in Kenya by NEMA licensed Lead Experts and Firms of Experts. An EIA or EA Study in Kenya is to be undertaken by a firm duly licensed by the National Environmental Management Authority (NEMA). The EIA/EA Regulations also provide information to project proponents on the requirements of either an EIA or EA as required by the EMCA.	• The proposed project is subject to relevant provisions of these regulations and subsequently, the ESIA has been undertaken in accordance with the requirements.
9	L.N. 120: WATER QUALITY REGULATIONS, 2006	These regulation provides for the sustainable management of water used for various purposes in Kenya. For effluent discharges into the environment and aquatic environment, a Proponent needs to apply directly to the NEMA. For discharges into public sewers, a Proponent needs to apply for the license to the relevant county. The regulation contains discharge limits for various environmental parameters into public sewers and the environment.	• These regulations will apply to the proposed project during the construction and operational phases. The contractor will be required to properly manage the effluent from construction activities in accordance with the above regulations prior to discharge into the environment.
10	L.N. 121: WASTE MANAGEMENT REGULATIONS, 2006	These regulations are comprehensive and cover the management of various kinds of waste in Kenya. Generally, it is a requirement under the regulations that a waste generator segregates waste (hazardous and non-hazardous) by type	• During the construction and operation phases, the proposed project will generate various streams of wastes. For the most part, it is expected that the wastes will be non-hazardous in nature and can be disposed of in accordance with these regulations.

		and then disposes the them in an environmentally acceptable manner. Under the regulation, it is a requirement that waste is transported using a vehicle that has an approved "Waste Transportation License" issued by NEMA. Wastes generated in Kenya must be disposed of in a licensed disposal facility. Such a facility will require annual environmental audits to be undertaken by NEMA registered Lead Experts. The regulation requires that prior to generating any hazardous waste, a proponent shall undertake an EIA Study and seek approval from the NEMA. Labelling of hazardous wastes is mandatory under the regulation and the specific labelling requirements are provided in Rule 18. The treatment options for hazardous waste disposal provided in Rule 19 include incineration or any other option approved by the NEMA.	
11	L.N. 61: NOISE AND EXCESSIVE VIBRATION CONTROL REGULATIONS, 2009	The general prohibition of these regulations states that no person shall make or cause to be made any loud, unreasonable, unnecessary, or unusual noise which annoys, disturbs, injures, or endangers the comfort, repose, health, or safety of others and the environment. The regulations further provide factors that will be considered in determining whether or not noise and vibration is loud, unreasonable, unnecessary, or unusual.	• Rules 13 and 14 of the regulations define the permissible noise levels for construction sites. These noise limits will be applicable to the proposed project.
12	LICENSES AND PERMITS REQUIRED UNDER THE EMCA	The subsidiary legislations under the EMCA are partially monitored through the use of permits and licenses. Subsequently all licenses and permits required during the construction phase shall be the responsibility of the individual contractors and their agents. During the operational phase, all permits and licenses required to operate the project will be the responsibility of the proponent.	The subsidiary legislations under the EMCA requires some or all the following types of permits to be available for inspection during the construction and operational phases of the project: ✓ Effluent Discharge License under Legal Notice 120: The Environment Management and Coordination (Water Quality) Regulations 2006;

			✓ Waste Transport License under Legal Notice 121: The Environment Management and Coordination (Waste Management) Regulations 2006 for disposal of all types of wastes; and ✓ Noise Permit under Legal Notice 61: The Environment Management and Coordination (Noise and Excessive Vibration Control) Regulations, 2009.
13	OCCUPATIONAL HEALTH AND SAFETY ACT, 2007	The Occupational Safety and Health Act (OSHA) was enacted to provide for the health, safety and welfare of persons employed in workplaces, and for matters incidental thereto and connected therewith. Part II of the Act provides the General Duties to which the occupier must comply with respect to health and safety in the workplace. Such duties include undertaking safety and health (S&H) risk assessments, S&H audits, notification of accidents, injuries and dangerous occurrences. A number of sections under this part shall be applicable to the proposed project. Part IV deals with the enforcement provisions that Directorate of Occupational Safety and Health Services (DOSHS) has under the Act. It discusses the instances when Improvement and Prohibition Notices can be issued as well as the powers of Occupational S&H officers. This part of the Act will be mandatory for the occupier to comply with for the proposed project. Part V of the Act requires all workplaces to be registered with the DOSHS. This part will be applicable for the proposed project as the Occupier will have to apply for registration of their project with the DOSHS on completion of the construction phase and before the operational phase of the project.	The proposed project will be undertaken in compliance with the OSHA-2007 during the construction, design, and operational phases. During the construction phase, the contractors will be required to fully comply with the requirements of Legal Notice 40 titled: Building Operations and Works of Engineering Construction Rules, 1984 (BOWEC). Each contractor will develop and implement a formal construction health and safety plan for the entire construction phase duration in alignment with the OSHA and international health and safety best practices.

Part VI of the Act lists the requirements for occupational health provisions which include cleanliness, ventilation, overcrowding, etc. This section of the Act will apply to the Occupier during the operational phase of the project.

Part VIII of the Act contains provisions for general safety of a workplace, especially fire safety. This part of the Act will apply to the proposed project during the design, construction, and operational phases.

Part X of the Act deals with the General Welfare conditions that must be present during the construction and operational phase of the project. Such conditions include first aid facilities, supply of drinking water, accommodation for clothing, ergonomics, etc. This part of the Act will apply to the proposed project during the construction and operational phases.

Part XI of the Act contains Special Provisions on the management of health, safety, and welfare. These include work permit systems, PPE requirements and medical surveillance. Some sections of this part of the Act will be applicable to the proposed project during the construction and operational phase.

Part XIII of the Act stipulates various fines and penalties associated with non-compliance with the Act. It includes those fines and penalties that are not included in other sections of the Act and will be important for the Occupier to read and understand the penalties for non-compliance with S&H provisions.

Part XIV of the Act is the last section of the Act and contains miscellaneous provisions which are not covered elsewhere in the Act. Some sections under this part of the Act will apply to

		the proposed project and it is in the interest of the occupier to read, understand, and ensure compliance.	
14	L.N. 31: The Safety and Health Committee Rules, 2004	These rules came into effect on April 28, 2004, and require that an Occupier formalise a S&H Committee if there is a minimum of 20 persons employed in the workplace. The size of the S&H Committee will depend on the number of workers employed at the place of work. For the Proponent and Contractor, the OSHA and the S&H Committee Rules 2004 are important as they require compliance with the following measures: ○ Posting of an Abstract of the Factories and Other Places of Work Act in key sections of each area of the factory or other workplace; ○ Provision of first aid boxes in accordance with Legal Notice No. 160 of 1977; ○ Ensuring that there are an appropriate number of certified first aiders trained by an approved institution and that the certification of these first aiders is current; ○ Provision of a General Register for recording, amongst other things, all incidents, accidents, and occupational injuries; ○ Appointment of a S&H Committee made up of an equal number of members from management and workers based on the total number of employees in the workplace; ○ Training of the S&H Committee in accordance with these rules; and	The contractor will be required to constitute Health and Safety Committee to oversee safety and health at the construction site. The number of the committee members will be deducted by the number of staff hired by the contractor. The S&H Committee must meet at least quarterly, take minutes, circulate key action items on bulletin boards, and may be required to send a copy of the minutes to the DOSHS provincial office. Appropriate record keeping including maintenance of all current certificates related to inspection of critical equipment such as cranes, air compressors, lifts, pulleys, etc. Such inspections need to be undertaken by an approved person registered by the Director of the DOSHS.

		○ Appointment of a S&H management representative for the Proponent.	
15	L.N. 24: Medical Examination Rules, 2005	These rules provide for Occupiers to mandatorily undertake pre-employment, periodic, and termination medical evaluations of workers whose occupations are stipulated in the Eighth Schedule to the OSHA and the First Schedule to this Rules. Workers that fall under the above two schedules are required to undergo medical evaluations by a registered medical health practitioner duly registered by the DOSHS.	Some construction activities such as metal cutting and grinding, repair or maintenance of construction equipment could expose the construction workers during construction phase and operations and maintenance workers during operation phase to physical and chemical hazards The contractor should that the workers exposed to such hazards undergo requisite medical examinations as required by these rules
16	L.N. 25: Noise Prevention and Control Rules, 2005	The rules set the permissible level for occupational noise in any workplace (which includes construction sites) as follows: • 90 dB(A) over an 8-hour time weighted average (TWA) period over 24-hours; and • 140 dB(A) peak sound level at any given time. Additionally, the rules set permissible limits for community noise levels emanating from a workplace as follows: • 50 dB(A) during the day; and • 45 dB(A) at night. The Proponent is to ensure that • any equipment brought to the site for use shall be designed or have built-in noise reduction devices that do not exceed 90 dB(A). • those employees that may be exposed to continuous noise levels of 85 dB(A) are medically examined as indicated in Regulation 16. If found unfit, the occupational hearing loss to the worker will be	It is expected that during the construction phase of the project, there may be plant equipment that exceeds the threshold levels of noise stipulated under the Rules. It will therefore be incumbent on the contractor and his or her sub-contractors to ensure that their equipment is serviced properly and/or use equipment that complies with the threshold noise values given above. Alternatively, each contractor will be required to develop and implement a written hearing conservation programme during the construction phase.

		compensated as an occupational disease.	
17	L.N. 59: Fire Risk Reduction Rules, 2007	A number of sections of the rules apply to the proposed project as enumerated below. • Regulation 5 requires Proponents to ensure that fire resistant materials are used for construction of new buildings. A number of minimum specifications of materials are provided in this rule. • Regulation 6 requires that all flammable materials be stored in appropriately designed receptacles. Some of the flammable materials anticipated at the project site including; fossil fuel using running construction equipment and vehicles (during construction phase) and stand by generator (operation phase) • Regulation 7 requires that all flammable storage tanks or flammable liquid containers be labelled with the words "Highly Flammable" in English or Swahili. It is therefore practical for the Proponent to use a system similar to the Hazardous Material Identification System of labelling their product containers. The regulation requires a Proponent to consult the product's MSDS for appropriate labelling requirements. • Regulation 8(3) requires a Proponent to have a Spill Prevention, Control, and Countermeasures (SPCC) plan. This may be important if there will be chemicals stored in the refuelling area at the construction site.	The proponent is expected to comply with the requirements of L.N. 59: Fire Risk Reduction Rules, 2007 by i. Carrying out, and record, a fire risk assessment identifying any possible dangers and risks. ii. Reducing, or where possible remove, the risk of fire and take precautions to deal with the remaining risks. iii. Putting in place protection measures if there are flammable or explosive materials used or stored on the premises. iv. Developing an emergency plan should a fire occur which includes evacuation procedures etc.

	• Regulation 16 requires Proponents to ensure that electrical equipment is installed in accordance with the respective hazardous area classification system. It is also a requirement that all electrical equipment is inspected every six months by a competent person and the Proponent is required to keep records of such inspections. • Regulation 22 provides a description of the functions of a fire-fighting team. • Regulation 23 requires Proponents to mandatorily undertake fire drills at least once a year. • Regulation 33 requires Proponents to have adequate fire water storage capacity. As a minimum this regulation requires Proponents to have at least 10 cubic meters of dedicated fire water storage capacity. • Regulation 34 requires Proponents to develop and implement a comprehensive written Fire Safety Policy. This policy should contain a Fire Safety Policy Statement signed by the CEO, a Fire Safety Policy Manual and a brief summary of the Fire Safety Policy of the company. • Regulation 35 requires a Proponent to notify the nearest Occupational S&H area office of a fire incident within 24 hours of its occurrence and a written report sent to the Director of DOSHS within 7 days.	
18 THE ENERGY ACT, 2019	The Energy Act deals with all matters relating to all forms of energy including the generation, transmission, distribution, supply, and use of electrical energy, as well as the legal basis	The proponent is in line with the Energy act regulations in the following ways; • The proponent has identified an available site • alignment of the Mini-Grid Project to County development plans;

for establishing the systems associated with these purposes. The Energy Act also established Energy and Petroleum Regulatory Authority (EPRA) in place of the Energy Regulatory Commission (ERC), whose mandate is to regulate all functions and players in the energy sector. One of the duties of the EPRA is to ensure compliance with environmental, health, and safety standards in the energy sector, as empowered by Section 99 of the Energy Act, 2019. In this respect, the following environmental issues will be considered before approval is granted:

- The need to protect and manage the environment and conserve natural resources; and
- The ability to operate in a manner designated to protect the health and safety of the project employees, the locals, and other potentially affected communities.

An ESIA approved by NEMA must support licensing and authorisation to generate and transmit electrical power.

- Part VI Section 121 (1a) stipulates that the EPRA shall, before issuing a license, take into account the impact of the undertaking on the social, cultural or recreational life of the community.
- Part VI Section 121(1b) stipulates that the EPRA shall, before issuing a license, take into account the need to protect the environment and to conserve natural resources in accordance with the Environmental Management and Coordination Act.
- the Mini-Grid proponent has the technical and financial capability to conduct the project
- The proponent has conducted the necessary engagement with the community.

		• Part VI Section 136 (1a) stipulates that it shall be the duty of a transmission licensee to operate, maintain (including repair and replace if necessary) and protect its transmission grid to ensure the adequate, economic, reliable and safe transmission of electricity; and	
19	THE ENERGY (SOLAR PHOTOVOLTAIC SYSTEMS) REGULATIONS, 2012	These regulations shall apply to a solar PV system manufacturer, importer, vendor, technician, contractor, system owner, a solar PV system installation and consumer devices. The Regulations prohibits any person from designing or installing any solar PV system unless he/she is licensed by EPRA.	The Regulations regulates, the design and installation of PV systems. The Proponent will ensure that persons engaged in the designing and installation of the Mini-Grid are licensed by EPRA
20	THE PUBLIC HEALTH ACT (CAP. 242)	The Act prohibits the project proponents from engaging in activities that cause environmental nuisance or those that cause danger, discomfort or annoyance to inhabitants or is hazardous to human and environmental health and safety.	The proponent will be in line with the regulations of this act and will ensure suppression of infectious diseases and maintain proper sanitation during all the phases of the project.
21	COMMUNITY LAND ACT, 2016	This Act is critical for the proposed project is within community land. Section 6(1) of the Act provides that 'county governments shall hold in trust all unregistered community land on behalf of the communities for which it is held'. Furthermore, Section 6(2) maintains that 'the respective county government shall hold in trust for a community any monies payable as compensation for compulsory acquisition of any unregistered community land'. Therefore, the proposed	The proposed project site falls on unregistered community land set aside by the community for development projects. The community has since offered to the land in kind for project use. The establishment of the minigrid will convert communal land to industrial use for long term. Further, based on community need assessment the proponent will undertake in kind development project to support the community as compensation for the given land. They have request for provision of clean water source. The proponent should adhere to the provision of this legislation

road project can access land or water resources in community land that may be unregistered and pay compensation to the County Government which the law authorizes to hold such monies in trust for the communities.

Section 30(1) states that 'Every member of the community has a right to equal benefit from community land'. Section 26(1) provides that 'a community may set aside part of the registered community land for public purposes' and Sub-section (2) holds that 'where land is set aside for public purposes under Sub-section (1), the (Land) Commission shall gazette such parcel of land as public land'. This provisions offer a window for the proposed project to acquire land for project works legally for communities as necessary and to convert the same into public land. This is useful for the project as once done powerful groups will not have opportunity to exclude them on account of their socio - economic statuses. In any event, Section 35 holds that, 'subject to any other law, natural resources found in community land shall be used and managed-
(a) Sustainably and productively;
(b) For the benefit of the whole community including future generations;
(c) With transparency and accountability; and
(d) On the basis of equitable sharing of accruing benefits'.

The concept of community land has been defined broadly enough to include VMGs. Women, children, old people and

		future generations have been thought of as beneficiaries and thus their rights secured in this Act	
22	HIV AIDS PREVENTION AND CONTROL (CAP 246A)	This Act is to promote public awareness about the causes, modes of transmission, consequences, means of prevention and control of HIV and AIDS. It also seeks to positively address and seek to address conditions that aggravate the spread of HIV infection.	Like other projects, the proposed project is expected to attract new people to the project area seeking employment. This can lead to increased transmission of HIV/AIDS and other sexually transmitted diseases (STDs) as they engage in sexual relationships amongst themselves and/or local community members. In line with the requirements of this Act, the Contractors will create awareness and sensitize the workers and other persons on the risks of infections to foster prevention and control.
23	THE PHYSICAL AND LAND USE PLANNING ACT, 2019	This Act of Parliament makes provision for the planning, use, regulation and development of land and for connected purposes. The objects of this Act related to the project include; (a) the principles, procedures and standards for the preparation and implementation of physical and land use development plans at the national, county, urban, rural and cities level; (b) the procedures and standards for development control and the regulation of physical planning and land use; (d) a framework for the co-ordination of physical and land use planning by county governments; (c) a framework for equitable and sustainable use, planning and management of land;	The proposed site is not in contravention of any Zoning regulations. The project site is within unregistered community land; necessary county approvals will be sought by the proponent eg. project design approval and change of use. The approvals shall be issued by the Physical planner in the department of Lands, Housing and Urban Development – Turkana County.

4.3.1 Administrative Framework

In 2001, the Government established the administrative structures to implement the Environmental Management and Co-ordination Act of 1999 (EMCA). The main administrative structures are described in the following sections:

Table 8. Administrative stakeholders and their roles

Stakeholders	Role
NEC	The **National Environmental Council** is responsible for policy formulation and directions for the purposes of EMCA. The Council also sets national goals and objectives and determines policies and priorities for the protection of the environment. *The proponent should ensure that the project abides by the set goals and objectives of the Council.*
NEMA	The responsibility of NEMA is to exercise general supervision and co-ordination over all matters relating to the environment and to be the principal instrument of Government in the implementation of all policies relating to the environment. *This ESIA has been prepared for submission to NEMA for review and approval prior to the commencement of the Project activities, in compliance to the EMCA.*
PCC	EMCA has also established a Public Complaints Committee, which provides the administrative mechanism for addressing environmental harm. The Committee has the mandate to investigate complaints relating to environmental damage and degradation. The members of the **Public Complaints Committee** include representatives from the Law Society of Kenya, NGOs, and the business community. *The proponent should address all issues arising from the Project in accordance with the above requirements, including a clear policy of stakeholder engagement and feedback.*
WRA	Water Resources Authority is responsible for regulation of water resources issues such as water allocation, source protection and conservation, water quality management and pollution control and international waters. One of its functions among others is to receive water permit applications for water abstraction, water use and recharge and determine issue, vary water permits; and enforce the conditions of those permits as well as formulate and enforce standards, procedures and Regulations for the management and use of water resources and flood mitigation. *The project area experiences serious water scarcity. The proponent will have to purchase water for use during construction.*
The Energy and Petroleum	Established by the Energy Act of 2019. The EPRA's mandate extends beyond electricity and includes natural gas (including petroleum), renewables and all other forms of energy. The generation, transmission, distribution, supply, import and export of electricity can only be carried out by parties in possession of a license or a permit issued by the EPRA. In the event that the capacity involved is for own use and

Regulatory Authority (EPRA):	less than 1 MW, authorization is not required. Although the generated electricity is expected to be less than 1 MW (0.3 – 1 MW), the fact that the generated electricity is intended for use in a factory and there is a possibility for connection to the national grid and sale of excess power to the government, the project requires a license from the EPRC to generate electricity as stipulated in the Energy Act, 2019. The Energy and Petroleum Regulatory Authority (Authority) together with industry stakeholders have developed the Draft Energy (Mini-Grid) Regulations, 2021 (the 'Regulations'). The Regulations have been developed within provisions 10, 11 and 208 of the Energy Act, 2019 (the 'Act') and shall constitute Regulations to the Act. The Regulations will amongst others, provide guidance to mini-grid developers and other stakeholders on the tariff approval and licensing requirements. This will be directly applicable to the Namukuse site.

4.4 INTERNATIONAL SAFEGUARDS REQUIREMENTS

The table below shows the applicability of World Bank Operational OPs to the proposed project in Namukuse site;

S.No.	Safeguard Policy	Objective	Applicability
1	Environment Assessment (Operational Policy, OP/BP 4.01)	The objective of this policy is to ensure that Bank-financed projects are environmentally sound and sustainable, and that decision-making is improved through appropriate analysis of actions and of their likely environmental impacts. This policy is considered to be the umbrella policy for the Bank's environmental 'safeguard policies.	The policy is applicable to this project because there are environmental and social concerns associated with the construction and operation of the proposed project. In response, REREC has commissioned and Environmental impact assessment in order to identify and address the potential impacts to a level that is acceptable.
2	Natural Habitats (Operational Policy, OP/BP 4.04)	This policy recognizes that the conservation of natural habitats is essential to safeguard their unique biodiversity and to maintain environmental services and products for human society and for long-term sustainable development. The Bank therefore supports the protection, management, and restoration of natural habitats in its project financing, as well as policy dialogue and economic and sector work. The Bank supports, and expects borrowers to apply, a precautionary approach to natural resource management to ensure opportunities for environmentally sustainable development. Natural habitats are land and water areas where most of the original native plant and animal species are still present. Natural habitats comprise many types of terrestrial,	The proposed project may be in or close to areas with natural unique flora and fauna though the component is unlikely to have significant negative impacts on natural habitat. Works will nevertheless be implemented in an area in Namukuse that may not negatively affect diverse flora, fauna, and avifauna. The main flora in the project area is *prosopis juliflora*, olive plants and palm trees. Additionally, caution will be taken to ensure minimum disruptions to habitats as guided by the ESMP.

		freshwater, coastal, and marine ecosystems. They include areas lightly modified by human activities but retaining their ecological functions and most native species.	
3	Indigenous Peoples (Operational Policy 4.10)	The objective of this policy is to (i) ensure that the development process fosters full respect for the dignity, human rights, and cultural uniqueness of indigenous peoples; (ii) ensure that adverse effects during the development process are avoided, or if not feasible, ensure that these are minimized, mitigated or compensated; and (iii) ensure that indigenous peoples receive culturally appropriate, gender and inter-generationally inclusive social and economic benefits.	The policy is applicable because the main inhabitants of Namukuse are Turkana. Other minority tribes include; Kalenjin, Turkana Luhya, Luo and Congolese. Turkana, Turkana is classified as marginalized groups in Kenya. The proponent will continue to engage the beneficiaries in a culturally appropriate way and allow for decision making in a free, prior and informed consent manner throughout the phases of the project.
4	Involuntary Resettlement (Operational Policy, OP/BP 4.12)	The objective of this policy is to (i) avoid or minimize involuntary resettlement where feasible, exploring all viable alternative project designs; (ii) assist displaced persons in improving their former living standards, income earning capacity, and production levels, or at least in restoring them; (iii) encourage community participation in planning and implementing resettlement; and (iv) provide assistance to affected people regardless of the legality of land tenure.	*The policy is triggered for the entire project because there is land acquisition for the Mini-grid, Wayleaves, contractor facilities and worker's camps.*

4.5 COMPARISON BETWEEN THE WORLD BANK AND KENYAN LAWS TO THIS PROJECT

A comparison between the WB policies and the Kenyan law is presented in this section. The objective is to find out any gaps and propose a recommendation.

Table 9: Comparison between the WB safeguard policies and the Kenya Legislation

World Bank safeguard Policies	Kenyan laws	Comparison	Recommendation
O.P 4.01 requires screening to determine level of environmental and social assessment to be done **An ESIA is prepared before project implementation**	EMCA requires screening of project to determine level of environmental and social assessment to be done An ESIA is required once determination is done	Similar both require screening	Screening has been done and the project is established as medium risk which requires and ESIA
ESIA is needed once determination had been established and should be prepared identifying all environmental and social impacts and mitigation measures proposed to address the impacts	ESIA is needed once determination had been established and should be prepared identifying all environmental and social impacts and mitigation measures proposed to address the impacts	Similar-both require ESIA depending on the project impacts	ESIA is prepared in line with EMCA /EIA regulations and makes reference to WB safeguard policies
O.P 4.12 Land Acquisition and Involuntary resettlement should be avoided wherever possible or minimized and exploring all alternatives	The Government and any other organization shall prevent internal displacement linked to development projects to the extent possible by exploring other alternatives.	Similar**-** displacement in projects should be avoided to the extent possible by exploring alternatives.	WB policy is more elaborate than the Kenyan Law.
O.P 4.10 on indigenous people seeks to promote the inclusion of these group in development project and especially through consultation to ensure they also share in the project benefits	The Constitution of Kenya 2010 article 56 provides for the right of marginalized communities and the importance of their input in decision making that regards them. National Gender and Equality Act and the Children's Act and Persons with disability Act seeks to promote the inclusion of these persons in	Similar-both seek to promote inclusion of these group so that they do can share the projects benefits and ensure that negative impacts of the project do not fall on them disproportionately WB needs a social assessment to be conducted	WB policy more elaborate and the two are being used to compliment

World Bank safeguard Policies	Kenyan laws	Comparison	Recommendation
and ensure negative impacts do not disproportionately fall on them **The policy requires these groups to be consulted separately to enhance their participation**	all issues as they are often overlooked and left out. Emphasis is also on consulting with them		
Project affected persons should be meaningfully consulted and be given opportunities to participate in planning and implementing of projects and especially where there is resettlement	EMCA requires that the project owner seeks the views of the people who are affected and explain the project information to them and especially the impacts of project and also obtain their opinions or comments	Both are similar	Consultation has been done and will be progressed in line with the two WB policy and Kenya legislation
O.P 4.04 is a comprehensive set of standards that aim to promote sustainable development and protect the environment and communities from the adverse impacts of development projects. The ESIA must consider the impacts of the project on natural habitats, including wetlands, forests, and other sensitive ecosystems, as well as the impacts on biodiversity and wildlife.	Under EMCA, an ESIA must be conducted before the implementation of any development project that is likely to have significant adverse impacts on the environment.	Similar-Both focus on protection of natural habitats and the assessment impacts of development projects on these habitats. However, OP/BP 4.04 provides more detailed guidance on the specific steps and considerations that must be taken into account when conducting an ESIA, while EMCA provides the legal framework for ESIA in Kenya	The World Bank policy is more detailed, and the two are used in a complementary manner

5 BASELINE SETTINGS - ENVIRONMENT, ECOLOGY AND SOCIAL

5.1 AREA OF INFLUENCE

The Area of Influence (AoI) of the project comprises of the project site and the surrounding area, where the influence of the project activities is anticipated. The areas likely to be affected by the project and its associated activities include:

- The areas where project activities and facilities operated and managed by the Ministry of Energy, Kenya Power and Lighting Company (KPLC), will be established,
- Project site where project components such as solar modules, control room and transmission line to power grid sub-stations; and any other selected CSR project, such as the construction water abstraction and distribution points will be established
- Areas where impacts from unplanned but predictable developments caused by the project that shall occur later or at a related location such as increase in traffic on the approach road;
- Areas where there is biodiversity or on ecosystem services upon which affected communities' livelihood are dependent; and
- Areas where associated facilities will be established e.g. approach road construction and widening of existing road.

  Further to this, the AoI with respect to the environmental and social resources was considered based on the following reach of impacts:

Air Quality

- Impact on ambient air quality from vehicle exhaust;
- Impact of air pollutants emission from construction activities and
- Dust fall- typically up to 200 m from construction activities

Noise

- Noise impact area (defined as the area over which an increase in environmental noise levels due to the project can be detected) - typically 500 m from operations and 200 m from the access road

Water

- Surface water body- typically 500 m upstream and downstream of water intake point and downstream of discharge point
- Other surface water bodies within 1 km of the project footprint
- Groundwater in 1-2 km radius of project footprint

Flora and Fauna

- The direct footprint of the project comprising the project site
- The areas immediately adjacent to the project footprint within which a zone of ecological disturbance is created through increased dust, human presence and project related activities (e.g., trampling, water intake/outfall, transportation). This kind of disturbance has been estimated to occur within the project footprint and surrounding areas of about 500 m to 1 km from the activity areas. Based on the above the AoI for environmental studies was limited to 5 km from the project site.

Socio-economic/Social

The AoI for social receptors was fixed to include 2 km radial zone which has been developed based on the reconnaissance site visits and stakeholder consultations with the local community. The AoI for development of the social baseline is within Namukuse Sub-Location. The socio-economic information presented in this report has drawn from primary socio-economic survey and the Population and housing census 2019, Kenya Bureau of Statistics (KBS).

5.1.1 Project Footprint Area

The site is located at the West shores of Lake Turkana in Namukuse Location, Turkana Central sub-county, Turkana County.
The proposed solar mini grid will be located on an approximate 1.143 Ha piece of land. The proposed project site is 700m from Namukuse Primary school. The proposed project site is generally flat; the area is characterised by highly permeable sandy soils. The main flora at the site include olive plants, palm trees and *prosopis juliflora.*

An abbreviated Resettlement Action Plan (A-RAP) outlining the principles and procedures for land acquisition and compensation is annexed to this ESIA. An A-RAP applies where affected persons are not physically displaced, and less than 10% of their productive assets are lost, or fewer than 200 people are displaced. In the case of KOSAP sub-projects, there is no physical displacement of affected persons, and the foreseen impacts on livelihoods, such as grazing occasioned by mini-grid construction, wayleaves acquisition, and implementation of community projects, are considered minor. A-RAPs will be implemented for sub-project sites on the unregistered community land.

5.2 ENVIRONMENT BASELINE

5.2.1 Land Use

The area is majorly arid and receives less rainfall in a year. The Land in Namukuse has several uses which are but not limited to construction of houses and economic activities. The major economic activity of the resident community in Namukuse is fishing due to the close proximity to Lake Turkana. Apart from fishing, Pastoralism is the preferred pattern of livelihood in this exceptionally hot, dry and arid environment. However, most households are also dependent on a combination of self-employment activities (charcoal, firewood, handicrafts, mat making, motorbikes, etc). They also depend on land for wild fruits.
The land on project site does not and cannot support growth of pasture hence it is rarely used as feeding ground for cattle. The most common animals that are domesticated include camels, sheep, and goats.

Land in the community is mainly communal and is also used for homesteads. There is no drilled borehole in the area.

5.2.2 Topography

The project area landscape is arid and vegetation is limited. Acacias, doum palm trees and other small trees are spotted on the landscape, shrubs and grasses cover the ground, which normally turn a vibrant green when it rains.
The site area is mostly plain lands; the distant mountain ranges lie in the Border areas near River Turkwel. The characteristics of the soil change considerably heading around the Ferguson Gulf, where the ground is mostly sand and doum palms are the most common type of vegetation. The area soils are mainly sandy soils. The area is prone to seasonal flash flooding during the rainy seasons which makes roads impassable especially along seasonal water ways. The terrain at the project site is nearly flat with an approximated slope of 0.001 which would be ideal for the mounting of the solar panels supporting structures.

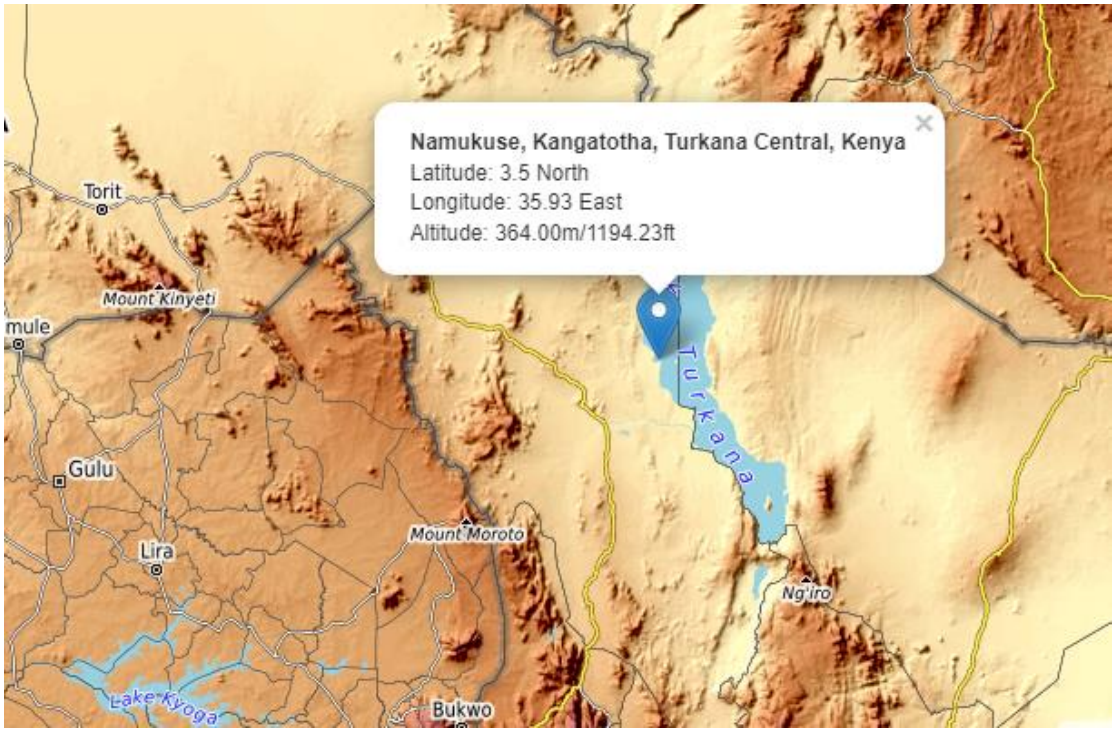

Figure 6: Topography map

5.2.3 Hydrogeology and Drainage

Turkana County is within Africas Tectonic region in the Great Eastern Rift Valley. It is on altitude of 360 meters while the surrounding basin's elevation varies between 375 and 914 meters. The county has three main inflows: Omo, Turkwel and Kerio rivers. However, there is no outflows with predominant water loss from evaporation. Lake Turkana where the project area lies at the western shores is the only lake with water from two distinct catchment areas of the Nile.
The project area is predominantly arid with most of water resources being underground. In Namukuse there is only one source of water i.e. Lake Turkana. The area depends on the water from the lake for cooking drinking and domestic use.

5.2.4 Ecology

The project area is characterised with large areas with bare soil and vegetative cover. The remainder is predominately moderate or senescent cover, representing those plants that are in the process of aging. Vegetation types in the county are diverse and include patchy, annual grassland and herbaceous plants interspersed with woody shrubs to riverine woody tree species. Most areas of the Namukuse are dominated by dwarf shrubs and duam palm trees.

The herbaceous tree species include *Aristide adscensionis, Blephanis linafolia, Cenchrus ciliaris, Cyperus rotundus, Cynodon plectostachyus, Echnochloa haploclada, Evolvulus alsinoides, and Launea cornuta.* Main wildlife around the project area include hippos, crocodiles, scorpions and tilapia fish in addition to the various fish species in Lake Turkana. There exists various bird species, key among them the flamingos in Lake Turkana and wild birds around the project site. The area has a high wildlife-human conflict especially with crocodiles. Around 8 people were killed by crocodiles in 2021.

Floral representation in the project area




5.2.5 Water Resources

Turkana is an arid region with most of water resources being underground. The main water sources in the county are boreholes, piped water and river water. Other sources include springs, rock catchments and wells. Various seasonal streams from inland Turkana flow into the lake, the largest of which are the Kerio and Turkwel rivers. Turkwel is a permanent source of water due to the hydro-electric dam upstream, which controls the amount of water flowing into the lake.

With regard to water resources in the project area, the main water source is Lake Turkana and the water is used for cooking, drinking and other domestic activities. The water is salty and unclean but the residents have no other alternative option.

Figure 7: A resident carries water for use from the lake

5.2.6 Ambient Air Quality

The proposed project area is located at the centre of Namukuse Location. It can be described as generally rural with scattered vegetation. There are no major industrial developments in the area. The air quality at the proposed project sites is therefore considered to be generally good. Monitoring of air quality was conducted during the baseline evaluation, and the data is as shown in the table below:

Table 10: Ambient air quality results

	NO2 (ppb)	O3 (ppb)	PM2.5 (µg/m3)	PM10 (µg/m3)	SO2 (ppb)	TSP (µg/m3)	TVOCs (ppb)
Average							
Maximum							
Minimum							
Time							

5.2.7 Ambient Noise Quality

In general, the project area is near the centre setting where the main source of noise is from motorists and motorbikes. Baseline noise data was collected in the project area and the data is shown in the table below:

Table 11: Noise measurement results

Aspect	dB	Time Stamp
Leq		

LS(max)		
LS(min)		
LPeak(max)		

Noise Descriptors used for the survey

Ls(max) A-Weighted Maximum sound pressure level obtained during the measurement period. This index is used to describe short period noise events.

Ls(min) A-Weighted Minimum sound pressure level obtained during the period of measurement. This index is used to describe short period noise events.

Leq Value of A-weighted sound pressure level of a continuous steady sound that, within a specified interval, has the same mean square of sound pressure as the sound under consideration whose level varies with time. This index is used to describe events over the period of the event.

dB Decibels

5.2.8 Soil Type

The area has a shallow soil profile with a bed rock very close to the surface, hence minor civil works will be conducted at the project site for the foundation, but a deeper analysis is needed to determine the precise depth for the foundation. The soil formation on the project site is poor has there is small top soil layer profile as rock outcrops are evident across the field. The site area is highly characterised by sandy soils.

A soil sample was collected from the site and submitted to a NEMA designated Laboratory for analysis of Petroleum Hydrocarbons.

Table 12: Soil Analysis results

Test	Method	Results	Units	Limit
BTEX				
Benzene				
Toluene				
Ethyl benzene				
Xylene				
Naphthalene				
Acenaphthylene				
Acenaphthene				
Fluorene				
Phenanthrene				
Anthracene				
Fluoranthene				
Pyrene				
Benzo(b)anthracene				
Chrysene				
Benzo(b)fluoranthene				
Benzo(k)fluoranthene				
Benzo(a)pyrene				

5.2.9 Climate and Meteorology

Turkana County is situated in the arid region of Kenya and receives between 150mm and 400mm of rainfall annually. It is characterised by unpredictable rainfall, extreme rainfall, frequent and prolonged dry spells, and increased daytime temperatures.

The site area has a hot, dry climate with temperatures ranging between 20ºC and 41ºC and with a mean of 30.5ºC. Rainfall in the area is bimodal and highly variable. The long rains occur between April and July and the short rains between October and November. Annual rainfall is low, ranging between 52 mm and 480 mm with a mean of 200 mm.

Rain patterns and distributions are erratic and unreliable. Rain usually comes in brief, violent storms that result in flash floods. The driest periods (akamu) are in January, February and September and the county is highly prone to drought. 80% of the county is categorised as either arid or very arid.

5.3 SOCIO-ECONOMIC ENVIRONMENT

5.3.1 Socio-economic status of Study Area

5.3.1.1 Demographic Profile

The study area is in Namukuse location, Turkana Central sub county, Turkana County. Houses in the community mainly composed of thatched with palm trees leaves or polythene covered manyattas with a few that are roofed by iron sheet and brick walls. The main dominant tribe is Turkana while the minority tribes include; Kalenjin, Turkana, Luhya, Luo and Congolese. Christianity is the dominant religion.

The approximate population in Namukuse Location according to the area chief is 23900 with an approximate 8600 households present. Namukuse has a gender ration that is currently estimated to be about 30 % male and 70% female.

Plate 1: Type of housing in the site area

Table 13 below presents a summary of demographic profile of Namukuse

Table 13: Summary of the Demographic profile

Attribute	Magnitude/Number
Approx. population	23900
Households	8600
Gender.	Male – 30% Female – 70%
Ave. No. per household	6 per household
Indigenous	Indigenous- 85% Settlers – 15%
Vulnerable classes	• Widows-approximately 200 • Orphans –approximately 500 • Persons Living with Disabilities- Approximately 150 • The elderly (80 years and above)- approximately 80
Dominant ethnic group	Turkana
Primary religion	Christianity
Other groups	Kalenjin, Turkana, Luhya, Luo, Congolese
Employment (formal/Informal)	Formal – 20% Informal – 80%

5.3.1.2 Educational Infrastructure

Existing schools include Namukuse Primary school and a nursey school and other separate 3 Early Childhood Centers. There is no secondary school in the area.

Namukuse Primary school is government public school. It has 10 teachers (Female-3 and 7 male). It has 5 TSC teachers, 3 volunteers and 2 ECD teachers. The main challenges faced at this school is lack water and electricity, understaffing, lack of teachers quarters and lack of a feeding programme. The school has 360 boys and 350 girls (a total of 710 pupils) with 40% boys completion rates and 60% among the girls. The school has two dormitories but lack the required number of beds. The average distance pupils and students walk to school is 2Km.

5.3.1.3 Occupation and Livelihood Profile

Namukuse lies along the western shores of Lake Turkana. Fishing is the main economic activity of the area, despite the populations' pastoral background. As such, the most valuable productive assets are fishing equipment (boats, nets, lines and hooks), whereas the importance of livestock to household income is relatively small.

Fish is sold fresh, dried, salted and smoked depending on the distance to the market. Turkana County has been working to enhance fish preservation and storage in the it has constructed the Namukuse Dry Fish Store that is complete and awaits operalization.

Higher levels of income in the area is derived from the sales of fresh fish, which is transported directly to Nairobi. The Congolese are many in the area specifically for fish business and the fish is also transported to Congo.

There is a Functioning Namukuse Beach Management Unit that comprise of members that contribute monthly (1000 per boat). Functions of the BMU includes; security of the boats, clean ups and safety of the fishermen. The main challenges of the fishing industry in the area is the poor fish preservation methods, Poor fishing gears and boats, Low fish prices and high rates of crocodile attacks.

Women are mainly fish mongers and they partly practice fishing too. The absence of large scale agriculture and the small herd sizes, mean households must purchase most of their food. The youths are also involved in small businesses and motorbike business and also do mat making.

Plate 2: Available Fishing facilities

5.3.1.4 Land Use

Land in Namukuse is mainly communal. The land has several uses which are but not limited to construction of houses, economic activities and subsistence activities. The major economic activity of the resident community in is fishing hence land is minimally utilised for commercial entrepreneur areas, homesteads and as a source of wild fruits and Palm for mat making.
The land on project site does not and cannot support growth of pasture hence it is rarely used as feeding ground for cattle. The most common animals that are domesticated include camels, sheep, and goats. The area does not support agriculture.

5.3.1.5 Social and Physical Infrastructure

Public and private institutions found in the project area include: schools and health facilities. The institutions observed in the area during the field visit include Namukuse Primary School and 3 ECD centres.

The main health facility in the area is Namukuse Health Centre. The facility offers maternity, laboratory services, Pharmacy, ANC and nutrition. The staff comprise of one Clinical officer, 2 nurses and 16 subordinate staff. Some of the equipment's present at the centre include; BP Machine, weighing scale, stethoscope and fridge to store drugs. The centre is a free service delivery and one of their major challenges is lack of electricity. The hospital receives more aid from Save the Children NGO and it has a Solar PV installed by the ministry of Energy

The main source of water is Lake Turkana. Roads connectivity within the area are very poor and its hard accessing the area.

Figure 8: Namukuse Dispensary

Figure 9: Funded projects at the health centre

5.3.1.6 Vulnerable groups

According to the World Bank Document-Vulnerability: A View from Different disciplines by Jeffry Alwang and Paul B. Siegel, a vulnerable group is a population that has some specific characteristics that make it at higher risk of falling into poverty than the others.

The categories of vulnerable groups identified at the project area include:

- Widows-approximately 200
- Orphans –approximately 500
- Persons Living with Disabilities- Approximately 150
- The elderly (80 years and above)- approximately 80

The vulnerable households can hardly access the basic needs. The project should consider such households for electricity connection. Most of them cannot afford the one thousand shillings' connection fees.

5.3.1.7 Gender based vulnerability

During the Female Focus Group Discussion and in-depth interviews, it was reported that the men are the main controllers of resources that include land, assets and equipment's and the women has minimal control of assets. The men have more opportunities in the community as compared to women. Women are involved in some decisions but majorly household decisions and not communal

The main challenges that women and girls face include Poverty and lack of maternity. The women in the area tend to provide more than their male counterparts in line with the Turkana tradition that women should provide 100%.

In a typical household, the head of the household is the eldest male members, while the decision making authority is the man. In addition to this, men are responsible for ensuring the financial security of the family. Girls have a 100% access and education and 80% can read and write.

5.3.1.8 Gender Based Violence

Gender based violence in the area are minimal as reported by the women. The current cases are mainly family based and its majorly caused by drunkenness.

5.3.1.9 Culture and heritage

No cultural site of significance was reported/observed within 10Km project area.

The community in the project area are a patriarchal society; men typically speak for women and make decisions in the family. The Predominant community which is Turkana practices polygamy and encourages early marriages for young girls. The main festivals and rituals undertaken in the community is Akuta(Marriage) and Asapan(Circumcision)

5.3.1.10 Religion in the project area

The community members are predominantly Christian with one main church spotted at the project area.

Figure 10: Main Church in the project site

5.3.1.11 HIV/AIDs prevalence

The county has an HIV/AIDS prevalence of 4.0% by 2015, below the national average of 5.9% (NACC, 2016). Mother to child HIV transmission rates was at 7.9% in 2017. Prevalence rates of sexually transmitted illness especially HIV/AIDS is high in the area as confirmed by the health practitioner at Namukuse Health Centre. The cases have been reduced by programs by Save the Children NGO. This high cases are due to the high sexual exploitation in the area.

6 STAKEHOLDER ENGAGEMENT

This section profiles the key stakeholders of the Namukuse site solar project and assesses their potential concerns and levels of influence. The process of stakeholder engagement involved;

i. stakeholder identification and analysis
ii. planning for the stakeholder engagement;
iii. disclosure of information;
iv. consultation with stakeholders
v. addressing and responding to grievances; and
vi. reporting to stakeholders

6.1 STAKEHOLDER CONSULTATION AND DISCLOSURE REQUIREMENT FOR THE PROJECT

The World Bank Environmental Social OPs 10 on Stakeholder Engagement and Information Disclosure emphasises on engagement in meaningful consultations with all stakeholders. The stakeholders should be provided with timely, relevant, understandable, and accessible information, and consult with them in a culturally appropriate manner, which is free of manipulation, interference, coercion, discrimination, and intimidation.

A documented record of stakeholder engagement, including a description of the stakeholders consulted, a summary of the feedback received, and a brief explanation of how the feedback was been explained in this chapter. The respective minutes and list of participants for the public consultation undertaken in Namukuse Centre is enclosed under appendices of this report. Further, an initial communication was shared with the county commissioner and Deputy County Commissioner for Turkana, prior to the public participation meeting held on 14/01/2022. Background information document (BID) with project details was posted clearly at one conspicuous area at the Namukuse centre for all to see and read it.

6.2 STAKEHOLDER CHARACTERISATION AND IDENTIFICATION

Stakeholders are classified in the following two categories;

- **Primary Stakeholders**- Stakeholders who have a direct impact on or are directly impacted by the project.

- **Secondary Stakeholders**- Stakeholders who have an indirect impact or are indirectly impacted by the project.

In line with the nature of the project and its setting in Namukuse the stakeholders have been identified and listed in the table given below;

Table 14: Identified stakeholders

Stakeholder Groups	Primary Stakeholders	Secondary Stakeholders
Community	Local Labourers Land sellers Project beneficiaries VMG's Local Community	Fishermen Pastoralists
Institutions	Faith Based Organisations Education institutions	

	Community Based organisations
Government Bodies	County Government District and local administration NEMA

6.2.1 Stakeholder Mapping

Stakeholder mapping" is a process of examining the relative influence that different individuals and groups have over a project as well as the influence of the project over them. The purpose of a
stakeholder mapping is to:

- Identify each stakeholder group;
- Study their profile and the nature of the stakes;
- Understand each group's specific issues, concerns as well as expectations from the project
- Gauge their influence on the Project;

The significance of a stakeholder group is categorized considering the magnitude of impact (type, extent, duration, scale and frequency) or degree of influence (power and proximity) of a stakeholder group and urgency/likelihood of the impact/influence associated with the particular stakeholder group in the project context. The magnitude of stakeholder impact/influence is assessed taking the power/responsibility and proximity of the stakeholder group and the group is consequently categorized as negligible, small, medium or large. The urgency or likelihood of the impact on/influence by the stakeholder is assessed in a scale of low, medium and high. The overall significance of the stakeholder group is assessed as per the matrix provided in Table below.

Table 15: Stakeholder Significance and Engagement Requirement

		Likelihood of Influence on/ by Stakeholder		
		Low	Medium	High
Magnitude of impact	Negligible	Negligible	Negligible	Negligible
	Small	Negligible	Minor	Moderate
	Medium	Minor	Moderate	Major
	Large	Moderate	Major	Major

6.3 STAKEHOLDER ANALYSIS

The Stakeholder influence and priority have both been primarily rated as:

- **High Influence**: This implies a high degree of influence of the stakeholder on the project in terms of participation and decision making or high priority to engage with the stakeholder;

- **Medium Influence**: Which implies a moderate level of influence and participation of the stakeholder in the project as well as a priority level to engage the stakeholder which is neither highly critical nor are insignificant in terms of influence; and
- **Low Influence**: This implies a low degree of influence of the stakeholder on the project in terms of participation and decision making or low priority to engage that stakeholder. The intermediary categories of low to medium or medium to high primarily imply that their influence and importance could vary in that particular range subject to context specific conditions or also based on the responses of the project towards the community.

The coverage of stakeholders as stated above includes any person, group, institution or organization that is likely to be impacted (directly or indirectly) or may have interest/influence over project. Keeping this wide scope of inclusion in stakeholder category and the long life of project, it is difficult to identify all potential stakeholders and gauge their level of influence over project at the outset of the project. Therefore, the project proponent is advised to consider this stakeholder mapping as a live document which should be revised in a timely manner so as to make it comprehensive for any given period of time.

Table 16:Summary of Stakeholder Influence

Stakeholder Category	Relevant Stakeholders	Magnitude of Influence/Impact	Urgency/Likelihood of Influence	Overall rating of stakeholder rating
Primary Stakeholders	Community land owners	Medium	Low	Minor
	Local Labourers and subcontractors	Small	Medium	Minor
	County Government of Turkana, District and local administration	Medium	Low	Minor
	FBOs, CBOs and Educational Institutions	Medium	Low	Minor
	VMGS			
	Local community			
Secondary Stakeholders	Fishermen	Small	Medium	Minor
	Pastoralists	Small	Medium	Minor
		Medium	Low	Minor

6.4 KEY FEEDBACK RECEIVED DURING COMMUNITY CONSULTATIVE MEETING LEADING TO LAND IDENTIFICATION AND GRC CONSTITUTION – SCREENING LEVEL

MIN 1.0 WELCOMING AND OPENING

The meeting was opened with a word of prayer by William Chegen. The Ward administrator said Namukuse was inhabited by the Ngiriamuk Clan and their main economic activity was Fishing. It had about 1000 households. He conveyed apologies for the absence of area Chief Mr. Peter Lotieng who was held up in another meeting. He told residents Government was aware of their plight and will be assisted accordingly. He asked them to listen keenly to what visitors have to say so that on going back they can enlighten those who were unable to attend. He then invited project team to enlighten the community.

The visiting team introduced themselves as follows;

1. Kioko Maithya - Social Safeguards Officer - REREC

2.	Irene Kawira	- Senior Environmentalist	- REREC
3.	Caleb Ewoi	- CREO	- MOE
4.	Agnes Gachoki	- Senior Surveyor	- REREC
5.	Lawrence Lorika	- Technician	- KPLC (lodwar)
6.	Myra Mukulu	- Technical Advisor Cook Stoves	- MOE

MIN 2.0 KOSAP AND NAMUKUSE MINI GRID

Ms Myra Mukulu informed the participants that the proposed project is part the Kenya off Grid Solar Access Project (KOSAP) which is funded by the World Bank and is being implemented by the Ministry of Energy, the Kenya Power and Lighting Company (KPLC) and the Rural Electrification and Renewable Energy Corporation (REREC). MoE will provide overall coordination of the Project including responsibility for safeguards due diligence, and compliance monitoring. REREC will implement the mini grid and will be responsible for the implementation of Resettlement Framework Plan, Environmental Social Management Framework and Social Assessment. She said the Government is committed to providing electricity to communities that have not been served by the national grid such as Namukuse because it recognises energy as a key development enabler.

She said KOSAP entails the following components;

1. Provision of electricity through solar mini grids to households, enterprises and community facilities,
2. Provision of energy services through solar home systems for and clean cooking technologies for households
3. Provision of solar power to electrify boreholes as well as to power community facilities
4. Community engagement and education as well as capacity building and institutional support for the national and county Governments

She further, said KOSAP is being implemented in 14 counties. In Turkana County 23 minigrid sites, 98 stand-alone solar facilities (public facilities) and 38 boreholes (solarisation) had been identified. One of these minigrid sites is Namukuse.

She noted that the agenda of the visit was to; undertake an environmental and social screening of the proposed project site, to sensitize the community on the project land requirements and community rights and entitlements, explain the Project Technical Description and connection requirements, discuss potential environmental/social risks and impacts and mitigation and sensitize members on grievance redress mechanism.

MIN 3.0 PROJECT LAND REQUIREMENTS: RIGHTS AND ENTITLEMENTS OPTIONS AND IMPLICATIONS

The Surveyor, Ms. Agnes Gachoki told the Baraza that the main purpose of the Baraza was to seek community consent for land donation for the project. Land required for the construction of the Mini grid is 3-5 acres. In Namukuse, Land falls under the Community land category. It is yet to be registered, has no title but is jointly owned by the community. Its use and management is governed by the Community Land Act 2016.

She explained the various forms of acquiring in land including; allocation, land adjudication process, compulsory acquisition, settlement programs, transfers, donation and long-term leases.

The Surveyor informed the meeting that if they opted to consent to donation of the project land, following VLD criteria has to be met;

VLD criteria

1	The infrastructure must not be site specific.
2	The impacts must be minor, that is, involve no more than 10 percent of the area and require no physical relocation.
3	The land required to meet technical project criteria must be identified by the affected community, not by line agencies or project authorities
4	The land in question must be free of squatters, encroachers, or other claims or encumbrances.
5	Verification (for example, notarized or witnessed statements) of the voluntary nature of land donations must be obtained from each person donating land.
6	If any loss of income or physical displacement is envisaged, verification of voluntary acceptance of community-devised mitigatory measures must be obtained from those expected to be adversely affected.
7	If community services are to be provided under the project, land title must be vested in the community, or appropriate guarantees of public access to services must be given by the private titleholder.
8	Establishment of Grievance mechanisms

Agnes also told the community on their rights and entitlements to the following;

1. They can refuse to donate the land.
2. They can opt to seek compensation for the project land.
3. They can refuse or accept the project.
4. The right to resettlement assistance in addition to compensation for affected assets, where the more vulnerable individuals/households have been identified among them.
5. The right to livelihood restoration measures where the project has impacted their livelihood strategies, if they choose compensation.

The surveyor further informed the meeting that there were several options on land compensation;

a) Payment of cash for the land that has been identified for the project. For this to take place the land is has to be valued first. All monies payable as compensation for acquisition unregistered community land are then held in trust by the county government. Any such monies shall be deposited in a special interest earning account by the County Government and shall be released to the community upon registration of the community land.
b) Compensation of land for land. The community would identify a similar piece of land in value to the project site and request that the same is purchased for the community.
c) A further option is compensation in kind. This option is for the community to grant land for the project and request for compensation in kind. This could be in the form of a project for the benefit of the community like the construction of classrooms or a borehole. This is the most preferred option.

She said the surveyor will need to pick exact GPS points of the land proposed for the project and with community consent the land will be registered in the name of the implementing agency. The surveyor encouraged the community to make an informed decision that collectively involved every member of the community the elders, men, women, the marginalised and PLWDs. Any land donation would have to be signed by at least five representatives nominated by the community. She disclosed to the meeting what the term advance possession on land issues meant and requested them to consider allowing the implementing agency to take

possession of the parcel and commence construction of the project even as the land transfer process is going on.

MIN 4.0 PROJECT TECHNICAL DESCRIPTION, WIRING, CONNECTION AND PAYMENTS

Mr. Lawrence Lorika from KPLC told the meeting the proposed mini grid will comprise a solar system and a thermal unit (generator). The Mini-grid will have a capacity of 31KVA and PV 104kwp). He said all potential customers will be mapped for connection. Energy meters will be installed by KPLC staff and the locals living within the required 3 km radius would be connected to power. He said to be connected one will be required to pay a one-off connection fee of kshs.1000 as opposed to other places like Lodwar, Kitale and other big towns whereby they pay kshs.15000 or more.

Power would not be for free, and residents will be buying tokens to facilitate their needs as far electricity is concerned. Tokens can be purchased in amounts of Kshs 50 and above. Purchase is done through a vendor or directly purchasing and paying through the mobile money platforms. The token purchased through this 'Pay As You Go' (PAYG)) mechanism, will last according to the individual power usage. If you have more load for example ceiling fans and air conditioners in your shop, it will last for short period of time.

He told the Baraza that power distribution will involve passing of electrical lines along the roads in order to reach their houses, business premises and public facilities and requested the community grant way leave consent.

He said the project land where the powerhouse comprising solar panels, diesel generator, batteries and inverters will be installed will be fenced of as a safety measure and access will thus be restricted to people and animals. The minigrid system would be operating throughout the day and night. In case of overload, cloudy day or low battery, the generator will automatically kick in to supply power.

MIN 5.0 SOCIAL AND ENVIRONMENTAL ISSUES

The Environmental specialist Ms Irene Kawira Mate said that there were many benefits that would accrue to residents due to the supply of power to the area. She cited some of them as:

Potential positive impacts:

1. Improved educational standards as a result of longer study hours for leaners.
2. Enhanced heath care as Clinics/dispensaries can operate at night and store perishable drugs and vaccines
3. Employment of locals during the construction phase
4. Increased information access and entertainment (TV, Radio, Internet phones and computers).
5. refrigeration of food products like meat and milk thereby increasing their shell life
6. Opportunity for locals to establish business ventures like hairdressing, photocopy and welding.

Potential negative impacts:

1. The land that is currently in use for grazing will now no longer be accessible to the residents as it would be fenced off.
2. The risk of electrocution due to lack of proper handling and care. The Contractor shall however educate the community on safety precautions.
3. Labour influx leading to sexual exploitation and harassment.
4. Environmental contamination may arise due to disposal of used batteries, inverters and other materials.
5. Increase in cases of Gender Based Violence and sexual harassment of workers

She affirmed that the project beneficiaries were the Yapakunur Clan, a major sub-tribe of the Turkana language group who are Indigenous people and are the only VMG residing near the sub-project area thus the sole project beneficiary. Construction of the mini grid could restrict the access of VMGs to grazing land thus affecting availability of pasture, and consequently their

main source of livelihoods, and forcing families to relocate grazing activities elsewhere. Consequently, a VMGP may not be required. The project can include specific interventions in the final ESMP to ensure the community has access to culturally appropriate benefits. The project will strive to minimize adverse impacts on the indigenous people and ensure that they fully and continuously participate in the consultation process and receive culturally appropriate benefits from construction of the mini grid. The ESIA study would be conducted before the onset of the project and an ESMP developed outlining viable mitigation measures.
Screening would be undertaken to ensure that the project is designed and implemented in an environmentally and socially sustainable manner, taking into account Kenya's relevant sector legislation as well as World Bank Safeguard Policies. This would be undertaken using screening checklists in reference to requirements of the Environmental Management and Coordination Act, 1999 (amended 2019) and KOSAP-Environmental and Social Management Framework (ESMF). The screening process would consider potential impacts of the project and propose viable mitigation measures. She assured the community that temporary or minor impacts which are foreseen during project implementation will be sufficiently mitigated.

Grievance Resolution Mechanism (GRM)
Ms Mate informed the Baraza on the need for constitution of a locational Grievance Resolution Committee (GRC) for purposes of resolving any grievances that may arise in the lifetime of the project as guided by project frameworks. The local GRC will be the first stop shop for resolution of project related disputes and grievances for project affected persons and interested parties. The GRM should be culturally appropriate, inclusive, and accessible and developed in consultation with Namukuse community. Grievances which cannot be resolved by the local GRC shall be escalated to the sub-county GRC and the National GRC respectively. Any unresolved matter can then be referred for arbitration or to a court of law. World Bank's GRS is also available to stakeholders to lodge their grievances. The GRC should constitute representation from all genders, youth and vulnerable persons. It should be structured in such a way that it provides multiple channels for lodging grievances, ensure anonymity and confidentiality. The following details shall be recorded for each grievance reported; and a close-out form issued to indicate the grievance registered has been closed.

a) Date of compliant
b) Name of complainant
c) ID of complainant
d) Telephone contact of complainant
e) Nature of complaint
f) Name of the Person handling the complaint
g) Contacts of person addressing the complaint
h) Action taken
i) Date of conclusion of complaint

Existing indigenous grievance redress mechanism
Conflicts occasionally arise within individuals and families. The Namukuse community like in all other parts of the Turkana society is endowed with elaborate and systematic traditional mechanisms of conflict management. When disputes occur, they are referred elders (*Ng'akasukou*). The elders then summon involved parties and witnesses to the meeting point (*Ekitoe Ng'akasukou*). The elders will listen to the conflicting parties/individuals, weigh adduced evidence and pronounce the verdict accordingly.
Any matter that is not resolved or when the parties are not satisfied, they can report to the chief or seek discourse in a court of law.

The summary of the comments/remarks from the community in the meeting held at Namukuse on 20/03/2021

QUESTION/COMMENTS ANSWER/REMARKS

QUESTION/COMMENTS	ANSWER/REMARKS
Patrick Moru Tukipata hii stima, stima hii ni ya kulipwa au bure.	Individual to do wiring and pay connection fee 1000, then meter is token based (PAYG) –Just as with mobile phone
Gabne Ekuwom Tumegojea sana. Tutapata kwa muda gani	Answers- As soon as land is found contractor will be identified/ tender issued
Alice Ekali Kama nimelipa 1000, hii token tena ni gani?	For Purchase of tokens
William Chegen Wakati stima itakuja- - kuna meter itafanywa itaigia stima kweli na meter itawekwa wapi?	Meter to be installed inside the premises
Justus Kaliba Sasa hii stima tumeeka – kuna hio pesa 1000. Sasa hio pesa nimekulipa. Sasa hii pesa ingine ni ya nini? Sasa wakati sitalipa itafanyika nini?	For Purchase of tokens Power will automatically go off till you buy tokens
Gabriel Ekwom Why should title be in the name of implementing agency?	The investment is massive. It will also ease access to the project for its operation and maintenance

MIN 6.0 Focus Group Discussions

After the main meeting women, men and youth convened for separate discussions (FGDs) where they could freely converse amongst themselves and pour out insights (hopes, fears, aspirations and expectations in relation to the mini grid and the land question).

FGD-MEN

The main objective of this discussion was to get gather and document how men thought/felt about the issues discussed during the main meeting including; environmental and social screening of the project site, land requirements and community rights/ entitlements, Project Technical Description and connection requirements, potential environmental/social risks and impacts, mitigation and grievance redress mechanism. The FGD would also provide them an opportunity to air their issues/give their opinions on the project.

Kioko them the FGD was a good avenue for the elders to express their opinions and freely ask any questions they might not have been unable to ask in front of the youth and women, He said that at the end of the FGD discussion the group should come into consensus on issues discussed in the earlier meeting and select a representative to the GRC. During the meeting the Men agreed to voluntary land donation and selected the following as their representatives in the GRC;

Name	ID number	Telephone number
William Chegem	0611482	0717082504
Paul Anam	21529180	0748135114

FGD WOMEN

The women understood the issue. When asked if they had any questions on the project, they stated that they did not have any questions. Therefore, Myra requested that they elect 2 women to the GRC.

The women elected were;

Name	ID number	Telephone number
Schola Ekai	0011697292	0711647272

FGD YOUTH

The youth had no questions and went ahead to elect 2 youths who will be members of the grievance redress committee. The youths nominated were;

Name	ID number	Telephone number
James Engomo	30623993	0714488591
Solomon Ekuwom	24108775	0748135114

REVIEW OF FEEDBACK FROM FGDS BY ALL COMMUNITY MEMBERS

After the FGDs the participants convened back to the main meeting to review the respective resolutions from the FGDs. During the meeting they expressed their support towards the project saying the benefits to the area shall be enormous. They mentioned the opportunity to light their homes, establish income generating business ventures and employment as some of the major benefits.

They resolved to freely donate land for the project, validated the nominees to the GRC and elected officials to lead the identification of project land and sign the land donation form on their behalf.

The community nominated the following as members of the GRC:

No	Name	Design.	1D No.	Mobile No.
1	Michael N. Lokwakot	Men	10986387	0790604608
2	Joseph E. Ekunoit	Men	13647323	0792977119
3	David M. Emase	MEN	11512716	0710232300
4	Schola Ekai	WOMEN	0011697292	0711647272
5	James Engomo	YOUTH	30623993	0714488591
6	Solomon Ekuwom	YOUTH	24108775	0748135114

6.5 KEY FEEDBACK RECEIVED DURING STAKEHOLDER CONSULTATION PROCESS

A Consultative Public Participation (CPPs) session is conducted to provide project information and facts to the local community and other stakeholders especially local government administrator thus giving them a platform to enable them to express their appreciation, concerns and fears as well as contribute ideas and opinions towards the project sustainability.

A detailed CPP and community engagement for Namukuse Solar Mini Grid was held at Namukuse center on 14th January 2022 chaired by the Senior Chief, Namukuse Location with the help of Village elders.

The meeting had 53 males and 37 females. The ESIA team spearheading the process included the following;

NAME	ORGANISATION
Kennedy Shisoka	Ministry of Energy Engineer
Lydia Komen	EIA Expert-Norken International
Japheth Kipsang Bor	EIA Expert Norken International
Umulkheir Abdi	EIA Expert-Centric Africa Limited

The feedback received during the stakeholder consultation process has been summarized below.

No	NAME	Organization/ Designation	Issues/comments discussed
1.	Mr. Ngisekona	Community member	He was concerned on how the power will be distributed and also how the community is going to pay. The consultants informed the community that the solar power will be provided in form of tokens and for each household the connection fee will be 1000 Kenya shillings.
2.	Mrs. Amekwi	Teacher	Madam Amekwi was concerned whether the women and the youth will be considered for employment. She was keen on equal payment to prevent social disparities. The consultant clarified that the project encourages the participation and empowerment of the community, regardless of age and gender; both skilled and non-skilled. Opportunities will be available and distributed fairly.
3.	Josphine	Community member	She was concerned if the power will be reliable enough and not affected by weather changes. The consultants addressed this by stating that the project will be undertaken by qualified and experienced contractors that will be carefully selected by KPLC in conjunction with MoE. Implementation will follow set out guidelines and Kenyan Laws during the construction and operational phase to ensure that power will be reliable.

4.	Alex Kurono	Village Elder	He was concerned on the project coverage once complete because some of the community members live far from the proposed site. He also inquired on the connection fee to be paid by the community. The consultants informed the community that the power will be supplied in prepaid(tokens) and every household will pay according to their consumption rates. The connection fee will be 1000 for each household. The project has four components and the mini-grid is one of them. The distance coverage for the power will likely be a diameter of 2-3km radius from the site.
5.	John Erot	Community member	He was concerned on the project start date. He requested the project to start as soon as possible since the community was in dire need of electricity. The consultants clarified that KOSAP is in its initial phase and once the approval/licence to commence is issued, the advertisement and selection process for a contractor is over, the construction phase will begin.
6.	Mrs. Ekaale	Community member	She explained that water was the main problem in Namukuse and the community will appreciate if the power will be sufficient enough to improve this situation. The consultant clarified that the project will be able to assist the community as compensation of the land for the project. This will be based on the community development priority that will be identified. 1 million Kenya shillings has been set aside to support one highly priority project in the community.
7.	Mr. Lateloi	Community member	He was concerned whether the workforce will be given any insurance cover for emergencies such as accidents and injury occurrence at the site. The consultant was quick to point out that all the workers will be issued a Work Injury Benefit Act (WIBA) insurance to cover their medical expenses in case of injuries during work or at the site. In addition, the contractor is going to observe mitigation measures e.g. the use of PPE's to enhance occupational safety and health.

6.5.1 Project benefits

Some of the positive impacts that were identified by the participants include the following.

1. Quality of the health service will increase due to the use of many equipment's.
2. Creation of jobs to the youths
3. Security in the area will be enhanced.
4. The quality of education will also improve.
5. The project will improve the water supply.
6. It will improve business especially the fish industry due to availability of preservation methods.

6.5.2 Community main concerns

Some of the main concerns raised by the community include;

- Whether the project will employ locals in the area
- Whether it will follow the laws and regulations governing the county and regarding environmental protection.
- Whether the chosen GRC will be engaged throughout the project.
- Whether the workforce will be given any insurance cover for emergencies such as accidents and injury occurrence at the site.
- Whether the project coverage will cater for all the community members.

6.5.3 Community Requests

- The community requested the following from the project in terms of projects that will impact them if implemented:
  - ✓ 1st Priority- Provision of a clean water source for the community. They rely on Lake Turkana for water.
  - ✓ 2nd Priority- Access road improvement. The roads are in a bad state.
  - ✓ 3rd Priority- Construction of more wards at Namukuse Dispensary

Other requests included; Construction of maternity wing and Construction of community social halls, construction of cooling plant for fish.

Public participation "Baraza" Session

Community members making their comments

6.6 SUMMARY FEEDBACK RECEIVED DURING FOCUSED GROUP DISCUSSION

The in-depth interviews were used as a tool for stakeholder identification and mobilization as well as collection of baseline data to enable identification of the likely project impacts. In addition, it provided an opportunity to the participants to raise their fears and concerns as well as make recommendation as pertains to the project.

During the discussions, information was gathered different roles, livelihood, health issues, challenges, perception of quality of life, education options for children, health care and project perception.

The Focus Group Discussions were held with Men, Women and the Youth as indicated in Table 17;

Table 17: FGD dates and attendance

Group	Date	Attendance	Venue
Men	14th January 2022	16	Lake Turkana shore
Women	14th January 2022	16	Lake Turkana shore
Youth	14th January 2022	23	Lake Turkana shore

The key concerns and expectations that were raised during the FGDs have been summarized below:

6.6.1.1 Female Stakeholders' Consultation and Participation

The females' participants in the FGD were 16 in number with an age range of 20-80. There were 4 widows in attendance and All were Turkana. The following were their responses;

The project perception

The women indicated that they had heard of the project and understand what it entails. They stated that the project will bring a positive impact to the community by lighting the area and business growth. There main concern about the project is if it will employ women in the area and what will be the main CSR that the project will undertake in the area.

Women in Namukuse community and their roles as reported by the FGD

- ✓ The women undertake fishing and are mainly fish mongers. They also sell fuelwood and undertake house chores.
- ✓ They stated that the men have more opportunities in the area than women.
- ✓ Women have no control of any resources or assets in the area.
- ✓ The women feel safe in the community and no conflicts has been experienced of late.
- ✓ The main challenge the women face in the community is lack of maternity in the area and the high poverty rates.
- ✓ Their gender roles in the community are still the same and have not changed.

Institutions/community Development

- ✓ The women are partially involved in decision making in the community.
- ✓ The main NGOs and CBOs in the area include Save the children and Red Cross.
- ✓ The top three priority community development;1. Any water project. 2. Maternity and 3. Road improvement

Economy /income generation by women

- ✓ Women earn income from fishing and fish mongering.
- ✓ They stated that women tend to contribute more than men. This is in line with the tradition that women should provide 100%. This could be improved if they get funds from the government.
- ✓ Some women have access to M-Pesa

Land use by women

- ✓ The main land based activities by women include fetching firewood. The women don't practice agriculture.
- ✓ The main animals reared include goats and chicken.
- ✓ Natural resources are collected from Nabulan Forest.

Education, literacy, and training of Women in Namukuse

- ✓ They denoted that 100% girls access to school while its few for women.
- ✓ The literacy levels in the area for women and girl is 20% and 80% respectively.

Health care for Women in Namukuse

- ✓ The women access health care from Namukuse Dispensary.
- ✓ The top three health problems among women is Malaria, UTI and UHTI
- ✓ The women have access to family planning initiatives.

Access to Water by women

- ✓ The community water for drinking, washing and bathing are mainly from L. Turkana.
- ✓ Initially they had water piping from Lobolo town. The pump is not working and the piping was destroyed.

Transport and communication

- ✓ The main forms of transport are motorbikes and boats.
- ✓ The area has poor road connectivity.

Female Focus Group Discussion

6.6.1.2 Male Stakeholders' Consultation and Participation

- ✓ The male participants were 16 in number. The male participants are household heads and the ages ranged from 40 to 65 years. The following were the response during the male FGD.

The project perception

- ✓ The men are fully aware of the project since they have been in 3 barazas concerning the project
- ✓ The project will improve water supply, education, healthcare and security. It should commence immediately and employ the locals and support community projects.
- ✓ The project should reach the community through the existing GRC.

Role of Men as per the FGD

- ✓ The men are fishermen and cattle keeping.
- ✓ They are key in decision making process in the community.
- ✓ Main challenges men face include; preservation of fish, scorpion, snakes and crocodiles and poor roads that makes it hard to transport fish.
- ✓ They noted crocodiles have in the past killed the locals; in 2021 8 people were killed and in 2020 4 people were killed. The victims are normally not compensated.
- ✓ They noted that during windy seasons boats normally capsize and in 2015, 13 people were killed while in 2021, 2 were killed.
- ✓ The main crimes in the area are theft. This has been attributed by the Youths that have taken M-Kopa and Motorcycle loans. Once they fail to pay, they decide to steal.

Institutions/Community Development

- ✓ Main income generating activities in the area is fishing and animal keeping
- ✓ Men contribute more than women in the households
- ✓ There are no banks in the area and men utilize mobile and internet banking.
- ✓ To increase economic opportunities, the men, need better fishing gears through grants, availability of water and veterinary services

Land use

- ✓ Pastoralism is the main land activity for men.
- ✓ Main animals kept in the community include goats, camels, cows, donkeys and sheep.
- ✓ The men can move as far as 200km for pasture.
- ✓ No conflicts in the area apart from theft of livestock.
- ✓ The men utilize locally boats to undertake fishing deep into the lake

Education, literacy, and training as per the FGD

- ✓ Existing schools include Namukuse primary and Nursery and 3 ECDs
- ✓ Boys tend to help in fishing hence more girls in school than boys
- ✓ Most girls can read and write than their male counterparts

Health care analysis by the male FGD

- ✓ Namukuse Dispensary is the main healthcare center
- ✓ Malaria, Typhoid, cholera, pneumonia and typhoid are the main diseases that affect me

Access to Water analysis by the male FGD

- ✓ The Girls and women are responsible for searching water
- ✓ Lake Turkana is the main source of water and the water is salty. There is no borehole in the area.

Sanitation and hygiene according to Male FGD

- ✓ The area residents use pit latrines and open bushes as toilet facilities.

Access to Power

- ✓ Sources of energy in Namukuse
  - For lighting – Torch, firewood and D-Light
  - For warming they use firewood
  - Cooking -firewood
  - Charging mobile-solar
  - Cooling – None
- ✓ There was no power supply in the area

Transport and communication

- ✓ The main forms of transport are motorbike use, walking and boats
- ✓ The have poor road network.

- ✓ They have no internet services due to the poor network

Religious heritage

- ✓ The main festivals in the area are; Akuta(Marriage) and Asapan(Circumcision)
- ✓ The men indicated that they do not have any sacred/ historical religious site nearby.

Male FGD Session

6.6.1.3 Youth Stakeholders' Consultation and Participation

- ✓ The youth participants were 20 in number (17male and 3 females). The following opinions were provided by the youth participants during the FGD.

The project perception

- ✓ The youth disclosed that they had heard about the project.
- ✓ They were optimistic that the project will improve businesses due to improved refrigeration of fish, proper lighting due to the availability of electricity and improved security.
- ✓ They felt that proper fencing needs to be done at the site to prevent electrocution.
- ✓ The wanted to know the timeline of the project and the cost of electricity connections to various individual's households.

Priorities

- ✓ The main youth group in the area is Namukuse Youth Group that was started in 2007.
- ✓ The main youth's priorities include; Improvement of sporting activities involved by the youths, construction of community social halls and construction of the cooling plant for fish.
- ✓ The youths are not involved in decision making.

Education, literacy, and training for youth FGD

- ✓ An estimate 20% of the youths have completed secondary school and 5% have completed vocational school.
- ✓ The main youth skills include crafting and mat making.

Unemployment

- ✓ 10% of the youths have full salaried jobs and 50% are self-employed.
- ✓ The main jobs are fishing, bodaboda and business (selling of fish and livestock

Youth FGD Session

6.6.2 Grievance Mechanism at Namukuse.

The project proponent has established project Local grievance redress committee (LGRC). The committee was reconstituted during the public meeting held at the Namukuse centre where the community members elected their representatives to the LGRC. The Namukuse LGRC is composed of 7 members including the following:

- ✓ 2 Female community representatives, elected by women, representing women and children related issues regarding the project.
- ✓ 2 Youth representatives, elected by youths, representing youths related concerns in the GRCs
- ✓ 2 Male representatives elected by the men of the Community-It includes the area chief.
- ✓ 1 PLWD representative

The roles of GRC include among others the following:

- ✓ Conducting extensive public awareness and consultations with the community
- ✓ Help ensure that local concerns raised by community members in regards to the project are promptly addressed by the proponent and the contractor.
- ✓ Resolve manageable disputes that may arise relating to the project. If it is unable to resolve/help refer such grievances to the proponent and the contractor.
- ✓ Ensure that the concerns of vulnerable persons such as the disabled, widowed women, orphaned children affected by the sub project are addressed.
- ✓ Assist the community in recording grievances, including helping those who cannot write or read.
- ✓ Help the vulnerable groups access project benefits
- ✓ Ensure that the community members are informed about the project

Community grievances are currently resolved at household levels. Households unable to resolve the grievance escalate the grievance to administrative/leadership levels. This is done through the chiefs/Ass. chiefs and community elders. Difficult grievances normally escalate to the police and a court of law

7 IMPACT ASSESSMENT AND MITIGATION MEASURES

7.1 INTRODUCTION

This section provides an assessment of potential environmental and social impacts from the proposed Projects as well as the proposed mitigation measures to avoid, reduce, remediate or compensate for potential negative impacts and to enhance positive impacts. A description of the assessment methodology used to assess the significance of potential impacts, taking into account impact magnitude and sensitivity of receptors and resources affected, is provided below. All the mitigation measures identified in this chapter have been collated into the Environmental and Social Management Plan ('ESMP') matrix. This is including Occupational Health and Safety

7.2 Impact Assessment Methodology

An impact is essentially any change to a resource or receptor brought about by the presence of the Project component or by the execution of a Project related activity. In general, the assessment of impacts will proceed through an iterative process considering four key elements:

- Prediction of potential impacts and their magnitude (i.e., the consequences of the development on the natural and social environment);
- Evaluation of the importance (or significance) of potential impacts taking the sensitivity of the environmental resources or human receptors into account;
- Development of mitigation measures to avoid, reduce or manage the potential impacts or enhancement measures to increase positive impacts; and
- Assessment of residual significant impacts after the application of mitigation and enhancement measures.

Where significant residual impacts remain, further options for mitigation may be considered and impacts re-assessed until they are as low as reasonably practicable for the Project and would be deemed to be within acceptable levels:

7.3 Defining Impact

Impacts will be defined in a number of ways, including:

- Nature of impact: positive or negative;
- Type of impact: direct, indirect, or cumulative;
- Duration of impact: temporary, short-term, national, international
- Scale of impact: onsite, local, regional, national, international.

7.4 ASSESSMENT OF SIGNIFICANCE

Criteria for assessing the significance of impacts will stem from the following key elements:

- Status of compliance with relevant Kenyan legislation, policies and plans and any relevant Kenyan or industry policies, standards or guidelines, as well as international best practice standards and guidelines;
- The magnitude (including nature, scale and duration) of the change to the natural or socioeconomic environment (e.g. an increase in coastal erosion, or an increase in employment opportunities), expressed, wherever practicable, in quantitative terms. The magnitude of all impacts is viewed from the perspective of those affected by considering the likely perceived importance as understood through stakeholder engagement;
- The nature and sensitivity of the impact receptor (physical, biological, or human). Where the receptor is physical, the assessment considers the quality, sensitivity to

change and importance of the receptor. For a human receptor, the sensitivity of the household, community or wider societal group is considered along with their ability to adapt to and manage the effects of the impact; and

- The likelihood (probability) that the identified impact will occur. This is estimated based upon experience or evidence that such an outcome has previously occurred.

It is generally accepted that significance is a function of the magnitude of the impact and the likelihood of the impact occurring.

For this assessment, significance has been defined based on five levels described in table below;

Table 18: Categories of Significance

Category	**significance**
Positive impacts	Positive impacts provide resources or receptors, most often people, with positive benefits. It is noted that concepts of equity need to be considered in assessing the overall positive nature of some impacts such as economic benefits, or opportunities for employment
Negligible impacts (or Insignificant impacts)	Negligible impacts (or Insignificant impacts) are where a resource or receptor (including people) will not be affected in any way by a particular activity or the predicted effect is deemed to be 'negligible' or 'imperceptible' or is indistinguishable from natural background variations.
Minor	An impact of minor significance ('Minor impact') is one where an effect will be experienced, but the impact magnitude is sufficiently small (with or without mitigation) and well within accepted standards, and/or the receptor is of low sensitivity/value.
Moderate	An impact of moderate significance ('Moderate impact') is one within accepted limits and standards. Moderate impacts may cover a broad range, from a threshold below which the impact is minor, up to a level that might be just short of breaching a legal limit. Clearly to design an activity so that its effects only just avoid breaking a law and/or cause a major impact is not best practice. The emphasis for moderate impacts is therefore on demonstrating that the impact has been reduced to a level that is ALARP (as-low-as-reasonably-possible). This does not necessarily mean that 'Moderate' impacts have to be reduced to 'Minor' impacts, but that moderate impacts are being managed effectively and efficiently.
Major	An impact of major significance ('Major impact') is one where an accepted limit or standard may be exceeded, or large magnitude impacts occur to highly valued/sensitive resource/receptors. An aim of EIA is to get to a position where the Project does not have any major residual impacts, certainly not ones that would endure into the long-term or extend over a large area. However, for some aspects there may be major residual impacts after all practicable mitigation options have been exhausted (i.e. ALARP has been applied). It is then the function of regulators and stakeholders to weigh such negative factors against the positive ones in coming to a decision on the Project.

For environmental impacts the significance criteria used in this ESIA is shown in Table 19: .

Table 19: Overall Significance Criteria for Environmental Impacts

Receptor sensitivity (or resource value)	**Impact Magnitude**		
	Low	**Medium**	**High**
Low	Minor	Minor	Medium
Medium	Minor	Medium	Major
High	Medium	Major	Major

For the social impact assessment, the perceptions of stakeholders, expressed as opinions around certain issues, can be as important as actual impacts. Consequently, the concept of perception is explicitly brought into the evaluation of significance after an impact is evaluated. When an impact is of significant stakeholder concern, this may be causing to raise the significance rating. This prompts the formulation of more rigorous and appropriate mitigation measures which focus on the source of the impact and also address stakeholder perceptions. The risk of not addressing stakeholder perceptions is that reputational damage could arise, resulting in the loss of a 'social licence to operate.

7.5 Magnitude of Impact

The impact assessment describes what will happen by predicting the magnitude of impacts and quantifying these to the extent practical. The term 'magnitude' covers all the dimensions of the predicted impact to the natural and social environment including:

- the nature of the change (what resource or receptor is affected and how);
- the spatial extent of the area impacted, or proportion of the population or community affected;
- its temporal extent (i.e., duration, frequency, reversibility); and
- where relevant (accidental or unplanned events), the probability of the impact occurring.

For biophysical impacts, the definitions for the spatial and temporal dimension of the magnitude of impacts used in this assessment are provided in Table 19

For social impacts, the magnitude considers the perspective of those affected by taking into account the likely perceived importance of the impact, the ability of people to manage and adapt to change and the extent to which a human receptor gains or loses access to, or control over, socio-economic resources resulting in a positive or negative effect on their well-being (a concept combining an individual's health, prosperity, their quality of life, and their satisfaction).

Table 19 below (under Likelihood) provides an account of the key features (definitions) of each of the impact significance classifications (from Not Significant to High); specifically linking them to the need for mitigation measures.

7.6 Sensitivity of Resources and Receptors

Sensitivities are defined as aspects of the natural or social environment which support and sustain people and nature. Once affected, their disruption could lead to a disturbance of the

stability or the integrity of that environment. For ecological impacts, sensitivity can be assigned as low, medium or high based on the conservation importance of habitats and species. For habitats, these are based on naturalness, extent, rarity, fragility, diversity and importance as a community resource.

For socio-economic impacts, the degree of sensitivity of a receptor is defined as 'a stakeholder's (or groups of stakeholders') resilience or capacity to cope with sudden changes or economic shocks. The sensitivity of a resource is based on its quality and value/importance, for example, by its local, regional, national or international designation, its importance to the local or wider community, or its economic value.

7.7 Likelihood

Terms used to define likelihood of occurrence of an impact are explained in Table 19;

Table 20: Explanation of Terms Used for Likelihood of Occurrence

An impact with a		
High probability	Refers to a very likely impact	Refers to very frequent impacts
Medium probability	Refers to a likely impact	Refers to occasional impacts
Low probability	Refers to rare impacts	Refers to rare impacts
	As far as one-time events (e.g. air emissions) or slowly developing effects are concerned (e.g. impacts on local life style)	As far as possibly recurring impacts are concerned, such as accident or unplanned events (e.g. traffic accident, fire)

7.8 Definition of mitigation measures

Mitigation measures are developed to avoid, reduce, remedy or compensate for significant potential negative impacts, and to create or enhance potential positive impacts, such as environmental and social benefits. In this context, the term "mitigation measures" includes operational controls as well as management actions. These measures are often established through industry standards and may include:

- Changes to the design of the project during the design process (e.g., changing the development approach);
- Engineering controls and other physical measures applied (e.g., waste water treatment facilities);
- Operational plans and procedures (e.g., waste management plans); and
- The provision of like-for-like replacement, restoration or compensation.

For potential impacts that are assessed to be of major significance, a change in design is sometimes required to avoid or reduce the significance. For potential impacts assessed to be of moderate significance, specific mitigation measures such as engineering controls are often sufficient to reduce these impacts to ALARP ('as-low-as-reasonably-possible') levels. This approach takes into account the technical and financial feasibility of mitigation measures. Potential impacts assessed to be of minor significance are usually sufficiently managed through good industry practice, operational plans and procedures.

In developing mitigation measures, the first focus is on measures that will prevent or minimise potential impacts through the design and management of the Project rather than on reinstatement and compensation measures.

7.9 Assessing residual impacts

Impact prediction takes into account any mitigation, control and operational management measures that are part of the project design and project plan. A residual impact is the impact that is predicted to remain once mitigation measures have been designed into the intended activity. The residual impacts are described in terms of their significance in accordance with the categories identified in Table 19 above

Social, economic and biophysical impacts are inherently and inextricably interconnected. Change in any of these domains will lead to changes in the other domains.

7.10 KEY NEGATIVE ENVIRONMENTAL IMPACTS – PRE- CONSTRUCTION PHASE

7.10.1 Land take

The study area consists of communal land. Considering the land use of Namukuse area, the distribution line will be located on unregistered community land. The community has since offered to the land in kind for project use. The establishment of the minigrid will convert communal land to industrial use for long term.

For the purpose of assessment of impacts on land use of the area, the following project activities leading to an alteration in land use of the area during construction phase have been considered:

- Installation of PV modules;
- Establishment and operation of temporary structures such as temporary site office and store yard.

The land use receptor sensitivity criteria will be low. This is due to the fact that there will be visual change upon installation of the minigrid. There is no major dependency for grazing or agriculture on the land offered for the project. The maginitude criteria of this impact will be medium because there will be noticeable of change over the restricted site area. The change may be medium to long term and is reversible.

7.10.1.1 Embedded/In-built Control

- The construction activities will be restricted to within the allocated land and the immediate surroundings only.
- After construction work, any land taken for a temporary basis for storage of material will be restored to their original form.
- The existing earth roads at Namukuse will be used for access to the project site.

7.10.1.2 Significance of Impact

The overall impact significance on land use will be Moderate. This is the case due to the fact that the receptor sensitivity is medium and the impact magnitude is medium.

7.10.1.3 Additional Mitigation Measures

- On completion of construction activities, land used for temporary facilities such as store yard should be restored to the extent possible;
- The land use in and around permanent project facilities should not be disturbed.
- Construction activities should be restricted to the designated area.

- The design of the distribution line will utilize the existing road reserves. However, any damage to structures, crops, trees, community facilities and other assets will be compensated in line with the RPF provisions.

7.11 KEY NEGATIVE ENVIRONMENTAL IMPACTS – CONSTRUCTION PHASE

7.11.1 Impact on Topography

The topography of the project area is arid landscape and the terrain at the project site is flat. There are no water bodies that pass though directly the proposed project site. Typically, solar power projects do not undertake levelling of topography and since the proposed project, along with the access road, is mostly on a flat terrain the receptor sensitivity has been assessed to be low.

Due to the topography, study area may exhibit presence of micro drainage channels. Therefore, the impact magnitude has therefore been assessed as minor.

7.11.1.1 Embedded/In built Control

The contractor will be instructed to avoid any unnecessary changes in the topography.

7.11.1.2 Significance of Impact

The overall impact significance will be Minor. This because the impact magnitude is low and there will be no major changes to the topography and the receptor sensitivity is low.

7.11.1.3 Additional Mitigation Measures

- Appropriate number of cross drainage channels should be provided during construction to maintain flow in existing natural channels.
- Disruption/alteration of micro-watershed drainage pattern should be minimized to the extent possible.

7.11.2 Impact on Soil

7.11.2.1 Project Phases and Associated Activities

For impact assessment, the following phases of the project cycles were considered for potential impacts on the soil environment. The phase wise project activities that may impact the environment are described below.

Construction Phase

- Vegetation clearance and top soil removal;
- Storage of oil and lubricants onsite;
- Storage of construction materials; and
- Disposal of different type of waste generated from the temporary project site.

Operation and Maintenance Phase

- Storage of oil and lubricants onsite;
- Disposal of municipal solid waste and waste water from site office; and
- Storage of waste materials onsite.

Decommissioning Phase

- Removal of PV modules;
- Removal of associated infrastructure including battery and generators.

7.11.2.2 Significance of Impacts

The significance of the impact to the soil will be minor due to the nature of the works and the fact that construction and operational activities will be confined in the small project area.

7.11.2.3 Additional Mitigations

- Vehicles will utilize the existing roads to access the site;
- No unauthorized dumping of used oil and other hazardous waste should be undertaken at site;
- All waste should be stored in a shed that is protected from the elements (wind, rain, storms, etc.) and away from natural drainage channels;
- Solid waste should be Segregated in color coded waste receptacles.
- In case of accidental/unintended spillage on small area, the contaminated soil should be immediately collected and stored as hazardous waste;
- Compacting of loose soil in excavated areas.
- Enclose the construction site and protect the soil to prevent the waste soils and other debris from being washed away by surface runoff and wind.
- All dug up soil that is not needed on-site to be removed promptly and disposed of to appropriate areas.
- Re-use the dug up soil in backfilling and landscaping.
- Any soil potentially contaminated by chemicals, oils, fuels to be collected and disposed of by a NEMA authorized waste

7.11.3 Impact on Air Quality

The assessment with respect to air quality of the study area has been done for the following project activities:

- Fugitive emissions from site clearing, excavation work, material handling etc.;
- Fugitive emission from traffic movement;
- Exhaust emission from operation of machineries like pile drivers, vehicles; and
- Point source emission from diesel generator.

7.11.3.1 Embedded/in-built control

Vehicle engines need to be properly maintained to ensure minimization in vehicular emissions.

7.11.3.2 Significance of Impact

There are few Receptors (settlements) within 200 m of the project site and a primary school 700m away and the impact magnitude will be moderate and sensitivity medium hence the impact significance will be moderate.

Sensitive receptors of air and emissions were identified by observation during field visit to project site. They were noted to be mainly residential and commercial in nature. The distances from a source that dust impacts can occur is highly site specific and will depend on the extent and nature of incorporated mitigation measures, prevailing wind conditions, rainfall and the presence of natural screening. Due to the variability of the weather, it is impossible to predict what the weather conditions will be when specific construction activities are being undertaken. Therefore, the assessment of construction dust impacts is typically qualitative.

7.11.3.3 Additional Mitigation Measures

- Spraying water on soil before excavation and periodic access road wetting to reduce nuisance dust levels.
- Visual inspection of dust pollution from roads and the construction site and appropriate intervention if dust levels are high.
- Speed restriction of construction vehicles to a speed of 10-15km/h or less on the site and on the access roads to the site.
- Maintenance and servicing of machines and engines off-site.

- Grievance procedure for dust complaints.
- The use of appropriate Personal Protective Equipment (PPE) such as dust masks, in particular, for construction workers.
- All construction materials will be transported in designated trucks which will be covered.

7.11.4 Impact on Ambient Noise

As most of the noise generating activities will be performed within the site area, construction activities will likely have a small to insignificant incremental impact on the existing noise levels. The sources of noise in the construction phase include construction activities, operation of generator sets and movement of vehicles. There will also be increased noise levels because of increased anthropogenic movement in the area.
The main receptor will be the Namukuse centre which is within 500m from the site that also hosts residents. The receptor sensitivity is therefore considered as medium. Impact magnitude is considered to be minor to medium considering the construction period of the project that will last for not more than 12 months and proximity to Namukuse centre.

7.11.5 Assessment Criteria for Impact on Ambient Noise

The assessment with respect to ambient noise quality of the study area has been done for the following project activities:

Construction activities including site preparation, piling work, construction of ancillary facilities;

Transportation of construction materials, machinery and personnel;
Operation of generator sets; and
Demolition activities during decommissioning phase.

The ambient noise levels have been assessed with respect to Noise Pollution (Regulation and

Control) Rules, 2000 and WHO Guidelines as shown in Table 41 and Table 42 respectively.

7.11.5.1 Embedded/in-built control

Normal working hours of the contractor to be defined (preferable 0800hrs to 1700hrs). If work needs to be undertaken outside these hours, it should be limited to activities which do not generate noise.

7.11.5.2 Significance of Impact

The impact significance has therefore been assessed moderate. This due to the fact that the impact magnitude is low and the receptor sensitivity is medium. The site is on very close proximity to Namukuse Primary School and few residential houses nearby.

7.11.5.3 Additional Mitigation Measures

- Only well-maintained equipment should be operated on-site;
- If it is noticed that any particular equipment is generating too much noise then lubricating moving parts, tightening loose parts and replacing worn out components should be carried out to bring down the noise and placing such machinery far away from the households as possible;
- Machinery and construction equipment that may be in intermittent use should be shut down or throttled down during non-work periods; and
- Minimal use of vehicle horns and heavy engine breaking in the area needs to be encouraged.
- Construction machineries should be maintained regularly to reduce noise resulting from friction;

- Normal working hours of the contractor to be defined (preferable 8 am to 5pm). If work needs to be undertaken outside these hours, it should be limited to activities which do not generate noise;
- Sensitize construction truck drivers to switch off vehicle engines while offloading materials.

7.11.6 Visual Intrusions and Changes in Landscape Impact

The project site is located on a flat terrain. There will be no significant change to visual quality of the area resulting from development or change in land use that will alter the landscape. Changes in the visual landscape will range from construction phase to commissioning of the minigrid and associated structures and further during operations. This Project is the first major solar power Project in the vicinity of project area and the new development will have impact on the surrounding area.

The project area is primarily a rural area and with fishing as a primary activity. Although the solar panels, inverter, Transformers and associated components would be manufactured off site and the construction phase would be relatively short-term in duration (less than one year), it would still require large number of equipment or infrastructure when being erected such as dumpers and transportation vehicles on site. Additionally, the presence of bare soil along the access roads would increase the potential visual impact. The significance of the visual impacts will reduce at increasing distance from the development.

The construction of the mini-grid sites may involve the site clearance of vegetation (minimal vegetation at the site) and other natural attributes. The erection of the solar PV panels and the resulting glare from the sun will make it a standout feature from the natural surroundings and this would the lower the visual appeal of the area.

Even though the Mini grid facilities will be small, their geometric and sometimes highly reflective surfaces may have visual impacts. However, being visible is not necessarily the same as being intrusive. Aesthetic issues are by their nature highly subjective.

7.11.6.1 Embedded/In-built Control

Proper siting decisions can help to avoid aesthetic impacts to the landscape. The project site is located in open area with minimal settlements.

7.11.6.2 Significance of Impact

Construction activities will mainly be inside the site footprint and will have moderate impact on the present visual environment. The sensitive receptors include the Namukuse primary school and the residents near the site. The impact magnitude will however be low hence the visual change during construction phase will be assessed as minor.

7.11.6.3 Additional Mitigation Measures

The following mitigation measures will have to be implemented to minimise potential visual impacts during the construction phase:

- The extent of the labour camp and storage area should be limited in area to only that which is essential;
- Minimize presence of ancillary structures on the site and minimize roads disturbance;
- Upon completion of construction work, areas utilized for labour camp, storage area to

be restored to original form.

7.11.6.4 Impacts on Waste Generation and Soil Contamination

General construction waste generated onsite will comprise of concrete, steel cuttings/filings, packaging paper or plastic etc. solid wastes consisting of food waste, plastic, glass and waste paper will also be generated by the construction workforce. A small proportion of the waste generated during construction phase will be hazardous and will include waste fuel, grease and waste oil containing rags. Used transformer oil which is also categorized as hazardous waste will be generated from the plant. If improperly managed, solid waste could create impacts on soil quality. Therefore, the receptor sensitivity has been assessed as medium.

The impact magnitude has been assessed as low since the proponent has managed other solar power projects as well and has effective management systems for waste and hazardous substances being generated or utilized during the project life cycle as part of their Environmental and Social Management Framework.

7.11.6.4.1 Embedded/in-built control

Hazardous material and waste should be properly labelled, stored onsite at a location provided with impervious surface and in a secondary containment system.

7.11.6.4.2 Significance of Impact

The impact significance for waste generation and soil contamination has been assessed as minor. Given the low sensitivity of the surrounding areas and the medium magnitude of the potential consequences of soil contamination, the potential impact significance is rated as minor.

7.11.6.4.3 Additional Mitigation Measures

- Contractor should ensure that no unauthorized dumping of used oil and other hazardous waste is undertaken at the site;
- Designated areas should be provided for Solid Waste and daily collection and period disposal should be ensured;
- Construction and Demolition Waste should be stored separately and be periodically collected by an authorized treatment and storage facility;
- All waste should be stored in a shed that is protected from the elements (wind, rain, storms, etc.) and away from natural drainage channels;
- A log book should be maintained for quantity and type of hazardous waste generated; and
- In case of accidental/unintended spillage, the contaminated soil should be immediately collected and stored as hazardous waste.

7.12 KEY POSITIVE SOCIAL IMPACTS – CONSTRUCTION PHASE

7.12.1 Impact on local economy and employment

The construction, operation and maintenance of the mini-grids will provide employment opportunities for skilled and unskilled labour. Receptors in the Social area of Interest that may be able to make the most of the direct and indirect employment opportunities in the project are those who have some level of experience in formal employment, as well as those who have gained a basic education. This will be a source of income for the labourers. Where possible, construction materials will be sourced locally in order to promote local businesses.

Thus, anticipated benefits of the Project include Direct employment opportunities mainly during construction of the mini-grids; indirect employment generated by the procurement of goods and services for the Project; induced employment related to jobs ensuing from the expenditure of incomes associated with direct and indirect. The local community is likely to benefit from the economic opportunities to be created from the following:

- Civil works during construction phase including, construction of solar PV module mounting area, transformer yard, inverter room, internal roads, laydown areas, labour camp, distribution line,
- Self- employment options for individuals possessing vocational or technical training skills like electricians, welders, fitters etc;
- Contracting opportunities for local's residents including men, women and youths. During the public meeting the community insisted that all the unskilled labour force must give to the locals.
- Creation of indirect employment for local community through establishing small shops like tea stalls, supply of intermediate raw materials, repair outlets, hardware stores etc. However, these are likely to be temporary.

The area is characterised by major unemployment. This has affected the community members including the youths, men and woman as reported during Focused group discussion sessions. Thus. the contractor should develop and implement an employment management plan to promote local content. This will ultimately resolve conflict which can be arise if the community feels left out in employment opportunities.

7.12.1.1 Impact Significance

The impact significance will moderate due to the high impact magnitude and the low receptor sensitivity. Due to expected limited job opportunities, a few locals will get jobs at the site that will impact their lives substantially.

7.12.1.2 Enhancement Measures

- A significant segment of labour requirement during the construction phase will be sourced locally. While, the significance of the impact on economy and employment opportunities during the construction phase is understood to be positive, the following measures should be put in place to ensure that the local community receives maximum benefit from the presence of the project;
- Preference should be provided to local labour, sub-contractors or suppliers to pass on maximum economic benefit locally;
- Preference should be provided to the vulnerable population in the Study Area;
- The project proponent will establish a mechanism to audit sub-contractors and suppliers with respect to compliance of utilizing local labour and resources.

7.13 KEY NEGATIVE SOCIAL IMPACTS – CONSTRUCTION PHASE

7.13.1 Land Uptake-Communal land

The proposed project will entail the acquisition of a 1. 143 Hectares of unregistered community land for setting up the mini-grid. The land acquired may also be used to develop contractor facilities, worker's camps and other ancillary facilities e.g. storage and sanitary facilities. Loss of land used by the communities for livestock grazing and farming may trigger land disputes. New settlements may arise due to migration of people to the centres near the mini-grid disrupting the existing community settlement patterns. The project proponents will use existing

access roads to set up the low-voltage power distribution lines and will seek access from beneficiaries and clients in whose property they will undertake electricity connection to the power grid.
During the consultation, it was also reported that the community is not entirely dependent on the land for income. The land has minimal vegetation cover that include duam palms and olive plants. After implementing the embedded controls, the impact magnitude is assessed to be minor.

7.13.1.1 Source of Impact and Overview of Baseline Conditions

- Additional employment opportunities may also be created for the local youth by the contractor.

7.13.1.2 Embedded/In-built Controls

Enabling the community to benefit from the project by supporting local projects e.g. schools and local water need.

7.13.1.2.1 Significance of Impact

The impact significance for communal land uptake is assessed minor considering the community willfully gave the land for project use.

7.13.1.3 Additional Mitigation Measures

The following additional measures may be recommended to minimise this impact:

- Providing skills-based training interventions, especially for self-employment to the young and unemployed. This will enhance their employability and create potential for income generation through self-employment;
- Procuring resources from the local sources so as to induce more employment in the supply chain.
- Community compensation in kind. The community identifying projects admissible in Water, Health and road sector within a radius of 10 km. During the public meetings the community identified water project for improvement.
- Undertake a ARAP (ARAP appended in this report)

7.13.2 Impact on Occupational Health and Safety

The construction activities include site preparation, infrastructure utilities installation, building structures. As a result, will be potential impacts on workers' health and safety due to exposure to risks through construction activities that lead to accidents causing injuries and death. The most probable risks cause of accidental death and injury are:

- Safety risks such as: tripping; falling due to working at heights; potential fire due to hot work, smoking, failure in electrical installations; electric shocks.
- Health risks: Injuries such as: lifting, lowering, pushing, pulling and carrying; temporary or hearing loss which usually comes from noise generated from machinery used for excavation or piling work and from compressors and concrete mixers etc.; heat stress and working during high temperatures
- Occupational hazards due to dust and noise pollution from operating of heavy machinery and vehicular movement in the project sites.
- Safety risk due to working at heights during installation of power lines
- Risks of road accidents during the transportation of material and equipment to the project sites owing to the poor road network leading to Namukuse village.
- The minigrid sites are located in ecological zones associated with flash flooding events. This poses a risk of washing away the mini-grid infrastructure including the power

storage units i.e. the batteries making it necessary factor in site design considerations to mitigate against extreme flooding events.

7.13.2.1 Embedded/in-built control

- All construction activities will be carried out during daytime hours and vigilance should be maintained for any potential accidents;
- Personal Protective Equipment (PPEs) including safety shoes, helmet, goggles, ear muffs and face masks;
- Cranes and other lifting equipment are operated by trained and authorised persons;
- Training of the workers on climbing techniques, and rescue of fall-arrested workers;
- Excavated areas should be temporarily fenced to avoid access to outsiders and wildlife

7.13.2.2 Significance of Impacts

The impact on occupational health and safety during the construction phase is evaluated to be of moderate significance. All the construction activities will be confined at the project site hence high sensitivity and low magnitude.

7.13.2.3 Additional mitigation measures

- All workers (regular and contracted) should be provided with training on Health and Safety management system of the contractor during construction stage and EHS policies and procedures during the operation stage;
- Obtain and check safety method statements from contractors;
- Monitor health and safety performance and have an operating audit system; and
- Permitting system should be implemented to ensure that cranes and lifting equipment is operated by trained and authorized persons only;
- Appropriate safety harnesses and lowering/raising tools should be used for working at heights;
- All equipment should be turned off and checked when not in use; and
- A safety or emergency management plan should be in place to account for natural disasters, accidents and any emergency situations.

7.13.3 Community Health and Safety

The receptors for impacts on community health and safety include project site workers, settlements in the close proximity of the project which will be exposed to health impacts from the project activities. The construction phase activities such as installation of solar panels, construction of distribution lines and substations and movement of material and personnel may result in impacts on the health and safety of the community.

Construction activities will involve the use of machinery and installation of distribution power lines. Furthermore, the movement of material and personnel via the access roads may result in damage to human life or livestock due to accidents. The major community health and safety risks include structural failure of project infrastructure eg. power line, fire safety and management of emergency situations.

7.13.3.1 Embedded/in-built control

Consultations with the proponent team and policy review indicated that the following embedded/in built control measures will be put in place during the construction phase;

- The excavated areas will be properly fenced for safety and sign boards in local languages will be put up;
- No hazardous waste or any waste be stored within the site for long periods of time and

be in contact with the soil in order to prevent against ground water contamination

- The truck drivers carrying construction machinery and materials will be instructed to drive within speed limits with careful consideration for village traffic;
- Movement of heavy equipment and construction materials will be regulated during peak hours (0900hrs to 0500hrs).

7.13.3.2 Significance of Impact

Impact significate is rated as moderate considering the high impact magnitude and low receptor sensitivity.

7.13.3.3 Additional Mitigation Measures

The following risk mitigation measures are suggested to minimize the risks/ hazards of construction activities onsite;

- Developing an onsite ESMS and EHS Policy by the developer;
- Ensuring that the sub-contractor agreements that the developer enters into require all contractors to possess an EHS plan with provisions for monitoring of the EHS performance of contractors and their workers;
- As part of the stakeholder engagement and information disclosure process, providing an understanding to the community concerning the activities proposed to be undertaken and the precautions being adopted for safety; and
- Implementing the existing grievance redress mechanism.

7.13.4 Labour Influx

The nature of the project will require technical skills that may not be all available in the project areas. This will require movement of construction workers into the project community. With an increase in population of the project area, the social set up may be affected resulting to different negative social impacts such as competition for resources, illicit behaviour and crime (including prostitution, theft and substance abuse).

7.13.4.1 Significance of Impact

The significance of labour influx is considered to be minor because the receptor sensitivity will be medium and the impact magnitude is low. However, except for the technically skilled personnel, most of the labour is expected to be sourced locally.

7.13.4.2 Additional Mitigation measures

- In contract documents for the Contractor, MOE/REREC should make explicit reference to the need to abide by Kenyan law, international best practice and the ratified ILO conventions and MOE's policies in relation to health and safety, labour and welfare standards.
- In selection of a Contractor, MOE/REREC should refer to past performance in similar assignments as an indicator of future performance with respect to worker management, worker rights, health and safety as outlined in Kenyan law and international standards.
- Regular checks by MOE/REREC should be undertaken to ensure the relevant labour laws and occupational health and safety plans are adhered to at all times.
- All project workers should, as part of their induction, receive training on health and safety.
- the contractor should put in place mechanism to ensure no employee or job applicant is not discriminated against on the basis of his or her gender, marital status, nationality, ethnicity, age, religion or sexual orientation.
- All workers will have contracts which clearly state the terms and conditions of their

employment and their legal rights. Contracts will be verbally explained to all workers where this is necessary to ensure that workers understand the provisions. Contracts must be in place prior to workers reporting to duty for the first time. The contract document will be enhanced by the Code of Conduct that will be provided by the Proponent.

- The Contractor will put in place a worker grievance redress mechanism accessible to all workers, whether permanent or casual, directly or indirectly employed. The Proponent worker grievance mechanism shall be open to the Contractor workforce in the event that their grievance is not adequately resolved by their direct employer. The Proponent will then have the authority to act to resolve this grievance.
- All project workers should have access to training on communicable diseases and STDs and community interactions in general. This training will be developed in collaboration with local health institutions.
- Carry out surveillance to ensure that no children are employed in the project, and to the extent possible by third parties related to the project and primary suppliers where such risk may exist

7.13.5 Child labour

Implementation of the Namukuse minigrid project could lead to increased opportunities for the host communities to sell goods and services to the incoming workers. This can lead to child labour to produce and deliver these goods and services, which in turn can lead to increased cases of school truancy and dropout.

7.13.5.1 Significance of Impact

The impact is rated minor. This is based on low sensitivity of the receptor and medium magnitude of the impact.

7.13.5.2 Mitigation measures

- The contractor should develop a code of conduct to ensure children are protected from any negative impact from the construction works.
- The contractor should strictly hire people who are above 18yrs and ensure they provide their Identity Cards.
- The contractor shall ensure every worker under their jurisdiction signs a document committing themselves to the protection of the area children.

7.13.6 Impacts on Cultural Heritage

Cultural and paleontological artefacts and cultural landscapes may be disturbed by the construction of the mini grid facilities. These could include community burial sites, sacred shrines. It is expected that a number of workers will be on-site during project construction of the project including skilled, semi-skilled, and unskilled personnel. During the consultation and field survey, no cultural artefact was established at the proposed project site.

7.13.6.1 Significance of Impact

Based on the analysis provided above, impacts on cultural heritage during the construction phase will be Minor considering low sensitivity of the receptor and low magnitude of the impact.

7.13.6.2 Additional Mitigation measures (Execution of a Chance Find Procedure)

In order to minimize the potential for impact to sub-surface cultural archaeological material, the proponent should establish a Chance Find Programme which includes the following provisions:

- A chance find can be reported by any member of the Project. Accordingly, if a chance find is encountered, the first course of action is to stop work in the vicinity of the find. Then the following steps will be undertaken:
- Inform site supervisor/foreman.
- Install temporary site protection measures (warning tape and keep off signs).
- Inform all personnel of the Chance Find if access to any part of the work area is restricted.
- Establish a localized no-go area needed to protect the Chance Find.
- The National Museum of Kenya will be contacted to perform a preliminary evaluation to determine whether the Chance Find is cultural heritage and if so, whether it is an isolate or part of a larger site or feature.
- Artefacts will be left in place when possible; if materials are collected they will be placed in bags and labelled by an archaeologist and handed over to the National Museum of Kenya; no Project personnel are permitted to take or keep artefacts as personal possessions.
- Document find through photography, notes, GPS coordinates, and maps (collect spatial data) as appropriate.
- If the Chance Find proves to be an isolated find or not cultural heritage, the specialists brought in from the National Museum of Kenya will authorize the removal of site protection measures and activity in the vicinity of the site can resume.
- If the archaeological specialists from National Museum of Kenya confirm the Chance Find is a cultural heritage site, they will inform the project team and initiate discussions with the latter about treatment.
- Prepare and retain archaeological monitoring records including all initial reports whether they are later confirmed or not.
- Develop and implement treatment plans for confirmed finds using the services of qualified cultural heritage experts.
- If a Chance Find is a verified cultural heritage site, prepare a final Chance Finds report once treatment has been completed.
- While investigation is on-going, co-ordinate with on-site personnel keeping them informed as to status and schedule of investigations, and informing them when the construction may resume.
- If mitigation is required, then expedient rescue excavations will be undertaken by the National Museum of Kenya specialist, except in the case that the chance find is of international importance (i.e. Critical Cultural Heritage). If an archaeological site of international importance is encountered special care will be taken and archaeologists with the appropriate expertise in addressing the find will be appointed.

7.13.7 Gender Based Violence, SEA & SH

Gender Based Violence (GBV), Sexual Exploitation and Abuse (SEA) may be committed against the communities by the construction workers and by staff during the operation and maintenance of the mini-grids. Incidences of Sexual Harassment (SH) may occur among the staff during construction, operation and decommissioning phases of the project. The coming of the project can promote GBV in the area. This may be experienced while the women are searching for jobs and those giving the jobs may ask for sexual favours.

7.13.7.1 Significance of Impact

According to the Female FGD conducted, it was noted that cases of GBV cases are mainly family

and caused by drunkenness. Hence, it cannot be ruled out during project implementation. Thus, the significance of this impact is considered to be Minor considering low sensitivity of the receptor and low magnitude of the impact.

7.13.7.2 Mitigation measures

- Prepare an Awareness Raising Strategy, which describes how workers and local communities will be sensitized to GBV risks, and the worker's responsibilities;
- Identify GBV Services Providers to which GBV survivors will be referred, and the services which will be available;
- Elaborate GBV Allegation Procedures i.e. How the project will provide information to employees and the community on how to report cases of GBV breaches to the GM.
- An Accountability and Response Framework, to be finalized with input from the contractor, should include at minimum:
    - GBV Allegation Procedures to report GBV issues to service providers, and internally for case accountability procedures which should clearly lay out confidentiality requirements for dealing with cases; and,
    - A Response Framework which has:
        - Mechanisms to hold accountable alleged perpetrators associated to the project;
        - The GM process for capturing disclosure of GBV;
        - A referral pathway to refer survivors to appropriate support services.

7.13.8 Exclusion of VMGs, Vulnerable Individuals and Households

A significant risk associated with this project is the potential for the exclusion of Vulnerable and Marginalized Groups (VMGs), vulnerable and marginalized households and individuals including the elderly, PLWDs, widows, widowers, orphan-led households, minority clans/sub-clans from participating and or benefiting from the mini-grids project. VMGs participation and inclusion could be disadvantaged based on social identity, which may be across dimensions of gender, age, location, occupation, race, ethnicity, disability, sexual orientation and religion. There is potential risk of lack of intentional actions by the mini-grids contractor(s) and implementing agencies for the inclusion of VMGs in the project activities and benefits. This potentially leads to the exclusion of VMGS from the benefits and opportunities derived from the proposed mini-grid facilities.

The activities of component 1 envisages upon completion of MGs, that the relevant Implementing Agencies will connect customers from community facilities, enterprises and households to the electricity grid on a commercial basis under a market driven approach. There is a high likelihood that the targeted beneficiaries of the new electricity connections to the mini-grids network will be dominated by the local elites. This may lead to the exclusion of those without the financial resources to connect to the mini-grid electricity distribution network. This could result in a situation where a majority persons or households with adequate financial resources in the project area will be able to take advantage of the provision to connect to the electricity grid. This will negate a key objective of the project of overcoming energy poverty.

During the ESIA study the community identified those considered vulnerable in the community include;

- Widows-approximately 200
- Orphans –approximately 500
- Persons Living with Disabilities- Approximately 150
- The elderly (80 years and above)- approximately 80

7.13.8.1 Significance of Impact

Considering the high sensitivity of the VMGs identified in the project and high magnitude, the impact significance is considered to be major. The project site is predominantly Turkana inhabitants and Somali are the minority.

7.13.8.2 Mitigation measures

- Participation will be through meetings with the different groups of the vulnerable people identified primarily to ensure that;
  - The VMGs are aware of the project and its impacts
  - The VMGs are Aware of any restrictions and negative impacts
  - Provide support to VMG participation arrangements in the project
- Confer with the VMGs at the outset on how they wish to be engaged
- Understand and respect local entry protocols as they relate to permission to enter a community and access traditional lands
- Commit to open and transparent communication and engagement from the beginning and have a considered approach in place
- Ensure that all representatives of the contractor and Proponent staff carrying out the specific sub project investment including third party subcontractors and agents are well briefed on local customs, history and legal status, and understand the need for cultural sensitivity
- Regularly monitor performance in engagement
- Enlist the services of reputable advisers with good local knowledge
- Implement the existing grievance redress mechanism

7.13.9 Risk of Communicable Diseases; HIV/AIDS

The construction, operation and maintenance of the mini-grids will lead to increased migration of labour into the mini-grid sites. Local communities can be exposed to increased risk of communicable diseases such as HIV/AIDS through risky behaviours involving job seekers and people employed on the project.

7.13.9.1 Significance of Impact

Based on the fact that the receptor sensitivity will be medium and the impact magnitude low, the impact significance will be Moderate pre-mitigation.

7.13.9.2 Mitigation measures

- The Contractor should develop and implement pre-employment screening measures for workers, which should include applicable diseases. Individuals found to be suffering from these diseases will need to be sensitized on prevention of transmission to others and management of the disease prior to mobilisation to site.
- The Contractor should develop and implement a HIV/AIDS and other STIs policy and an information document for all workers directly related to the Project. The information document should address factual health issues as well as behaviour change issues around the transmission and infection of HIV/AIDS and other STIs.
- The Contractor will make condoms available to employees and communities neighbouring the site office during construction.

- All project personnel should be inducted on a Code of Conduct that gives guidelines on worker-worker interactions, worker-community interactions and development of personal relationships with members of the local communities.
- If workers are found to be in contravention of the Code of Conduct, which they will be required to sign at the commencement of their contract, they will face disciplinary action including dismissal from duty.

7.13.10 COVID-19 amongst workers and the community

This impact is triggered during Project Construction Phase and operation phase due to the Project attracting various categories of workers drawn from local, and national markets. This therefore pose risk of spread of COVID-19 and measures should be in place to curb this.
COVID – 19 is a highly infectious disease and since consultations are required during the project implementation, it will also pose a potentially high risk of infection to and among communities. It is important that alternative ways of managing consultations and stakeholder engagement are implemented to mitigate the impacts.

According to the Ministry of Health,Turkana County reported few COVID-19 cases. No significant cases has been reported in Namukuse area. If the status remain the same even at the time of implementation of the project then the significance of this impact pre-mitigation is considered to be moderate

7.13.10.1 Significance of Impact

The receptor sensitivity medium and low magnitude, hence Moderate significance.

7.13.10.2 Mitigation Measures

- Install handwashing facilities with adequate running water and soap, or sanitizing facilities at entrance to main site;
- Ensure routine sanitization of shared social facilities and other communal places routinely including wiping of workstations, doorknobs etc.;
- All workers and visitors accessing the site every day shall be subjected to rapid Covid-19 screening which may include temperature check and other vital signs;
- The project shall put in place means to support rapid testing of suspected workers for covid-19;
- Avoid concentrating of more than 5 workers at one location. Where two or more people are gathered, maintain social distancing of at least 2 meters;
- Sensitize all community segments and project workers on Covid 19 and precautionary measures that need to be observed;
- Avoid concentrating of more than 15 community members at one location. Where two or more people are gathered, maintain social distancing of at least 2 meters;
- The team carrying out engagements within the communities on one-on-one basis will be provided with appropriate PPE for the number of people they intend to meet;
- Restrict site access to only Authorised persons; and
- Continuously adhere to the MoH, WHO and World Bank guidelines on Covid-19 management.

7.14 KEY ENVIRONMENTAL IMPACTS – OPERATION PHASE

7.14.1 Landscape and Visual Impacts

The solar panels will be spread over a horizontal form with a maximum height of 2m above the ground level. The current use of land surrounding site is grazing, mixed commercial and residential. The permanent change of current landscape to area spread with solar panels will have potential visual impact for nearest habitations and passers.

7.14.1.1 Significance of Impacts

It is important to note that whether the visual impact is seen as positive or negative is highly subjective, and people's attitude towards and perception of the visual impacts associated with the any project including solar power project. The project and its surrounding area are new for such developmental project and will have visual impacts during initial period of Project and the same will disappear over a period of time. Based on the above, significance of visual impact on landscape during operation phase of the project has been assessed as minor due to low receptor sensitivity and impact magnitude being medium.

7.14.1.2 Suggested mitigation measures

The following mitigation measures are proposed to reduce the visual impacts on the surroundings during operational phase:

- Signage related to the minigrid must be discrete and confined to entrance gates.
- The footprint of the operations and maintenance facilities, as well as parking and vehicular circulation, should be clearly defined, and not be allowed to spill over into other areas of the site;
- Construction of fencing or compound wall around the project boundary;
- Landscaping area around the solar farm site within the project with the participation of the local community. Some trees can be planted around the buffer zone to Camouflage or Facade or smokescreen the solar panels.

7.14.1.3 Waste Generation and management

During operation phase, the waste generated from project includes domestic solid waste building and substation and hazardous waste like waste oil and lubricants and oil containing jutes and rags will be generated during maintenance activities.

The quantity of hazardous and non-hazardous waste generated will be much lesser quantity than during the construction phase. Thus, the receptor sensitivity Impact magnitude has been assessed to small.

7.14.1.4 Embedded/in-built control

The waste generated will be disposed of through approved NEMA waste handlers.
The hazardous wastes will be stored onsite at separate designated covered area provided with impervious flooring and disposed through NEMA approved hazardous waste handler.
During operation phase, the quantity of municipal waste and hazardous waste generated is less and probability of the hazardous waste generation is only during plant maintenance and therefore occasional. The waste generated would be routed through proper collection and containment.

7.14.1.4.1 <u>Additional Mitigation measures</u>

- The Contractor shall develop a Solid Waste Management Plan in accordance with the guidelines.
- All Project staff will be trained on this plan and attendance will be recorded.

- Preparation and implementation of a Waste Management Plan (WMP) will be done.
- Fuel shall be stored on site in temporary above ground storage tanks.
- Adhere to Kenyan laws and regulations applicable to waste management and the MSDS.
- Proper waste segregation and colour coding of the waste receptacles.
- Provision of temporary ablution facilities and ensure treatment and/or removal of sewage wastes off site.
- Hazardous wastes such as damaged solar panels and batteries that contain heavy metals shall be collected and stored prior to disposal offshore at a licensed facility as per the requirements of the solid waste management plan. This will be done by a Licenced NEMA Waste Handler.
- Any Solar Panel or batteries removed from the array for disposal will first be collected and stored in the covered 10ft container before being disposed off.
- Hazardous waste shall be shipped offshore to a facility licensed by NEMA to handle hazardous waste.
- Maintain all waste tracking documents (Transportation, treatment and disposal)
- Solid Waste Management Code of Practice will be integrated into SOP

7.14.1.5 Significance of Impact

The overall impact significance on land due to waste disposal during O&M phase has been assessed as minor due to medium sensitivity and low magnitude.

7.14.1.6 Additional Mitigation Measures

- Municipal domestic waste generated at site to be segregated onsite;
- Ensure hazardous waste containers are properly labelled and stored onsite provided with impervious surface, shed and secondary containment system;
- Ensure routinely disposal of hazardous waste through NEMA approved waste Handlers and records are properly documented; and
- Maintain all the waste tracking documents (Transport, treatment and disposal)
- The overall impact significance on land due to waste disposal during O&M phase has been assessed as minor.
- Disposal of hazardous wastes shall be done strictly as per the conditions of authorisation granted by NEMA.
- Ensure hazardous waste is properly labelled, stored onsite at a location provided with impervious surface, shed and secondary containment system.

7.14.2 Impact on Water Quality and Scarcity

Water is required during operation phase to meet domestic requirements of O&M staff and for cleaning solar panels. For that purpose, the water requirement will most likely be sourced from existing local water vendors in the nearby area. During operation phase, there will be no wastewater generation from the power generation process.

Discussions with the residents in Namukuse confirmed that water is a major concern in the area. The local community relies on one borehole and Lake Turkana. Therefore, the receptor (water resource) sensitive is assessed as high.

Since the project is likely to generate very little or negligible amount of wastewater during the O&M phase, the impact on water resources will be negligible as there will be no perceptible or readily measurable change from baseline conditions.

7.14.2.1 Embedded/in-built control

Planning of toilets and waste collection areas should be away from natural drainage channels;

7.14.2.2 Significance of Impact

Although the sensitivity of the receptor (surface water) in the project area is high owing to unavailability of feasible alternative source of water for the local community, the overall significance of impacts is assessed to be negligible due to neglible magnitude of the impact.

7.14.2.3 Additional Mitigation Measures

- Ensure proper cover and stacking of loose construction material to prevent surface runoff and contamination of receiving water point;

- The workforce will be given training towards proactive use of designated areas/bins for waste disposal and encouraged to use toilets. Open defecation and random disposal of sewage shall be strictly restricted;
- Construction workers to be sensitised about water conservation and encouraged use of water optimally;
- Regular inspection for identification of water leakages and preventing wastage of water from water supply tankers.
- Recycling/reusing water to the extent possible.
- The contractor should provide portable/mobile toilets for use on site

7.15 KEY ECOLOGICAL IMPACT- OPERATION PHASE

7.15.1 Collision and Electrical hazards from Distribution Infrastructure

The wildlife observed in the area are mainly wild birds which have been accustomed to the local habitat. No endangered bird species were observed nor reported at the proposed project area. The distribution lines and poles can potentially constitute an electrocution and collision hazard to birds.

7.15.1.1 Embedded/ in-built Control

There are no embedded controls to prevent birds from roosting/nesting on distribution poles and colliding with distribution wires.

7.15.1.2 Significance of Impacts?

The receptor sensitivity is low and the impact magnitude will be medium hence the minor impact significance.

7.15.1.3 Additional Mitigation Measures

The following mitigation measures will further reduce the impact significance on avifaunal species:

- Design of distribution power line conductors and transformers should be such so as to minimize the risks of electrocution of birds;
- The distribution poles should be raised with suspended insulators in order to reduce the electrocution of bird species; and
- Marking overhead cables using bird-flight deterrents and avoiding use in areas of high bird concentrations of species vulnerable to collision.

7.16 KEY POSITIVE SOCIAL IMPACTS – OPERATIONS PHASE

7.16.1 Impact on Economy and Employment

Community consultations and observations made during the site visit suggest that the existing scenario of fishing in the study area is not capable enough to meet requirements of the people who are solely dependent upon it; due to the poor fish prices and lack of fishing gears.

During the operations phase, the requirement for unskilled and semi-skilled labour is expected to reduce to 5 and 15 respectively. The locally procured services will include maintenance work of the facility, 24-hour security, bush and undergrowth cleaning and housekeeping activities. In addition to this, the community will improve their livelihood and businesses by using the electricity from the project.

7.16.1.1 Significance of Impact

The overall impact significance of the impact on economy and employment during the operations phase is Major, the receptor sensitivity will be medium and the impact magnitude will be high.

7.16.1.2 Additional Mitigation Measures

While, the significance of the impact on economy and employment opportunities during the operations phase is understood to be positive, the following measures should be put in place to ensure that the local community receives maximum benefit from the presence of the project:

- Priority should be provided to local labour or suppliers to pass on maximum economic benefit locally;
- Opportunities should be provided to the vulnerable population in the Study Area

7.17 KEY NEGATIVE SOCIAL IMPACTS – OPERATIONS PHASE

7.17.1 Impact on Soil

In the operation phase, soil compaction and erosion may occur due to vehicle movement, which only happens during the occasional maintenance activities. Soil compaction for the operation phase has therefore been infrequent and low.
Since the chances of soil compaction and erosion during the O&M phase are less, the impact magnitude is assessed to be small.

7.17.1.1 Embedded/in-built control

Vehicles will utilize the existing access road to undertake maintenance activities at the solar plant.

7.17.1.2 Significance of Impact

The overall impact significance on soil erosion and compaction has been assessed as negligible.

7.17.1.3 Additional Mitigation Measures

No further mitigation measures are suggested as embedded/in-built control will be sufficient to reduce the impact on soil environment.

7.17.1.4 Residual Impact Significance

The significance of residual impacts has been reduced to negligible considering the recommended mitigation measures.

7.17.2 Waste Generation and Soil Contamination

During operation phase, the waste generated from project includes domestic solid waste building and mini-grid and hazardous waste like waste oil and lubricants and oil containing jutes and rags will be generated during maintenance activities.

The quantity of hazardous waste generated will be much lesser quantity than during the construction phase. Therefore, receptor sensitivity has been assessed as low.
The quantity of municipal and hazardous waste generated will be much lesser in quantity in operation phase than during the construction phase. Thus, the Impact magnitude has been assessed too small.

7.17.2.1 Embedded/in-built control

The waste generated will be disposed of through approved NEMA waste handlers. The hazardous wastes will be stored onsite at separate designated covered area provided with impervious flooring and disposed through NEMA approved hazardous waste handler.

During operation phase, the quantity of municipal waste and hazardous waste generated is less and probability of the hazardous waste generation is only during plant maintenance and therefore occasional. The waste generated would be routed through proper collection and containment.

7.17.2.2 Embedded/in-built control

Additionally, the following steps must be undertaken to avoid soil contamination:

- Ensure oil/ lubricants are stored on impervious floor in the storage area having secondary containment.
- Use of spill control kits to contain and clean small spills and leaks during O&M activities; and
- The guidelines and procedures shall be prepared and followed for immediate clean-up actions following any spillages.

7.17.2.3 Significance of Impact

The overall impact significance on land due to waste disposal during O&M phase has been assessed as minor.

7.17.2.4 Additional Mitigation Measures

- Municipal domestic waste generated at site to be segregated onsite.
- Ensure hazardous waste containers are properly labelled and stored onsite provided with impervious surface, shed and secondary containment system.
- Ensure routinely disposal of hazardous waste through NEMA approved waste Handlers and records are properly documented; and
- The overall impact significance on land due to waste disposal during O&M phase has been assessed as minor.
- Disposal of hazardous wastes shall be done strictly as per the conditions of authorization granted by NEMA.
- Ensure hazardous waste is properly labelled, stored onsite at a location provided with impervious surface, shed and secondary containment system.

7.17.2.5 Residual Impact Significance

The significance of residual impacts will be negligible post implementation of recommended mitigation measures.

7.17.3 Impact on water quality and scarcity

Water is required during operation phase to meet domestic requirements of O&M staff and for cleaning solar panels. Water will be obtained from the local water point sand borehole. During operation phase, there will be no wastewater generation from the power generation process. Therefore, the receptor sensitivity is assessed to be **low**.

Discussions with the residents in Forole confirmed that water is a major concern in the area.

Since the project is likely to generate very little or negligible amount of wastewater during the O&M phase, the impact magnitude has been assessed to be small.

7.17.3.1 Embedded/in-built control

Planning of toilets and waste collection areas should be away from natural drainage channels *(lag gas).*

7.17.3.2 Significance of Impact

The overall significance of impacts is assessed to be **minor**.

7.17.3.3 Additional Mitigation Measures

- Ensure proper cover and stacking of loose construction material to prevent surface runoff and contamination of receiving water point.
- The workforce will be given training towards proactive use of designated areas/bins for waste disposal and encouraged for use of toilets. Open defecation and random disposal of sewage shall be strictly restricted.
- Construction labor deputed onsite to be sensitized about water conservation and encouraged for optimal use of water.
- Regular inspection for identification of water leakages and preventing wastage of water from water supply tankers.
- Recycling/reusing to the extent possible.
- The contractor should provide portable/mobile toilets for use on site

7.17.3.4 Residual Impact Significance

The residual impact significance is envisaged to be negligible upon application of embedded controls and additional mitigation measures.

7.17.4 Occupational, Health and public safety Impacts

During the operational phase, it will involve direct use of electricity by the community and maintenance of the power lines. As a result, it will lead to potential impacts on workers' and community member's health and safety due to exposure to risks through that lead to accidents causing injuries and death. The most probable risks include:

- Safety risks such as: tripping; falling due to working at heights during maintenance of the power lines
- Electric shocks in case of poor handling of electricity such as using wet hands, poor wiring and overloading of sockets.

7.17.4.1 Embedded/in-built control

- Community sensitization on health and safety issues
- Training of the workers on climbing techniques, and rescue of fall-arrested workers during maintenance;
- Proper electrical safety signage's on the distribution poles

7.17.4.2 Significance of Impacts

The impact on occupational health and safety during the operational phase is evaluated to be of moderate significance. All the operational activities will be in line with the safety measures hence high sensitivity and low magnitude.

7.17.4.3 Additional mitigation measures

- All workers (regular and contracted) should be provided with training on EHS policies and procedures during the operation stage;
- Monitor health and safety performance and have an operating audit system; and

- Appropriate safety harnesses and lowering/raising tools should be used for working at heights; and
- A safety or emergency management plan should be in place to account for natural disasters, accidents and any emergency situations within the community.

7.17.5 Impact on Noise and Air Quality

The Project is expected to cause significant long term air quality impacts. It is anticipated that there will be gaseous emissions from vehicles using the road. However, the significance of exhaust emission impacts during operation phase of the project was not assessed during this study as it requires conducting air dispersion modelling which could not be undertaken during this study.

Irrespective of the proposed project, urban air quality is the major environmental problem associated with transport-related activities. Therefore, to address air potential impacts during this phase the following measures will need to be adopted by the government:

i. Fuel improvement strategy that involves phasing out leaded gasoline, reduce sulfur content in diesel and checking use of alternative fuel
ii. Compulsory annual testing of vehicle emission levels, certify and control garages to force regular technical inspections (annual emission test) and to control them
iii. Emission-related taxes on mineral oil i.e. Taxes or increased taxes for oil for leaded and diesel fuel, no taxes or freezing of taxes on unleaded fuel, Substitute value added taxes by emission related taxes on fuel

7.17.6 Landscape and Visual Impacts

The solar panels will be spread over a horizontal form with maximum height of 2m above the ground level. In addition, the entire facility will be fenced with a stone wall with height of approximately above 2 meters, hence may not be visible to the passers or moving traffic.

The current use of land surrounding site is mixed commercial and residential. The permanent change of current landscape to area spread with solar panels will have potential visual impact for nearest habitations and passers.

7.17.6.1 Significance of Impacts

It is important to note that whether the visual impact is seen as positive or negative is highly subjective, and people's attitude towards and perception of the visual impacts associated with the any project including solar power project. The project and its surrounding area are new for such developmental project and will have visual impacts during initial period of Project and the same will disappear over a period.

Based on the above, significance of visual impact on landscape during operation phase of the project has been assessed as moderate.

7.17.6.2 Suggested mitigation measures

Following mitigation measures are proposed to reduce the visual impacts on the surroundings during operational phase:

- Signage related to the mini-grid must be discrete and confined to entrance gates.
- The footprint of the operations and maintenance facilities, as well as parking and vehicular circulation, should be clearly defined, and not be allowed to spill over into other areas of the site.
- Construction of fencing or compound wall around the project boundary.
- Landscape development around the solar farm site with the participation of the local community.

7.17.6.3 Residual impact significance

After implementation of mitigation measures, the significance of residual impacts will reduce to minor.

7.17.7 Electrocution Impact - Collision and Electrical hazards from Transmission Infrastructure

Potentially constitute an electrocution and collision hazard to birds. Some birds building nests in the gaps of solar panels and perch on the power lines and poles.

Electricity is a hazard and safety precautions must be adhered to and properly used. Within the household electric shocks are likely in case of poor handling of electricity such as using wet hands, poor wiring and overloading of sockets. Electrical hazard can also result from loose hanging electrical lines, power surges.

Electric magnetic fields are only anticipated during operation period, but these are negligible. The exposure to would be little EMFs is highly negligible because the EMFs produced by the electrical installation are low. Consequently, the study does not anticipate impacts of EMFs.

7.17.7.1 Embedded/ in-built Control

There are no embedded controls to prevent birds from roosting/nesting on transmission poles and colliding with transmission wires.

The proponents shall adhere to ensure that electrical equipment is installed in accordance with the respective hazardous area classification system within the Fire Risk Reduction Rules, 2007. It is also a requirement that all electrical equipment is inspected every six months by a competent person and the Proponent is required to keep records of such inspections.

7.17.7.2 Additional Mitigation Measures

The following mitigation measures will further reduce the impact significance on avifaunal species:

- Design of transmission towers and transformers should be such to minimize the risks of electrocution of birds.
- The transmission poles should be raised with suspended insulators to reduce the electrocution of bird species; and
- Marking overhead cables using bird-flight deterrents and avoiding use in areas of high bird concentrations of species vulnerable to collision. Electricity is a hazard and safety precautions must be adhered to and properly used
- Community sensitization on fire safety measures

7.17.7.3 Residual Impact Significance

After implementation of mitigation measures, the significance of residual impacts will be **Minor**.

7.17.8 Workers Occupation Health and Safety

Working within the Mini-grid can poses potential health hazards and accidents to workers. Therefore, caution must be taken to ensure that the Mini-grid does not pose a health and safety risks to workers. Because the maintenance activities will be conducted less frequently, the impact magnitude on occupational Safety and Health will be low. Considering that the accidents may result in injuries and death, the sensitivity is considered to be High. Therefore, the significance is Moderate.

Mitigation Measures

- Ensure only qualified staff are employed to work in the facility
- All workers operating the Mini-grid must be equipped with appropriate and adequate person protective equipment (PPE) such as; safety footwear, helmet among others.
- Operators must be skilled on firefighting management
- Annual environmental audits should be done
- WIBA cover for staff is mandatory

7.17.9 Waste Generation

The amount of hazardous waste generated will be very low and possibly originate from maintenance works and would include; used up batteries, damaged panes, waste oil, and their containers, used rags and spent clean-up rags. This impact is assessed as minor due to medium sensitivity and low magnitude.

Mitigation Measures

- These waste wastes should not be mixed with other non-hazardous waste
- Operator to have a designated waste storage area for absolute lead-acid batteries awaiting disposal
- These wastes should be disposed by NEMA approved handlers
- Any solar panels or batteries removed from the array for disposal will first be collected and stored in the covered and leak proof section before being collected and transported by NEMA licensed waste collector for proper disposal by the proponent in a facility licensed to handle hazardous waste.

7.17.10 Risks related to poor or inadequate stakeholder engagement (Conflict)

During operation of the project there are grievances that may arise from community and other stakeholders related to poor or inadequate engagement of stakeholders and other need for information or challenges in using power by the community. Therefore, the contractor will design and implement a grievance redress mechanism to deal with grievances. The grievance redress mechanism committee should also include representatives from the community. With the implementation of the mitigation measures the impact significance is minor to negligible.

Mitigation measures

- Employ from the community to the extent possible
- Engage the community members and other stakeholders in a timely manner
- Work closely with the GRM committee members in solving the conflicts
- Solve all conflicts/grievances at the earliest time possible
- Ensure all grievances are logged and closed
- Monitoring the pattern of grievances to come up will long term measures

7.18 KEY ENVIRONMENTAL IMPACTS – DECOMMISSIONING PHASE

In the event of decommissioning of the Project, it is likely that any potential impacts would be similar to those in the construction phase, as broadly similar activities would be required and therefore impacts on the physical environment associated with this phase.

7.19 KEY SOCIAL IMPACTS – DECOMMISSIONING PHASE

7.19.1 Impact on Economy and Employment

The major social impacts associated with the decommissioning phase are linked to the loss of jobs and associated income. This has implications for the households who are directly affected, including their families. However, the impacts are likely to be limited due to relatively small number of permanent employees (mainly security guards and PV panel cleaners) who will be affected.

Impact magnitude is considered to be small considering the decommissioning period to last for a short duration.

7.19.1.1 Significance of Impact

The overall impact significance is envisaged to be Minor due to low sensitivity and medium magnitude.

7.19.1.2 Additional Mitigation Measures

The decommissioning phase will require removal of machinery, workers and other temporary structures. The mitigation measures for decommissioning shall include the following:

- Notify the GRC, Local leadership, the County Government reps of the specific jobs and the skills required for the Project
- Prioritize the employment of unskilled labour from the local communities.
- Prioritize the procurement of goods and services from within Turkana County.
- Develop and implement a fair and transparent employment and procurement policy.
- Advertise all jobs and tenders. (the jobs can be advised through local administrative offices, GRC meetings)
- Ensure gender mainstreaming during employment
- The contractor shall inform the workers and local community about the duration of work; and
- Reduction of worker will be done phase wise and corresponding to completion of each activity.
- Proper disposal of waste including debris, panels and other accessories
- Rehabilitation of the project site will be carried out to restore the site to its original status or to a better state than it was originally. This will include replacement of topsoil and re-vegetation which will lead to restoration of the visual quality of the area.

7.20 CUMULATIVE IMPACTS

7.20.1 Cumulative Impact Assessment

It was observed during the site survey that there are no other similar solar projects within the projects site. Thereore, it is assumed that there will be no cumulative impacts from the above mentioned projects on the local soil, water, land, air and ambient noise environment.

8 CHAPTER EIGHT: ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN (ESMMP)

8.1 INTRODUCTION

Environmental and Social Management and Monitoring Plan (ESMMP) for development projects provides a logical framework within which identified negative environmental and socio–economic impacts can be mitigated and monitored. The ESMMP has been developed to be used as tool to manage the environmental and social impacts that the activities of the proposed project will cause. The contractor before construction will make reference to this ESMMP and develop specific implementation plans. In addition, the ESMMP assigns responsibilities of actions to various actors and provides a timeframe within which mitigation measures and monitoring can be done.

The key objectives of the ESMMP are:

- To monitor the implementation of mitigation measures against potential adverse impacts of construction and operation phases of the project to ensure that they conform and comply with relevant environmental and social policies, guidelines and legislation
- To assess for emerging non-anticipated adverse environmental and social impacts and implement relevant mitigation measures to maintain them within acceptable levels
- To maintain best practice in environmental, social health and safety during project construction and operation

The ESMMP outlined below addresses the identified potential negative impacts and mitigation measures of the proposed Mini-grid during pre-construction, construction, operational and decommissioning phases, based on the chapter of Environmental Impacts and Mitigation Measures of the potential negative impacts.

8.2 MONITORING

Monitoring denotes a systematic process of collecting, analyzing and using information to track the progress of implementation of the ESMMP including coming up with measures to address any emerging issues. Monitoring of the ESMMP will involve recording information to track performance and recommendations to keep implementation of ESMMP on track. Reporting is a key component of the monitoring exercise.

The proposed ESMMP will be subjected to monitoring. Monitoring will have two elements: routine monitoring against standards or performance criteria; and periodic review or evaluation. Monitoring will often focus on the effectiveness and impact of the ESMMP as a whole.

During construction phase, the Implementing agency (KPLC) shall monitor the contractor's activities in order to verify that the management measures/procedures/specifications are implemented as contained in the ESMMP. Compliance will mean that the contractor is fulfilling their contractual obligation.

During operation phase, KPLC will monitor facility's operations to ensure compliance with management measures in the ESMMP and operation procedures. As part of this monitoring, the KPLC will undertake or statutory initial environmental audit as required by the ESIA/EA Regulations, 2003 and subsequent annual environmental audits.

8.3 PLAN MONITORING

All of the management plans make provision for monitoring and evaluation. Special attention should be given to the monitoring arrangements relating to biophysical impacts, occupational health and safety, social risks, facility operational and emergency response.

During the construction phase of the project, the contractor's Environmental Health and Safety Officer (EHSO) shall report on the implementation of the ESMMP i.e., all environmental, safety and health impacts as well as accidents and incidents to the implementing agency. The social specialist of the contractor will report on implementation of the social measures as spelt out in the ESMMP.

The reported impacts and incidents will be captured on a database to ascertain trends and track progress in the implementation of preventive and corrective actions, and benchmarking against other, similar operations.

During operation, the implementing agency – KPLC will monitor the health and safety of personnel and contractors, in compliance with legislative requirements. Emergency incidents should be reported to the relevant authorities. The reported impacts and incidents will be captured on a database to identify weakness in the emergency response plan and track progress in the implementation of preventative and corrective and benchmarking against other similar operations.

The Environmental and Social Management and Monitoring Plan (*ESMMP*) will provide the basis for monitoring of potential Environmental, social and health Impacts associated with the project. The ESMMP provides effective observation and documentation of monitorable parameters that will help in analyzing the effectiveness of the proposed mitigation measures with the advantages of improving operational efficiency, promoting competitive advantage, improving risk management, reducing liabilities and improving business performance. The ESMMP has been provide in Table 11 below.

8.4 ENVIRONMENTAL AND SOCIAL MONITORING BY CONTRACTORS

KPLC will require that contractors monitor, keep records and report on the following environmental, health and social issues of the proposed project.

1. *Safety*: hours worked, recordable incidents and corresponding root cause analysis (lost time incidents, medical treatment cases), first aid cases, high potential near misses, and remedial and preventive activities required (for example, revised job safety analysis, new or different equipment, skills training, and so forth).
2. *Environmental incidents and near misses*: environmental incidents and high potential near misses and how they have been addressed, what is outstanding, and lessons learned.
3. *Major works*: those undertaken and completed, progress against project schedule, and key work fronts (work areas).

4. *E&S requirements*: noncompliance incidents with permits and national law (legal noncompliance), project commitments, or other E&S requirements.

5. *E&S inspections and audits*: to include date, inspector or auditor name, and records reviewed, major findings, and actions recommended and implemented.

6. *Workers*: number of workers, indication of origin (expatriate, local, nonlocal nationals), gender, age and skill level (unskilled, skilled, supervisory, professional, management).

7. *Training on E&S issues*: including dates, number of trainees, and topics.

8. *Footprint management*: details of any work outside boundaries or major off-site impacts caused by ongoing construction—to include date, location, impacts, and actions taken.

9. *External stakeholder engagement*: highlights, including number of formal and informal meetings, and information disclosure and dissemination—to include a breakdown of women and men consulted and themes coming from various stakeholder groups, including vulnerable groups (e.g., disabled, elderly, children, etc.).

10. *Details of any security risks*: details of risks the contractor may be exposed to while performing its work—the threats may come from third parties external to the project.

11. *Worker grievances*: details including occurrence date, grievance, and date submitted; actions taken and dates; resolution (if any) and date; and follow-up yet to be taken—grievances listed should include those received since the preceding report and those that were unresolved at the time of that report.

12. *External stakeholder e.g., community grievances*: grievance and date submitted, action(s) taken and date(s), resolution (if any) and date, and follow-up yet to be taken—grievances listed should include those received since the preceding report and those that were unresolved at the time of that report. Grievance data should be age and gender-disaggregated.

13. Major changes to contractor's environmental and social practices.

14. *Deficiency and performance management*: actions taken in response to previous notices of deficiency or observations regarding E&S performance and/or plans for actions to be taken—these should continue to be reported until KPLC determines the issue is resolved satisfactorily.

Table 21: Environmental and social management plan for preconstruction, construction, operation and decommissioning phase

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
Local employment	-Prioritize hire of locals for all unskilled labour. -Implement a local recruitment plan that is fair and transparent (including recruitment processes that ensure inclusivity of both men and women, vulnerable individuals, minority clans, ethnic groups and VMGs. -Adhere to labour laws, and labour management practices (timely renumeration, equitable compensation for both genders for equal work etc.) -Create awareness to workers and the community on worker and project grievance redress mechanisms.	Construction Operations Decommissioning	REREC, KPLC construction, O&M Contractor	-Fair and transparent local recruitment plan in place. -Recruitment processes (job adverts, interviews, selection etc.). -Number of locals employed based on gender, vulnerability, ethnic group, clan etc. -Type of employment (skilled, semi-skilled and unskilled). -Grievances raised, those aggrieved, status of resolution.	Quarterly	Contractor's cost
Local Sourcing	-Source materials from local businesses/communities, and where necessary give opportunities to businesses owned or operated by vulnerable individuals.	Construction Decommissioning	REREC, KPLC construction, O&M Contractor	-Number and types of businesses sourced from, businesses owned and operated by vulnerable individuals, types and quantities of materials etc.	Quarterly	No additional cost

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
Land acquisition and compensation for land and assets on land	In line with the RPF provisions; -Prepare and implement an **Abbreviated Resettlement Action Plan (A-RAP)** to guide land acquisition for the mini-grid, wayleaves for power distribution. Further, the proponent will fast-track A-RAP preparation to ensure that land acquisition and contractor mobilization to the site is undertaken after the A-RAP is finalized, cleared, and disclosed. -The contractor will implement and adhere to agreements for temporal use of land and restoration of land after use. -Compensate affected communities in-kind (priority project) for the loss of land. -The construction activities will be restricted to within the allocated land and the immediate surroundings only. -After construction work, any land taken for a temporary basis for storage of material will be restored to their original form.	Pre- Construction	Contractor- *(contractors' facilities, workers camps)* REREC- *(project land for generation assets)*	-Land Acquisition and consultation report (consultation (minutes and lists of participants). -Type and amount of compensation paid to affected persons. - Priority community project implemented and handed over to affected communities. -Signed agreements with communities on the use and restoration of their land.	Quarterly	Value of compensation in kind project will be equivalent to the value of land acquired as per NLC

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	-Consultations with the community on the low voltage lines. -The design of the distribution line will utilize the existing road reserves. However, any damage to structures, crops, trees, community facilities and other assets will be compensated in line with the RPF provisions.					
Labor Influx and related impacts (SEA/SH, HIV/AIDs and other STIs)	-Tap into the local workforce to the extent possible to reduce labor influx. -Recruit local workforce to the extent possible especially for unskilled and semi-skilled jobs. -Consult with and involve local community in project planning and other phases of the project. -Raise awareness among local community and workers on the need to have a good /cordial working relation -Sensitize workers regarding engagement with local community. -Make provision to provide resources needed by the	Construction Decommissioning	REREC, KPLC construction, O&M Contractor	-Records of employees/updated employee register. -Number of local community employees and external employees/ updated employee register.	Quarterly	50,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	workers if the need for such resources may result to competition e.g., water. -Establish and operationalize an effective Grievance Redress Mechanism accessible to community members. -The contractor and the project/community grievance redress committee to work closely address complains raised on time. -Include gender considerations in employment opportunities. -Provide appropriate compensation for work done. -Respect for community values/culture. -Prompt payment of workers as per the contractual agreements/terms.					
Child labor	-Employ workers who are 18 years and above, and with a valid national ID at the time of hire. -Implement and monitor the employment register regularly. Compliance with the national labor laws and labour management practices.	Construction Decommissioning	REREC, KPLC construction, O&M Contractor	-Updated employment register indicating locals employed, their ages, national identification numbers etc. -Grievances raised, aggrieved persons	Quarterly	20,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	-Put visible signage on site "**No Jobs for children**" -Do not allow children at the project site.			and status on resolution etc.		
GBV- SEA and SH	-Prepare an SEA/SH Prevention and Response Action Plan, to manage the SEA/SH risks. -The Action Plan to be proportionate to potential SEA/SH risks, and to include measures such as awareness creation for communities and workers; identification of referral services for survivors and a GRM that ensures confidential reporting of GBV cases. -Implement a code of conduct signed by all those with physical presence on site.	Construction Operations Decommissioning	REREC, KPLC construction, O&M Contractor	-Minutes of awareness creation sessions for the community and workers on GBV-SEA/SH. -Code of conduct signed by all those with physical presence on site. -GRM that ensures confidentiality of GBV cases in place. Documented referral services for survivors. -Grievances raised, aggrieved persons and status on resolution etc	Quarterly	50,000.00
Forced Labor	-Adhere to the Employment Act which outlaws any form of forced labor. -Report any form of forced labor at the site. -Ensure that all workers have a national ID card or documentation to show they are adults (above 18 years).	Construction Decommissioning	REREC, KPLC construction, O&M Contractor	-Number of reported cases of forced labor.	Quarterly	20,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
Risks related to Inadequate stakeholder engagement	-Prepare a stakeholder engagement/consultation plan (SEP) that is proportionate to the subproject and the identified stakeholders. -Timely and prior disclosure of project all project information, including project instruments, the full rights and entitlements of project affected persons, sub-project positive and negative impacts and opportunities, proposed subproject budget. -In line with the SEP, undertake adequate consultations prior to construction and throughout the project cycle with all segments of the community and other relevant stakeholders. -Prepare and implement a grievance redress mechanism to deal with grievances. -The grievance redress committee to include representatives from the community. -Sensitize stakeholders on SEP and GRM.	Construction Operations Decommissioning	REREC, KPLC construction, O&M Contractor	-Availabiliy of and implementation of the Stakeholder Engagement Plan. -# of stakeholder consultations held -Record of stakeholder consultations held (minutes of meetings and list of participants). -Information disclosed, to whom it was disclosed (men women, PWD, youth, vulnerable individuals and households etc., methods and languages used in the disclosure (culturally appropriate and accessible), grievances raised and status on resolution etc. -Concerns raised andactons raised.	Quarterly	30,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
Exclusion of VMGs and vulnerable individuals and households	In line with the provisions of the ESMF, VMGF and Social Assessment ensure the following. • Early identification and inclusion of VMGs and disadvantaged groups. • Meaningful consultation to effectively participate in the project. • Timely and prior disclosure of relevant project information to VMGs and disadvantaged groups. • Adequate and ongoing consultations with VMGs and disadvantaged groups in line with the SEP. • All concerns or grievances raised are fully resolved in a timely manner. • Access to culturally appropriate project	Pre-construction Construction Operations Decommissioning	REREC, KPLC construction, O&M Contractor	Minutes of consultative meetings with all community segments including VMGs and vulnerable individuals and households, grievances raised and status on resolution etc.	Quarterly	No additional cost

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	benefits and opportunities.					
Inaccessibility of project benefits to VMGs and other vulnerable individuals due to affordability challenges	-Consult VMGs and Vulnerable individuals and households on charges for sub project services, and put in place specific interventions to ensure the vulnerable equally access project benefits.	Operations	REREC, KPLC construction, O&M Contractor	-Interventions to enable those vulnerable access project benefits. -Number of complaints raised by VMGs/vulnerable individuals regarding access to project services. -GRM that is culturally appropriate and accessible. Grievances raised and status on resolution etc	Quarterly	No additional cost
Inadequate grievances management	-Constitute a Local Grievances Committee is in consultation with all community segments, and incorporates the existing local dispute resolution mechanism. -Implement a workers grievances mechanism. -Awareness on the culturally appropriate and accessible GRM to all community segments	Construction Operations Decommissioning	REREC, KPLC construction, O&M Contractor	-Local Grievances Committee in place, composition of committee, awareness of community and workers on project and worker GRMs, updated GRM logs, types of grievances -Availability of grievance redress process	Quarterly	No additional cost

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	including VMGs, vulnerable individuals and households and CSOs -All reported grievances are logged, dated, processed, resolved and closed out in a timely manner. -Proportionate representation of VMGs and vulnerable individuals in the local grievances committee. -GRM provides for confidential reporting of particularly sensitive social aspects such as GBV, as well as anonymity.			-Number of grievances reported -Number of grievances resolved in a timely manner -Number of grievances escalated to national courts and the World Bank Grievances Redress Service and Inspection Panel.		
Environmental Impacts						
Vegetation clearance	1. Clear only the necessary areas 2. Ensure proper demarcation and delineation of the project area to be affected by construction works. 3. Specify locations for vehicles and equipment, and areas of the site which should be kept free of traffic, equipment, and storage. 4. Designate access routes and parking areas	Construction	REREC, construction, O&M Contractor	-Number of trees cleared -Planted trees	Once off	50,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	5. Re-vegetation including planting of trees around the plant/facility					
Soil erosion	1. Avoid groundbreaking during the seasons of high rainfall to avoid erosion. 2. Monitoring of areas of exposed soil during rainy seasons to ensure that any incidents of erosion are quickly controlled. 3. Construction related impacts like erosion and cut slope destabilizing should be addressed through landscaping and grassing, carting away	Construction	REREC, construction, O&M Contractor	Assess size of rills or Gulleys forming from accelerated run off from compacted areas	Quarterly	Part of contractor's fee

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	and proper disposal of construction materials 4. Use silt traps where necessary 5. Cover soil stock piles 6. Landscaping with grass on areas without electrical installation (lower areas) 7. Monitoring of areas of exposed soil during rainy seasons to ensure that any incidents of erosion are quickly controlled.					
Contamination of soil from fossil fuels	1. Ensure waste water generated is discharged or drained into approved drainage facilities 2. Construction vehicles must be maintained in good state and proper servicing to ensure no oils are likely to leak 3. Care must be exercised not to spill any fossil fuels 4. Any contaminated soil shall be scooped and disposed-off appropriately. 5. No servicing vehicles on site	Construction	REREC, construction, O&M Contractor	Records of any leakages from construction equipment/ vehicles.	Quarterly	50,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
Dust emissions	1. The construction area should be fenced off to reduce dust to the public 2. Suppress dust during dry periods by use of water sprays; **3.** Stockpiles of excavated soil should be enclosed/covered/watered during dry or windy conditions to reduce dust emissions. 4. Burning of woody debris & construction waste to be prohibited **5.** Use of personnel protective equipment (PPE) -masks should be provided to all personnel in areas prone to dust emissions 6. Restrict speed on loose surface roads during dry or dusty conditions 7. Keep stockpiles and exposed soils compacted and re-vegetate as soon as possible. 8. Construction trucks moving materials to site,	Construction	REREC, construction, O&M Contractor	-Visual Observation of dust -Provision of PPEs especially masks	Daily	100,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	delivering sand and cement to the site should be covered to prevent material dust emissions into the surrounding areas 9. Plant short trees to break speed of wind					
Vehicle exhaust and emissions from Generator	1. Drivers of construction vehicles must be sensitized so that they do not leave vehicles idling so that exhaust emissions are lowered. 2. Maintain all machinery and equipment in good working order to ensure minimum emissions of carbon monoxide, NO_X, SO_X and suspended particulate matter 3. Maintain equipment in good running condition – no vehicles to be used that generate excessive black smoke 4. Use of diesel which is Sulphur- free to run the power producing	Construction	REREC, construction, O&M Contractor	-Engine maintenance records - inspection of stacks	Quarterly	100,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	generators to be encouraged 5. The stack chimney of the generators will be increased from its normal height of 3 meters to 6 meters					
Solid waste generation	1. Ensure spoil from excavations is arranged according to the various soil layers. This soil can then be returned during landscaping and then rehabilitation, in the correct order which they were removed that is top soil last; 2. Segregate waste 3. Provide litter collection facilities such as bins 4. Contractor to put in place and comply with a site waste management plan 5. The contractor should comply with the requirement of OSHA ACT 2007 and Building rules on storage of construction materials	Construction	REREC, construction, O&M Contractor	Presence of well-maintained receptacles and centralized collection points	Quarterly	100,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	6. Use of durable, long-lasting materials that will not need to be replaced as often, thereby reducing the amount of waste generated over time 7. Recovery of materials remains and return to stores 8. Re-use of materials where possible 9. Proper budgeting to avoid waste generation 10. Proper disposal of waste in line with solid waste regulation 6. Construction wastes to be managed in accordance with construction standards in Kenya					
Impacts on Water Resources and Water Quality	1. Clear the necessary areas only. 2. Appropriate remedial measures shall be implemented by the contractor in the event of erosion. 3. Infrastructure shall be designed to ensure that	Construction	REREC, construction, O&M Contractor	-Oil spill containment plan. -Provision of fuel/oil drip and spill trays	Quarterly	150,000

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	contaminated run-off does not reach water source i.e., earth dam. 4. Contractor to develop an oil-spill containment plan as part of the emergency response plan. In the event of an oil spill the procedures contained in the emergency response plan of the contractor will come into effect. 5. No vehicle maintenance and service shall be done at project site 7. Ensure that potential sources of petro-chemical pollution are handled in such a way to reduce chances of spills and leaks.					

Noise & vibration	1. Construction activities to avoid any unchanneled flow of water at the site 2. Storage areas that contain hazardous substances should be bunded with an approved impermeable liner and provision for a pit to be made in case of oil spill. 3. The excavation and use of rubbish pits during construction should be strictly prohibited. 4. A waste disposal area should be designated within the active construction area and this should be equipped with suitable containers i.e., skips or bins of sufficient capacity and designed to contain and prevent refuse from being blown by wind, 11. Areas contaminated by spilled concrete and/or fuels and oils leaking from vehicles and machinery should be cleaned immediately	Construction	REREC, construction, O&M Contractor	Noise levels-Records of noise measurements done by contractor within the project area and at distances of 30m from the Solar mini-grid	Quarterly	150,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
Impacts from Hazardous materials -	1. Maintenance of construction vehicles will not be done on site 2. All hazardous products and waste should be labeled and handled properly to avoid contact with the ground 3. Dispose hazardous waste through a NEMA approved waste handler	Construction	REREC, construction, O&M Contractor	Presence of well-maintained receptacles and centralized collection points	Quarterly	100,000.00
Accidental Oil Spills or Leaks	1. In the event of accidental leaks, contaminated top soil should be scooped and disposed of appropriately. 2. Refueling and maintenance of vehicles will not take place at the construction site. 3. Create awareness for the employees on site on procedures of dealing with spills and leaks 4. Vehicles and equipment must be serviced regularly and kept in good state to avoid leaks. 5. In case of spillage the contractor should isolate the source of oil spill and contain the spillage using	Construction	REREC, construction, O&M Contractor	Records of all accidental spills and number of liters	Quarterly	150,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	sandbags, sawdust, absorbent materials and/or other materials approved by materials. 6. All chemicals should be stored within the bunded areas and clearly labeled detailing the nature and quantity of chemicals within individual containers.					
Fire Hazards	1. Create awareness to the construction workers on potential fire hazards 2. Provision of firefighting equipment on site during construction. 3. No smoking shall be done on construction site 4. 'No smoking' signs shall be posted at the construction site 5. A fire risk assessment and evacuation plan should be prepared and must be posted in various points of the construction site including procedures to take when a fire is reported. 6. Designate an assembly point	Construction	REREC, construction, O&M Contractor	-Records of any Fire incidences -Fire equipment and evacuation plan	Quarterly	100,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
Impacts of construction material sourcing (e.g., quarrying)	1. Source all building materials such as stone, sand, ballast and hard core from NEMA approved sites. 2. Ensure accurate budgeting and estimation of actual construction materials to avoid wastage. 3. Reuse of construction materials where possible.	Construction	REREC, construction, O&M Contractor	Sources of raw materials (from local community)	Quarterly	Part of contractor's cost
Increased water demand	1. Prudent use of available water 2. Consultations with the project local committee on use of water in the community to avoid conflicts with the community 3. Source and utilize a sustainable and reliable water supply for both construction and operation phase.	Construction	Contractor	Water usage records	Quarterly	Part of contractor's cost
Energy Consumption	1. Ensure responsible electricity use at the construction site through sensitization of staff to conserve electricity by switching off electrical	Construction	REREC, construction, O&M Contractor	Energy consumption records	Quarterly	No additional cost

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	equipment or appliances when they are not being used. 2. Proper planning of transportation of materials will ensure that fossil fuels (diesel, petrol) are not consumed in excessive amounts. 3. Complementary to these measures, they monitor energy use during construction and set targets for reduction of energy use.					
Occupational Health and safety Impacts	1. Use skilled personnel for activities which demand skills/technical tasks 2. Awareness creation/Tool box talks on safety to workers while at construction site 3. Workers coming to the site should be knowledgeable on safety precautions to take 4. Appropriate PPE (helmet, safety harness, boots, masks, climbing irons) 5. Proper general house keeping	Construction	REREC, construction, O&M Contractor	Records of any near misses, incident, and accidents. Records of corrective actions implemented if there was an accident.	Quarterly	1,000,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	6. Close supervision of workers 7. Risk assessment by contractor of the construction activities and implement mitigation measures appropriately 8. Adherence to occupational Safety and Health Act 2007 9. Availability of equipped first aid box on site 10. Provide safe drinking water for workers 11. Engagement of trained first aider on site 12. Ensure the WIBA cover is taken for the staff 13. Establish safety committees					
Community safety –access	1. Proper barricading 2. Hazard communication. 3. Controlled access to the site by designated personnel 4. Maintain records of any person who comes to site	Construction	REREC, construction, O&M Contractor	Presence of a controlled access and records of every person accessing the site	Daily	20,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
Public Health Impacts	1. Sensitize workers and the community on prevention and mitigation of HIV/AIDS and other sexually transmitted diseases, through staff training, awareness campaigns and community *Barazas.* 2. Awareness creation and consultations with local communities prior and during construction on the dangers of these diseases 3. Informing workers on local cultural values and health matters. 4. Provision of condoms to workers 5. Allowing migrant workers time to be with their families 6. The contractor is impressed upon not to set a construction camp on site. 7. The contractor will provide public	Construction	REREC, construction, O&M Contractor	Number of awareness creation sessions conducted. -Availability of and distribution of condoms	Quarterly	20,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	education/information about HIV/AIDS transmission and prevention measures. 8. Ensure equal treatment of workers 9. Provide all appropriate COVID-19 preventive measures including campaign to maintain individual measures at the workplace.					
Sanitary waste	**1.** Construct/ install pit latrines for both genders clearly labelled	Construction	REREC, construction, O&M Contractor	Presence of separate and clean washrooms for both the gents and ladies	Quarterly	300,000.00
Solid Waste Generation	1. Provide waste handling facilities such as labeled waste bins 2. Emphasis on prudent waste generation and give priority to reduction at source 3. Solid waste management awareness to operators 4. Operator to contract a NEMA licensed waste	Operation	KPLC construction, O&M Contractor	Presence of well-maintained receptacles and centralized collection points	Quarterly	50,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	handler to collect and dispose solid waste					
Liquid Waste/Oils Generation	*1.* Proper storage of the oil is required to ensure no leakages 2. Frequent inspection and maintenance of the generator to minimize leakages. 3. No vehicles should be serviced or maintained at the Mini-grid area. 4. The waste oil or used oil must be disposed-off appropriately. 5. Proper training for the handling and use of fuels for the operators of the Mini-grid. *6.* In the event of accidental leaks, contaminated top soil should be scooped and disposed of appropriately.	Operation	KPLC construction, O&M Contractor	-Engine maintenance records -Oil spill containment plan	Quarterly	200,000.00
Increased oil Consumption	1. Efficient energy consumption	Operation	KPLC construction, O&M Contractor	Energy consumption records	Quarterly	No additional cost

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	2. Install an energy-efficient lighting system					
Increased storm water flow	1. Construct the drainage system in a way to follow natural drain of the water 2. Concrete only the required area and leave the rest of the land with vegetation like grass 3. Construct rain water harvesting system on the control buildings/office and harness into storage tanks for use	Operation	KPLC construction, O&M Contractor	Provision of a drainage system and a rain water harvesting system	Quarterly inspections	200,000.00
Fire Outbreaks	1. The power plant must contain firefighting equipment (Portable fire extinguishers) of recommended standards and in key strategic points	Operation	KPLC construction, O&M Contractor	-Provision of serviced fire equipment, evacuation plan and safety signages -Records of fire safety training	Quarterly	50,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	2. Detection/alarm systems that can detect fire should be and installed 3. A fire evacuation plan should be prepared and posted at strategic points and should include procedures to take when a fire is reported. 4. Workers especially operators of the plant must be trained on fire management 5. 'No smoking' signs shall be posted within the Mini-grid area 6. A fire Assembly point should be identified and marked					
Visual Impacts	1. Fence round the solar Mini-grid to keep off/screen the solar panels.	Operation	KPLC construction, O&M Contractor	Presence of a perimeter fence	Quarterly inspections	No additional cost
Water demand	1. Ensure prudent use of water. 2. Install water-conserving automatic taps.	Operation	KPLC construction, O&M Contractor	Water usage records	Quarterly	20,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	3. Any water leaks through damaged pipes and faulty taps should be fixed promptly.					
Sanitary waste	1. Provide sanitary waste facilities for both genders clearly marked 2. Disposal of waste through septic tanks	Operation	KPLC construction, O&M Contractor	Presence of separate and clean washrooms for both the gents and ladies	Quarterly	No additional cost
Flooding	1. Ensure drainage channels are free of any obstruction at all times i.e., not blocked 2. Construct more channels and or expand existing ones 3. Raise foundations of the solar panels and ensure a proper and from concrete base 4. Create flooding diversions and or spill ways to divert water from getting into the solar power facility	Operation	KPLC construction, O&M Contractor	-Provision of drainage system -Raised foundations for the structures	Quarterly	100,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
Occupation health and Safety	1. Ensure only qualified staff are employed to work in the facility 2. All workers operating the Mini-grid must be equipped with appropriate and adequate person protective equipment (PPE) such as; safety footwear, helmet among others. 3. Operators must be skilled on firefighting management 4. Annual environmental audits should be done 5. WIBA cover for staff is mandatory	Operation	KPLC construction, O&M Contractor	-Provision of PPEs and WIBA cover -Environmental audit reports	Quarterly	100,000.00
Hazardous waste-damaged panels	1. Segregation from other waste streams 2. Proper disposal through a NEMA approved/licensed handler	Operation	KPLC construction, O&M Contractor	Presence of well-maintained receptacles and centralized collection	Quarterly	200,000.00
Noise and Vibration	1. Generator room should be sound proof to ensure no noise of a nuisance level will be produced.	Operation	KPLC construction, O&M Contractor	Noise levels-Records of noise measurements done by contractor within the project area and	Quarterly	Part of contractor's cost

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	2. Monitor noise levels			at distances of 30m from the Solar mini-grid		
Shocks and electrocutions	1. Inspect the wiring of the houses before connecting power 2. Safety awareness campaigns to the community before connection of power on safety precautions such as: ○ Require community to engage a certified technician to do wiring in the premises ○ Use of quality materials while wiring ○ Refraining from individual illegal extensions of power lines to other houses ○ Observing safety measures while using electricity such as not touching sockets and switches with wet hands or wiping with wet cloths ○ Keeping off all electricity infrastructure e.g., not tying livestock on	Operation	KPLC construction, O&M Contractor	-Records of awareness sessions conducted -Incidences report	Quarterly	No additional cost

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	electric poles, no cutting earth wires that run along some electric poles, not interfering with sockets or switches ○ Reporting any electric wire/conductors if found fallen on the ground ○ Report any incident regarding electricity at the local office –staff in charge of operating the Mini-grid					
Community Safety- Access to site by general public	1. Fencing off the facility to keep of community members, children and livestock from entering into the facility 2. Controlled access to the site only with prior approval	Operation	KPLC construction, O&M Contractor	Presence of a controlled access and records of every person accessing the site	Daily	Part of contractor's cost

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	3. Maintain records of any person who comes to site					
Risks related to poor or inadequate stakeholder engagement (Conflict)	1. Employ from the community to the extent possible 2. Engage the community members and other stakeholders in a timely manner 3. Work closely with the GRM committee members in solving the conflicts 4. Solve all conflicts/grievances at the earliest time possible 5. Ensure all grievances are logged and closed 6. Monitoring the pattern of grievances to come up will long term measures	Operation	KPLC construction, O&M Contractor	Grievance records	Quarterly	20,000.00
Gender Based Violence –SEA and SH	To manage GBV risks, the contractor will prepare a SEA/SH Prevention and Response Action Plan that will	Operation	KPLC construction, O&M Contractor	-SEA/SH Prevention and Response Action Plan	Quarterly	20,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	include a GRM that ensures confidentiality. The plan will include the necessary measures for prevention and response and must ensure survivor-based approach			-Grievance records		
Public Health Impacts – HIV/AIDs	1. Sensitize workers and the community on prevention and mitigation of HIV/AIDS and other sexually transmitted diseases, through staff awareness and awareness campaigns for the community 2. Provision of condoms to workers 3. Allowing migrant workers time to be with their families	Operation	KPLC construction, O&M Contractor	Number of awareness creation sessions conducted. -Availability of and distribution of condoms		20,000.00
Public health Impacts -Covid 19 disease	1. Social distance must be observed 2. Provision of hand wash facilities before access 3. Temperature check and monitoring of the temperature of workers	Operation	KPLC construction, O&M Contractor	Availability of hand washing facilities Utilization of hand washing facilities Number of Covid-19 cases reported	Quarterly	30,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
	and any other person coming to site 4. Enforce wearing of masks 5. Make provision for testing and treating especially of workers 6. Provision of contact numbers for the nearest health facility for testing and treatment 7. Adhering to any other measures from the ministry of health which may be issued from time to time					

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
Dust Emission	**1.** Trees can be planted around the plant/facility provided they do not cast shadows to the solar panels to act as wind breakers and hence decrease dust pollution 2. Ensure planting of grass around and within the facility compound	Operation	KPLC construction, O&M Contractor	Visual inspection	Quarterly	50,000.00
Vehicle Exhaust Emissions	1. Drivers of the vehicles must be sensitized so that they do not leave vehicles idling so that exhaust emissions are lowered. 2. Company vehicles should be well maintained	Operation	KPLC construction, O&M Contractor	Engine maintenance records	Quarterly	No additional cost

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
Noise and Vibration	1. Install portable barriers to shield compressors and other small stationary equipment where necessary. 2. Use quiet equipment (i.e., equipment designed with noise control elements). 3. Co-ordinate with relevant agencies in case the noise produced will require a license. 4. Limit pickup trucks and other small equipment to a minimum idling time and observe a common-sense approach to vehicle use and encourage workers to shut off vehicle engines whenever possible. 5. Demolish mainly during the day when most of the neighbors are out working.	Decommissioning	KPLC construction, O&M Contractor	Noise levels-Records of noise measurements done by contractor within the project area and at distances of 30m from the Solar mini-grid	Once off	20,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
Solid Waste Generation	1. Demolition contractor to adhere to the various manufacturer's guidelines and requirements regarding demolition and disposal 2. Segregation of waste in order to separate hazardous waste from nonhazardous waste and other streams of waste 3. Provision of facilities for proper handling and storage of demolition materials to reduce the amount of waste caused by damage or exposure to the elements 4. Adequate collection and storage of waste on site 5. Safe transportation to the disposal sites / designated area 6. Hazardous waste must be disposed by NEMA approved waste handler	Decommissioning	KPLC construction, O&M Contractor	Presence of well-maintained receptacles and centralized collection points	Daily	700,000.00

Potential Impacts	Recommended Mitigation Measures	Project phase	Responsibility	Monitoring Indicator	Frequency	Estimated Cost (Ksh)
Dust Emissions	1. Cover all trucks hauling soil, sand and other loose materials or require all trucks to maintain at least two feet of freeboard	Decommissioning	KPLC construction, O&M Contractor	Visual inspection	Daily	20,000.00
Public Health-HIV/AIDS	The project will sensitize workers and the surrounding communities on prevention and mitigation of HIV/AIDS and other sexually transmitted diseases, through staff training and awareness campaigns/ to the community.	Decommissioning	KPLC construction, O&M Contractor	Records of awareness creation sessions conducted. -Availability of and distribution of condoms	Once off	20,000.00
	Total					4,380,000.00

8.5 APPROACH TO ENVIRONMENTAL IMPACT MANAGEMENT

The proposed ESMP will be the responsibility of KPLC and the contractor as outlined. This section presents the range of approaches that will be used to manage potential impacts of the proposed project.

8.5.1 Roles and Responsibilities of proponent, supervision consultant, contractor and EHS officer

Duties of the Proponent

It will be the duty of the proponent to ensure that all legal requirements as pertaining to the development are met as specified by the law, including World Bank Safeguards and specifically OP4.01 (Environmental Assessment).

- The proponent shall hand over the site to the contractor for implementation of the project after the social and environmental mitigation measures that are the responsibility of the proponent has been completed.
- KPLC will supervise construction works through a supervision consultant
- Monitoring of the technical aspects will also be done by the KPLC appointed engineer while monitoring of the ESMP will be done by the safeguards team
- The proponent is also the one to fund the project
- The proponent will ensure that the ESIA is submitted to NEMA and a license is obtained.
- The proponent is also the one who has initiated the project and will also ensure its satisfactory implementation

Duties of the supervising consultant

- The consultant must appoint an ESHS officer who will be reporting on the ESMP implementation
- The consultant ESHS officer be required to generate various reports including production of minutes of monthly site visits and quarterly supervision reports detailing environmental, health, social and safety compliance on quarterly basis.
- Reporting on the ESMP will be done on regular basis and will be captured in the construction site log, periodical E&S reviews with the Engineer

Duties of the Contractor

- Implementation of the contractor related aspects of the ESMP and regularly reporting back to the Project proponent.
- The contractor on his part will have to appoint EHS officer to coordinate ESMP implementation during construction period. The contractor will also have to appoint a social specialist /CLO to handle the social risks and impacts that will come during the construction period and also to oversee the c-ESMP implementation.
- The contractor to engage a Community Liaison Officer to act as the link between the community and the contractor and support the Social Specialist.

- The contractor to prepare and implement the c-ESMP informed by the proponent's ESMP
- Maintaining the required level of stakeholder engagement and communication, including providing project schedule information to the public, accepting and resolving public grievances, advertising and hiring local workers.
- Maintain a working grievance redress mechanism.
- Ensure that the project has children protection champions.
- Prepare and maintain an approved Time and Progress chart, showing clearly the period allowed for each section of the work
- The contractor is to comply with all regulations and by-laws of the local Authority including serving of notices and paying of the fees.
- The proponent shall define the area of the site, which may be occupied by the contractor for use as storage, on the site
- The contractor shall refer to ESIA recommendations and the ESMP when preparing the contractors- ESMP.
- The contractor shall provide water required for use in connection with the works including the work of subcontractors, and shall provide temporary storage tanks, if required
- The contractor shall make his own arrangements for sanitary conveniences for his workmen. Any arrangements so made shall be in conformity with the public health requirements for such facilities and the contractor shall be solely liable for any infringement of the requirements.
- The contractor shall be responsible for all the actions of any subcontractors in the first instance.
- The contractor shall take all possible precautions to prevent nuisance, inconvenience or injury to the neighbouring properties and to the public generally, and shall use proper precaution to ensure the safety of wheeled traffic and pedestrian.
- All work operations which may generate noise, dust, vibrations, or any other discomfort to the workers and/or guest of the client and the neighbours must be undertaken with care, with all necessary safety precautions taken.
- The contractor shall take all effort to muffle the noises from his tools, equipment and workmen to not more than 75dBA (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009
- The contractor shall upon completion of working, remove and clear away all plant, rubbish and unused materials and shall leave the whole site in a clean and tidy state to the satisfaction of the Proponent. He shall also remove from the site all rubbish and dirt as it is produced to maintain the tidiness of the premises and its immediate environs.
- No shrubs, trees, bushes or underground thicket shall be removed except with the express approval of the proponent.

- Borrow pits will only be allowed to be opened up on receipt of permission from the proponent
- The standard of workmanship shall not be inferior to the Kenya Bureau of Standards where existing. No materials for use in the permanent incorporation into the works shall be used for any temporary works or purpose other than that for which it is provided. Similarly, no material for temporary support may be used for permanent incorporation into the works.
- Disposing of the waste generated during construction activities in accordance to the ESMP.

NOTE:

- All the subcontracted companies should subscribe to the main Contractor's EHS Policies and guidelines.
- The subcontractor should manage all E&S related risks while at the project area (on and off site)
- The Contractor must supervise the subcontractor at the project area.
- The subcontractors should provide their EHS policies, staff training certificates, plant inspection reports, methods statements etc to the main contractor for approval
- The subcontractor should develop and implement relevant Environmental and social management plans for use while on site.

Duties of EHS officer

- The EHS officer will report on ESMP implementation during construction period.
- The aspect to be reported by the contractor will include*;*
- Safety issues i.e. hours worked, recordable incidents and corresponding Root Cause Analysis (lost time incidents, medical treatment cases), first aid cases, high potential near misses, and remedial and preventive activities required (for example, revised job safety analysis, new or different equipment, skills training etc); Environmental incidents and near misses; noncompliance incidents with permits and national law; Training on E&S issues (dates, number of trainees, and topics); Details of any security risks; Worker & External stakeholder grievances and E&S inspections and audits by contractor, engineer, or others, including authorities.

Environmental and Social concerns need to be part of the planning and development process and not an afterthought, it is therefore advisable to avoid land use conflicts with the surrounding area. To avoid unnecessary conflicts that retard development in the project area, the proponent undertook this ESIA and incorporated environmental and social concerns as advised by the Authority. Finally, a comprehensive Environmental and Social Management and Monitoring Plan (ESMMP) has been prepared and will guide in mitigation measures.

Duties of Social Specialist

- Facilitate the investigation, verification and timely closure of complaints in consultation with GRC.
- Deal with all social issues arising from the communities during and post construction and other stakeholder matters
- Review sub-contracts and ensures social provisions are incorporated

- Collect data and information on social issues
- Establish linkages with Contractor/stakeholders on social matters
- Supervise implementation of various social management plans
- Assess the level of awareness on major social issues affecting the community as a result of KOSAP project
- Facilitate Gender Mainstreaming in the projects;

8.6 MANAGEMENT PLAN DURING CONSTRUCTION PHASE

The contractor will prepare targeted management plans to deal with specific environmental and social aspects guided by the ESMP and any other emerging issues on the ground. The following management plans will be prepared and implemented during construction phase of the proposed project:

- Construction management plan
- Labour and human resources plan
- Workplace health and safety plan
- Community safety plan
- Emergency management and response plan
- Rehabilitation and site closure management plan
- Sexual Exploitation and Abuse and Sexual Harassment Prevention and Response Action Plan
- Labor Influx Management Plan
- Local Recruitment Plan
- Stakeholder Engagement plan
- Grievance Redress Mechanism

NOTE:
Stakeholder Engagement Plan; Grievances Redress Mechanism; Sexual Exploitation and Abuse and Sexual Harassment Prevention and Response Action Plan will be implemented throughout the project cycle.

8.6.1 Construction Management Plan

The construction management plan for the proposed project shall include the following:

Management of fuels and other hazardous materials

- The Contractor shall comply with all applicable laws, regulations, permit and approval conditions and requirements relevant to the storage, use, and proper disposal of hazardous materials.

Management of the construction site

- The contractor shall prevent littering and the random discard of any solid waste on or around the construction site
- The contractor shall manage other solid and liquid waste

Fire Prevention and management

- The Contractor shall take all necessary precautions to prevent fires caused either deliberately or accidentally during construction process.
- The Contractor shall prepare a fire prevention and fire emergency plan as a part of the plans to be submitted to KPLC.

Management of air quality

- The Contractor shall institute appropriate measures e.g sprinkling water on ground before any excavation works to minimize or avoid air quality impacts.

Neighboring land owner and occupier relations

- The Contractor shall respect the property and rights of neighboring landowners and occupiers at all times and shall treat all persons with deliberate courtesy.
- The contractor shall respect any special agreements between the proponent and the neighbors e.g. the wayleaves agreements signed between Kenya power and landowners will need to be respected by the contractors.

Complaints register

The contractor shall establish and maintain a register for periodic review by the proponent that logs all the complaints raised by the neighbors or the general public about construction activities. The register shall be regularly updated, and records maintained including the name of the complainant, his/her domicile and contact details, the nature of the complaint and any action taken to rectify the problem.

Construction Control

The construction control for the proposed project shall cover the following:

Control of access

The contractor shall ensure that the construction site is accessed by authorized persons only and uptodate records kept

Control of material supply and burrow areas

- The contractor shall, as far as possible, source all material needed to construct the proposed project from the licensed quarries
- In instances where materials are to be obtained from a new burrow area; the contractor shall comply with relevant legislations.
- The contractor shall prepare a method statement including plans, detailing the expected quantity of excavation, temporary and permanent drainage control, the final contouring of the burrow pit and the proposed method of rehabilitation.

8.6.2 Rehabilitation and site closure plan

- After completion of construction activities, the contractor shall clear the site of construction materials and dispose wastes in appropriate disposal sites.

  The contractor shall remove all temporary works on the construction site and grow grass on areas that are not covered by the installations to control erosion

8.6.3 **Local Recruitment Plan**

The contractor will prepare a local recruitment plan to guide on recruitment of locals. The plan shall pay attention or adhere to Employment Act.
In designing the labour recruitment plan contractor shall:

- Comply with the provisions of Employment Act, 2007

  Wherever possible, give priority to qualified local people when hiring employees.

8.6.4 Workplace Health and Safety Plan

The workplace health and safety plan to be implemented by the contractor and KPLC shall include the following key measures:

- The contractor shall comply with all relevant legislative requirements governing worker health and safety at the work place (e.g. OSHA 2007 and its subsidiary legislations i.e. First Aid Rules, 1977; Fire Risk Reduction Rules, 2007; Noise Prevention and Control Rules, 2005 and Hazardous Substances Rules, 2007 among others).
  - The contractor shall prepare and implement measures to minimize diseases likely to be contracted by the construction workers as a result of the proposed project such as HIV &AIDs and other communicable diseases
  - The contractor shall have obligations of managing the safety of its employees by;
    - Provision of appropriate PPEs to employee
    - Training employees on competence
    - Employing competence and qualified staff
    - Provision of First Aid Kits onsite
    - Should have a trained first aider
    - Document and create awareness on safe work procedures and work instruction
  - The contractor will manage accidents by having an emergence response plan which will include contacts for emergency service providers e.g. ambulances, fire brigade and nearest hospitals
  - Health and safety performance will be continuously monitored, and procedures reviewed with the aim of eliminating risk as far as reasonably practicable.

8.6.5 Community health and safety plan

The community health and safety plan to be implemented by the contractor shall include:

- Adherence to OSHA 2007 Act and its subsidiary legislations i.e. Fire Risk Reduction Rules, 2007; Noise Prevention and Control Rules, 2005 and Electrical Power Special Rules, 1979 to ensure that health and safety of immediate neighbors and the public is not threatenedThe contractor to ensure that construction work is undertaken in manner not likely pose risks to community health and safety.
- The contractor shall undertake an independent risk assessment prior to construction. The findings of this assessment will inform the development of a community safety plan and create awareness to the community on the same

8.6.6 Emergency Preparedness Plan

The Contractor shall develop an emergency plan that will enable rapid and effective response to all types of environmental emergencies and cases of ill health in accordance with recognized national and international standards.

The emergency plan shall include establishment of a network of communication between the Contractor and emergency services including police, ambulance services, and fire brigades among others.

8.6.7 SEA/SH Prevention and Response Action Plan

The contractor will prepare a SEA/SH Prevention and Response Action Plan that will include a GRM that ensures confidentiality. The plan should have an Accountability and Response Framework. The plan will include the necessary measures for prevention and response of GBV impacts.

The mitigation measures shall include:

- Ensure that local employment opportunities are equitably accessible to all segments of the community,
- Ensure equal pay for equal work
- Prepare and implement GBV (SEA/SH management plan that includes sensitisation of community members and subproject workers on the potential of the subproject giving rise to, exacerbating and/or mitigating SEA and SH, and the appropriate mitigation measures
- Map all GBV service providers and document referral services for survivors, and, sensitize community members and subproject workers on the referral pathways.
- Prepare and implementing a functional and accessible contractor GBV GRM for use by workers and community members (as appropriate).
- The GBV GRM should allow for anonymous incident reporting and should be GBV survivor-centric
- Sensitize community members and workers on contractor GRMs

  Prepare and sensitise Code of Conduct (CoC) for SEA and SH, and their responsibilities for the same, to demystify the stigma associated with SEA and SH

8.6.8 Grievance Redress mechanism

One of the key roles of the Grievance Redress Committees, will be to address disputes led by the administrative chiefs. All PAPs will be informed how to register grievances or complaints, including specific concerns about land and environment. The PAPs will be informed about the dispute resolution process, specifically about how the disputes will be resolved in an impartial and timely manner.

The Land Acquisition Tribunal has the jurisdiction to hear and determine appeals from the decision of the NLC on the process of compulsory land acquisition of land. However, if a party is dissatisfied by the decision of the tribunal, they may appeal to the Environment and Land Court. The court will deal with land related disputes. However, the Land Act 2012 and Environment and Land Court Act 2011 advocates for Alternative Dispute Resolution (ADR) methods in tackling land related disputes. ADR approaches will be given preference and based on customary rules, arbitration, or third-party mediation. ADR will be promoted or defended as a resolution to disputes related to land. The affected persons and other stakeholders also have

a right to access the World Bank Redress Service (GRS) and the World Bank Inspection Panel at no cost.

Grievance Redress Principles

The principles of grievance mechanism management that need to be observed include;

- All complaints and grievances are resolved as quickly as possible.
- That the resolution of complaints and grievances should be at the lowest possible level for resolution.
- All complaints that can be resolved, should be resolved immediately on the site. The focus of the GRM is to resolve issues in a customarily appropriate fashion at community level and record details of the complaint, the complainant and the resolution.

Grievance Redress Committee Capacity Building

A grievance redress mechanism and a committee were established in a culturally appropriate manner in consultation with the community during the consultations for ESIA and will be utilized post ESIA. The GRM committee will have the following roles; log the grievances, maintain records of the GRC meetings and grievances, resolve the grievances to the extent possible.

Grievance Procedures

a) *Registration* - Community members can inform the contractor about concerns directly and if necessary, through third parties. Once a complaint has been received, it will be recorded in a complaints log or data system. The log will be kept in hardcopy or electronic form. All reported grievances will be categorized, assigned priority, and routed as appropriate.

Grievance Log

The grievance logbook will ensure that each complaint has an individual reference number, and is appropriately tracked and recorded actions are completed. The information to be recorded will include:

- Name, age, gender of complainant;
- Date the complaint was reported;
- Date the grievance logged;
- Action taken;
- Date information on proposed corrective action sent to complainant (if appropriate);
- The date the complaint was closed; and
- Date response was sent to complainant.

b) *Sorting and Processing* - This step determines whether a complaint is eligible for the grievance mechanism and its seriousness and complexity. The complaint will be screened however this will not involve judging the substantive merit of the complaint.

The following guide will be used to determine whether a complaint is eligible or not:

Eligible complaints may include those where:

- The complaint pertains to the mini-grid project.
- The issues raised in the complaint fall within the scope of issues the grievance mechanism is authorized to address.

Ineligible complaints may include those where:

- The complaint is clearly not mini-grid project -related.

- The nature of the issue is outside the mandate of the grievance mechanism.
- The complainant has no standing to file.
- Other project or organizational procedures are more appropriate to address the issue.
- Closing Out and Escalation: Project-related grievances will be addressed and closed out as appropriate. The GRM will provide a channel for escalation e.g., through legal redress.

The proponent KPLC will monitor the activities of the stakeholder engagement and grievance management activities.
The three tiers if the GRM are as described below:

8.6.8.1 National Grievances Redress Committee (NGRC)

NGRC has been established at the National level to ensure participatory and transparent implementation of the project. The NGRC will help the project carry out its mandate efficiently-particularly ensuring effective and amicable settling of disputes among the communities/PAP's.
Members to **NGRC** include representation from the following agencies and entities

1. Representative from the Ministry, chair of the Committee
2. Representative from NLC to handle matters that involve land take
3. Representative of the Implementing Agencies (IA)-KP and REREC
4. Representative from the Ministry's Legal office to guide on Alternative Dispute Resolution methods
5. Representative from the County Grievance Redress Committee-depending on the matter at hand; Land or Environment
6. Representative from Gender and Social Development Office who will be responsible for ensuring gender issues are well addressed.
7. Representative from NEMA to handle environmental issues
8. County Surveyor/Physical planner from the county Lands office
9. Project Affected Person's-to represent the matter before the committee

Functions of the National Grievances Redress Committee

a) Ensuring effective flow of information between PAPs, the implementing agency and the County Grievance Redress committee on matters brought before the committee
b) Co-ordinate County Grievance Redress Committees (CGRC)
c) Co-ordinate activities between the various organizations involved; facilitate grievance and conflict resolution at the highest level
d) Resolving disputes that may arise within the project. If it is unable to resolve any such problems, the PAP's can seek legal redress.

8.6.8.2 County Grievance Redress Committees (CGRC)

CGRC has been established at the county level to ensure participatory and transparent implementation of the project. The CGRC will help the project carry out its mandate efficiently-particularly ensuring effective communication with the communities.

Members to **CGRC** will include representation from the following agencies and entities

1. Representative of NLC, to grant legitimacy to the acquisition process and ensure that legal

procedures as outlined in Land Act 2012

2. Representative of the implementing agency
3. Representative of NEMA to handle environmental issues
4. The County Administration representative, which will provide the much-needed community mobilization, and support to the sub-project.
5. County Land Survey Officer will survey all affected land and produce maps.
6. The County Gender and Social Development Officer who will be responsible for ensuring gender programs are adhered to.
7. The County Lands Registrar will verify all affected land and validate the same.
8. Two PAP representatives from Location Grievance Resettlement Committee – act as voice for the PAPs
9. NGOs and CBOs locally active in relevant fields

The CGRC will have the following **specific responsibilities:**

a) Ensuring effective flow of information between PAPs and the implementing agency
b) Coordinate Locational Grievance Redress Committees (LGRC)
c) Coordinate activities between the various organizations involved; facilitate grievance and conflict resolution; and provide support and assistance to vulnerable groups.
d) Conducting extensive public awareness and consultations with the affected people so that they can air their concerns, interests, and grievances.
e) Resolving disputes that may arise within the project. If it is unable to resolve any such problems, channel it to the National Grievance Redress committee before utilizing the appropriate formal grievance procedures.

8.6.8.3 Locational Grievance Redress Committee (LGRC)

Since counties are large, further decentralized Grievance Redress Committee will be formed at the location of the sub-project. Subsequently, Locational Grievance Redress Committees (LGRC's), based at each location of a sub-projects, will be established. The LGRC's will be constituted by implementing agencies and representatives of CGRCs through consultation with the PAPs and will act as the voice of the PAPs.

The LGRCs will work under guidance and coordination of CGRC and the implementing agencies. Their membership will comprise of the following:

1. The locational Chief, who is the Government administrative representative at the locational unit and who deals with community disputes will represent the Government in LGRC
2. Assistant Chiefs, who supports the locational Chief and Government in managing local community disputes in village units will form membership of the team.
3. Female PAP, elected by women PAPs, will represent women and children related issues regarding the project
4. Youth representative, elected by youths, will represent youth related concerns in the LGRCs
5. Male representatives elected by the members of the PAPs

6. Vulnerable persons representative will deal and represent vulnerable persons issues in the LGRCs.
7. CBO representatives

Membership of LGRCs will be elected by each category of PAPs except the locational Chief and assistant chiefs who will be automatic members of the team by virtue of their positions. Each of LGRCs will elect their own chairperson and a secretary among themselves.

The roles of LRCCs will include among others the following:

a) Conducting extensive public awareness and consultations with the affected people.
b) Help ensure that local concerns raised by PAPs as regards to the project are promptly addressed by relevant authorities.
c) Resolve manageable disputes that may arise relating to the project. If it is unable to resolve/help refer such grievances to the CGRCs instituted.
d) Ensure that the concerns of vulnerable persons such as the disabled, widowed women, orphaned children affected by the sub project are addressed.
e) Assist the community in recording grievances, including helping those who cannot write or read.
f) Help the vulnerable groups access project benefits
g) Ensure that all the PAPs in their locality are informed about the project

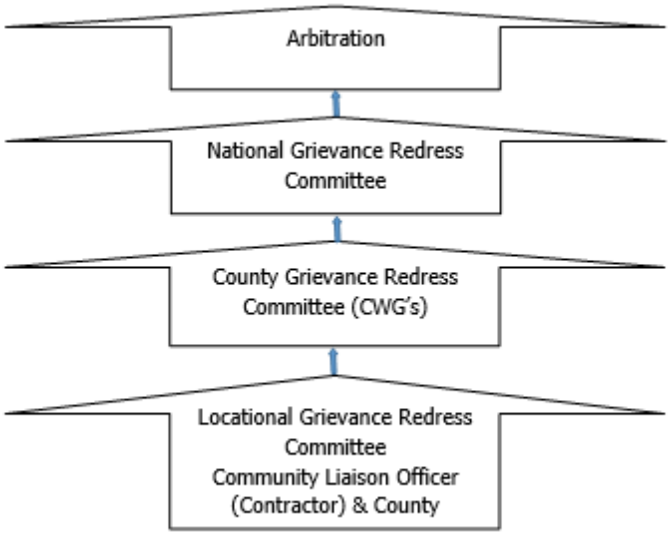

Figure 8: KOSAP Grievance Redress Mechanism

It should be noted that if complainants are not satisfied with the grievance process, even after arbitration they have the right to present their complaint through the court system.

It is expected that most disputes will be resolved at the lowest level-Locational Grievance Redress Committee and since most disputes arise during the Construction and operation period

the contractor's Environmental and Social Safeguard team specifically the Community Liaison Officer will work closely with the community to be able to resolve disputes.

Responsibilities of the Community Liaison Officer include:

- Monitor day to day Implementation of the Project
- Address grievances as they arise on the project
- A member of the Locational and County Grievances Redress Management Committee to respond on issues that may have been brought to the attention of the committee before escalating to the National Grievance Redress Committee
- Escalate grievances internally to get a lasting solution

8.6.8.4 World Bank Grievances Redress Mechanism

The World Bank has established 2 grievance redress mechanisms that provide avenues for individuals and communities to submit complaints directly if there is belief that they have been, or are likely to be, adversely affected by a World Bank-funded project. In this project PAPs and other stakeholders have the right to know and access at no cost these GRMs as described below.

1. **World Bank Grievances Redress Service**

The Grievance Redress Service (GRS) is an avenue for individuals and communities to submit complaints directly to the World Bank if they believe that a World Bank-supported project has or is likely to have adverse effects on them, their community, or their environment. The GRS enhances the World Bank's responsiveness and accountability to project-affected communities by ensuring that grievances are promptly reviewed and addressed. Complaints must be in writing and addressed to the GRS and sent through the following methods namely:
Those aggrieved or their representatives can report their complaints through the following mediums; (i) Online by accessing the online form; (ii) Sending an Email to grievance@worldbank.org; or (iii) Submitting a letter to the World Bank Headquarters in Washington D.C., United States or World Bank Kenya County Office.

2. **World Bank Inspection Panel**

The Inspection Panel is an independent complaints mechanism for people and communities who believe that they have been, or are likely to be, adversely affected by a World Bank-funded project. The Panel is an impartial fact-finding body, independent from the World Bank management and staff, reporting directly to the Board. The Inspection Panel process aims to promote accountability at the World Bank, give affected people a greater voice in activities supported by the World Bank that affect their rights and interests, and foster redress when warranted. In September 2020, the Board updated the resolution that created the Panel and added to the Panel functions. At the same time, the Board approved a resolution establishing the World Bank Accountability Mechanism (AM). The new AM began operations in early 2021 and houses the Panel to carry out compliance reviews and a new Dispute Resolution Service (DRS), which will give complainants another way to have their concerns addressed. Contacts for registration of complaints to the IP are; (i) Tel: +1 202 458 5200: and (ii) Email: ipanel@worldbank.org.

8.6.8.5 Government Management of Land Acquisition Disputes

The Environment and Land Court, established under the Environment and Land Court Act 2011, is a superior court (with offices across the country) that hears and determines disputes relating

to land and the environment. Likewise, the Land Acquisition Tribunal established under the Land Act 2012; (PART VIIIA 133A) has jurisdiction to hear and determine appeals from the decision of the NLC on the process of compulsory acquisition of land. Therefore, in the first instance, such appeals are referred to the Tribunal. However, a party dissatisfied with the decision of the Tribunal may appeal to the Environment and Land Court on a question of law only. The regulations to set the Land Acquisition Tribunal established under the Land Value (Amendment) Act of 2019 are underway. Besides, the Judicial Service Commission will chair the Land Acquisition Tribunal once operational.

8.6.9 Labor Influx Management Plan

The purpose of this plan is to provide a clear set of actions and responsibilities for the control of impacts linked to in-migration within the Project's area of influence. This plan will be regularly reviewed and updated to reflect revised Project design, socio-economic changes and learning experienced during its implementation.

The objectives of this plan are as follows:

- Monitor the scale of project induced in-migration into the project area and specific in-migration 'hotspots';
- Support local government and communities to manage both internal and external immigration into the project area; and
- Mitigate and manage any negative impacts and enhance and promote any positive impact related to labor influx.

The plan shall consider these measures:

❖ Prepare and Implement a Labour Management Plan (LMP) with policies and measures for ensuring that:

- Subproject managers and workers are sensitised on:
  - ✓ County/National Labour laws
  - ✓ County/National Child Labour laws
  - ✓ National/International Forced Labour laws
- Enforce:
  - ✓ The Code of conduct
  - ✓ County/National Labour laws
  - ✓ County/National Child Labour laws
  - ✓ National/International Forced Labour laws

8.6.10 Rehabilitation and Decommissioning Management Plan

The rehabilitation and decommissioning management plan include the following:

8.6.10.1 Planning for Closure

a) The implementing agency shall investigate practical options for closure of the facility at least one year before decommissioning and submit a report to relevant authorities NEMA included.

b) The KPLC shall develop rehabilitation and decommissioning plan in conjunction with relevant stakeholders at least one year before the end of facility's operations.

c) The KPLC shall explore options of re-use and recycling of the facility's components/structures.

8.6.10.2 Decommissioning

a) The KPLC shall take into consideration the health and safety of personnel, contractors, neighbors and the public during the planning and implementation of the demolition process.
b) The KPLC shall undertake a further survey to identify any contaminated areas and remediate them accordingly.

8.6.10.3 Post Closure

The KPLC shall ensure that the facility's site is free of impacts associated with the closure and demolition

The KPLC shall develop, rollout and implement a monitoring plan that includes:

a) Monitoring of the rehabilitated site to confirm whether progress is satisfactory.
b) Outline of how land improvement and future land use will be affected by the past operations and decommissioning of the associated infrastructure.

8.7 INSTITUTIONAL IMPLEMENTATION ARRANGEMENTS FOR THE PROPOSED PROJECT

This section presents roles and responsibilities of proponent, implementing agency, supervision consultant and contractor. The project is jointly implemented by the Ministry of Energy and Kenya Power. Specific roles are presented below;

8.7.1 Proponent -Ministry of Energy and Petroleum (MoEP)

The MoEP will provide overall coordination and oversight of the project. MOE will be responsible for overall responsibility for safeguards due diligence, and compliance monitoring. The MOE will also provide funding for the project planning and implementation.

8.7.2 KOSAP Project Implementation Unit

The MOE has already put in place a Project Implementation Unit (PIU) to guide implementation of the project. The PIU is already implementing the project. In the PIU Environmental and Social issues are spearheaded by an Environmental and Social Safeguards Expert whose role is to coordinate and oversee implementation of safeguards. The PIU reports to the MOE.

8.7.3 The Implementing Agency (KPLC)

KPLC will be responsible for implementation and operation of the project on behalf of the MOE. Some of the key responsibilities include but not limited to are;

- KPLC will supervise construction works through a supervision consultant and also directly
- Monitoring the progress of the project in terms of the safeguards and technical aspects.
- Monitoring of the ESMMP implementation
- Ensuring the project is on course in terms of timelines

Note: *The Solar Mini-grid will be installed operated and maintained by the contractor for the first seven years and then handed over to KPLC engineers and operators. So, for the seven years KPLC will be monitoring the operations of the contractor.*

8.7.4 County Government of Turkana

The County government is a key stakeholder. The roles of the county government include giving relevant approvals needed, assisting is process of allocating land for Mini-grid, solving grievances that cannot be sorted at project level, monitoring progress of the project among others.

8.7.5 National Environmental Management Authority

This authority is responsible for approval of ESIA report and licensing and is free to check progress of implementation of ESMMP

8.7.6 Roles and Responsibilities of the Supervising Consultant

- The consultant must appoint an ESHS officer who will be reporting on the ESMMP implementation supervision
- The consultant ESHS officer be required to generate various reports including production of minutes of monthly site visits and quarterly supervision reports detailing environmental, health, social and safety compliance on quarterly basis amongst other technical aspects
- Reporting on the ESMMP implementation progress and recommendations

8.7.7 Roles and Responsibilities of the Contractor

- Implementation of the contractor related aspects of the ESMMP and regularly (monthly) reporting
- The contractor on his part will have to appoint an EHS officer and a Social Specialist to coordinate and report on the ESMMP implementation respectively.
- The contractor to engage a Community Liaison Officer to act as a link between the community and the contractor and support the Social Specialist.
- The contractor will also have the obligation of managing the E&S risks related to his/her operations.
- Maintaining the required level of stakeholder engagement and communication, including providing project schedule information to the public, accepting and resolving public grievances, advertising and hiring local workers.
- Maintain a working grievance redress mechanism.
- The contractor is to comply with all regulations and by-laws at the county level and other relevant regulations and laws
- The contractor shall refer to ESIA recommendations and the ESMMP when preparing the contractors- ESMMP and the specific plans
- The contractor shall provide water required for use in connection with the works including the work of subcontractors and shall provide temporary storage tanks, if required
- The contractor shall make his own arrangements for sanitary conveniences for his workers. Any arrangements so made shall be in conformity with the public health requirements for such facilities and the contractor shall be solely liable for any infringement of the requirements.
- The contractor shall be responsible for all the actions of any subcontractors whom he subcontracts.
- The contractor shall take all possible precautions to prevent nuisance, inconvenience or injury to the neighboring properties and to the public generally, and shall use proper precaution to ensure the safety of the community

- All work operations which may generate noise, dust, vibrations, or any other discomfort to the workers and/or visitors of the client and the local community must be undertaken with care, with all necessary safety precautions taken.
- The contractor shall take all effort to muffle the noises from his tools, equipment and workmen to not more than 70dBA
- The contractor shall upon completion of working, remove and clear away all plant, rubbish and unused materials and shall leave the whole site in a clean and tidy state to the satisfaction of the Proponent. He shall also remove from the site all waste
- No shrubs, trees, bushes or underground thicket shall be removed except with the express approval of the proponent.
- No blasting shall be permitted without the prior approval of the KPLC and the local authorities.
- Borrow pits will only be allowed to be opened up on receipt of permission from the approving authorities.
- The standard of workmanship shall not be inferior to the Kenya Bureau of Standards where existing. No materials for use in the permanent incorporation into the works shall be used for any temporary works or purpose other than that for which it is provided. Similarly, no material for temporary support may be used for permanent incorporation into the works.
- Disposing of the waste generated during construction activities in accordance to the ESMMP.
- The contractor EHS officer will report on ESMMP implementation during construction period. The aspect to be reported by the contractor will include safety issues i.e. hours worked, recordable incidents and corresponding Root Cause Analysis (lost time incidents, medical treatment cases), first aid cases, incidents and accidents, potential near misses, and remedial and preventive activities required (for example, revised job safety analysis, new or different equipment, skills training etc.); Environmental incidents and near misses; noncompliance incidents with permits and national law; Training on E&S issues (dates, number of trainees, and topics); Details of any security risks; Worker & External stakeholder grievances and E&S inspections by contractor, including any authorities.

Environmental and Social concerns need to be part of the planning and development process and not an afterthought, it is therefore advisable that all the risks and impacts of the project be prevented and mitigated at the earliest opportunity possible to ensure smooth implementation of the project. Finally, a comprehensive Environmental and Social Management and Monitoring Plan (ESMMP) has been prepared and will guide in implementation of mitigation measures.

8.8 MANAGEMENT OF IMPACTS DURING OPERATION PHASE

The operation phase of the proposed project will be mainly power supply, line maintenance and clearing of wayleaves. KPLC will be responsible for all the mitigation measures for negative impacts during the operation phase. This will be done by implemenataion of the the following steps

- Inspections
- Corrective action
- Reporting

8.9 STAKEHOLDER ENGAGEMENT PLAN AND GRIEVANCE MANAGEMENT POST-ESIA

The rationale for this Stakeholder Engagement Plan (SEP) is to ensure that the stakeholders' involvement, participation and commitment in making decision in the project activities is well implemented.

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 in the entire life cycle.

Communication is critical to transmission of clear concise and factually correct information, either through inter-personal communication or communication with a group of persons. Some of the key risks to poor communication for this phase of the project include:

- Reduced community buy-in on critical project needs such as material sources;
- Misinformation on project activities, impacts and outcomes resulting in disagreement and in heightened cases, demonstrations (non-violent and violent) by aggrieved communities;
- Growing opposition to the project and its staff;
- Increased costs and serious delays in project implementation due to stakeholder and community objections to the project.

8.9.1 Principles/Objectives of Stakeholder engagement Plan

I. Principles/Objectives

Stakeholder engagement is usually informed by a set of principles that define core values underpinning interactions with stakeholders. Key principles to guide the Stakeholder Engagement under this Project are:

- Creating an atmosphere for a two-way dialogue that gives all parties an opportunity to exchange views, listen and have the issues satisfactorily addressed;
- Promoting inclusivity through broad participation of the affected persons and interested parties by creating appropriate avenues for stakeholder participation;
- Giving attention to special groups including people with disabilities, the elderly, the youth, women, children and the minority/marginalised groups;
- Encouraging open and meaningful dialogue that respects and upholds community's belief, values and opinions without intimidation, coercion, manipulation and interference;

- Demonstrating commitment through identification, recognition and engagement with all stakeholder timeously in a format and language that is easily understandable;
- Respecting the rights, cultural beliefs, values, traditions, community decision-making processes and interest of all stakeholders;
- Exercising transparency when responding to community concerns in a timely, open, and effective manner;
- Developing a clear mechanism for receiving, documenting and responding to stakeholders' concerns and grievances.

8.9.2 Stakeholder Identification and Mapping

Stakeholders are classified in the following two categories;

- **Project affected Persons**- Stakeholders who have a direct impact on or are directly impacted by the project. This includes individuals, households, businesses, and institutions.

- **Interested parties**- Stakeholders who have an indirect impact or are indirectly impacted by the project. They are parties that will have a concern about the project and hence need to be consulted.

Stakeholder mapping" is a process of examining the relative influence that different individuals and groups have over a project as well as the influence of the project over them. The purpose of stakeholder mapping is to:

- Identify each stakeholder group;
- Study their profile and the nature of the stakes;
- Understand each group's specific issues, concerns as well as expectations from the project
- Gauge their influence on the Project;

The significance of a stakeholder group is categorized considering the magnitude of impact (type, extent, duration, scale and frequency) or degree of influence (power and proximity) of a stakeholder group and urgency/likelihood of the impact/influence associated with the particular stakeholder group in the project context. The magnitude of stakeholder impact/influence is assessed taking the power/responsibility and proximity of the stakeholder group and the group is consequently categorized as negligible, small, medium or large. The urgency or likelihood of the impact on/influence by the stakeholder is assessed in a scale of low, medium and high.

In line with the nature of the project and its setting in Namukuse, the stakeholders have been identified and listed in the table given below;

Stakeholder Groups	Project Affected persons	Interested parties
Community	Local Labourers VMG's Local Community	
Institutions	Faith Based Organisations Education institutions Community Based organisations	
Government Bodies		County Government District and local administration

8.9.3 Approach for Stakeholder Engagement Plan

The first approach to an effective Stakeholder engagement is to determine who the stakeholders are, who will be adversely affected by potential environmental and social impacts of the Project, who are the most vulnerable among the potentially impacted and whether special engagement efforts would be necessary, at which stage of project development stakeholders will be most affected, what are the various interests of project stakeholders, their expectations and what level of influence they might have on the Project, which stakeholders might help to enhance the Project design or reduce Project costs.

Stakeholders have been, and will continue to be, identified. At this stage, stakeholders identified consists primarily of those who have been engaged during the initial phase of the Project, specifically with regard to obtaining the required approvals to commence the feasibility studies and the identification and securing of land for the Project.

8.9.4 Monitoring

Stakeholder engagement monitoring will be a continuous function aimed at providing the Project and relevant stakeholders with regular feedback and clear indicators of the progress or lack thereof in the achievement of intended results. The Project will engage in continuous monitoring throughout the project lifecycle to track actual performance of the Stakeholder Engagement Plan in compliance with the national requirement and World Bank Standards. Namukuse community will be consulted and be involved at all times during the monitoring of this Plan.

Monitoring will be done internally through inspections and performance audits. Key monitoring activities will include collecting and analysing data on stakeholder's engagement activities and recommending corrective measures.

Monitoring will be effected through internal inspections and performance audits. Information of stakeholder engagement activities will be recorded to track progress and establish relevant controls. The Project shall conclude the procedures for participatory monitoring of the SEP based on the intended targets.

8.9.5 Reporting

Documentation, reporting and maintenance of good records are important aspects to any engagement process. The effectiveness and efficiency of documentation may lead to perceived transparency in the overall engagement process. All interactions with the Namukuse community members and interested stakeholders will be recorded through minutes of meetings, field reports and/or photographs among other tools.

Reporting to stakeholders is an important practice to resolving potential project risks and to ensuring that the engagement objectives are achieved. The Project will provide periodic reports to the affected communities and interested stakeholders on various aspects of this stakeholder engagement plan. Relevant reports to be communicated to the affected communities and the relevant stakeholders include progress on community development planning and general project progress at planning, construction and operation. The Project will also document and report on grievance related matters. The frequency of reports and the necessary documentations will depend on the Project environment. However, it is largely expected that reporting will be done daily, weekly, monthly, annually and during community meetings.

The table below outlines the stakeholder engagement activities for the project, the relevant actors and their related interests and grievance redress across the project life-cycle (ESIA Stage, construction, operation and deccommsisioning phase)

Table 22: Stakeholder Engagement Plan

S/N	Organization	Specific Stakeholder	Thematic Areas and Summary on Areas of interest	Key Message	Engagement / Grievance management	Expected Outcomes	Responsible	Timeline
1.	The National Government	• County Commissioners • Members of Parliament • Chiefs • Other national agencies • Children Officer • Social Development Officers • MoE • KPLC • NLC • Other national agencies like EPRA and NEMA	• Community development • General socio - economic development e.g. construction safety, child protection, HIV/AIDS management, land acquisition etc. • Security • Rule of law	• Project GRM • Labour • Security • Good political will	• Consultative meetings • Participation in public barazas as organised by the consultant / contractor	• Provision of access to data necessary for follow-up on project implementation as well as partners in project Support activities. • Partners in dispute resolution and implementation of the project.	• Social Safeguards Specialists • EHS Officer • Contractor's Project Manager	• Quarterly • Monthly
2.	County Government	• Governor and his office • County Executive Members; • Chief Officers; • MCAs • Ward administrators/sub-county administrators	• General County Development • Ensuring county social and economic development • Mobilization of local resources for development	• Project GRM • RAP • Security • Good political will	• Consultative meetings	• Provision of access to data necessary for follow-up on project implementation. • Partners in dispute resolution and implementation of the	• Social Safeguards Specialists • EHS officer • Contractor's Project Manager	• Quarterly • Monthly

S/N	Organization	Specific Stakeholder	Thematic Areas and Summary on Areas of interest	Key Message	Engagement / Grievance management	Expected Outcomes	Responsible	Timeline
			• Infrastructure development			project activities.		
3.	Community	• Villages • Elders • Women • Youth • Opinion leaders • Vulnerable groups • VMGs	• Construction Environmenta and Social Management Plan (CESMP) and applicable project activities of relevance to the community • General welfare for prosperity • Participation, involvement and consultations in social economic development activities	• Project GRM • Labour • Security • Community health and safety • Construction safety • Project staff / community relations • Good political will	• Consultative meetings • Participation in public barazas as organised by the contractor • Notices on notice boards at accessible spaces / places • GRM Hearings • Phone calls and SMS where applicable • Awareness creation public events as organised under constructio	• Community to be engaged as required by the project documents eg. Stakeholder's report, ESIA • Engagement by Contractor as required in the Contract specifications which also cover the activities as required in the Construction Environmental and Social Management Plan (CESMP).	• Social Safeguards Specialists • EHS Officer	• Quarterly • Monthly
4.	Market centres	• Hawkers • Retailers • Buyers	• General welfare for prosperity	• Project GRM • Labour • Security				

S/N	Organization	Specific Stakeholder	Thematic Areas and Summary on Areas of interest	Key Message	Engagement / Grievance management	Expected Outcomes	Responsible	Timeline
			• Participation, involvement and consultations in social economic development activities.	• Good political will	n Safety Programs • Door to door meetings as applicable			
5.	Vulnerable and marginalized groups	• Community representatives	Have programs in • Reproductive health • Water program • Peace building and conflict mitigation tied with natural resource management in Turkana County. • Behaviour change communication in reproductive health • Water harvesting.	• Livelihood programs • Good political will	• One on one meetings • Participation in discussions as organised by consultant / contractor's social safeguards experts	• Discussions on and where applicable support on livelihood programs. • Information sharing during investigation on relevant cases under GRM	• Social Safeguards Specialists	• As necessary to inform quarterly social safeguards performance report

S/N	Organization	Specific Stakeholder	Thematic Areas and Summary on Areas of interest	Key Message	Engagement / Grievance management	Expected Outcomes	Responsible	Timeline
6.	Kenya Police -	• Officers at police front desk.	• Maintain Law and order. • Prosecution of law breakers.	• Security	• Filing of Reports at Police Station	• Filing of reports on law breaking as required by law	• Aggrieved parties	• As necessary.
			• Traffic management and construction safety.	• Construction safety awareness	• One on one meetings • Participation in discussions / events	• Participation in discussions / awareness programs as organised by consultant / contractor's construction safety experts	• EHS officer • Social Safeguards Specialists	• As necessary to inform quarterly social safeguards performance report
7.	Local media	• Contact persons in local FM stations / community radios to be determined	• Awareness creation on current issues. • Means of communication to reach larger community.	• Advocacy	• Radio infomercials • Radio discussion sessions	• Awareness raising • Information dispersal to wider audiences within the project area.	• As advised by MoE/KPLC on wider project communication strategy	• As advised by MoE/KPLC on wider project communication strategy

9 IMPACT SUMMARY AND CONCLUSION

9.1 INTRODUCTION

This chapter gives a summary of impacts conclusion and recommendations

9.2 SUMMARY OF IMPACTS IDENTIFIED AND ASSESSED

9.2.1 Construction Phase Impacts

A number of impacts have been identified as a result of the construction of the proposed Namukuse project. Of these, impacts on employment, procurement and the economy have been determined to be positive.

The significance of the identified negative impacts associated with the construction phase is moderate prior to the application of appropriate mitigation measures. The significance of two of the identified negative impacts associated with the construction phase, specifically: impacts related to labor and working conditions and visual impacts are minor prior to the application of appropriate mitigation measures. With the application of appropriate mitigation measures, the significance of all the identified negative impacts associated with the construction phase will be reduced to minor or negligible.

9.2.2 Operational Phase Impacts

A number of impacts have also been identified to be associated with the operational phase of the proposed Namukuse solar project. Of these impacts, four (collectively referred to as Impacts on Employment, Procurement and the Economy) will be positive impacts. Prior to the application of appropriate mitigation measures, none of the identified negative impacts will be of major significance during the operational phase. The presence of electrical infrastructure will pose this health threat to avifauna prior to the application of appropriate mitigation measures. Four of the negative impacts are of minor significance before the application of appropriate mitigation measures. These include: impacts on water quality; health, safety and security and visual impacts.

With the application of appropriate mitigation measures, the significance of all the identified negative impacts associated with the operational phase will be reduced to MINOR or NEGLIGIBLE

9.3 SA AND VMGP CONCLUSION

The Namukuse project has triggered the World Bank Operational Policy (OP 4.10) for Indigenous Peoples due to the known presence of indigenous peoples (IPs)/vulnerable and marginalized groups (VMGs) at the project area. Namukuse area is overwhelmingly IP/VMG area and is inhabited predominantly by the Turkana and the minority tribes include; Kalenjin, Luhya, Luo, Congolese. This is addition to The Kenya Constitution requirement to protect and promote the interests and rights of minorities and marginalized communities and the relevant laws and regulations of the Government of Kenya concerning VMG (Vulnerable and Marginalized Groups). The OP 4.10 Indigenous Peoples contributes to the Bank's mission of poverty reduction and sustainable development by guaranteeing that the development process fully takes due regard to the dignity, human rights and cultures of indigenous people. The Bank requires that the Borrower engage the IPs/VMGs in a process of Free, Prior and Informed

Consultations. This was the basis of the public participation done in Namukuse Centre on 14th January 2022 in Namukuse involving all the communities in the area which resulted in broad community support for the project by the affected IPs/VMGs. During the ESIA study the community members further identified members of the community they consider vulnerable by the community member. The vulnerable were identified to include;

- Widows-approximately 200
- Orphans –approximately 500
- Persons Living with Disabilities- Approximately 150
- The elderly (80 years and above)- approximately 80

The elements of the VMGP will be included in the ESMP.

9.4 CONCLUSION AND RECOMMENDATIONS

With all the identified impacts, mitigation will reduce the significance of such impacts to a minor or negligible level. The mitigation measures provided and the management of residual impacts are described in the ESMP has been described as a vehicle for the continued integrated management of all such impacts.

An Environmental and Social Management Plan (ESMP) has been prepared to ensure that social and environmental impacts and risks identified during the ESIA process are effectively managed during the construction and operations of the Project. The ESMP specifies the mitigation and management measures to which the Project Proponent and the Contractor will be committed and shows how the Project will mobilize organizational capacity and resources to implement these measures. The ESMP also shows how mitigation and management measures will be scheduled and will ensure that the Project complies with the applicable laws and regulations within Kenya, as well as the requirements of WB OPs on environmental and social sustainability. The consultant is confident that every effort will be made by the Project Proponent and Contractor to accommodate the mitigation measures recommended during the ESIA process to the extent that is practically possible, without compromising the economic viability of the Project or having a lasting impact on the environment.

In summary, based on the findings of this assessment, the consultant finds no reason why the proposed Project, should not be moved to the next stage of Project planning and development, contingent on the mitigations and monitoring for potential environmental and socio-economic impacts as outlined in the ESMP

APPENDIX 1 –ABBREVIATED RESETTLEMENT ACTION PLAN (A-RAP)

1. Namukuse Sub-project Site

The Namukuse sub-project site is located on unregistered community land in Turkana County. The land is held in trust by the County Government of Turkana on behalf of the community, in line with the Community Land Act 2016. The proposed site has minimal vegetation cover, it is uninhabited, has no structures, community facilities, or incumbrances. Consultations lading to the identification and selection of the sub-project site are captured in the Environmental and Social Screening report for Namukuse. *Refer to Chapter 3 of the ESIA for the comprehensive socio-economic profile.*

2. Actual Census Survey of PAPs and Valuation of Affected Assets

The number of project-affected persons (PAPs) is X (approximately X households). The land acquisition-related impacts are loss of land and pasture. Mitigation measures include in-kind compensation for loss of land and pasture, and designing power distribution lines to avoid impacting trees, crops, structures, and community facilities. No physical displacement is anticipated; however, there is minimal loss of pasture occasioned by the acquisition of land utilized by the community for grazing. The 1.143 hectares identified for the sub-project will be acquired compulsorily by the Land Commission (NLC). The proposed site will be valued and compensated in line with the provisions of the Resettlement Policy Framework (RPF) prepared under KOSAP. *Refer to section 3.3 of the ESIA for the sketch map of the site.*

3. Compensation Measures Agreed with the PAPs and other Resettlement Assistance to be Provided

The proponent requested the community identify three priority projects, whereby one out of the three would be provided as in-kind compensation for land, wayleaves and potentially, economic displacement (loss of pasture). The Namukuse community proposed the following three projects in order of priority; provision of a clean water source for the community, access road improvement and construction of more wards at Namukuse Dispensary. The value of the priority community project will be proportional to or higher than the value of land under acquisition. In addition, any loss or damage to crops, trees, structures, and community facilities will be compensated in line with the provisions of the RPF, and as summarized in the entitlement matrix below.

3.1 Entitlement Matrix

Types of Impact	Person(s) Affected/Eligible for Compensation	Compensation/Entitlement/Benefits	Responsible organization
1. Loss of Land			
Loss of unregistered community land.	Community.	Compensation in-kind as prioritized by the community.	REREC
Loss of land in unregistered group ranches.	Group ranch members.	Compensation in-kind as prioritized by the community.	
Loss of land in registered group ranches.	Group ranch members.	Compensation in-kind as prioritized by the community.	
Loss of land owned by the National Police, county governments and the Ministry of Interior	Government agencies.	No compensation for public land allocated to another government body.	
Loss of land owned by the Kenya Forest Service (KFS) and Kenya Wildlife Service (KWS).	Government agencies.	No compensation for public land allocated to another government body. However, payment of conservation fees to KWS and KFS as stipulated under their respective regulations is foreseen.	
2. Loss of Use on Land			
Loss of use on public land (e.g., grazing, farming etc.).	Communities utilizing public land.	Communities do not own public land; however, they utilize public land with consent from the relevant agencies. The project will implement the infrastructure project prioritized by the community as compensation for the loss of public land use.	REREC
Loss of use on unregistered community land, unregistered group ranches and registered group ranches (e.g., grazing, farming etc.).	Communities utilizing unregistered community land, unregistered group ranches, and registered group ranches.	Compensation in-kind as prioritized by the community.	
3. Loss of /Damage to Assets on Land			
Trees	Community members on unregistered community land; community members utilizing public land; members of registered and unregistered group ranches and government entities.	During detailed design for power distribution lines and construction of the mini grid and community project, any crops, structures, trees, and community facilities shall be avoided to the extent possible. However, loss	REREC
Crops			
Structures			

Community facilities e.g., water sources (earth pans, boreholes etc.).	Community members on unregistered community land, community members utilizing public land, and members of registered and unregistered group ranches.	or damage to the above will be compensated/restored at full replacement cost,[1] in line with the provisions of the RPF.	

4. Consultations with PAPs About Acceptable Compensation Options and Alternatives that have been Considered

Detailed consultations with PAPs on land acquisition and compensation, including the modalities of acquiring land and compensation options, were undertaken during the Environmental and Social Screening, Environmental and Social Impact Assessment, and the NLC land valuation process. The following sections provide a summary of the consultations.

4.1 Engagement of Project -Affected Persons (PAPs)

Local administration and County Renewable Energy Officers (CREOs) supported the proponent and implementing agency (IA) to mobilize community members and other stakeholders for public consultations and engagement activities. National and county government entities, community segments (men, women, youth, elders, persons with disability, vulnerable and marginalized groups, etc.), NGOs, and local leaders were engaged through key informant interviews, community meetings, and focus-group discussions. The proponent and IA implemented appropriate measures to ensure PAPs effectively participated in the consultations. *Refer to Chapter 6 of the ESIA on Stakeholder Engagement.*

Once the compensation award and Bill of Quantities (BoQs) are known, the Implementing Agency (IA) will engage the community and agree on the community project to be executed as in-kind compensation. During these consultations, the IA and the community will define the roles and responsibilities of the community in monitoring the implementation of in-kind compensation and maintenance once the IA hands it over to the community. Thus, the IA and the community will effect an agreement to be signed by the local leadership; representatives of the Grievance Redress Committees at the locational, county, and national levels; A-RAP Implementation Committee, and Implementing Agencies.

4.2 Identification of Community Representatives

The Namukuse Locational Grievance Redress Committee (LGRC) constituting a chairperson, secretary, and three members, was formed through community consensus. The committee comprises representation from men, women, youth, persons with disabilities, and ethnic minorities. The LGRC is responsible for engaging PAPs and resolving complaints. *Refer to chapter 6 of the ESIA on the Grievance Redress Committees.* Further, the community will constitute the A-RAP Implementation Committee responsible for coordinating community engagements on the A-RAP and monitoring the implementation and closure of the A-RAP. The representation of the committee will consider gender, vulnerability, and intergenerational sensitivities.

Figure 1: ———————————

[1] A cost basis that will yield compensation sufficient to replace assets, plus necessary transaction costs associated with asset replacement).

4.3 Summary of Consultations on Land Acquisition and Compensation Options

Date	Objective	Implementing Entities	Land Acquisition and Compensation Aspects Discussed	Key Issues Raised	Responses Given
March 20th 2021	Environmental and Social Screening. Voluntary land donation (VLD). Constitution of the Locational Grievance Redress Committee (GRC).	Ministry of Energy (MoE) Kenya Power (KPLC) Rural Electrification and Renewable Energy (REREC)	Site identification and land allocation for the sub-project. Criteria for VLD. Community entitlements (forms of compensation and implications for each).	Why should title be in the name of implementing agency?	The investment is massive. It will also ease access to the project for its operation and maintenance
February 2nd 2022	Environmental and Social Impact Assessment.	Consultants MoE REREC KPLC	Land acquisition through compulsory acquisition (not voluntary land donation). Selection of three priority community projects, whereby one is to be implemented as in-kind compensation for land.	Community requested for the following in order of priority: 1.Provision of a clean water source for the community 2. Access Road improvement 3.Construction of more wards at Namukuse Dispensary.	The proponent has set aside KES 1 million to implement the priority in-kind compensation project. The value of the project will be proportional to or greater than the value of land. NLC will determine the value of land.
May 2023	Compulsory Land Acquisition.	NLC	Site inspection and inquiries. Land valuation. Award of compensation.		

5. Institutional Responsibility for Implementation of the ARAP

Entity	Role
Ministry of Energy	• Coordinate A-RAP implementation and provide budget for in-kind compensation.
National Land Commission	• Implement the statutory process for compulsorily land acquisition, including site gazettement and inspections, inquiries, valuation, and award of compensation.
REREC	• Monitor all land acquisition and compensation aspects (including A-RAP closure), complemented by a third-party monitor. • Provide budgets for stakeholder engagement, grievance management, and monitoring, including the facilitation of the Land Acquisition and Compensation Implementation Committee, and the Grievance Redress Committee.
Mini-grid Contractor	• Implement in-kind compensation concurrently with the solar mini-grid project.
Supervising Consultant	• Monitor and report on implementation of in-kind compensation, and overall project compliance with social safeguards.
Grievance Redress Committees	• Formed at the locational, county, and national levels, and responsible for resolving complaints, including A-RAP related grievances.
A-RAP Implementation Committee	• Coordinate A-RAP engagements at the community level, monitoring A-RAP implementation and closure.
Affected Community	• Responsible for the operation and maintenance (O&M) of in-kind compensation project. An agreement stipulating the O&M roles and responsibilities of the community will be effected.

6. Procedures for Grievance Redress

The Project procedures for grievance redress were established through a public consultation process and informed by the existing conflict resolution structures in the community. The Grievance Redress Mechanism (GRM) comprises tiers at the project, county, and national levels. *Refer to Chapter 6 of the ESIA for a detailed GRM.*

7. Implementation Timetable and Budget for the ARAP Implementation

7.1 Timelines

The proponent will commission the community project by May 25th, 2025, before operationalizing the mini-grid. The mini-grid contractor will implement the mini-grid and the community project simultaneously. The Supervision Consultant and IAs will implement a commitment register to ensure the mini-grid contractor can achieve the agreed-upon milestones. The register will be complete with clear and practical timebound indicators, which can be monitored by all parties – the PAPs, IAs, the Ministry, third-party monitor, and the Bank.

7.2 Budget

The proponent has set aside KES 1 million for the community project (budget captured in the ESMP). The compensation award from NLC and the Bill of Quantities will inform the final cost of the community project. The costs for in-kind compensation, stakeholder engagement, grievance management (including the facilitation of the GRCs and the A-RAP Implementation Committee), and monitoring are covered under the project.

APPENDIX 2 – PUBLIC MEETING PARTICIPANTS' REGISTER

REREC

Kenya Power

Ministry of Energy

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED KENYA OFF-GRID SOLAR ACCESS PROJECT (KOSAP) FOR UNDERSERVED COUNTIES.

Venue.....Namukuse.....

Date.....16.01.202.....

Time.....4:30pm.....

List of Participants

#	Name	Position/Institution/Location	Phone No.	Signature
1.	[illegible]	CENTRIC AFRICA LTD-ESO	0729924873	
2.	Josphath kipsang Bor	Norken (Int) Ltd	0725650870	
3.	Kennedy D.S. Shisoka	min. of Energy	0722591628	
4.	Ummkhir Abdi	CENTRIC AFRICA	0795023964	
5.	Ludis Komen	Norken (I) Ltd	0717153263	
6.	PETER LOTHANG	AREA CHIEF NAMUKUSE LOCATION	0798688460	
7.				
8.				
9.				
10.				

Norken International Ltd
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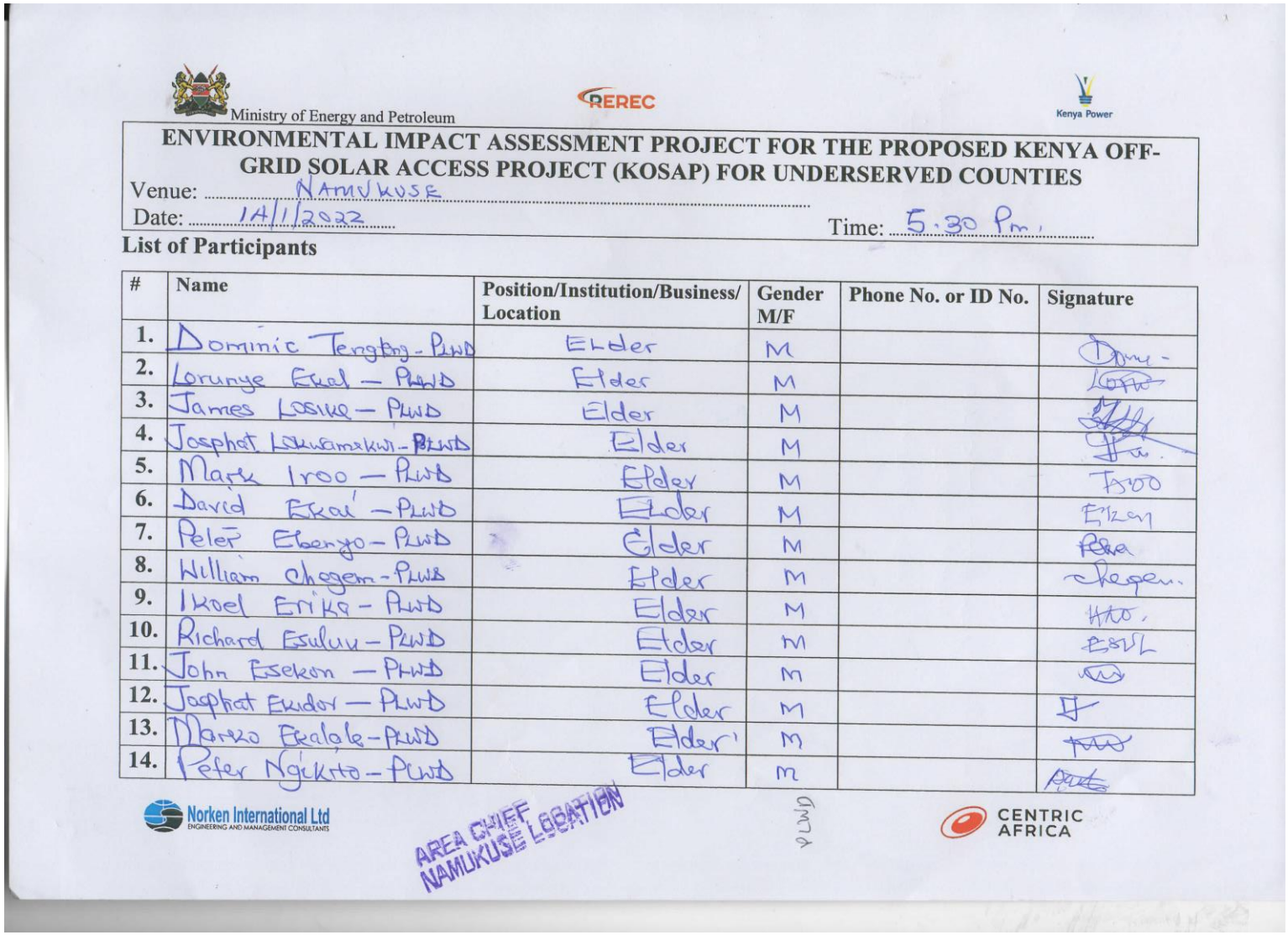
AREA CHIEF
NAMUKUSE LOCATION

CENTRIC
AFRICA LTD



Ministry of Energy and Petroleum

REREC

Kenya Power

ENVIRONMENTAL IMPACT ASSESSMENT PROJECT FOR THE PROPOSED KENYA OFF-GRID SOLAR ACCESS PROJECT (KOSAP) FOR UNDERSERVED COUNTIES

Venue: NAMUKUSE

Date: 14/1/2022 Time: 5.30 Pm

List of Participants

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	Dominic Tengteng - PLWD	Elder	M		
2.	Lorunye Ekal – PLWD	Elder	M		
3.	James Losike – PLWD	Elder	M		
4.	Josphat Lokwamakwi - PLWD	Elder	M		
5.	Mark Iroo – PLWD	Elder	M		
6.	David Ekai – PLWD	Elder	M		
7.	Peter Ebenyo – PLWD	Elder	M		
8.	William Chegem - PLWD	Elder	M		
9.	Ikoel Erika - PLWD	Elder	M		
10.	Richard Esuluu – PLWD	Elder	M		
11.	John Eseken – PLWD	Elder	M		
12.	Josphat Ewidor – PLWD	Elder	M		
13.	Marco Ekalale - PLWD	Elder	M		
14.	Peter Ngikito – PLWD	Elder	M		

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AREA CHIEF
NAMUKUSE LOCATION

CENTRIC AFRICA

REREC Kenya Power Ministry of Energy

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED KENYA OFF-GRID SOLAR ACCESS PROJECT (KOSAP) FOR UNDERSERVED COUNTIES.

Venue: NAMUKUSE Time: 4:20 p.m.

Date: 14.01.2022

List of Participants

#	Name	Position/Institution/Location	Phone No.	Signature
1.	GABRIEL EKUWOM	NAMUKUSE	0748135090	
2.	LOPEYOK KEEPA	FISHERMAN	—	
3.	AREMI LOSIKE	NAMUKUSE	0715838207	
4.	PETER EBENYO	NAMUKUSE	—	
5.	JOHN EKAI	FISHERMAN	—	
6.	WILLIAM CHEGEM	NAMUKUSE	0717082504	
7.	MARKO EKALELE	FISHERMAN	—	
8.	ASINYEN AWESIT	NAMUKUSE	—	—
9.	ELIZABETH LEILEI	NAMUKUSE	—	—
10.	CHRISTINE LOTIT	NAMUKUSE	0713010306	

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REREC Kenya Power Ministry of Energy

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED KENYA OFF-GRID SOLAR ACCESS PROJECT (KOSAP) FOR UNDERSERVED COUNTIES.

Venue...NAMUKUSE.....
Date.....14.01.2022.....
Time.....4:20 p.m.....

List of Participants

#	Name	Position/Institution/Location	Phone No.	Signature
1.	PETER ALEPER NYANGA	FISHERMAN	0796409216	
2.	ISIAYA LOPIRA	FISHERMAN	0745594235	
3.	JAMES EKAI LOLEM	FISHERMAN	0790253612	
4.	ALEXANDER EKAI LOMUKUNY	FISHERMAN	0717048761	
5.	JOSEPHAT EKIRU	FISHERMAN	0729657506	
6.	JOSEPHAT ARII	FISHERMAN	—	
7.	SAMWEL AKIRU	FISHERMAN	—	
8.	RICHARD ESULU EMANMAN	FISHERMAN	—	
9.	LOSOKOYA ALETIA	NAMUKUSE	—	
10.	JOHN ESINYEN LOMUKUNY	FISHERMAN	0700516940	

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ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED KENYA OFF-GRID SOLAR ACCESS PROJECT (KOSAP) FOR UNDERSERVED COUNTIES.

Venue: NAMUKUSE

Date: 14.01.2022 Time: 4:20 pm

List of Participants

#	Name	Position/Institution/Location	Phone No.	Signature
1.	SILAS ELOTO ELIM	NAMUKUSE	0742043038	
2.	PATRICK NGASIKE	NAMUKUSE	0704705453	
3.	EKUWOM LOKOR CHEPER	NAMUKUSE	0716607318	
4.	JAMES LOSIKE	NAMUKUSE	0717[illegible]2213	
5.	EVANS LOKWANG	NAMUKUSE	0757022172	
6.	SIMON EKARIBAN	NAMUKUSE	0790604872	
7.	NAPERIT PETER	NAMUKUSE	—	
8.	JAMES LOMULEN	NAMUKUSE	0743784914	
9.	DORCAS NASURU	NAMUKUSE	—	
10.	NANCY ASINYEN	NAMUKUSE	—	

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REREC Kenya Power Ministry of Energy

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED KENYA OFF-GRID SOLAR ACCESS PROJECT (KOSAP) FOR UNDERSERVED COUNTIES.

Venue: NAMUKUSE

Date: 14.01.2022 Time: 4:20 P.M.

List of Participants

#	Name	Position/Institution/Location	Phone No.	Signature
1.	ETABO ESEKON	FISHERMAN	—	
2.	SOLOMON EKUWOM	NAMUKUSE	0748135114	
3.	FRANCIS EKAI	FISHERMAN	0791067026	
4.	MICHAEL EBEI	NAMUKUSE	—	
5.	PETER EIPA	FISHERMAN	0710701800	
6.	PETER ELIM	NAMUKUSE	0717539004	
7.	JOSEPHAT EKUWOM	NAMUKUSE	0704763729	
8.	JOHN ESEKON	FISHERMAN	0796812225	
9.	JACKSON LOCHUCH	FISHERMAN	0778904026	
10.	FLEX KANGOLE	NAMUKUSE	0794653745	

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ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED KENYA OFF-GRID SOLAR ACCESS PROJECT (KOSAP) FOR UNDERSERVED COUNTIES.

Venue..... NAMUKUSE .....

Date..... 14.01.2022 .....

Time..... 4:20 pm .....

List of Participants

#	Name	Position/Institution/Location	Phone No.	Signature
1.	REBECCA AKAL	NAMUKUSE	——	
2.	REJINA AKIRU	NAMUKUSE	——	
3.	SAMWEL ETIIR	NAMUKUSE	0723688171	
4.	LOKWANYA MARAKA	NAMUKUSE	0740750200	
5.	ETABO NAMOCHO PETER	NAMUKUSE	0768428681	
6.	JOHN AUPWAL EKOLIANG	NAMUKUSE	0741174548	
7.	MATHEW ALETIA EPUKE	NAMUKUSE	0799751849	
8.	LUCAS EKENO	NAMUKUSE	—	
9.	SIMON NAKOLOMO	NAMUKUSE	0798688445	
10.	DOMINIC LOKONG TENGTENG	NAMUKUSE	0791650031	

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ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED KENYA OFF-GRID SOLAR ACCESS PROJECT (KOSAP) FOR UNDERSERVED COUNTIES.

Venue: NAMUKUSE

Date: 14.01.2022 Time: 4:20 p.m

List of Participants

#	Name	Position/Institution/Location	Phone No.	Signature
1.	HELLEN ATIIR	NAMUKUSE	—	
2.	SELINA NAMOCHO	NAMUKUSE	—	
3.	MARY LONGOLAN	NAMUKUSE	—	
4.	SARAH LORE	NAMUKUSE	—	
5.	ELIZABETH ATABO	NAMUKUSE	—	
6.	ALICE LOKURUKA	NAMUKUSE	—	
7.	ELIZABETH LOKI	NAMUKUSE	—	
8.	MARY AKAL	NAMUKUSE	—	
9.	LUCY ASINYEN	NAMUKUSE	—	
10.	PAMELA ELAAK	NAMUKUSE	0704022189	

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ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED KENYA OFF-GRID SOLAR ACCESS PROJECT (KOSAP) FOR UNDERSERVED COUNTIES.

Venue: NAMUKUSE

Date: 14.01.2022 Time: 4:20 p.m

List of Participants

#	Name	Position/Institution/Location	Phone No.	Signature
1.	MARY ASIBITAR EKAMAIS	NAMUKUSE	—	
2.	AGENES ADOME ETABO	NAMUKUSE	—	
3.	ALICE EDUKAN	NAMUKUSE	—	
4.	JECENTA ADAPAL	NAMUKUSE	0796784863	
5.	SUSAN ASIGER	NAMUKUSE	0727779668	
6.	PAULINA AYANAE	NAMUKUSE	—	
7.	DORCAS AKAI	NAMUKUSE	0115889018	
8.	MARTHA ETOOT	NAMUKUSE	0727681180	
9.	ELIZABETH AKUWOM	NAMUKUSE	—	
10.	SELINA AJIKON	NAMUKUSE	—	

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ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED KENYA OFF-GRID SOLAR ACCESS PROJECT (KOSAP) FOR UNDERSERVED COUNTIES.

Venue..... NAMUKUSE .....

Date..... 14.01.2022 ..... Time..... 4:20 pm .....

List of Participants

#	Name	Position/Institution/Location	Phone No.	Signature
1.	LOKWAWI NAKULEU	NAMUKUSE	0791974871	
2.	IKOEL ERIKA	NAMUKUSE	—	
3.	LORUNYE JAMES	NAMUKUSE	0728349609	
4.	JOHN EROT	NAMUKUSE	0743685693	
5.	FRANCIS ELOTO	NAMUKUSE	0706345634	
6.	PETER NGIKITO	NAMUKUSE	—	
7.	SAMWEL EKAL KAPENGI	NAMUKUSE	0700673056	
8.	SHARLIN AROT	NAMUKUSE	0742017933	
9.	SIMON EWOI	NAMUKUSE	0112669378	
10.	ERUKUDI NYANGA	NAMUKUSE	0798223816	

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ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED KENYA OFF-GRID SOLAR ACCESS PROJECT (KOSAP) FOR UNDERSERVED COUNTIES.

Venue: NAMUKUSE

Date: 14.01.2022 Time: 4:20pm

List of Participants

#	Name	Position/Institution/Location	Phone No.	Signature
1.	DORCAS EWOTON	NAMUKUSE	0796924208	
2.	JOSEPHINE AKENO	NAMUKUSE	0712103924	
3.	MARY AWESIT	NAMUKUSE	0742647880	
4.	AMEKWI LOSURU	NAMUKUSE	0728803176	
5.	JOSEPHINE AKENO	NAMUKUSE	0727734287	
6.	MARGRET AKAI	NAMUKUSE	~~07~~ 0113774694	
7.	AKONE EMEKWI	NAMUKUSE	—	
8.	POLINE AKIRU	NAMUKUSE	0746~~786~~486	
9.	SELINA AMETO	NAMUKUSE	—	
10.	FLOWRIDAH AJIKON	NAMUKUSE	0799803763	

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AREA CHIEF
NAMUKUSE LOCATION

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APPENDIX 3 – FOCUS GROUP DISCUSSION PARTICIPANTS REGISTER

FCD YOUTHS (NAMUKUSE) FEMALE

Ministry of Energy and Petroleum

REREC

Kenya Power

ENVIRONMENTAL IMPACT ASSESSMENT PROJECT FOR THE PROPOSED KENYA OFF-GRID SOLAR ACCESS PROJECT (KOSAP) FOR UNDERSERVED COUNTIES

Venue: NAMUKUSE

Date: 14:01:2022 Time: 4:20p.m

List of Participants

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	ROSELYNE AKOL	NAMUKUSE	F	—	—
2.	STELLAR LONGOLE	NAMUKUSE	F	0759695575	
3.	DORCAS EWOTON	NAMUKUSE	F	0796924208	
4.	FLOWRDAH AJIKON	NAMUKUSE	F	0799803763	
5.	POLINE AKIRU	NAMUKUSE	F	0746676486	
6.	LUCY ASINYEN	NAMUKUSE	F	—	
7.	PAMELA ELAAK	NAMUKUSE	F	0704022187	
8.	AKONE EMERUT	NAMUKUSE	F	—	
9.					
10.					
11.					
12.					
13.					
14.					

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AREA CHIEF
NAMUKUSE LOCATION

CENTRIC AFRICA

FGD Youths (NAMUKUSE) MALE

Ministry of Energy and Petroleum

REREC

Kenya Power

ENVIRONMENTAL IMPACT ASSESSMENT PROJECT FOR THE PROPOSED KENYA OFF-GRID SOLAR ACCESS PROJECT (KOSAP) FOR UNDERSERVED COUNTIES

Venue: NAMUKUSE

Date: 14.01.2022 Time: 4:20 p.m.

List of Participants

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	SILAS ELOTO ELIM	NAMUKUSE	M	0742043038	
2.	MATHEW ALETIA EPUKE	NAMUKUSE	M	0797951849	M
3.	ISIAYA LOPIRA	NAMUKUSE	M	0745594235	I
4.	EVANS LOKWANG	NAMUKUSE	M	0757022172	
5.	IKOEL JOHN	NAMUKUSE	M	0743685693	
6.	SIMON EKALIBAN	NAMUKUSE	M	0790684872	
7.	FRANCIS EKAI	NAMUKUSE	M	0791067026	
8.	FLEX KANGOLE	NAMUKUSE	M	0794864533	
9.	MICHAEL EBEI	NAMUKUSE	M	–	
10.	PATRICK ESUKUKU	NAMUKUSE	M	–	
11.	THOMAS EKENO	NAMUKUSE	M	0769464145	
12.	PETER KAHAMAN	NAMUKUSE	M	0111432581	
13.					
14.					

Norken International Ltd
ENGINEERING AND MANAGEMENT CONSULTANTS

AREA CHIEF
NAMUKUSE LOCATION

CENTRIC AFRICA

FGD - Women

Ministry of Energy and Petroleum

REREC

Kenya Power

ENVIRONMENTAL IMPACT ASSESSMENT PROJECT FOR THE PROPOSED KENYA OFF-GRID SOLAR ACCESS PROJECT (KOSAP) FOR UNDERSERVED COUNTIES

Venue: Namukuse

Date: 14/01/22 Time:

List of Participants

#	Name	Position/Institution/Business/ Location	Gender M/F	Phone No. or ID No.	Signature
1.	Esther Ensiro	Kanukurdio	F	-	
2.	Elizabeth Aden	"	F	-	
3.	Selina Ameto	"	F	-	
4.	Josphine Akeno	"	F	-	
5.	Mary Akai'	"	F	-	
6.	Regina Akiru	"	F	-	
7.	Alice Lokuruka	"	F	-	
8.	Rode Amakwi	"	F	-	
9.	Rebeca Kibukaki	"	F	-	
10.	Magret Akai'	"	F	—	
11.	Mary Long'olan	"	F	—	
12.	Elizabeth Akuam	"	F	—	
13.	Judith Aboka.	"	F	—	
14.	Lokariwyan Mercy.	"	F	—	

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APPENDIX 4 – SCREENING/ LAND ACQUSITION MEETING PARTICIPANTS' REGISTER

MIN 1.0 WELCOMING AND OPENING

The meeting was opened with a word of prayer by William Chegen. The Ward administrator said Namukuse was inhabited by the Ngiriamuk Clan and their main economic activity was Fishing. It had about 1000 households. He conveyed apologies for the absence of area Chief Mr. Peter Lotieng who was held up in another meeting. He told residents Government was aware of their plight and will be assisted accordingly. He asked them to listen keenly to what visitors have to say so that on going back they can enlighten those who were unable to attend. He then invited project team to enlighten the community.

The visiting team introduced themselves as follows;

7.	Kioko Maithya	- Social Safeguards Officer	- REREC
8.	Irene Kawira	- Senior Environmentalist	- REREC
9.	Caleb Ewoi	- CREO	- MOE
10.	Agnes Gachoki	- Senior Surveyor	- REREC
11.	Lawrence Lorika	- Technician	- KPLC (lodwar)
12.	Myra Mukulu	- Technical Advisor Cook Stoves	- MOE

MIN 2.0 KOSAP AND NAMUKUSE MINI GRID

Ms Myra Mukulu informed the participants that the proposed project is part the Kenya off Grid Solar Access Project (KOSAP) which is funded by the World Bank and is being implemented by the Ministry of Energy, the Kenya Power and Lighting Company (KPLC) and the Rural Electrification and Renewable Energy Corporation (REREC). MoE will provide overall coordination of the Project including responsibility for safeguards due diligence, and compliance monitoring. REREC will implement the mini grid and will be responsible for the implementation of Resettlement Framework Plan, Environmental Social Management Framework and Social Assessment. She said the Government is committed to providing electricity to communities that have not been served by the national grid such as Namukuse because it recognises energy as a key development enabler.

She said KOSAP entails the following components;

5. Provision of electricity through solar mini grids to households, enterprises and community facilities,
6. Provision of energy services through solar home systems for and clean cooking technologies for households
7. Provision of solar power to electrify boreholes as well as to power community facilities
8. Community engagement and education as well as capacity building and institutional support for the national and county Governments

She further, said KOSAP is being implemented in 14 counties. In Turkana County 23 minigrid sites, 98 stand-alone solar facilities (public facilities) and 38 boreholes (solarisation) had been identified. One of these minigrid sites is Namukuse.

She noted that the agenda of the visit was to; undertake an environmental and social screening of the proposed project site, to sensitize the community on the project land requirements and community rights and entitlements, explain the Project Technical Description and connection requirements, discuss potential environmental/social risks and impacts and mitigation and sensitize members on grievance redress mechanism.

MIN 3.0 PROJECT LAND REQUIREMENTS: RIGHTS AND ENTITLEMENTS OPTIONS AND IMPLICATIONS

The Surveyor, Ms. Agnes Gachoki told the Baraza that the main purpose of the Baraza was to seek community consent for land donation for the project. Land required for the construction of the Mini

grid is 3-5 acres. In Namukuse, Land falls under the Community land category. It is yet to be registered, has no title but is jointly owned by the community. Its use and management is governed by the Community Land Act 2016.

She explained the various forms of acquiring in land including; allocation, land adjudication process, compulsory acquisition, settlement programs, transfers, donation and long-term leases.

The Surveyor informed the meeting that if they opted to consent to donation of the project land, following VLD criteria has to be met;

VLD criteria

1	**The infrastructure must not be site specific.**
2	The impacts must be minor, that is, involve no more than 10 percent of the area and require no physical relocation.
3	The land required to meet technical project criteria must be identified by the affected community, not by line agencies or project authorities
4	The land in question must be free of squatters, encroachers, or other claims or encumbrances.
5	Verification (for example, notarized or witnessed statements) of the voluntary nature of land donations must be obtained from each person donating land.
6	If any loss of income or physical displacement is envisaged, verification of voluntary acceptance of community-devised mitigatory measures must be obtained from those expected to be adversely affected.
7	If community services are to be provided under the project, land title must be vested in the community, or appropriate guarantees of public access to services must be given by the private titleholder.
8	Establishment of Grievance mechanisms

Agnes also told the community on their rights and entitlements to the following;

1. They can refuse to donate the land.
2. They can opt to seek compensation for the project land.
3. They can refuse or accept the project.
4. The right to resettlement assistance in addition to compensation for affected assets, where the more vulnerable individuals/households have been identified among them.
5. The right to livelihood restoration measures where the project has impacted their livelihood strategies, if they choose compensation.

The surveyor further informed the meeting that there were several options on land compensation;

d) Payment of cash for the land that has been identified for the project. For this to take place the land is has to be valued first. All monies payable as compensation for acquisition unregistered community land are then held in trust by the county government. Any such monies shall be deposited in a special interest earning account by the County Government and shall be released to the community upon registration of the community land.

e) Compensation of land for land. The community would identify a similar piece of land in value to the project site and request that the same is purchased for the community.

f) A further option is compensation in kind. This option is for the community to grant land for the project and request for compensation in kind. This could be in the form of a project for the benefit of the community like the construction of classrooms or a borehole. This is the most preferred option.

She said the surveyor will need to pick exact GPS points of the land proposed for the project and with community consent the land will be registered in the name of the implementing agency. The surveyor

encouraged the community to make an informed decision that collectively involved every member of the community the elders, men, women, the marginalised and PLWDs. Any land donation would have to be signed by at least five representatives nominated by the community. She disclosed to the meeting what the term advance possession on land issues meant and requested them to consider allowing the implementing agency to take possession of the parcel and commence construction of the project even as the land transfer process is going on.

MIN 4.0 PROJECT TECHNICAL DESCRIPTION, WIRING, CONNECTION AND PAYMENTS

Mr. Lawrence Lorika from KPLC told the meeting the proposed mini grid will comprise a solar system and a thermal unit (generator). The Mini-grid will have a capacity of 31KVA and PV 104kwp). He said all potential customers will be mapped for connection. Energy meters will be installed by KPLC staff and the locals living within the required 3 km radius would be connected to power. He said to be connected one will be required to pay a one-off connection fee of kshs.1000 as opposed to other places like Lodwar, Kitale and other big towns whereby they pay kshs.15000 or more.

Power would not be for free, and residents will be buying tokens to facilitate their needs as far electricity is concerned. Tokens can be purchased in amounts of Kshs 50 and above. Purchase is done through a vendor or directly purchasing and paying through the mobile money platforms. The token purchased through this 'Pay As You Go' (PAYG)) mechanism, will last according to the individual power usage. If you have more load for example ceiling fans and air conditioners in your shop, it will last for short period of time.

He told the Baraza that power distribution will involve passing of electrical lines along the roads in order to reach their houses, business premises and public facilities and requested the community grant way leave consent.

He said the project land where the powerhouse comprising solar panels, diesel generator, batteries and inverters will be installed will be fenced of as a safety measure and access will thus be restricted to people and animals. The minigrid system would be operating throughout the day and night. In case of overload, cloudy day or low battery, the generator will automatically kick in to supply power.

MIN 5.0 SOCIAL AND ENVIRONMENTAL ISSUES

The Environmental specialist Ms Irene Kawira Mate said that there were many benefits that would accrue to residents due to the supply of power to the area. She cited some of them as:

Potential positive impacts:

7. Improved educational standards as a result of longer study hours for leaners.
8. Enhanced heath care as Clinics/dispensaries can operate at night and store perishable drugs and vaccines
9. Employment of locals during the construction phase
10. Increased information access and entertainment (TV, Radio, Internet phones and computers).
11. refrigeration of food products like meat and milk thereby increasing their shell life
12. Opportunity for locals to establish business ventures like hairdressing, photocopy and welding.

Potential negative impacts:

6. The land that is currently in use for grazing will now no longer be accessible to the residents as it would be fenced off.
7. The risk of electrocution due to lack of proper handling and care. The Contractor shall however educate the community on safety precautions.
8. Labour influx leading to sexual exploitation and harassment.
9. Environmental contamination may arise due to disposal of used batteries, inverters and other materials.
10. Increase in cases of Gender Based Violence and sexual harassment of workers

She affirmed that the project beneficiaries were the Yapakunur Clan, a major sub-tribe of the Turkana language group who are Indigenous people and are the only VMG residing near the sub-project area thus the sole project beneficiary. Construction of the mini grid could restrict the access of VMGs to grazing land thus affecting availability of pasture, and consequently their main source of livelihoods,

and forcing families to relocate grazing activities elsewhere. Consequently, a VMGP may not be required. The project can include specific interventions in the final ESMP to ensure the community has access to culturally appropriate benefits. The project will strive to minimize adverse impacts on the indigenous people and ensure that they fully and continuously participate in the consultation process and receive culturally appropriate benefits from construction of the mini grid. The ESIA study would be conducted before the onset of the project and an ESMP developed outlining viable mitigation measures.

Screening would be undertaken to ensure that the project is designed and implemented in an environmentally and socially sustainable manner, taking into account Kenya's relevant sector legislation as well as World Bank Safeguard Policies. This would be undertaken using screening checklists in reference to requirements of the Environmental Management and Coordination Act, 1999 (amended 2019) and KOSAP-Environmental and Social Management Framework (ESMF). The screening process would consider potential impacts of the project and propose viable mitigation measures. She assured the community that temporary or minor impacts which are foreseen during project implementation will be sufficiently mitigated.

Grievance Resolution Mechanism (GRM)

Ms Mate informed the Baraza on the need for constitution of a locational Grievance Resolution Committee (GRC) for purposes of resolving any grievances that may arise in the lifetime of the project as guided by project frameworks. The local GRC will be the first stop shop for resolution of project related disputes and grievances for project affected persons and interested parties. The GRM should be culturally appropriate, inclusive, and accessible and developed in consultation with Namukuse community. Grievances which cannot be resolved by the local GRC shall be escalated to the sub-county GRC and the National GRC respectively. Any unresolved matter can then be referred for arbitration or to a court of law. World Bank's GRS is also available to stakeholders to lodge their grievances. The GRC should constitute representation from all genders, youth and vulnerable persons. It should be structured in such a way that it provides multiple channels for lodging grievances, ensure anonymity and confidentiality. The following details shall be recorded for each grievance reported; and a close-out form issued to indicate the grievance registered has been closed.

j) Date of compliant
k) Name of complainant
l) ID of complainant
m) Telephone contact of complainant
n) Nature of complaint
o) Name of the Person handling the complaint
p) Contacts of person addressing the complaint
q) Action taken
r) Date of conclusion of complaint

Existing indigenous grievance redress mechanism

Conflicts occasionally arise within individuals and families. The Namukuse community like in all other parts of the Turkana society is endowed with elaborate and systematic traditional mechanisms of conflict management. When disputes occur, they are referred elders (*Ng'akasukou*). The elders then summon involved parties and witnesses to the meeting point (*Ekitoe Ng'akasukou*).The elders will listen to the conflicting parties/individuals, weigh adduced evidence and pronounce the verdict accordingly.

Any matter that is not resolved or when the parties are not satisfied they can report to the chief or seek discourse in a court of law.

The summary of the comments/remarks from the community in the meeting held at Namukuse on 20/03/2021

QUESTION/COMMENTS ANSWER/REMARKS

QUESTION/COMMENTS	ANSWER/REMARKS
Patrick Moru Tukipata hii stima, stima hii ni ya kulipwa au bure.	Individual to do wiring and pay connection fee 1000, then meter is token based (PAYG) –Just as with mobile phone
Gabne Ekuwom Tumegojea sana . Tutapata kwa muda gani	Answers- As soon as land is found contractor will be identified/ tender issued
Alice Ekali Kama nimelipa 1000, hii token tena ni gani?	For Purchase of tokens
William Chegen Wakati stima itakuja- - kuna meter itafanywa itaigia stima kweli na meter itawekwa wapi?	Meter to be installed inside the premises
Justus Kaliba Sasa hii stima tumeeka – kuna hio pesa 1000. Sasa hio pesa nimekulipa . Sasa hii pesa ingine ni ya nini? Sasa wakati sitalipa itafanyika nini?	For Purchase of tokens Power will automatically go off till you buy tokens
Gabriel Ekwom Why should title be in the name of implementing agency?	The investment is massive. It will also ease access to the project for its operation and maintenance

10.1 MIN 6.0 FOCUS GROUP DISCUSSIONS

After the main meeting women, men and youth convened for separate discussions (FGDs) where they could freely converse amongst themselves and pour out insights (hopes, fears, aspirations and expectations in relation to the mini grid and the land question).

FGD-MEN

The main objective of this discussion was to get gather and document how men thought/felt about the issues discussed during the main meeting including; environmental and social screening of the project site, land requirements and community rights/ entitlements, Project Technical Description and connection requirements, potential environmental/social risks and impacts, mitigation and grievance redress mechanism. The FGD would also provide them an opportunity to air their issues/give their opinions on the project.

Kioko them the FGD was a good avenue for the elders to express their opinions and freely ask any questions they might not have been unable to ask in front of the youth and women, He said that at the end of the FGD discussion the group should come into consensus on issues discussed in the earlier meeting and select a representatives to the GRC. During the meeting the Men agreed to voluntary land donation and selected the following as their representatives in the GRC;

Name	ID number	Telephone number
William Chegem	0611482	0717082504
Paul Anam	21529180	0748135114

FGD WOMEN

The women understood the issue. When asked if they had any questions on the project, they stated that they did not have any questions. Therefore Myra requested that they elect 2 women to the GRC.

The women elected were;

Name	ID number	Telephone number
Schola Ekai	0011697292	0711647272

FGD YOUTH

The youth had no questions and went ahead to elect 2 youths who will be members of the grievance redress committee. The youths nominated were;

Name	ID number	Telephone number
James Engomo	30623993	0714488591
Solomon Ekuwom	24108775	0748135114

REVIEW OF FEEDBACK FROM FGDS BY ALL COMMUNITY MEMBERS

After the FGDs the participants convened back to the main meeting to review the respective resolutions from the FGDs. During the meeting they expressed their support towards the project saying the benefits to the area shall be enormous. They mentioned the opportunity to light their homes, establish income generating business ventures and employment as some of the major benefits.

They resolved to freely donate land for the project, validated the nominees to the GRC and elected officials to lead the identification of project land and sign the land donation form on their behalf.

The community nominated the following as members of the GRC:

No	Name	Design.	1D No.	Mobile No.
1	Michael N. Lokwakot	Men	10986387	0790604608
2	Joseph E. Ekunoit	Men	13647323	0792977119
3	David M. Emase	MEN	11512716	0710232300
4	Schola Ekai	WOMEN	0011697292	0711647272
5	James Engomo	YOUTH	30623993	0714488591
6	Solomon Ekuwom	YOUTH	24108775	0748135114

REPUBLIC OF KENYA

MINISTRY OF ENERGY

KENYA OFF-GRID SOLAR ACCESS PROJECT (KOSAP).
ENVIRONMENTAL, SOCIAL SCREENING AND LAND ACQUISITION FOR PROPOSED SOLAR MINI-GRID FOR COMMUNITY FACILITIES, ENTERPRISES, AND HOUSEHOLDS.

SITE ...NAMUKUSE.....

MEETING VENUE.....NAMUKUSE.....

DATE..12/03/2021

PLENARY

LIST OF ATTENDANCE/PARTICIPANTS LIST

No	NAME	Identification number –ID No	Mobile No.	Gender Male/Female	Village	Do you agree to donation of land Yes/no	SIGN.
1.	Caleb Nakaen	26055415	0714377685	M	Namukuse	YES	
2.	JOSEPH EKITELA	12911384	0728866631	M	NAMUKUSE	YES	
3.	PATRICK MORU EKUTAR	21347813	0705446302	M	NAMUKUSE	YES	

4.	GABRIEL	EKUWOM EIPA	12433759	0748135090	M	Engatuny	Yes	
5.	JAMES	LOSIKE NGIKASUKOU	0610964	0718712213	M	Nawoitorong	YES	
6.	Mark	Emaskui Ekunoit	23593193	0717392897	M	ENGATUNY	YES	
7.	HENRY	KANYI	38715198	0769045182	M	ENGAtuny	Yes	
8.	JAMES	ENGOMO LOLIM	30623993	0714488591	M	ENGATUNY	YES	
9.	ALICE	EKALI	28226228	0727535643	F	NAWOKADOU	YES	
10	PULINE	EBWANGAN	33091066	0798846399	F	LOKORKOR	Yes	
11	Nelly	ETABO	34682500	0711681820	F	Makoda	Yes	
12	Roselyne	Asinyen	13041416	0714160788	f	Lopoto	Yes	
13	Loaya	Epuke			F	Nawoitorong	YES	
14	Rebecca	Epuke			F	Engatuny	YES	
15	IRIA	ASOFAR	27812247	0727499726	F	Nawokodou	YES	
16	EDUKAN	LOMOE	4779560		F	Engatuny	YES	
17	Soloman	EKUWOM	24108776	0748135174	M	Nawokodou	YES	
18	Alice	Akeru	22666654		F	Engatuny	Yes	

19	Mary Enge Lotome			F	Nawontorong	Yes	
20	FLORIDA ADIKON	20297829	0799803767	F	Nawoyatir	Yes	
21	Akoom Akimat Koya	4778064	N/A	F	Lokorokor	YES	
22	Kibukakin Akal	—	07 —	F	Nawontorong	YES	
23	Vivian Ayanae	30256335	07 —	F	Nawuytorong	Yes	
24	Scola Ikai	079641164	0711647272	F	Nawokodor	YES	
25	Veronica Akur Eyanae	25864716		F	Nawokodor	Yes	
26	ROSELYNE AKOL	31953048	0792164320	F	Nawoitorong	YES	
27	MARY LORUMAN (ROB)	20322623	0719324782	F	NA —	Yes	
28	Kaliba Justine	36207720	0746651428	M	Lokorkon	Yes	
29	John Esekon	36817045	0746403240	M	Lokorkor	Yes	
30	Samuel Efir	12970760	0723688171	M	Nawoitorong	Yes	
31	Akal Chumale	9006963	0768490287	F	Nawoitorong	Yes	
32	Peter Etabo		0768428681 0742647860	M	Engatuny	Yes	
33	JOHN ELAAR		0790393658	M	Nawokodor	Yes	

3

34	Jackson Lotem	34256690	0701123748[illegible]	M	Lokorokor	Yes	
35	James Kevin	34311774	07	M	Nawoskodou	YES	6 1
36	Joseph Lomenat		0768429536	M	Lokorokor	Yes	
37	Estron Lokalo	4792541		M	Lokorokor	YES	
38	ELIBIT JOHM		076840156[illegible]	M	Lokorokor	YES	N
39	Ikwell Erika	4796513		M	Engatuny	YES	
40	Lowoya Sanya Lomarorai	275173309	0798498351	F	Nawotorong	YES	
41	Ekuwom Tusko	30376861	0798498351	M	Nawotorong	Yes	
42	Erupe Lotome	9336303		F	Nawotorong	YES	
43	Esther Lotiang	28070615		F	Nawotorong	YES	
44	Pamela Elaac	28087537	0704022189	F	Lokorokor	YES	
45	JOSEPHINE LIWAN	28184813	0702947775	F	Nawokodony	Yes	
46	BECKY EKAL		0796588161	F	Nawokody	Yes	
47	EVERINY APUAa			F	Nawokody	Yes	
48	Jocy musee			F	Nawokodo	Yes	

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APPENDIX 5 – NEMA PRACTISING CERTIFICATES

FORM 7 (r.15(2))

nema
mazingira yetu | uhai wetu | wajibu wetu

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY(NEMA)

THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION ACT

ENVIRONMENTAL IMPACT ASSESSMENT/AUDIT (EIA/EA) PRACTICING LICENSE

License No : NEMA/EIA/ERPL/18263

Application Reference No: NEMA/EIA/EL/23929

M/S **Norken International Limited**
(individual or firm) of address
P.O. Box 9882 - 00100 NAIROBI

is licensed to practice in the capacity of a (Lead Expert/Associate Expert/Firm of Experts) **Firm of Experts** registration number **0181**

in accordance with the provision of the Environmental Management and Coordination Act Cap 387.

Issued Date: **12/30/2022** Expiry Date: **12/31/2023**

Signature.....

(Seal)
Director General
The National Environment Management Authority

P.T.O.

ISO 9001:2015 Certified

FORM 7

(r.15(2))

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY(NEMA)

THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION ACT

ENVIRONMENTAL IMPACT ASSESSMENT/AUDIT (EIA/EA) PRACTICING LICENSE

License No : NEMA/EIA/ERPL/18279

Application Reference No: NEMA/EIA/EL/23951

M/S **Isaiah Kegora**
(individual or firm) of address
P.O. Box 860 - 20200 Kericho

is licensed to practice in the capacity of a (Lead Expert/Associate Expert/Firm of Experts) **Lead Expert**

General

registration number **1893**

in accordance with the provision of the Environmental Management and Coordination Act Cap 387.

Issued Date: **12/30/2022**

Expiry Date: **12/31/2023**

Signature.....

(Seal)
Director General
The National Environment Management Authority

P.T.O.

ISO 9001:2015 Certified